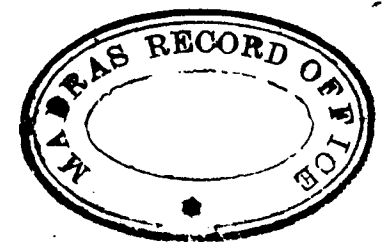


A.S. B. 33

MYSORE-MADRAS CAUVERY ARBITRATION.

16TH JULY 1913 TO 13TH MAY 1914.

Exhibits filed by the Madras Government.



MYSORE-MADRAS ARBITRATION.

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Exhibit Ma. 1.

STATEMENT OF CASE PUT IN BY MADRAS.

I. The Government of Madras refused to assent to the project for the larger reservoir proposed by Mysore chiefly on the ground that the proposals did not provide to any adequate degree for passing down to Madras the water for Madras irrigation to which Madras is entitled by prescriptive right already acquired and actually existing. Further, Mysore have failed to afford to Madras any statement of the discharges past the dam site on which they base their water-supply computations, and in the absence of such statement with full details as to the data on which the discharges are based, Madras is unable fully to investigate the proposals or realize fully to what extent the proposals are calculated to affect Madras irrigation.

II. The proposals put forward by Madras are that the regulation of water in the working of Mysore Reservoir must be such as to give to Madras the whole flow of the river up to the quantities specified below:—

(a) A discharge equivalent to the normal discharge due to a depth of 7 feet of water passing over the Cauvery dam at the Upper Anicut.

(b) This discharge is to be measured on the Cauvery and its tributaries immediately above the waterspread of Kannambadi Reservoir and at a station on the Kabbani river about 40 miles above its junction with the Cauvery.

(c) A right to call for an additional quantity of water not exceeding 350 million cubic feet daily, subject to a maximum in any one year of 4,900 million cubic feet. (This claim is based on existing practice in past years.)

(d) During the south-west monsoon (June to September) an additional 66 million cubic feet daily for the supply of Veeranam tank.

(e) During the south-west monsoon an allowance of 25 per cent. on the flow in Mysore to be made to provide for losses in transmission between Sivasamudram* and the Upper Anicut.

* “ Mysore ” in original. Amended in the course of Proceedings of the 19th July with permission.

III. The rules proposed by Mysore in connection with the working of Mysore Project with a view to giving to Madras the supply to which there exists prescriptive right are noted below:—

(1) With the project as originally sent in with a request for assent of Madras, no rules of regulation were furnished.

(2) Provisional rules for the working of the smaller reservoir (Enclosure to Diwan's No. 11-Camp of 10th May 1912).

(3) Rules proposed by the Diwan at a conference held at Ootacamund on 30th May 1913.

As regards (1), no remarks are called for.

As regards (2), the examination into the working of these rules showed that not only did they altogether fail to secure to Madras the supplies of water to which prescriptive right exists, but they were also unfavourable to Mysore, necessitating passing from Mysore Reservoir water much of which would be inevitably wasted into the sea.

As regards (3), in the absence of statements of daily discharges past the dam site which Mysore have failed to furnish, it is impossible to make an accurate examination of the effect of working of these rules on Madras water-supplies. An examination was, however, made making certain assumptions and using the best figures of discharges available.

The result of such examination showed that, under the rules put forward, the supplies which would be delivered at the Upper Anicut did not amount in quantity to what under existing prescriptive right Madras is entitled. In addition to this it was found that under the proposed system of regulation the daily discharges at the Upper Anicut would be made to fluctuate much more than they do under existing conditions, and this would render regulation more difficult and reduce efficiency and duty of water.

The results of the above examinations were communicated to Mysore with the intimation that the Government of Madras were unable for the reasons given to assent to the system of regulation proposed.

W. M. ELLIS, Col., R.E.,
Representative of the Madras Government.

Exhibit Ma. 1-a.

**ACCOMPANIMENT TO PARAGRAPH III (2) AND (3) OF THE
STATEMENT OF CASE PUT IN BY MADRAS.**

MYSORE-CAUVERY RESERVOIR PROJECT.

(i) Provisional rules defining the method of passing down supplies required for irrigation in the Madras Presidency.

[Enclosure to Diwan's letter No. 11-Camp of 10th May 1912.]

The total flow in the river up to a limit of 26,700 cusecs as measured at the Cauvery dam across the Aganda Cauvery shall be considered as the supply required for irrigation in the Madras Presidency during the irrigation season, viz., from 1st June to 31st January.

2. Any flow in the river in excess of this limit of 26,700 cusecs shall be considered as available for storage in Mysore.

3. From 1st March to 31st May the entire flow in the river shall be available for impounding within Mysore limits.

4. For purposes of calculation, the total river discharge at the Cauvery dam on any day shall be taken as the actual flow at the Cauvery dam on that day plus the quantity impounded in the Mysore Reservoir four days previously. Necessary deductions should be made from this quantity for supplies passed down from the Mysore-Cauvery Reservoir four days previously, for adjusting any excess storage in that reservoir.

5. All excess water impounded in the reservoir above the quantity determined by rules 2 and 4 shall be passed down into the river from day to day.

6. The gauge at each station, that is, the Mysore-Cauvery Reservoir and the Cauvery dam (Upper Anicut), shall be observed twice a day, namely, at 6 A.M. and 6 P.M., and the average taken as the mean rate of discharge for the day.

7. A register of gauge discharges shall be maintained on a printed form for each station.

8. Copies of the record of observations at the Mysore-Cauvery Reservoir dam shall be forwarded from day to day to the Madras Government; similarly, the daily observations at the Bhavani bridge and the Cauvery dam (Upper Anicut) shall be forwarded from day to day to the officer in charge of the Cauvery Reservoir. From the day the reservoir comes into operation, the daily discharges at the Cauvery dam and the Bhavani bridge shall be communicated by telegram to the officer in charge of that reservoir. The charges in this connection shall be borne by the Mysore Darbar.

9. These rules shall be subject to reconsideration by mutual consent between the two Governments at the end of three years from the date the Mysore-Cauvery Reservoir comes into operation.

(ii) Rules proposed by the Diwan of Mysore at a Conference held at Ootacamund on the 30th May 1913.

I. There shall be no impounding on any day at Kannambadi until the supply at Sivasamudram exceeds 12,000 cusecs.

II. The daily discharges at the Upper Anicut shall be telegraphed to Kannambadi and Sivasamudram.

III. The daily discharge at the Upper Anicut, plus the quantity (if any) impounded at Kannambadi three days previously, shall be taken as representing the correct discharge at the Upper Anicut, i.e., what would have been the discharge if there had been no impounding at Kannambadi.

IV. If the quantity reckoned under rule III is less than 2,300 million cubic feet in 24 hours, the whole of the quantity stored shall be sent down from Kannambadi on the same day, unless the Madras authorities desire otherwise and it is possible to hold the water up longer in the Kannambadi reservoir.

V. Any surplus water held up at Kannambadi by the request of the Madras Government, which they do not require on the day that it is due, shall be at their call for a period of seven days.

VI. When the Madras Government consider that they can with safety spare water below 7 feet at the Upper Anicut, they will permit Mysore to impound.

VII. Gauges shall be established before the confluence of the more important tributaries en route and observations shall be telegraphed daily, so that an indication may be afforded to the officer at Kannambadi of the amount which he is likely to be permitted to impound.

Exhibit Ma. 1-b.

Telegram from the Secretary to the Government of India, Public Works Department, to the Joint Secretary to the Government of Madras, Public Works Department (Irrigation Branch), dated Simla, the 5th July 1913, No. 981 I.

Your telegram 4 of third. Precise terms of reference will be settled by Arbitration Committee on spot. Nethersole reaches Ootacamund 15th instant.

Exhibit Ma. 1-c.

Conditions of Arbitration.

I am instructed by my Government to strongly protest against the conditions under which the enquiry is to be carried on as defined in the Diwan's letter of 17th July to the Arbitrator.

One of the conditions of arbitration agreed upon by each side was to have a representative (an Engineer appointed by his Government) to put forward the case on behalf of that Government.

It is submitted that, under the conditions proposed by Mysore, these conditions are not fulfilled and the Mysore Government is only represented by written statements signed by a Secretary to that Government.

The Chief Engineer, Mysore, is not a representative of his Government but merely a technical explainer, and even in this capacity his Government are empowered under the terms to repudiate his explanation or any admission he may make. Under such conditions it will be necessary to ask for adjournment of the sitting for confirmation by Government of every important explanation—justification or admission given.

Under such conditions a representative is almost useless and it is clear why Mysore did not send one.

It is submitted that the intention of the Government of India is that the Engineer representative shall be a "real representative" and that his statement, written or oral, shall be binding on his Government.

When the representative is in doubt as to the views of his Government, it is open to him to ask for time to ascertain these, but to carry on an enquiry in which every statement, oral or written, of the representatives on both sides may be repudiated involves interminable delay and will protract proceedings unduly.

I am, however, instructed that, if it is decided that the conditions enunciated by the Diwan are approved by the Arbitrator, the same conditions shall be accepted as applying to the representative of the Madras Government.

21st July 1913.

W. M. ELLIS, Col., R.E.,
Representative of the Madras Government.

Exhibit Ma. 1-d.

I have received instructions from my Government to submit that this Government have put in a brief statement of their claims as regards water-supply and justification of their refusal to assent to the construction of the Mysore larger project.

It is on account of failure to come to terms on these matters that this Arbitration Court is appointed.

I am instructed with all respect to submit that, before proceeding further, Madras are entitled to claim from Mysore—

First, a reply to Madras statement already put in, saying how much of the claim advanced it admits.

Second, a clear statement of the rules of regulation which Mysore now propose as suitable for satisfying the admitted rights of Madras as regards water-supply.

In this connection it is useless to say that they consider the water should be measured at the Upper Anicut, as the dam must be the place of final issue and regulation, and Mysore must, it is submitted, state clearly by what means they propose to effect such regulation. Two sets of rules have already been advanced by Mysore to both of which Madras take exception and refuse assent. These are attached to the Madras statement of the case. This Government claim to know which of these sets of rules is now advanced by Mysore or in alternative what new proposals are put forward. Until this is known, a detailed statement of Madras objections to the Mysore Project cannot be formulated and no further advance can be made. The proposed terms of reference made by Mysore further indicates that their case is to be based on an interpretation of the Agreement of 1892 that the rights of Madras therein mentioned are those actually in existence when the agreement was entered into.

The interpretation put on the agreement by Madras is that the rights alluded to are those actually in existence at the time when sanction to the proposed work was asked for, and this has been intimated to Mysore.

If Mysore claims a different interpretation, it is claimed that this should be clearly stated in the statement of the Mysore case.

I am further instructed to claim the right of rejoinder after the Mysore statement of case is put in. Madras are now in ignorance of what Mysore claims, they have refused assent to the project as advanced by Mysore and the proposed rules of regulation advanced by them and hitherto all considerations and arguments used have been based on existing rights and not on rights existing when the agreement was come to.

Should new proposals be put forward by Mysore or a new reading of the meaning of the agreement, it will be clear that the Madras statement of the case put in as a rejoinder to the new claim put forward by Mysore may take the form of an alternative statement of our demands.

Under instructions from my Government, I therefore claim the right, after seeing Mysore claims, to put in a fresh statement of the case.

I am instructed to respectfully ask that after this stage the issues should be framed, after which it will be for Madras or Mysore to open the argumentative aspect of their case and produce evidence and arguments in support of the claims which they have advanced.

W. M. ELLIS, Col., R.E.,
Representative of the Madras Government.

21st July 1913.

Exhibit Ma. 1-e.

Information required from Mysore.

I. Statements of daily discharges at Kannambadi for the period for which discharges are available at Chamraj anicut and Sriramadivar dam.

The various items which are components of these discharges under the following separate heads and working up to the total discharges in million cubic feet :—

- (a) Discharge over or through Chamraj anicut.
- (b) Discharge into irrigation channels drawing off above the anicut if included in total.
- (c) Discharge over and through Sriramadivar dam.
- (d) Discharge into irrigation channels drawing off above the dam if included in total.
- (e) Allowance for run-off from Lakshmanathirtha catchment.
- (f) Allowance for run-off of catchments between the above anicuts and Kannambadi.
- (g) Total daily computed discharges past Kannambadi in million cubic feet.

Full details enabling complete check to be made of the amounts entered under (c) and (f) should be given.

Details as regards daily discharges of anicuts and channels have already been furnished.

In the event of Mysore not having the information available as regards daily discharges, information regarding half-monthly discharges in the above form should be given at a very early date, with reasons for not furnishing daily discharges.

II. (a) A description of the Halhalli anicut on the Kabbani with site plan showing length and shape in plan of the anicut and position of any gauges above or below.

(b) A few cross-sections of the anicut sufficient to show the character of the work—on these cross-sections should be marked the water-level above and below the anicut of the highest flood of which record of such levels exists.

(c) A statement of all the gauge-readings which have been taken at this anicut with dates of reading and detail of level of zero of gauge with respect to anicut crest and position of gauge on site plan.

III. A statement of any readings available of any gauges in the river in connection with Chickdevarayasagar dam with dates of reading. A site plan or sketch plan with dimensions showing lengths of different parts of this anicut should be sent and a few typical cross-sections of the dam showing river-bed level above and below the work of the maximum flood of which there is record.

The crest level, or, if varying levels, of various parts of the anicut with length at each level should be stated and the level of the zero of each gauge with reference to the crest level given.

If any discharges of the Cauvery past this place have ever been calculated and results are available, these discharges with dates should be furnished. It is noted that the conditions of the anicut are such that accurate discharges cannot be computed, and this will be noted as regards any discharges furnished.

IV. A map showing for the Cauvery and its tributaries in Mysore, the distribution and approximate areas of all irrigation fed from the Cauvery and its tributaries either direct by channels or by tanks fed by channels having their head in the Cauvery. The distribution shown need only be approximate and need not be drawn to scale.

The statement of areas made on the map or in an attached statement should be materially correct, that is, based on the best information readily available.

On the map the position and names of any channels feeding the irrigation should be shown and the position and names of any anicuts or dams serving such a purpose.

V. All the above information has already been asked for, and in respect to items I to III replies have been received of an evasive or incomplete nature, and the information is therefore sought through the Arbitrator.

It is asked that any part of the information asked which is available should be furnished at once without delaying to supply items or particulars involving delay.

As regards item I in particular, it is asked that if daily discharges have not been computed half-monthly discharges should be furnished, with full details as regards methods of computation.

If half-monthly discharges are not available, discharges for the shortest periods computed should be furnished.

So far only yearly discharges have been furnished in response to repeated enquiry for daily discharges, and even with these the methods of computation are not explained in such a way as to permit of any check or critical examination.

21st July 1913.

W. M. ELLIS, Col., R.E.,
Representative of the Madras Government.

Exhibit Ma. 1-f.

Note.

Copies of Triennial Revenue Reports (Irrigation Branch) ending with 1901-1902 and with 1904-1905, were handed over to the Mysore Representative with reference to paragraph (d) of his statement of information required from Madras, dated 22nd July 1913.

26th July 1913.

H. D. GRIFFIN.

Exhibit Ma. 2.

To

Sir H. D. GRIFFIN.

The Rules and Agreement of 1892 with Mysore which are signed by the Mysore Representative with attachments are herewith returned. The rules do not in all particulars agree with the Madras version. The chief difference is under rule II. The Madras version has "fifteen" not "thirteen" main rivers and omits the words "minor" and "major" before "streams."

In the list of minor streams, Schedule B, the remarks under item IV 11 and item IV 16 are not the same in both versions.

2. The memorandum by the Diwan, Mysore, dated 7th September 1899, which is attached to the Mysore copy of the rules and which defines the object and scope of the rules, does not appear to have been communicated to Madras and appears to be merely the expression of opinion of a former Diwan of Mysore.

The checking of the agreement and searching of files has taken some time and hence the delay in sending on the papers.

I send a signed copy of the Madras version of the agreement.

26th July 1913.

W. M. ELLIS, Col., R.E.,
Representative of the Madras Government.

ENCLOSURE TO MA. 2.

Rules defining the limits within which no new irrigation works are to be constructed by the Mysore State without previous reference to the Madras Government.

I. In these rules—

(1) "New irrigation reservoirs" shall mean and include such irrigation reservoirs or tanks as have not before existed, or, having once existed, have been abandoned and been in disuse for more than thirty years past.

(2) A "new irrigation reservoir" fed by an anicut across a stream shall be regarded as a "New irrigation reservoir across" that stream.

(3) "Repair of irrigation reservoirs" shall include (a) increase of the level of waste weirs and other improvements of existing irrigation reservoirs or tanks, provided that either the quantity of water to be impounded, or the area to be irrigated, is not more than the quantity previously impounded, or the area previously irrigated, by them; and (b) the substitution of a new irrigation reservoir for and in supersession of an existing irrigation reservoir but in a different situation, or for and in supersession of a group of existing irrigation reservoirs, provided that the new work either impounds not more than the total quantity of water previously impounded by the superseded works, or irrigates not more than the total area previously irrigated by the superseded works.

(4) Any increase of capacity other than what falls under "Repair of irrigation reservoirs" as defined above shall be regarded as a "New irrigation reservoir."

II. The Mysore Government shall not, without the previous consent of the Madras Government, or before a decision under rule IV below, build (a) any "New irrigation reservoirs" across any part of the fifteen main rivers named in the appended Schedule A, or across any stream named in Schedule B below the point specified in column 5 of the said Schedule B, or in any drainage area specified in the said Schedule B; or (b) any "new anicut" across the streams of Schedule A, Nos. 4 to 9 and 14 and 15, or across any of the streams of Schedule B, or across the following streams of Schedule A, lower than the points specified hereunder:—

Across 1. Tungabhadra—lower than the road crossing at Honhalli,
" 10. Cauvery—lower than the Ramaswami anicut, and
" 13. Kabani—lower than the Rampur anicut.

III. When the Mysore Government desires to construct any "New irrigation reservoir" or any new anicut requiring the previous consent of the Madras Government under the last preceding rule, then full information regarding the proposed work shall be forwarded to the Madras Government and the consent of that Government shall be obtained previous to the actual commencement of work. The Madras Government shall be bound not to refuse such consent except for the protection of prescriptive right already acquired and actually existing, the existence, extent and nature of such right and the mode of exercising it being in every case determined in accordance with the law on the subject of prescriptive right to use of water and in accordance with what is fair and reasonable under all the circumstances of each individual case.

IV. Should there arise a difference of opinion between the Madras and Mysore Governments in any case in which the consent of the former is applied for under the last preceding rule, the same shall be referred to the final decision either of arbitrators appointed by both Governments or of the Government of India.

V. The consent of the Madras Government is given to new irrigation reservoirs specified in the appended Schedule C, with the exception of the Srinivasasagara new reservoir across the Pennar, the Ramasamudram new reservoir across the Chitravati and the Venkatesasagara new

reservoir across the Papaghni. Should, owing to the omission of the Mysore Government to make or maintain these works in a reasonably adequate standard of safety, irrigation works in Madras, themselves in a condition of reasonably adequate safety, be damaged, the Mysore Government shall pay to the Madras Government reasonable compensation for such damage.

As regards the three new reservoirs excepted above, the admissibility of any compensation from Mysore to Madras on account of loss accruing to Madras irrigation works from diminution of supply of water caused by the construction of the said works will be referred to the Government of India whose decision will be accepted as final, and should such compensation be decided to be admissible, the decision of the Government of India as to the amount thereof will be accepted, after submission to them of the claims of Madras which would be preferred in full detail within a period of five years after the completion of said works.

VI. The foregoing rules shall apply, as far as may be, to the Madras Government as regards streams flowing through British territory into Mysore.

SCHEDULE A.

Main rivers.	Remarks.
1. Tungabhadra .. .. .	.....
2. Tunga	Tributary of Tungabhadra.
3. Bhadra	Do.
4. Hagari or Vedavati	Do.
5. Pennar or Northern Pinakini .. .. .	.....
6. Chitravati	Tributary of Pennar or Northern Pinakini.
7. Papaghni	Do. do.
8. Palar .. .. .	.....
9. Pennar * or Southern Pinakini .. .. .	.....
10. Cauvery .. .. .	.....
11. Hemavati	Tributary of the Cauvery.
12. Lakshmantirtha	Do.
13. Kabani	Do.
14. Honhole (or Suvarnavati)	Do.
15. Yagachi, up to the Belur bridge	Tributary of the Hemavati.

*Known as the "Ponnar" in Madras.

SCHEDULE B.

A LIST of the minor streams and catchments in Mysore territory on which no new irrigation reservoirs are to be built within the limits specified without previous reference to the Madras Government.

Serial numbers in Schedule A.	Drainages.	Serial numbers on map.	Minor branches.	Defined limit on a stream below which, or defined drainage area within which, no new irrigation reservoirs are to be built without previous reference to Madras Government.	Distance from frontier as measured up the stream (approximate).	Remarks.
1	2	3	4	5	6	7
I	Tungabhadra ..	(a)	Charodi or Kumadvati.	Up to the bridge on this river on Honnali-Shikarpur road.	10 miles ..	....
		1	Sulikere-halla ..	The bund of Sulikere tank	46 do. ..	The Sulikere tank seldom discharges. This stream joins the Tungabhadra in Mysore territory.
		2	Sagali-halla ..	Up to the boundary line of the Channagiri taluk.	40 do. ..	About this point there are numerous existing tanks, and the run-off from these smaller catchments are of no appreciable importance to floods in the Tungabhadra river.
		3	Sarati-halla ..	As far as the boundary line of the Kakkargola and Avargola villages.	9½ do. ..	A stream of insignificant importance to floods in the Tungabhadra river. This stream joins the Tungabhadra river in Mysore territory.

SCHEDULE B—cont.

Serial numbers in Schedule A.	Drainages.	Serial numbers on map.	Minor branches.	Defined limit on a stream below which, or defined drainage area within which, no new irrigation reservoirs are to be built without previous reference to Madras Government.	Distance from frontier as measured up the stream (approximate).	Remarks.
1	2	3	4	5	6	7
I	Tungabhadra —cont.	4	Branch of Sarati-halla from east.	Up to Kadaji tank bund..	16½ miles ..	Catchment above the Kadaji tank small and insignificant.
		5	North Hagari ..	Up to boundary of Chital-droog taluk.	12½ do.	There are no existing Madras works on this branch of the Tunga-bhadra.
		6	Branch of Hagari	Up to Anaji tank bund ..	10 do.	No existing Madras works on this stream before it joins the North Hagari.
		7	Sokke-halla ..	Up to the Hoskere tank bund.	9 do.	Catchments above Hoskere and Kyasenhalli tanks very small and insignificant.
		8	Branch of Sokke-halla.	Up to the Kyasenhalli tank bund.	9 do.	This is an outlying bit of Mysore territory in latitude 14-55'; longitude 76-38'.
		9	Jiganhalli tank (Madras) catchment.	The whole of the outlying bit of Mysore territory which drains into this Madras tank.	..	There are existing Madras tanks below, and the whole area which drains into such tanks is included.
		10	Anantapur tank (Madras) catchment.	The whole of the area of the extreme northern portion of the Molakalmuru taluk in Mysore which drains northwards into the Anantapur (Madras) tank catchment.	..	
		11	Chinna-Hagari..	Up to where the stream crosses the frontier near Rangaiyandroog.	16 miles ..	This stream joins the main river about 8 miles beyond the frontier. Affects the supply to Madras tank below.
		12	Sherikola-halla or Nagalapura tank (Madras) catchment.	The whole catchment area in Mysore territory.	..	
		13	Rangasamudram tank (Madras) catchment.	The whole area of catchment of the tank in Mysore territory.	..	The stream from this catchment leaves Mysore territory in latitude 14-37'-50" and longitude 76-48'-30".
IV	Vedavati or Hagari.	14	Yeradkere tank (Madras) catchment.	Do. do.	..	The Yeradkere in Madras is on latitude 14-30'; longitude 76-57'-30".
		15	Main stream of the taluk drainage.	Up to the bridge over this stream on the Salem-Bollary road.	16½ miles ..	The road is a convenient point for a limit. This stream joins the Vedavati river within Mysore limits.
		16	Main stream of the Doderi drainage.	Up to the boundary of the Hosahalli village.	17½ do. ..	Latitude 14-21'; longitude 76-49'. This stream joins the Vedavati river within Mysore territory.
		17	Virapsamudram and Amarapur tank (Madras) catchments.	The whole area of catchment of this series in Mysore territory.	..	This area represents a large proportion of the Pavagada taluk of Mysore.
		18	Mulkalkara tank (Madras) catchment.	Do. do.	..	This Madras tank is situated in latitude 14-8'; longitude 77-26'-20".
V	Pennar or Northern Pinakini.	19	Ruddam tank (Madras) catchment.	Do. do.	..	A considerable area in the north of the Maddagiri taluk of Mysore is on this catchment.
		20	Virapsamudram tank (Mysore) catchment.	Do. do.	..	This terminal tank is in south-east corner of the Pavagada taluk of Mysore, but there are some Madras tanks above in the Madakasira Tahsildari. The catchment excluded from Mysore operations is chiefly in the north of the Maddagiri taluk.
		21	Purghi tank (Madras) catchment.	Do. do.	..	The catchment excluded from Mysore operations is in the north of the Maddagiri taluk.
		22	Jayamangali river.	Up to its junction with the Garudaahala stream.	28 miles ..	The river above this point is of minor importance to Madras.

SCHEDULE B—cont.

Serial numbers in Schedule A.	Drainages.	Serial numbers on map.	Minor branches.	Defined limit on a stream below which, or defined drainage area within which, no new irrigation reservoirs are to be built without previous reference to Madras Government.	Distance from frontier as measured up the stream (approximate).	Remarks.
1	2	3	4	5	6	7
V	Pennar or Northern Pinakini —cont.	23	Suvarnamukhi branch of Jayamangali.	Up to site of Rampur anicut.	25 miles ..	Joins the Jayamangali a few miles below this point.
		24	Kumadvati ..	Up to site of anicut feeding the Kodagatur and Gundagal tanks in Mysore.	9½ do. ..	This stream joins the Pennar on the Mysore frontier.
		25	Chaulur tank (Madras) catchment.	The whole direct catchment of this tank in Mysore territory.	..	This Madras tank is on the west bank of the Pennar just outside Mysore territory.
		26	Western or Thondebhavi branch of the Pennar or N. Pinakini.	Up to its source	27 to 30 miles.	....
		27	Central or Varvani branch of the Pennar or N. Pinakini.	Do.	25 miles ..	....
		28	Hindupur tank (Madras) catchment.	The whole area of catchment of this series in Mysore territory.	..	An important and large area of the Goribidnur taluk is here excluded from Mysore operations in a part where water for irrigation is much appreciated.
		29	Kushavati stream (Bukkapatna tank catchment in Madras).	Up to site of Daparti anicut.	10½ miles ..	The large Gudibanda tank in Mysore and the 20 smaller tanks above impound a very large proportion of the upper catchment already.
		30	Chitravati catchment (Bukkapatna tank catchment).	The whole area to the north of the Chelur-Bagenhalli road.	..	This portion of the Chitravati catchment being more hilly and barren, the run-off is greater than in the more cultivated and level catchment to the south of the Chelur-Bagenhalli road.
VI	Chitravati ..	31	Vadnaman-halla.	Up to Naremadipalli tank.	9½ miles ..	No Madras works affected up to the junction of this stream with the Papaghni river.
		32	Guntipalli tank (Madras) catchment.	The whole area of catchment in Mysore territory.	..	This Madras tank is situated just above the large Vyasaamudram tank.
		33	Sadam tank (Madras) catchment.	The main stream up to its source.	17 to 18 miles.	This Madras tank, the waterspread of which is partly in Mysore territory, drains into the Papaghni river just above the Vyasaamudram tank.
		34	Kotagal branch of the Papaghni	Up to Kotagal tank ..	Do.	The catchment above Kotagal tank is comparatively small and unimportant with numerous small tanks already on it.
		35	Tippasamudram tank (Madras) catchment.	The Marasanpalli-Digavakota stream up to Digavakota Pathacheruvu tank; and the Marasanpalli-Gundedu stream up to Gundedu tank.	9½ miles ..	These are the only two important streams on this catchment, and above these terminal tanks there are a large number of small tanks on the small drainages.
		36	Rangasamudram tank (Madras) catchment.	Adgal stream up to Adgal-Vasantanayikankere tank.	6½ do. ..	These terminal tanks are only situated from 4 to 5 miles from the watershed of the Palar.
VII	Papaghni river.	37	Kurigeipalli branch stream up to the Kurigeipalli tank.	Kurigeipalli branch stream up to the Kurigeipalli tank.	4½ do. ..	The Kurigeipalli tank is only 4 miles from the watershed and there are some 18 small tanks above it.

SCHEDULE B—cont.

Serial numbers in Schedule A.	Drainages.	Serial numbers on map.	Minor branches.	Defined limit on a stream below which, or defined drainage area within which, no new irrigation reservoirs are to be built without previous reference to Madras Government.	Distance from frontier as measured up the stream (approximate)	Remarks.
1	2	3	4	5	6	7
VIII	Palar river	37	Nangli (Mysore) tank drainage.	Main stream up to its source.	17½ miles	There are 12 Mysore tanks situated on this main stream.
		38	Shettikal (Mysore) tank drainage.	Do. do.	10 do.	There are about 5 existing Mysore tanks and 1 breached tank on this main stream.
		39	Malinayakanhalli (Mysore) drainage.	Do. do.	6½ do.	There are 4 existing Mysore tanks on this main stream.
		40	Vegmadgu (Mysore) drainage.	Do. do.	7 do.	There are 4 existing Mysore tanks on this main stream.
		41	Tallur tank (Mysore) drainage.	Do. do.	23 do.	There are 10 Mysore tanks on this important branch of the Palar, the terminal tank being 12½ miles from the frontier.
IX	Peenar * or South Pinakini.	42	Verushuvatti river.	Main stream up to Koppa (or Kuppam) tank.	16 do.	There are 76 tanks above the Koppa tank which is only some 12 miles from the watershed.
		43	Budikote stream.	Main stream up to Thimmanayakanhalli tank.	21 do.	There are 146 tanks above this terminal tank which is only about 12 miles from the watershed.
		44	Masti catchment.	The whole area of catchment in Mysore territory.	..	About 45-40 square miles in area in which there are 63 tanks in existence.
		45	Kadgodri drainage.	Main stream up to its source.	36 miles	There are 10 Mysore tanks on this main stream now in use, most of them of large size.

* Known as the "Pooniar" in Madras.

SCHEDULE C.

A LIST of works already in progress, and which are to be allowed to be completed, although they would be barred by the proposed rules for restriction of Mysore operations.

Serial number in Schedule A.	Main river drainage.	Serial number of stream or catchment in Schedule B.	Name of work in progress.	Date on which work was sanctioned.	Amount of estimate in rupees.	Expenditure incurred to end of March 1891.	Descriptive remarks.
1	2	3	4	5	6	7	8
I	Tungabhadra.	..	....	..	..	..	No works in progress on these catchments which are affected by the proposed rules submitted to Madras.
II	Tunga	..	....	..	..	..	
III	Bhadra	..	....	..	..	..	The estimate provides for raising the weirs by 2 feet and increasing capacity from 107 to 163 units. Work in abeyance owing to objection raised by Madras Government. But it is not intended to irrigate more than the area of land (189 acres) assessed as wet by the Revenue Survey.
IV	Hagari or Vedavati.	17	Restoration of the Arsikere-Hampiandurga tank.	May 1889..	4,262	..	
		17	Restoration of the Arsikere-Gujjarappankere tank.	May 1889..	3,582	..	The estimate provides for raising the weir by 1 foot and to increase the capacity from 149 to 186 units. The raising of the weirs by 1 foot will not do more than compensate for the silting up of the bed for years.

SCHEDULE C—cont.

Serial number in Schedule A.	Main river drainage.	Serial number of stream or catchment in Schedule B.	Name of work in progress.	Date on which work was sanctioned.	Amount of estimate in rupees.	Expenditure incurred to end of March 1891.	Descriptive remarks.
1	2	3	4	5	6	7	8
V	Peenar or Northern Pinakini.	Main stream.	New Reservoir (Srinivasasagara) across the river near Kottagrabaili.	July 1888.	99,206	66,696	This new masonry dam with earthen bund on flanks is two-thirds completed. No Madras works affected. The capacity of the tank will be 610 units, and it is intended to irrigate 80 or more acres. This work is referred to by Colonel H. Smalley, R.E., in his No. 674, dated 10th June 1890, to Chief Engineer for Irrigation, Madras.
			28 Restoration and improvement of Myalya tank.	Sept. 1887.	(Original estimate) 14,452 (Revised estimate) 17,168	..	The capacity was increased from 95 units to 318 units, and the work is nearing completion. This tank is on the Hindupur (Madras) tank catchment, but only has a catchment of 38-80 square miles of its own.
			28 Raising the weirs of the Mahamalesvara tank.	Sept. 1890.	3,165	865	This is a small tank above the Myalya noted above. The estimate provides for increasing the capacity of the tank from 62 to 102 units, the former capacity having proved insufficient to irrigate the 198 acres of assessed wet lands. No increased area of irrigation is provided for. The total catchment above this tank is only 3 square miles.
			28 Restoring the Manivala tank.	Feb. 1889.	4,094	2,860	The tank weir is to be raised 2 feet, and capacity increased from 139 to 211 units, but only in order to impound sufficient water to irrigate the tank's original atchkat of 350 acres.
			30 New Reservoir (Kanasamudram) near Periyasandra.	May 1888.	75,077	51,824	This reservoir is noticed by Colonel H. Smalley, R.E., in his No. 674, dated 10th June 1890, to Chief Engineer for Irrigation. It is to have a capacity of 1,207 units to irrigate 1,200 acres. The catchment area above the tank is 47-61 square miles.
VII	Papaghni river.	Main stream.	Restoration of the Malsandra-Rachevar tank.	Dec. 1883.	4,742	4,724	Weirs of the tank were raised 2 feet, increasing the capacity from 106 units to 159 units. It is not intended to increase the area originally irrigated, 258 acres. The capacity of the tank is even now insufficient unless the tank fills 1½ times in the year. Work is nearly completed.
			New Reservoir (Venkatesasagara) near Devaganhalli.	June 1888.	60,985	28,423	This work is noticed by Colonel H. Smalley, R.E., in his No. 674, dated 10th June 1890, to Chief Engineer for Irrigation. The tank will impound 517 units as designed, and will perhaps irrigate 750 acres if it fills 1½ times. The catchment above the tank is 61 square miles.

SCHEDULE C—cont.

Serial number in Schedule A.	Main river drainage.	Serial number of stream or catchment in Schedule B.	Name of work in progress.	Date on which work was sanctioned.	Amount of estimate in rupees.	Expendi- ture incurred to end of March 1891	Descriptive remarks.
1	2	3	4	5	6	7	8
II	Papaghni river—cont.	Main stream.	Restoring the Buradagunte anicut, chan- nel and tank.	Dec. 1888.	25,575	17,350	This work consists in (1) building a masonry anicut with the usual earth flank bunds across the main stream, (2) restoring the old channel therefrom, and (3) restoring the Burada- gunte Timmasani tank and increasing its capacity from 111 units to 167 units. This project is also noticed by Colonel Smalley in his report No. 674, dated 10th June 1890.
			Restoring the Timmasanaya- kanhalli Agrahar tank.	Aug. 1888.	16,776	13,234	Noticed also in Colonel Smalley's letter above quoted. This is a restora- tion of an old breached tank 26 miles up the main stream and 2 miles above the Chin- tamani-Bagerhalli road. The tank is to impound 240 units and irrigates 250 acres as against its original atchkat (irrigable area) of 330 acres as per Revenue Survey maps. Work is nearing completion.
		35	Restoring Kote- kallur tank.	April 1888.	6,564	5,690	This project consists in the restoration of a tank which breached in 1874, and for increasing its capacity from 25 to 80 units. It is 6 miles from the frontier on the Tippasamudram (Madras) tank catchment.
VIII	Palar river	37	Restoring the Byatnur Naga- varu tank.	Sept. 1888	11,300	8,102	This is the terminal tank of the series. The capacity being increased from 152 to 320 units, it is only intended to irrigate the original area of 365 acres included in the atchkat.
		37	Restoring Ma- randhalli tank.	March 1886. Revised estimate in July 1888.	5,345	5,254	The project provides for raising the weirs 3 feet and increasing the capacity from 121 to 186 units, to irrigate perhaps 250 acres. Work is nearing comple- tion.
		41	Restoring Jagal- kashti-Dodkere tank.	April 1888. Revised estimate in January 1890.	7,246	7,210	Project provides for raising the weirs 3 feet and in- creasing capacity from 50 to 107 units. Work is nearly completed. No Madras works affected.
IX	Pennar * or Southern Pinakini.	Main stream.	Restoring Bha- dram tank.	April 1888.	21,689	15,033	The project provides for rais- ing the weirs of this tank by 3 feet and increasing the capacity from 701 units to 1,225 units. The work to the tank itself is nearly completed and only channels have now to be extended.
		44	Restoration of Santehalli tank.	Nov. 1889.	7,480	4,076	This tank is in the Maati catchment. The weirs are to be raised 3 feet and capacity increased from 93 to 164 units. No Madras works are affected.

* Known as the "Ponniar" in Madras.

Exhibit Ma. 3.

REPLY OF THE MADRAS GOVERNMENT TO THE STATEMENT OF THE MYSORE CASE PRESENTED BY MYSORE TO THE COMMITTEE OF ARBITRATION ON THE 21st JULY 1913.

[NOTE.—The parts and paragraphs referred to are those in the Mysore case.]

PART I.—PRELIMINARY.

Paragraph 1.—The Mysore Darbar gave a distinct undertaking in letter No. 347-Pol., dated 26th October 1911, from the Diwan (copy attached), that the fact of the Darbar having built a dam of wider foundations than is necessary for the small reservoir of 11,030 million cubic feet capacity, shall not be brought forward in any future discussion as an argument for the construction of a larger reservoir. It is therefore submitted that the last sentence of this paragraph is entirely irrelevant and is introduced merely as a topic of prejudice.

PART II.—PRESCRIPTIVE RIGHTS OF MADRAS.

Paragraphs 3 and 4.—In the correspondence on the subject the discussion has hitherto been confined to the quantity of water which Madras required under the conditions existing in 1910, but the Madras Government accept the statement that they are entitled to the quantity to which in 1910 they had a prescriptive right.

Under this admission of the Darbar, Madras have a right to a larger quantity than they claimed originally and they now put forward the following as their claim in lieu of that given in paragraph II of Exhibit Ma. 1:—

"II. The proposals put forward by Madras are that the regulation of water in the working of the Mysore Reservoir must be such as to give to Madras yearly throughout the period, June to February (inclusive), the whole flow of the river up to the quantities specified below:—

"(i) A discharge in the Aganda Cauvery at the Upper Anicut sufficient to secure a flow over the Cauvery dam of a depth of 7 feet, under the conditions existing prior to the remodelling of the Upper Anicut between 1899 and 1902.

"(Note.—Such discharge under normal conditions is computed as equivalent to 2,989 million cubic feet in 24 hours made up of 2,300 million cubic feet passing over the Cauvery dam and 689 million cubic feet passing over the old Upper Anicut under the conditions of that work before remodelling.)

"(ii) This discharge to be measured on the Cauvery and its tributaries, immediately above the waterspread of Kannambadi Reservoir, and at a station on the Kabbani river about forty miles above its junction with the Cauvery.

"(iii) During the south-west monsoon (June to September) an allowance of 25 per cent. on the flow in Mysore to provide for losses in transmission between Sivasamudram and the Upper Anicut.

"(iv) During the period, March to May inclusive, a supply of not less than 900 cusecs passed without interruption through the left branch of the river at Sivasamudram."

Under the conditions on which the above claims are formulated, the supply of the Veeranam tank and the Lower Anicut System is secured and no separate claim on this account is made, and the claim previously made under (II) (c) based on the actual existing practice is waived.

The Madras Government do not admit that the second part of paragraph 4 correctly represents the extent of their prescriptive rights. This is in no way limited to the actual extent of land irrigated, or amount of water used, in the three years before and three years after 1890.

PART III.—REQUIREMENTS OF MADRAS IRRIGATION.

Paragraph 5.—This is not a complete statement of Madras claims which are now formulated in the reply to Mysore, paragraphs 3 and 4 above.

Paragraph 6.—The fact of the rare occurrence of a flow reaching the limit claimed in certain months, is no argument for depriving Madras of that limit flow when it is received.

Short freshes in the months of low supply have frequently been of the greatest service in saving the irrigated area from severe loss.

The prescriptive right of Madras during the months mentioned is to the whole flow of the river up to the limit claimed, and for this claim there is full justification, and proof of actual use and enjoyment can be adduced.

In the months of November and December a flow over the Cauvery Dam at the Upper Anicut up to, or exceeding, the limit depth claimed, has been realized on 64 days in the twenty years considered (1890 to 1909). It is thus not correct to say that the depth was "rarely ever reached."

Madras is entitled by prescriptive right to the limit flow claimed whenever available.

Paragraph 7.—The accuracy of the statement made in the first two lines is denied. The statement in the last sub-paragraph is also denied, and the record of discharges of the Cauvery dam fully supports such denial.

In the paragraph quoted from the Madras Cauvery Project Report, there is an error in the original, and "one foot" at the end of the fifth line of the quotation should be altered to "two feet."

Paragraph 8.—The Government of Madras do not admit that a claim for a certain maximum is untenable because the average is much below the maximum.

If the maximum were lowered, the average would also fall, and the fact that the average in certain months is very low furnishes an argument for raising, not for reducing, the maximum.

The contention of Mysore that the supply of water to Madras should be restricted to, or regulated by, the fortnightly averages is entirely fallacious.

Paragraph 9.—The Government of Madras do not admit that their claims should be reduced in periods when the river supply is normally low; the fact that the limit of high supply flow is seldom available in certain months is not a valid reason for depriving Madras of the enjoyment of such a flow, when it does come.

The Government of Madras do not admit that the harvest extends from September to February.

As regards allowances for rainfall, it was found impossible in connection with the Madras Cauvery Reservoir Project to frame any rules for making allowances for rainfall in the irrigated area.

This area is two days' flow from the site of the Metur Cauvery dam, and another day is required to pass the water on to the fields; the site of the Mysore Reservoir is double the distance of the proposed Madras Reservoir from the Cauvery dam.

The collection and transmission of rainfall statistics would take one day; six days would therefore elapse between the fall of rain and the time when the reduced supplies of water to be passed in consequence of the rainfall would reach the irrigated area. It is considered impracticable to frame rules for allowing a reduction in issue at the Mysore Reservoir in consequence of rainfall in the irrigated area.

Paragraph 10.—The table given in paragraph 8 of the Mysore statement is reproduced below with an additional column (No. 5) showing the depth of flow obtained half-monthly by increasing the allowances made for the Metur Reservoir (shown in column 4) by 30 per cent.

The Madras Government note with satisfaction the reasonable admission made by Mysore, that an addition of 25 to 30 per cent. in the quantities of water provided for in the Madras Reservoir Project (as shown in column 4) should be made on account of the uncertain and fluctuating nature of the supplies under a system of direct flow, and accept this admission which, it is hoped, will prove a great step towards a settlement of the matter.

Table from Mysore case with column 5 added.

Months.		Average depths corresponding to average fortnightly discharge.	Average depths corresponding to maximum fortnightly discharge.	Average depths now proposed by Madras in connection with their new project.	Depths representing discharge 30 per cent. more than those of column 4.
1		2	3	4	5
June	1st half	3.5	5.4	2.9	3.5
	2nd half	5.1	6.4	2.9	3.5
July	1st half	5.7	7.0	6.1	6.8
	2nd half	6.4	7.0	6.1	6.8
August	1st half	6.6	8.0	5.9	6.6
	2nd half	6.0	7.0	5.9	6.6
September	1st half	5.6	6.7	5.8	6.5
	2nd half	5.2	6.4	4.7	5.1
October	1st half	5.4	6.9	5.0	5.5
	2nd half	5.4	6.6	4.2	4.7
November	1st half	5.0	6.6	3.8	4.3
	2nd half	4.4	6.5	3.8	4.3
December	1st half	3.9	6.1	3.0	3.6
	2nd half	3.0	5.1	1.7	2.0
January	1st half	2.5	4.6	2.1	2.5

The total quantity of water representing the flow at depths shown in column 5 has been worked out to be 255,628 million cubic feet in the period 1st June to 15th January, as compared with the total of average flow, according to column 2, of 250,055 million cubic feet.

Thus, the average flow of the past twenty years, actually realized under the rules of regulation in force during the period, is between 25 and 30 per cent. greater than the supplies provided for in the Madras Cauvery Project, and such flow is now admitted by Mysore to be reasonable.

Paragraph 11.—Mysore reject any claims for the supply of the Lower Coleroon Anicut System of irrigation on the authority of the statement quoted by them from paragraph 11, Volume I, Madras Cauvery Project Report.

The fact that the system does not, under ordinary circumstances, receive any regulated supply under existing conditions and is dependent, to a great extent, on the surplus of freshes and floods is not inconsistent with a claim for specific supply, when it is proposed altogether to alter existing conditions by impounding, in an ordinary year, a material part of the floods which now feed the system, and in a bad year, almost all the flood water surpluses now passed through the Upper Anicut. It is proposed to cut off the chief source of supply to the system, viz., the surplus water available after feeding the Cauvery Delta System, which is now passed through the Upper Anicut.

To these floods Madras have prescriptive right, and they are the chief source of supply of the Lower Coleroon Anicut System, especially of the Veeranam tank. To compensate for the losses of supply by impounding floods by Mysore, specific allowances for feeding the Lower Anicut System may reasonably be claimed.

A specific allowance was made for the Coleroon irrigation in the Madras Cauvery Project* (*vide* the end of the paragraph quoted by Mysore), although no rules for regulation were formulated; the statement made that no allowance has been made is denied. Moreover any flood impounded in a Madras Reservoir is held impounded at the call of Madras authorities and in the interests of the irrigated lands in the Cauvery and Coleroon deltas. In the case of the Mysore Reservoir the floods will be impounded and diverted to another area altogether.

Under the revised claim now made, a special allowance for the Lower Anicut system is not claimed in consideration of the different conditions on which the revised claim is based.

Paragraph 12.—The foregoing remarks are applicable to the case of the claim made for the Veeranam tank, which forms part of the Lower Anicut System.

The suggestion that the Veeranam tank ayacut, an area of 52,400 acres, should depend on the catchment area of the Veeranam tank, an area of 95 square miles, is wholly untenable. Even if the catchment had a good south-west monsoon rainfall which it has not, it would require a catchment area of upwards of 1,000 square miles to feed such an area of irrigation and a capacity from five to six times its existing capacity of 1,490 million cubic feet.

The claim advanced by the Government of Madras for occasional additional supplies is fully covered by existing prescriptive right and based on existing practice and custom.

It is admitted that no claim has previously been advanced for a specific supply for the Lower Anicut System, but the necessity for making such a claim was stated at a very early stage of the discussion—*vide* paragraph 3 of note by the Chief Engineer for Irrigation, which accompanied letter No. R.O.C. 386 I/10 of 6th December 1910, from the Joint Secretary to the Government of Madras, Public Works Department, to the Resident in Mysore. This states "the Special Superintending Engineer's draw-off tables show what water can be impounded by Mysore, and the period during which it may be so impounded by Mysore, but, as indicated in his note, no allowance has been made for Coleroon irrigation, and it probably be necessary on this account to make a reduction in the quantity of water available."

While Mysore were contesting as excessive the tentative figures, based on the ordinary system of regulation, initially assumed for purposes of computation and as a basis for argument, it was obviously futile, and only leading to fruitless controversy, to propose that these should be enhanced.

Although it was known that some provision for the Lower Anicut system would be necessary, it is only, since the decision to submit the matter to arbitration, that the conditions of supply of the Veeranam tank and Lower Coleroon Anicut System have been made the subject of any real study and consideration, and it has therefore only now been possible to advance complete proposals. Under the revised claim now made, no special supply is claimed for the Veeranam tank and the claim to the additional occasional supply is waived.

Paragraph 13.—The Government of Madras do not admit the contention put forward in this paragraph which is based on the fallacy exposed in the reply to paragraph 8.

PART IV.—PLACE OF MEASUREMENT OF SUPPLY DUE TO MADRAS.

Paragraph 14.—The Government of Madras claim that the flow of the river should be measured above the water spread of Kannambadi Reservoir and at a selected site on the Kabbani. Allowances of 25 per cent. for losses in transmission between Sivasamudram and the Upper Anicut are claimed during the south-west monsoon. The Madras discharge records of flow at Bhavani Bridge are reliable, except for high floods and discharges below 1,000 cusecs. This is stated in paragraphs 29, 30, Volume III, Madras Cauvery Project Report.

* Paragraph 11, Volume I, Madras Cauvery Project papers.

The bed of the river at Bhavani Bridge is rocky and not liable to scour, and the discharges are reliable.

The statement that the discharges are unreliable is now made by the Mysore Government for the first time and they are put to the proof of this statement.

It is noted that Mysore admit that the discharges at the Cauvery dam are reliable. Those at Bhavani Bridge are equally reliable.

As regards the gaugings of discharge at Sivasamudram, a statement of these was furnished by the Darbar to the Madras Government, and put forward as accurate, except for flood discharges, as lately as the 31st March last, by the Diwan of Mysore in his letter No. 838-Pol. of 31st March 1913, paragraph 2, which runs as follows: "with reference to paragraph 2 of the Madras Government letter, I may point out that there are accurate records of discharges both at Sivasamudram and at Bhavani Bridge for more than nine years."

These discharges have been used as the basis of arguments throughout the discussions which have taken place, and are the only basis of the Mysore proposals, so far as concerns the safeguarding of Madras supplies.

They have also been used as the basis of the Madras case as regards comparison of discharge records for computing losses in transmission and show that the occasional losses are great.

It is now stated that for gauging "high floods" the site is unsuitable, and this is admitted.

It is, however, also stated in contradiction of everything previously put forward that "the past records of gauge-readings are unreliable." Such a statement appears to foreshadow a repudiation by Mysore of the discharges based on gauge-readings at Sivasamudram, that is, of all the discharges furnished to Madras, notwithstanding the Diwan's admission that these discharges were accurate except for high floods.

This sudden repudiation of gauge-readings as "not reliable" cannot be acquiesced in by Madras in view of the previous statements officially made by Mysore, that the discharges based on these gauge-readings are "accurate".

Paragraph 15.—The Madras claim is for a measurement of the flow of the Cauvery above Kannambadi, and on the Kabbani, with an allowance of 25 per cent. for net loss in transmission during the south-west monsoon.

In working on the system proposed by Mysore based on measurements at the Upper Anicut, losses in transmission on compensation water, passed to make up excess balances impounded by Mysore, will still be necessary.

The percentage in this case is, however, not the same, and 30 per cent. on the quantity of compensation water would in such a case be required to provide for such loss.

PART V.—SYSTEM OF REGULATION.

Paragraph 16.—It is for Mysore to put before the Arbitrator the proposals and details of their project fully and clearly. So far as Madras is concerned, the most important item of the Mysore Project, and the one which must be adjudicated on before all others, is the method of regulation.

It is for Mysore to state clearly and fully the system of regulation proposed for their project.

It is not for the Arbitrator to "devise" the system of regulation of the Mysore Project, but to adjudicate on the system proposed by Mysore, or in the alternative on the proposal of the Government of Madras, making such amendments in matters of details as may appear to him necessary.

Paragraph 17.—It is denied that water ever passes from Kannambadi to the Cauvery dam in one day, which is equivalent to a mean velocity of 14 feet per second or 9.66 miles per hour.

In saying that Mysore should be enabled to store all water "in excess of that to be given for irrigation at the Cauvery dam," the Darbar ignores the obligation to supply the 95,000 acres of Madras irrigation above the Upper Anicut. This area alone is about 65 per cent. of the area proposed to be irrigated under the Mysore Project and is certainly not a negligible quantity.

Mysore may suffer from the circumstance which fixes the site of their reservoir at so great a distance up the river from the bulk of the Madras irrigation, but this is no ground for adopting a remedy which would entail continuous risk of loss, and not infrequent actual loss, to Madras.

Paragraph 19.—It is denied that, in a stage of river discharge which limits the maximum flow to a "depth of 6 or 7 feet" at the Cauvery dam, the mean velocity of flow is 7 feet a second (4.83 miles per hour), which is what is necessary for transmission of the supply in two days, and the Mysore Government are put to the proof of this.

For the stages of flow which will rule when the Mysore Reservoir is under regulation, allowance for time of transmission which will fairly meet the circumstances of the case is considered to be 3½ days, and Madras is prepared to adduce evidence in support of this proposition.

The second part of this paragraph is not understood, but it is denied that in the months of July and August the local rainfall near the Cauvery dam produces floods.

PART VI.—PROPOSED REGULATION TO BE TENTATIVE.

Paragraphs 20, 21 and 22.—The Madras Government most strongly oppose a tentative settlement. They demand that rules for regulation at the Mysore Reservoir and the water supplies to be passed to Madras should be settled now.

Further, they demand full examination of the proposals for the larger project proposed by Mysore, and a decision regarding the refusal of assent by Madras to the proposals put forward. The Government of Madras press for a final decision as to whether the large reservoir proposed by Mysore may be built or not.

In the interests of Mysore as well as Madras a final settlement of this question is most desirable, so that it may be known definitely what dimensions are required for the dam at Kannambadi, on which work has already been commenced. The arbitration in progress has been ordered by the Government of India with a view to a definite and final settlement of the matters at issue. The Government of Madras demand that the decisions of the Arbitrator shall be a final and binding settlement of the questions involved.

The Mysore Darbar have had this project in view for many years. In his letter No. 869-Pol. of 27th March 1911 to the Resident, a copy of which was forwarded to the Government of India with the Resident's letter No. 2053-F.I. of 3rd April 1911, the Diwan states as follows: "For many years the Mysore Government have intended to construct a reservoir on the Cauvery for developing irrigation in the valley."

It was obviously under such circumstances the duty of Mysore to make suitable gaugings and measurements of discharge during these many years, and to some degree they appear to have done so. It is not open to Mysore to claim postponement of settlement on the ground of the inaccuracy of such measurements, until now described by them as accurate. On most of the points to be decided, postponement for six years would not result in production of any more relevant or reliable facts than will be now at the disposal of the Arbitrator, while data collected specially to prove one proposition or another would even, if sufficient, be open to suspicion.

On the matter of quantity of water to which Madras had in 1910 prescriptive right, evidence taken now must be better than evidence taken at the end of six years. Accordingly a final and binding decision is pressed for.

In six years' time there will be little or no more information available as a guide to drawing up rules for fixing the system of regulation.

The matter of losses in transmission is, it is admitted, a complex one, but such losses can only be computed on consideration of the results of bad years. The nine years, regarding which gaugings are available, include three bad years, and it is improbable that a period of six years would give better information in this respect.

The Government of Madras ask for decisive, final, and binding decisions on the points at issue.

PART VII.—NO OUTSIDE INTERFERENCE WITH DISTRIBUTION OF WATER.

Paragraph 23.—The Government of Madras claim no right of interference with the "internal distribution" of water in Mysore territory, meaning by this the distribution of the water to the enjoyment of which it is decided that Mysore has a title.

The Government of Madras do, however, insist on their right to such limited interference as may be necessary to secure that the rules for the regulation of impounding in and issues from Kannambadi Reservoir are duly observed.

The Government of Madras, however, claim that full detail of the scope and character of the project proposed by Mysore shall be communicated to them and laid before the Arbitrator.

The points on which information is required in addition to what is included in the printed book describing the Mysore Project are noted below:—

(a) A statement of the proposed half-monthly "draw-off" for all irrigation channels taking off from the reservoir.

(b) A statement of the proposed half-monthly "draw-off" of each of the Mysore channels below the dam existing or proposed which will be fed from water issued from the reservoir sluices.

(c) A "duty table" showing draw-off per acre proposed half-month by half-month for the channels—

(i) taking off from the reservoir;

(ii) taking off below the reservoir and fed from the reservoir sluices.

(d) Statement of areas, and seasons of "draw-off," as regards each of the above channel separately stated with respect to—

- (i) Monsoon crop.
- (ii) Dry season crop.
- (iii) Crops requiring perennial supply.

(e) Areas and details of any proposed extension of irrigation above the reservoir, rendered practicable by supplying existing irrigation below the reservoir from it.

(f) The maximum discharge which each new channel taking off from the reservoir is to be designed to carry.

(g) Rules for regulation of the reservoir regarding issue of water to Mysore irrigation and restrictions imposed so as to absolutely secure an uninterrupted full supply to the power installation.

(h) Full details of allowance made for reduction in reservoir capacity by deposition of silt, and of the number of years it is computed such allowance will enable the original effective capacity to be maintained unimpaired.

(i) Tables of daily discharges past Kaunambadi as such are necessary for investigating the effect of the Mysore "Rules for Regulation of the Reservoir" on the Madras existing irrigation.

Full details of the methods of computation of the discharges and data on which these tables are based should be furnished, the details being sufficient to enable all such computations to be verified by Madras officers and by the Arbitrator.

(j) The Darbar should also furnish full engineering particulars concerning the dam, its sluices, surplus works and all works which may affect Madras, and designs of the same.

As regards the last lines of the Mysore statement, paragraph 23, it is not clear to what restrictions Mysore is referring.

As already stated, the Madras Government do not wish to interfere with distribution of the water which Mysore may be held by the Arbitrator to be entitled to use.

As regards the construction of reservoirs or other irrigation works, Rule VI of the Agreement of 1892 imposes on Madras similar restrictions with reference to streams flowing through Madras territory into Mysore.

PART VIII.—SUPPLY DUE TO MYSORE.

Paragraph 24.—The statements in this paragraph are irrelevant to the matter at issue.

PART IX.—CREATION OF NEW PRESCRIPTIVE RIGHTS UNDESIRABLE.

Paragraph 25.—The statements are irrelevant.

Paragraph 26.—The Government of Madras entirely repudiate the suggestion put forward in the first two lines.

Paragraphs 25 and 26 introduce matters which are altogether outside the scope of the present reference and should therefore be dismissed from consideration.

PART X.—OTHER POINTS FOR CONSIDERATION.

Paragraph 27.—The Government of Madras claim that no infringement whatever of Madras existing rights shall be permitted.

Paragraph 28.—The statement made is denied.

Paragraph 29.—The fact that Madras may possibly construct a reservoir at Metur hereafter is wholly irrelevant to the arbitration.

The Madras Government deny that the construction of such a reservoir would afford just ground for reducing the amount of water to which they are now entitled.

The Madras Government have full liberty to deal as they please with the water to which they have a prescriptive right, and it cannot for a moment be admitted that the Mysore Darbar has any right to benefit by works constructed by the Madras Government. Moreover, construction by Madras of works on the Cauvery below the Mysore frontier is not covered by the Agreement of 1892 and is wholly irrelevant to this arbitration.

Paragraph 30.—It is denied that the flow realised in the month of June up to the limit of flow claimed is "mostly allowed to run into the sea." In the Madras Cauvery Project, to which reference is given, the remarks alluded to are made by a Revenue Officer who had not access to the water registers and who qualified the whole paragraph with the initial remark "I have heard it said."

Paragraph 31.—This appears to be a plea to respect the prescriptive rights of Madras in certain years when water is plentiful, and to ignore them in bad years. The Madras Government altogether repudiate such a suggestion, and insist that Mysore must be bound by her obligations to respect Madras prescriptive rights throughout every year, no matter what its character.

PART XI.—TERMS OF REFERENCE AND CONCLUSION.

Paragraph 34.—The statements in this paragraph are irrelevant.

Should the Government of Madras undertake the construction of a reservoir on the Cauvery, such construction will in no way diminish their prescriptive rights, or their title to whatever water may now be decided to be justly due to them.

Paragraph 35.—Sufficient reasons for refusing assent to the Mysore Reservoir have been given to the Government of Mysore with the original refusal. The further reasons subsequently put forward strengthen the Madras case.

The Government of Madras believe that they have furnished ample justification of their refusal to assent to the construction of the proposed work.

If the water to which they are entitled is passed down, there is strong reason to believe, from the data so far available, that the Mysore Project must fail, and the Darbar should therefore not be allowed to carry it into execution.

The existence of such a work would be a serious menace to the Madras Irrigation of over one million acres, since in years of short supply there would be risk of a breach of the rules for the regulation of impounding, owing to the pressure which is bound to be brought to bear on those controlling the impounding.

CONCLUSION.

The Government of Madras do not admit any statement in the Mysore case which has not been expressly admitted above.

Copy of letter No. 347-Pol., dated 26th October 1911, from the Diwan of Mysore to the Honourable the Resident in Mysore.

In continuation of my letter No. 328, dated the 19th October 1911, on the subject of the construction of a reservoir on the Cauvery at Kannambadi, I have the honour to inform you that, as desired by the Government of Madras, the Darbar definitely undertake that the fact of their having built a dam of wider foundations than are necessary for the small reservoir of 11,030 million cubic feet shall not be brought forward in any future discussion as an argument for the construction of a larger reservoir.

Reply of Madras as regards the Mysore "Provisional Rules for working the Mysore Reservoir" handed in to the Arbitration Committee on 26th July 1913 (Exhibit My. 2).

1. The Madras Government cannot assent to the proposals in paragraph 1 of the Mysore rules.

The flow limits at the Cauvery dam which Mysore suggest as the supply which will satisfy the existing prescriptive rights of Madras are altogether inadequate and do not give to Madras irrigation a supply even approaching in volume that admitted by Mysore to be reasonable in paragraph 10 of the "Statement of the case for Mysore."

2. The system of control of regulation described in the Mysore rules 2, 3, 4, 5, 6 and 7 is exactly similar to that proposed by the Diwan of Mysore in his letter No. 11-Camp of 10th May 1912 (Exhibit M.A. 1-a) alluded to in the Madras Statement of Case (Exhibit Ma. 1) with the exception that the limit supplies, instead of being 26,700 cusecs, are as shown in paragraph 1 of the new rules, while the period during which Mysore is to be permitted to impound all flow is now fixed as commencing on the 1st February instead of on the 1st March as proposed in the previous rules above specified. Both these deviations are open to still greater objection than the rules originally proposed.

These rules are as regards Madras supplies much more unfavourable than those referred to and rejected in the Madras statement (Exhibit Ma. 1), and cannot, for reasons already given in Exhibit Ma. 1, be accepted by Madras.

3. The effect of paragraph 8 of the rules is to give to the Mysore Officer in charge of the works at Kannambadi extensive discretionary powers to depart from the rules for impounding.

The Madras Government object to any discretionary power being given to deviate from any rules which may be decided on for ensuring the passing of suitable supplies to Madras.

4. In addition to the objections above stated the rules are considered impossible to work either smoothly or efficiently and are also open to the other objections set forth in the reply of Madras to the Mysore statement of their case (Exhibit My. 1) submitted on the 21st July.

W. M. ELLIS, Col., R.E.,
Representative of the Madras Government.

See page 23
para 29 also
page 27 para 46 also

Exhibit Ma. 3-a.

List of irrigation maps of Cauvery and its tributaries and Coleroon handed over through the Arbitrator to the Mysore Representative on 29th July 1913.

Number on the map.	Name of river.	Mounted or in paper.
1. Cauvery delta		Mounted.
2. Veerasholanar		"
3. Nandalar		Paper.
4. Vanjiyar		Mounted.
5. Noolar		"
6. Keerthimannar		"
7. Puthar		"
8. Vellapar		"
9. Palavar		"
10. Nattar		"
11. Sholasudamaniar		"
12. Mudikondanar		Paper.
13. Mahimalayar		"
14. Cauvery river below Veerasholan head		Mounted.
15. Vikramanar		"
16. Arasalar		"
17. Tirumalrajannar		"
18. Cauvery river up to Veerasholan head		Paper.
19. Manjalar		"
20. Aiyavaiyanar		"
21. Kodamurti		"
22. Odambogiyar		Mounted.
23. Vennar river lower reach		"
24. Vettar lower reach		"
25. Mulliyar		"
26. Kaduvayar		"
27. Adappar		"
28. Paudavaiyar		"
29. Vellar		"
30. Harischandranadhi		"
31. Korayar		"
32. Pamaniyar		"
33. Aiyannar		"
34. Kattar		"
35. Vadavar		Paper.
36. Vennar up to Korayar and Pamaniyar head works		"
37. Vettar up to Engan regulators		"
38. Odaiyar		Mounted.
39. Coleroon Kumikimanniar		"
40. Do. South Rajan Voikal		"
41. Manniar		Paper.

1. Map of minor works, P.W.D., Coimbatore district, four sheets.
2. Do. Salem district, eight sheets.
3. Do. Trichinopoly district.
4. Map showing Cauvery river, the head works of Vangal, Pogalur and Nerur channels, etc. (Blue print).
5. Map of minor works, P.W.D., Madura district.
6. Original tracings of the irrigation maps of the Veeranam tank, 28 sheets.
There are seven more sheets not at present available as they are being reproduced at the Survey Office.
7. Statement showing the area of irrigation under the Cauvery and its tributaries above Upper Anicut.

Statements of Lower Anicut Discharges handed over through the Arbitrator to the Mysore Representative on 29th July 1913.

Volume I—

Both Branches—April 1895 to March 1899.

Except:—

- (a) 27th to 30th June 1895.
- (b) South Branch.—22nd to 31st July 1895.
- (c) North Branch.—14th to 31st " "

- (d) North Branch.—19th to 23rd August 1895.
- (e) Both Branches.—September 1895—1st to 13th.
- (f) South Branch.—24th to 30th June 1896.
17th to 24th July "
- (g) North Branch.—16th to 31st " "
- (h) South Branch.—August 1896—15th to 19th.
- (i) South Branch.—20th to 23rd September 1896.
22nd to 31st October
16th to 22nd August 1897.
- (j) North Branch.—16th to 24th " "
14th to 16th September 1897.

Volume II—

April 1899 to March 1909.

Except:—

- (a) April 1899.—North Branch. South Rajen.
South Branch. North Rajen.

Details to calculate daily discharges not available. Total of discharges as noted in the annual diagram is entered.

- (b) 18th to 31st August 1901.—Anicuts and both branches Discharges not available. Total discharges of month as noted in the diagram are entered.
- (c) April 1905.—Both branches and South Rajen. Details to work out the daily discharge are not sufficient. Discharge as noted in the diagram is entered.
- (d) May and June 1907.—Both branches. Details not sufficient to calculate discharge. Total discharges of month as noted in the diagram are noted.

Volume III—

1st April 1909 to 28th February 1910.

Statement of daily discharges at Grand Anicut and through Cauvery and Vennar Regulators, handed over through the Arbitrator to the Mysore Representative on the 29th July 1913.

1890 (except for January to May).
1891 }
1892 } (complete).
1893 }
1894 (except for March to July).
1895 } (complete).
1896 }
1897 (except for December).
1898 (except for January to June).
1899 (complete).
1900 }
to } (complete).
1903 }

Exhibit Ma. 3-b.

I am instructed to ascertain through the Arbitrator whether Mysore intends to put in a further pleading by way of rejoinder on perusal of our reply, now put in, to their statement of the case and *Rules of Regulation*.

I am specifically instructed to object to the settlement of issues before the pleadings are fully put in.

29th July 1913.

W. M. ELLIS, Col., R.E.,
Representative of the Madras Government.

Exhibit Ma.-4.

ENQUIRY INTO THE PROJECT FOR A RESERVOIR ON THE CAUVERY
PROPOSED BY THE MYSORE DARBAR.

REJOINDER OF THE MADRAS GOVERNMENT TO THE REJOINDER PRESENTED BY
MYSORE ON 4TH AUGUST 1913.

[NOTE.—The parts and paragraphs referred to are those in the Mysore statement of the case.]

PART II.

Paragraphs 3 and 4.—(1) The Madras Government deny that any prescriptive rights acquired by them prior to the remodelling of the Upper Anicut could in law be cut down in extent by the reconstruction of that work or any economies which they may have been able to effect in the use of water.

Any such voluntary economies cannot constitute an interruption or non-enjoyment of the kind required to affect a prescriptive right.

(2) The Government of Madras further deny that it is not open to them to prove the completed acquisition of a prescriptive right prior to the remodelling of the Upper Anicut or that they are restricted to proof of enjoyment of the quantities claimed subsequent to 1890.

(3) With reference to the claim of the Madras Government under II (iv) of the Madras reply for a continuous flow of 900 cusecs in the months of March, April and May, it is pointed out that the Mysore Government have throughout the discussions and correspondence represented that all the water passed for power generation throughout the year would be passed down the river to Madras. It is only under such understanding and on such conditions that the Madras Government consent to waive their existing right to the whole natural flow of the river during the months of March, April and May.

The project put forward by Mysore provides for passing for power a steady flow of 1,000 cusecs, and this should be passed down the river to Madras.

In the claim made this flow has been reduced to 900 cusecs to allow a working margin.

To such an arrangement it was believed that Mysore Darbar agreed and it was one of the points on which it was understood there was no divergence of views. If Mysore deny the right of Madras to the flow of 900 cusecs throughout the months of March, April and May, the Government of Madras claim in alternative throughout this period the whole natural flow of the river up to the limit stated in II (i), Madras reply.

PART III.

Paragraph 10.—Mysore Government made a reasonable admission which they now propose to withdraw. There appears to the Government of Madras only one meaning which can be attached to the admission in paragraph 10 of the Mysore statement. The meaning now advanced by Mysore Government would have the effect of reducing the supplies to be passed at the Cauvery dam to a quantity far below that allowed in the Metur Project. It is not clear how this can have been the intention of the Mysore Government when saying "an addition of 25 to 30 per cent. of the supplies 'provided in the Metur Project' should be sufficient" (*vide* paragraph 10 of Mysore statement).

Proof will be adduced that the explanation now given entails great reduction of the "supplies provided in the Metur Project."

PART IV.

Paragraph 14.—The Government of Madras accept the admission of Mysore that the Bhavani Bridge discharges are incorrect only to the extent stated in the Madras Cauvery Project Report, paragraphs 29 and 30, Volume III.

PART VI.

Paragraphs 20, 21 and 22.—The Government of Madras emphatically deny the contention of the Mysore Darbar that the question before the Arbitrator is not whether the reservoir should be large or small or whether the reservoir should be built or not but what is the quantity of water available for impounding in Mysore after satisfying Madras rights.

Under rule IV of the Agreement of 1892, it is only a concrete case that can be the subject-matter of reference to arbitration and not the mere abstract question how much water is available after satisfying the rights of Madras.

In view of the language of rules II and III, the case referred to in rule IV can only be whether any particular new irrigation reservoir may be built or not and whether the Madras Government are bound to assent or not to such a work.

The whole correspondence between the two Governments also shows that the Mysore Darbar have been seeking the consent of the Madras Government and that the latter have been refusing to consent to the execution of the bigger project.

The issue as to how much water is needed for Madras requirements is only subsidiary to the main issue in the case, which is whether the particular project proposed should be allowed to be executed.

This subsidiary issue cannot dispense with the adjudication of the relief claimed by Mysore, whether the Madras Government are bound to consent to the construction of the large reservoir she has proposed.

If Mysore now says that she wants no such relief, the case before the Arbitrator must drop.

Under agreement Mysore has no right to ask for any adjudication except with reference to some specific project in hand.

PART VII.

Paragraph 23.—The replies to items (c) to (h) amount to a refusal to give the information called for.

The Government of Madras claim that full information regarding the Mysore Project shall be given to them and laid before the Arbitrator.

Although on some of the points on which information is asked the Madras Government have no right of interference, it is claimed that they have the right to demand and receive from Mysore full information regarding the project put forward by the Mysore Darbar and to which they have refused to give assent pending the furnishing by the Darbar of full details.

It is urged that neither the Arbitrator nor the Government of Madras can fully consider the matter under enquiry unless the particulars asked for are disclosed by the Mysore Government.

Under (e), the information asked for materially affects Madras supplies of water and any extension of irrigation due to the proposed reservoir is a material portion of the project and particulars and details of such extension must be furnished.

Regarding item (j), the Government of Madras deny that all necessary engineering particulars as regards the proposed works have been furnished. The particulars required should contain sufficiently full engineering details to enable a judgment to be formed on the soundness of the engineering designs and proposals.

So far only mere outlines of proposals have been furnished and the Government of Madras repeat and press their previous demand.

PART X.

Paragraph 29.—The Madras Government urge that their prescriptive right extends to all the flow in the river which they have customarily enjoyed and which is necessary to ensure the full customary supply to the existing irrigated area and that it cannot be curtailed with reference to conditions and economies brought about by any irrigation works already constructed or hereafter to be constructed by them. The internal distribution of the flow to which the Madras Government have acquired a prescriptive right and the manner of enjoyment of that flow are matters with which Mysore has no concern.

Note.—This also constitutes a reply to "Conclusion," sub-clause (1), of Mysore rejoinder.

PART XI.

Conclusion.

Reference to sub-clause (1)—*vide* reply under paragraph 29.

Sub-clause (2).—The Madras Government contend that the question for the determination of the Arbitrator is the depth of flow hitherto found necessary by the Madras Government to give an adequate supply and not what is, in the opinion of the Arbitrator, required for such irrigation irrespective of past user.

The Government of Madras do not admit any statement in the Mysore rejoinder which has not been expressly admitted above.

W. M. ELLIS, Col., R.E.,
Representative of the Madras Government.

Exhibit Ma.-5.

Suggested Terms of Reference by the Madras Government.

(1) In what manner and at what point or points shall measurement be made of the discharge of the Cauvery to guide the regulation of the supplies which must be passed down to Madras before impounding in Kannambadi Reservoir is allowable?

(2) What is the quantity of water to which Madras is entitled under the Agreement of 1892 to fully safeguard her existing rights and interests both above and below the Upper Anicut and which should during the different months of the year be passed down by Mysore before impounding in Kannambadi Reservoir?

(3) Does the decision as regards the foregoing and other points covered by the agreement of 1892 justify the continued refusal of Madras to assent to the construction of the reservoir projected by the Mysore Darbar; and, if not what rules and restrictions as regards measurement of flow, means to ensure and agency to supervise the passing of supplies to Madras, draw off and area irrigated, engineering details and other points should be made conditions of giving assent

5th August 1913.

W. M. ELLIS, Col., R.E.,
Representative of the Madras Government.

Exhibit Ma.-6.

A protest by Madras regarding information required of Mysore.

In the "reply of the Government of Madras," Exhibit Ma-3, paragraph 23 (g), a request was made to be furnished with "Rules of regulation of the Mysore Reservoir as regards issue of water for irrigation." The assessor has ruled in his letter No. 38-I.G. of 16th September 1913 that this is a matter which does not concern Madras.

The reconsideration of this decision is respectfully pressed on the arbitration committee.

2. There are two reasons why it is necessary to know the rules of regulation—

First, in order that the Government of Madras may be secured in the undertaking to be made by Mysore to pass down the river to Madras in the hot season a certain steady supply. It is only on being satisfied that the Mysore working system is such as to ensure the passing of this down that the Government of Madras consent to waive their right to the full natural flow of the river in the months of February to May.

Second, in order to enable the working conditions of the Kannambadi reservoir to be investigated by working tables drawn out on the basis of the rules, it is necessary to know what the rules are. Without rules, it is quite impossible to draw working tables properly.

3. It is not suggested that the rules should in all respects be permanently binding on Mysore but they should form the basis on which the working of the reservoir is to be examined.

4. The conditions of the Mysore reservoir are such as preclude the adoption of a system of issue of full seasonal supplies steadily to the full area so long as these supplies last.

The conditions appear to render it absolutely necessary to always maintain sufficient water impounded in the reservoir to *absolutely secure the supply for power*.

The agreement with the mining companies makes this necessary and further the liability to Madras for a steady hot weather flow also makes it necessary if Mysore wish Madras to waive their rights to the full natural flow in this season.

Thus the power supply must be absolutely safeguarded from failure.

To do this, it is necessary to frame rules defining under what circumstances and conditions supplies passed to irrigation are to be restricted and to what extent.

5. The duties and draw-off to which Madras have been referred as representing the Mysore proposals presuppose that there will be an abundant supply and total absence of any failure to pass full supplies. The preliminary tables prepared by Madras do not foreshadow that such condition of affairs can be maintained in bad years.

6. What is required is to be told what rules and restrictions will be imposed on irrigation draw-off to secure water for power. It is not to be imagined that a system of regulation will be adopted which will continue full "draw-off" when the conditions of supplies are such as to entail imminent risk of failure for power supply.

The drawing up of suitable rules is not a matter of greater difficulty: indeed the problem is very similar to that in the Madras "Kistna reservoir project." In that project, the conditions make it essential to have without failure and at all costs a certain balance of water in the reservoir for seed-beds on the 1st June yearly and the rules of regulation drawn up with the project are such as will secure this.

What is asked of Mysore is similar suitable working rules so as to enable an examination of the working of their reservoir to be made.

7. In default of such rules detailed instructions are asked from the arbitration committee as to the method on which working tables for the Mysore reservoir are to be drawn and will be accepted as a correct representation of working conditions and what, if any, restrictions are to be placed on the full "draw-off" when the conditions of the reservoir appear to require such restrictions.

8. It is submitted that under the fourth term of reference the arbitrator has explained that the fullest examination into working of the proposed Mysore reservoir is contemplated.

Without rules of regulation regarding the "draw-off" for Mysore irrigation no such examination can be made and the arbitrator must decide whether the Madras contentions and objections to the Mysore reservoir are justifiable without knowing what the working conditions and prospects of the Mysore reservoir are.

9. Madras have refused to consent to the construction of the Mysore reservoir on the ground that a successful reservoir scheme on the lines proposed by Mysore is incompatible with the passing to Madras of the water which will fully secure her existing rights and interests. The position of the Mysore works is such as to render it possible under conditions implying scarcity, inadequate supply and failure in Mysore wholly or partially to redeem the situation by impounding water to which Madras has prior rights. Not only is this possible but the circumstances accompanying such a state of affairs would be such as to subject the controlling staff to the greatest pressure to induce them to act in such a manner. Under these circumstances of

the case, it is a reasonable assumption that if the conditions of working the reservoir are such as to entail frequent deficiency of supplies accompanied, as it would always be, with the power to end this by improperly impounding water, the risk to Madras interests and rights would be very great and that in the protection of these rights Madras is justified in refusing assent to the proposals of Mysore for construction of a project, the failure of which under conditions which safeguard Madras interests is clearly foreshadowed. It is not contended that a single failure in a long term of years would justify such a refusal, but it is contended that frequent minor failures or less frequent serious failures would be a justification of such refusal.

10. It is not intended to suggest that the Mysore Darbar have been deliberately proposing to build a reservoir which can only be successful through the appropriation of water to which Madras has rights.

The Darbar have been informed and led to believe, whether rightly or wrongly remains to be shown, that there is plenty of water to make the Mysore scheme successful while fully protecting and safeguarding Madras rights.

Further it is believed that the Mysore Engineers were also of this opinion, and have originally advanced their scheme in good faith, and in the belief that it was quite possible to impound all the supplies required without detriment to Madras.

On the incomplete and inaccurate data and records of discharges, and on the optimistic assumptions made by Mysore Engineers, such an aspect was displayed in the descriptive papers regarding the Mysore project. The Madras contentions, also made on insufficient data [although the best available], put a different aspect on the question, but one the accuracy of which is denied by Mysore.

11. It is the contention of Madras that it is for the arbitrator with the assistance of the assessor carefully to examine the working conditions of the reservoir and have as accurate a forecast of these conditions as it is possible to make, before coming to a decision on the point at issue, which is whether the refusal of assent to the construction of the proposed reservoir is justified.

12. In order to make such an examination of the working conditions the working rules must be stated and form the basis of the computations to be made and Madras press for a statement of such rules—either by Mysore or by the arbitrator. It is only after the working conditions have been examined with the aid of working tables based on the water-supplies to which Madras rights are established and on the working rules which are pressed for, that Madras can formulate their views and arguments regarding the same.

13. When the fourth issue was framed the arbitrator assured the Madras Representative in reply to his enquiry that the form in which it was drawn was intended and designed to include in its scope the fullest examination of the working conditions and engineering aspects of the proposals and it is submitted that in the absence of working rules, the working conditions cannot be fully examined.

Further it is to be fully understood that the Government of Madras altogether decline to waive their claims to the natural hot weather flow of the Canvey (February to May inclusive) except under working rules which fully secure the uninterrupted flow of not less than 900 cusecs throughout these months and insist that the working rules so far as they shall affect such security shall be fully binding on Mysore.

14. If Mysore decline to put in such rules the Government of Madras claim their full prescriptive rights to water all the year round.

15. Another point on which reconsideration is solicited is in regard to the view of the assessor expressed in letter No. 38-I.G. of 16th September 1913 with regard to furnishing the information asked of Mysore in the Madras reply (Exhibit Ma-3, paragraph 23-d).

This asks for areas irrigated and reasonable "draw-off" separately with respect to—

- (i) channels taking off direct from the reservoir.
- (ii) channels taking off below the reservoir and supplying areas fed from the reservoir.

The assessor has stated that this information does not appear to be necessary for purposes of this investigation.

The only information available on the subject of "draw-off" from the reservoir for Mysore irrigation is "total draw-off" for each day or half month.

A study of the conditions will show that the effective capacity of the reservoir is taken as the capacity down to sill level of the head sluice of the canal taking off from the reservoir.

It will be clear that if the canal full supply level is say 7 feet deep and hot weather supply 3 feet deep supplies can only be passed down with the reservoir water at a level not less than say 7½ or 3½ feet above sill, and an automatic and involuntary restriction of supply comes into play. This restriction, however, does not apply to irrigation supplies to be passed through channels taking off below the dam.

The above reasons make it clear that for purposes of constructing working tables and investigation of conditions and prospects of working of Mysore reservoir separate figures for "draw-off" from the channels—

- (i) taking off from the reservoir,
- (ii) taking off below the reservoir

are necessary.

It is urged on the above grounds that the assessor should be pleased to reconsider his instructions in this matter.

16. Failing this, it is asked that instructions should be given regarding what assumptions should be made and will be accepted in working out tables in which the above considerations form factors which must be considered.

17. As regards the above matters attention is further invited to the agreement of 1892 between Madras and Mysore in which it is laid down that "full information regarding the proposed work" shall be furnished to the Government of Madras.

It is submitted that under this agreement, the Government of Madras have a right to demand information regarding such vital considerations as "draw-off" and "system of regulation."

The information on all important points is under the agreement to be given to Madras and these points are not restricted to those to which it is within the province of Madras or of this arbitration to object. The system of internal regulation and distribution of proposed irrigation is not a matter with which Madras claim, subject to the safeguarding of her interests, any right of interference, but she does claim a right to information which, under the agreement, should be given to her, and without which neither the Madras Engineers, nor any Engineer, however expert he may be, can make a really efficient examination of the conditions of water-supply and working prospects of the Mysore project.

W. M. ELLIS, Col., R.E.,
Representative of the Government of Madras.

Exhibit Ma. 6-a.

Letter—from the Joint Secretary to the Government of Madras, Public Works Department (Irrigation Branch).

To—M. NETHERSOLE, Esq., Inspector-General of Irrigation, Simla.

Dated—the 9th September 1913.

No.—262-0/13-9.

I am directed to forward herewith a copy of letter No. 55, dated 6th instant, from Colonel W. M. Ellis, R.E., Superintending Engineer on special duty, on the subject of information called for from the Mysore Darbar, and to request that you will be pleased to arrange with the Darbar for furnishing the information not yet supplied at the earliest date possible.

2. A copy of this letter and enclosures is being sent to the Honourable the Resident in Mysore.

ENCLOSURES.

(i)

Letter—from Colonel W. M. ELLIS, R.E., Superintending Engineer on Special Duty.

To—the Chief Engineer for Irrigation.

Dated—the 6th September 1913.

No.—55.

I have the honour to address you on the subject of information called for from Mysore and the way in which the non-receipt in reasonable time of such information hampers the preparation of the Madras case.

3. A list is enclosed showing in brief the information awaited and the occasions and dates on which this information was asked for.

7. It may be specially pointed out to the assessor that the information asked in items IX and X is required in connection with the enquiry regarding the proportionate discharge of the Kannambadi catchment in relation to other parts of the catchments and that the early furnishing of this information was promised by the Mysore representative when the matter was discussed at Kannambadi.

(ii)

Date of applying for
information through arbitra-
tor or assessor.

Brief statement of the
nature of infor-
mation asked.

Remarks.

- | | | |
|---|---|--|
| <p>XI. Formally asked for orally in the presence of assessor at meeting at Kannambadi on 12th August 1913. Also promised at arbitration proceedings on 6th and 7th August at Bangalore.</p> | <p>(1) As regards replies to Madras Exhibit Ma. 3, paragraph 23, sub-paragraphs (a), (b), (c), (d), (e), (f), (g), (h), whether the Mysore Government formally adhere to the total "draw-off" and duties and distribution of draw-off for their project to the figures given in Mr. Visveswaraya's working tables of 10th September 1911 and if not, what draw-off duties, etc., are proposed</p> <p>(2) Statement of Mysore Government as to the maximum discharge capacity of the canals taking off from their reservoir as proposed.</p> <p>(3) If the silt computations already communicated to the Madras Government are those still adhered to for the purposes of the Mysore project.</p> <p>(4) A statement of the areas of extensions of irrigation on the Cauvery and its tributaries above Kannambadi proposed by Mysore Government.</p> | <p>After discussion at meeting of 6th August it was decided that biuding replies to Madras enquiries must be given. The Mysore representative put forward replies indicated but promised to consult his Government before giving these in writing. The promise was again made in meeting of 7th and again at Kannambadi in meeting of 12th. The assessor promised to endeavour to get a reply made on 15th before he left Bangalore. No reply given to date.</p> |
|---|---|--|

Exhibit Ma. 6-b.

Letter—from M. NETHERSOLE, Esq., Inspector-General of Irrigation and Assessor Madras-Mysore Arbitration.

To—the Joint Secretary to the Government of Madras, Public Works Department (Irrigation Branch).

Dated—the 16th September 1913.

No.—38-I G.

I am in receipt of your letter No. 262-0/13-9, dated the 9th September 1913, and with reference thereto have the honour to point out that a part of the information called for in Madras Exhibit Ma. 3, paragraph 23, and the other information referred to in the last clause of the list furnished with Colonel Ellis' note of 6th September 1913 have been supplied with Mysore Government letter No. 1134/7522, dated the 6th September 1913, a copy of which was sent to me by Mysore. I note, however, that the information is not quite complete. Items (a), (b), (c) of paragraph 23 may be taken to be covered by the reply given in the memorandum forwarded with the Mysore letter above referred to. Items (d) and (f) appear to me to be difficult, if not impossible, to comply with at the present, as it is known that the Mysore draw-off channels have not yet been designed, nor do I think that it is necessarily essential to the arbitration. Item (e) appears to be complied with in the statement accompanying the same letter. Item (g) appears to me to be a matter for Mysore and I do not think it necessarily affects the arbitration. Item (h) is met in the reply given in the Mysore memorandum referred to. Item (i) was dealt with in my memoranda on inspection and I trust that Mysore will expedite the supply of the information as early as possible.

With regard to the other information called for previously and not yet supplied as detailed in Colonel Ellis' memorandum, I am asking Mysore if they will kindly inform me how far the preparation of the information which obviously will take some considerable time has advanced and when they will be able to supply it.

Exhibit Ma. 6-c.

Note by Assessor on the protest put in by Madras, Exhibit Ma. 6.

In reference to the protest put in by the Madras Representative (Exhibit Ma. 6) against certain passages in my letter No. 38-I.G., of 16th September 1913, I would point out firstly that no rulings were given in that letter in the sense in which it has been read by Madras.

In referring to item (g) the words used by me are as follows:—

"Item (g) appears to me to be a matter for Mysore and I do not think that it *necessarily* affects the arbitration." This is clearly not a ruling, but an expression of opinion as to the relevancy to the arbitration of the information called for and obviously left it open to Madras to repeat their call for the information if they still considered it essential.

There is an obvious and reasonable inference to be drawn from the fact already before the Arbitration Committee that the primary object of the Mysore storage is to augment and secure their supply for power, and that this would therefore necessarily take precedence of the use of the storage for irrigation. Moreover so far no specific evidence has been put before the Arbitration Committee in support of any claim of Madras to prescriptive right as against Mysore to all the hot weather flow in the river, and in its absence, as stated in my letter, I am doubtful whether this question of the hot weather supply is in any sense material to the arbitration. If, however, further evidence on this point is to be put in by Madras, it will, of course receive due consideration.

The other point is in reference to Ma. 3 paragraph 23 (d). The words I used are as follows:—

"Items (d) and (f) appear to me to be difficult, if not impossible, to comply with *at present* as it is known that the draw-off channels have not yet been designed, nor do I think that it is *necessarily essential* to the arbitration." I might have added to the word "designed" the words "or surveyed" and it is perfectly certain that if the information based on actual channel details is *essential* to the arbitration at this stage, proceedings would have to be postponed for at least twelve months until those details could be furnished. Thus it appeared to me that the information really essential to the arbitration could be presented by Mysore in the form of average draw-offs to which they would be bound to restrict themselves and to fit which they would subsequently design their channels, and that this would obviate the necessity of calling for the detailed data which it was well known were not available and would take much longer to collect than the time available when the information was called for by Madras.

It is of course accepted that the Mysore rules for working the reservoir must be framed with due regard to their existing irrigation below the reservoir as well as to the supplies required for new irrigation, that is to say, it must be made clear that any proposed extensions to irrigation from existing channels both above and below the reservoir are included in the total new irrigation it is intended to bring in under the storage scheme, but as the matter stands at present it still appears to me that all Mysore can do is to work out their scheme on the basis of half-monthly or other period supplies from the reservoir and thereafter restrict their irrigation channels and areas to fit those supplies. This matter had already been discussed before the Arbitration Committee and with these facts in my mind I assumed that Madras would read my letter as regards this point in the sense in which it was written and as herein explained.

26th October 1913.

M. NETHERSOLE,
Assessor.

Exhibit Ma. 6-d.

*Enquiry by Madras Representative with reference to the Assessor's reply—
Exhibit Ma. 6-c.*

With regard to the Madras (Exhibit Ma. 6) on the subject of information asked of Mysore and the Assessor's reply Exhibit Ma. 6 (c) I ask if I am correct in understanding that it is recognised by the Assessor that information regarding the means to be adopted to secure uninterrupted supply for power must form a feature of the rules for regulation of the Mysore Reservoir and that it is recognised that the communication in due course of such information is essential to this arbitration.

2. As regards a statement of what proportion of the whole new irrigation fed by the reservoir will have off-take from below the reservoir which was asked for it is likely that the rules referred to in paragraph 1 may be such as to make this information unnecessary for the preparation of working tables. If however this forecast is not realised, it is understood that the matter may be brought up again. I would ask if I am correct in this.

W. M. ELLIS, Col., R.E.,
Representative of Madras Government.

Exhibit Ma. 6-e.

*Reply by the Assessor to the enquiry made by the Madras Representative, dated
the 7th November 1913.*

Both the inferences (1) and (2) specified by Madras in their enquiry in reference to Ma. 9-c are correct.

M. NETHERSOLE,
Inspector-General of Irrigation and Assessor,
Mysore-Madras Arbitration.

Exhibit Ma. 7.

THE MADRAS CASE.

PART I.—LEGAL ARGUMENT.

Memorandum on the legal questions arising in connection with the Mysore-Madras Cauvery Project Arbitration.

The principal legal or quasi-legal questions to be dealt with arise under the first and second issues of the reference.

2. The second issue is intelligible enough. It may now be fairly taken as common ground that for the present purpose the prescriptive rights of Madras are to be ascertained as about the year 1910, and the point at issue is as to their *extent*. This is a mixed question of law and fact and is raised by issue 2-A. The nature and extent of the user by Madras at different periods must be ascertained and certain legal principles have to be applied to determine how far such user supports a prescriptive right in Madras in the year 1910. It is evident from the pleadings that Mysore and Madras differ as to some of these principles, as also the result of their application, and they have therefore to be discussed; but the last three words of issue 2-A refer back to the first issue which raises generally the question of the true interpretation of the Agreement of 1892.

Points raised by second issue.

Indefiniteness of first issue.

3. On the face of it it is difficult to see what exactly the first issue was intended to cover.

4. Though at one stage of the controversy it was contended on behalf of Mysore that, as a matter of construction of the Agreement, Madras was entitled only to such prescriptive rights as existed at the date of the Agreement, while Madras contended that it was entitled to prescriptive rights as at the date when any particular work was proposed to be constructed by Mysore, this contention no longer requires notice. It is not now put forward in the Mysore case, and the Arbitrator himself has taken it that the parties are agreed that the year under consideration is 1910 and that they differ only on the interpretation of the law of prescriptive right.

1910, the year to be considered.

5. An incidental question arising in a way on the interpretation of the Agreement is as to the scope of the arbitration itself. Mysore is evidently anxious to get the Arbitrator to pronounce that the Agreement itself is unfair to Mysore. Of course, the Arbitrator himself has already expressed his opinion that his function is only to interpret the document and not to suggest modifications. The question is not therefore pursued further.

Scope of the arbitration.

Question of "fairness" of Agreement.

6. Another point on which there is a difference of opinion between Mysore and Madras is as to whether the Arbitrator has merely to decide the question of the extent of the prescriptive right of Madras or the propriety or otherwise of the refusal of Madras to consent to the work proposed by Mysore. We do not contend that the Arbitrator has no power to decide the question of the extent of our rights, but we say that this is only incidental to his determination of the main question and that on a true construction of the Agreement the main question for the Arbitrator always is whether or not Madras is justified in refusing its consent to a particular work proposed by Mysore. In the ordinary language of the law courts, an adjudication as to the rights of Madras is not a substantive relief claimable by Mysore from the Arbitration Committee, but it is only a subsidiary determination necessary to enable the Arbitrator to adjudicate on the propriety of our refusal to consent. The point turns solely on the language of the Agreement. It is clear from paragraph 4 of the Agreement that what is referred to the Arbitrator is "any case" in which there is a difference of opinion between Madras and Mysore, and it is the case that has to be decided by the Arbitrator and not the particular reasons or points about which the two Governments differ. Rule 2 also confirms this view. It says that Mysore shall not build any new reservoirs without the previous consent of the Madras Government or before a decision under rule 4. This shows that the decision under rule 4, if favourable to Mysore, takes the place of the consent of the Madras Government. Of course, Madras in giving its consent, or the Arbitrator in giving his decision, is directed not to prevent the construction of a proposed work "except for the protection of prescriptive right already acquired, etc." That is, if either the Madras Government or the Arbitrator considers that the prescriptive rights of Madras will be injured by a particular work in Mysore, the result is that that work is not to be carried out, and Mysore has

no right to ask the Arbitrator or the Madras Government to say what are the prescriptive rights of Madras at any particular date, apart from the bearing of this question on the main point. The concluding words of rule 3 also show that the Arbitrator has to give his decision not once for all on the totality of the prescriptive rights of Madras but with reference to "each individual case."

7. One other subsidiary point is that raised by Mysore with reference to the words "in accordance with what is fair and reasonable" in clause 3 of the Agreement. Mysore suggests that the Arbitrator should devise some method by which the water in the river may be usefully employed by both Madras and Mysore. For the reasons already stated, this is not the function of the Arbitrator. Some of the Mysore arguments also suggest that the *extent* of the prescriptive rights of Madras must be decided on the basis of what is "fair and reasonable." This again cannot be admitted. On a proper reading of clause 3 of the agreement, the words "fair and reasonable" in that clause have reference evidently to the expression "*mode of exercising* (the prescriptive right)," and this question comes up for the consideration of the Arbitrator only in so far as it may be necessary for the Arbitrator to see whether the protection of what he may find to be the prescriptive rights of Madras in accordance with the law on the subject necessarily requires that consent should not be given to the Mysore work; it is open to him to say that on a reasonable way of exercise of its rights by Madras such rights will not be affected by a work proposed by Mysore. It would be meaningless to suggest that a question should be determined both in accordance with law and in accordance with notions of what is fair and reasonable. What is to happen if the two criteria differ? The only sensible way of construing the last sentence of the third clause is to apply the two criteria respectively to the two points to be determined and to hold that the *existence, extent and nature of the right* should be determined in accordance with law and that the *mode of exercising* the right (as ascertained) is to be fixed in accordance with what is *fair and reasonable*. It is clear from draft issue 2 attached to the Mysore Memorandum (My.—1) that Mysore also understood the clause in this sense.

8. But presumably it is not for the purpose of these incidental questions only that the first issue has been raised. On the 7th of August 1913 the Arbitrator observed that the Memorandum attached to My.—2, and the arguments directed to the points raised in that Memorandum. The reference must be to Sir K. Seshadri Ayyar's Memorandum of 1899 and not to that of 1890, extracts from which are incorporated in the later Memorandum. The Memorandum of 1890 was anterior to the Agreement and in fact denied that Madras could have any rights at all whether natural or prescriptive. It could thus have no bearing on the interpretation of the Agreement of 1892. As to the Memorandum of 1899, the statements therein are legally irrelevant to the construction of the Agreement, but we are asked to refer to it only as embodying the contentions that Mysore now wishes to put forward.

9. The Memorandum of 1899 asserts that the Agreement of 1892 was not intended to curtail in any way the rights of the Mysore State to utilise all waters within its own territorial limits. If this was not the intention and effect of the Agreement, it is certainly difficult to see what else it was. According to well-established rules of construction, we have to gather the intention primarily from the document itself. The Agreement clearly provides that Mysore shall not build new irrigation reservoirs whenever the effect of it will be to interfere with the prescriptive rights of Madras. Unless it could be said that Madras had no prescriptive rights—in which case the saving clause would be meaningless—this provision is clearly a restriction on Mysore constructing any new irrigation reservoirs. We must interpret the document as reasonable men, and it must be taken that the object of constructing new reservoirs was to utilise more of the water within the limits of the State, and that is why Madras insisted on the saving of its prescriptive rights. Of course, Sir K. Seshadri Ayyar, in his Memorandum of 1890, went so far as to say that there could be no prescriptive rights in favour of Madras, but this is not the present contention of Mysore, and it will surely be too much to assume that this theory of Sir K. Seshadri Ayyar was accepted by the Agreement of 1892 and that the saving clause in favour of prescriptive rights really saves nothing.

10. The only other material assertion in the Memorandum of 1899 is that in paragraph 4, namely, that "The Madras Government cannot object on the ground of proposed or possible future new works in its own territory. Its objection must be on the ground of protection of rights already actually existing and not of rights hereafter by user and enjoyment." Date to which the expressions "already acquired" and "actually existing" in the Agreement should be referred. If the words "already actually existing" and "hereafter" are understood to refer not to 1892 but to the dates of any controversy relating to any particular works to be proposed by Mysore, we do not contest this statement.

11. The main question under the head of interpretation seems to be what is it that the Interpretation of "prescriptive right" and "law of parties to the Agreement meant or intended when they provided that Madras should not refuse its consent to any particular work proposed by Mysore unless that step was necessary for the protection of prescriptive right already acquired and actually existing, the existence, extent and nature of such right and the mode of exercising it being in every case determined in accordance with the law on the subject of prescriptive right to the use of water and in accordance with what is fair and reasonable." What did the parties mean by prescriptive right and the law on the subject of prescriptive right to the use of water?

12. Having regard to the fact that the two parties to the contract were not private individuals but two neighbouring States, the law referred to could not possibly be any statutory enactment obtaining in British India or England. So far as Mysore is concerned, it is believed that there was no statute in force in 1892 dealing with the subject of easements and that there is none even at the present moment. Even in British India, the Easements Act is not in force in all the Provinces. The law intended to be applied could not possibly be a municipal law of limited applicability in the territories of one only of the two contracting powers. It could, therefore, only refer to the principles of international law and the principles of the English common law in so far as they might by their generality and intrinsic reasonableness commend themselves for acceptance in inter-State dealings. This is the reason why, in paragraph 6 (a) and (b) of his Memorandum of 1890, Sir K. Seshadri Ayyar felt himself obliged to appeal to international law. The principles invoked by him, however, have no foundation in that body of law.

13. Before going to the second issue it is perhaps well to point out that some of the Mysore claim of "unlimited natural right." contentions now put forward by Mysore are in a manner a repetition of their original claim of unlimited right. It will not then be necessary to deal with those contentions again, and some of the remarks to be made in this connection will in a measure also answer the suggestion of Mysore that the Agreement is unfair to them. Thus, in their rejoinder to the reply of the Madras Government to paragraph 27 of the Mysore Statement of Case, the Mysore Government say that they have no intention of infringing the existing prescriptive rights of Madras, but they are most anxious that the Madras Government shall not be allowed to indefinitely trench upon their natural rights to the use of water in their own territory, and in paragraph 24, "Madras can go on building reservoirs and, what is most detrimental to Mysore, accumulating further and new prescriptive rights of irrigation." This view found place in Sir K. Seshadri Ayyar's Memorandum of 1890, paragraph 6 (a) and (b), and in the draft Agreement proposed by Mysore. The material portion of clause 3 of this draft ran as follows: "The Madras Government shall be bound not to refuse its consent . . . the mode of exercising it as to control or limit the natural right of the Mysore State . . ." This sought to embody the theory of Sir K. Seshadri Ayyar that Mysore had a natural right to divert for its own use all the waters of its rivers within its territorial limits, and it followed that other States could if at all urge as against this only such rights as they had acquired by prescription, for in this view other States would have no right to the flow of water merely on the ground of being riparian owners. This claim of natural right was emphatically repudiated by the Madras Government (*vide* G.O. No. 343 L., Public Works, dated 15th July 1889), and they therefore objected to the mention of natural rights as well as to the mention of the law of prescription in the draft Agreement. But Mysore, while agreeing to drop the reference to natural rights, insisted on retaining the reference to the law on the subject of prescriptive rights. The Agreement of 1892 must be held to preclude any contention of Mysore based on the assumption of unlimited natural right.

14. The claim of unlimited natural right is also opposed to well-understood principles. "Riparian rights" theory in international law. The theory of riparian rights is as much part of international law as of private law, though of course like all rules of international law it cannot be enforced as between States, because there is no tribunal. The question has not arisen in Europe with reference to irrigation rights, but it has often arisen in connection with navigation rights on inter-State rivers. The generally accepted opinion is that no State should do anything to prevent the navigation of an inter-State river by other States through which that river flows. Irrigation is of comparatively little importance in Europe, particularly in England, and questions of irrigation rights are therefore not of frequent occurrence there even in private law. It is the subject of more frequent discussion in America, and the law is thus stated by Farnham in his book on "Waters and Water-rights", section 6: "A river which flows through the territory of several States or nations is their common property. Each State is entitled to its navigation throughout its whole extent so far as it can be exercised without injury to the rights of others. It is a great natural highway conferring besides the facilities of navigation certain incidental advantages, such as, fishery and the right to use the water for power and irrigation. Neither nation can do any act which will deprive the other of the benefits of those rights and advantages. The inherent right of a nation to protect itself and its territory would justify the one lower down the stream in preventing by force the one further up from turning the river out of its course

or in consuming so much of the water for purposes of its own as to deprive the former of its benefit. . . . The gifts of nature are for the benefit of mankind and no aggregation of men can assert and exercise such rights and ownership of them as will deprive others having equal rights and means of enjoying them of such enjoyment. The acts of nations must be governed by principles of right and justice . . . One State cannot authorise changes in the river which will injure property in another State." In an article in 8 Harvard Law Review at page 144 the authors point out certain instances in which the United States Government treated the law of riparian rights as applicable to the relations of independent States. One of them is mentioned in volume I of Wharton's International Law Digest, section 20.

15. With reference to the user of water for irrigation by Madras in the past, Sir K. Seshadri Ayyar suggested that such enjoyment must be regarded as "permissive" to be

Argument of "permissive" user in the past. allowed only so long as Mysore did not wish or was not able to store more water, for, he said, it could not be said that Mysore never intended to store its rainfall for irrigation and other purposes to a greater extent than in the past. To take an analogy from private law, a similar argument was put forward in the case in *Perumal v. Ramaswami* (I.L.R., 11 Madras, page 16). But the learned Judges refused to accept it. They pointed out that such an argument overlooked the fact that "to support an inference of permissive enjoyment there must be some evidence, 'apart from a recent desire to extend wet cultivation, indicating a mutual understanding, when the user originated and during its continuance, that it was only permissive and not of right.' (The italics are ours.)

16. On the footing of the applicability of the common law of riparian rights, the scheme of the Agreement of 1892 is perfectly intelligible. With reference to irrigation rights, the law was thus stated by the Judicial Committee in the case reported in (*Debi Pershad v. Joynta Singh*, I.L.R., 24 Calcutta), 865: "The right

Privy Council on extent of "riparian rights." claimed by the appellants is a right on the part of an upper proprietor to dam back a river running through his land and to impound as much of its water as he may find convenient for the purposes of irrigation leaving only the surplus, if any, for the use of proprietors below. In the absence of a right acquired by contract with the lower heritors or by prescriptive use the law concedes no such right. The common law right of a proprietor in the position of the appellants is to take and to use for the purpose of irrigation so much only of the water of the stream as can be abstracted without materially diminishing the quantity which is allowed to descend for the use of riparian proprietors below and without impairing its quality. What quantity of water can be abstracted and consumed without infringing that essential condition must in all cases be a question of circumstances depending mainly upon the size of the river or the stream and the proportion which the water abstracted bears to its entire volume. . . . The legal right of the lower riparian owners is to have the water of the stream transmitted to them continuously and without interruption and without any substantial diminution in volume, their right being only subject to the qualification that an upper proprietor may, for purposes which the law regards as legitimate, withdraw from the stream as it passes along his land so much of its stream as will not materially affect its downward flow or impair their use of it." As pointed out in *Embrey v. Owen* (6 Exch. 353) the question is always one of degree and of considerable difficulty to determine, and it is therefore reasonable to suppose that in the present case the two parties who are respectively upper and lower riparian owners thought it best to lay down a test for determining reasonable user for irrigation purposes by reference to the existing state of irrigation from time to time as the question might arise. It is difficult to understand the Agreement of 1892 in any other light. There are

Agreement fair and intelligible on the basis of "riparian rights" theory.

two things in the Agreement which are significant for this purpose. One is that the Agreement recognises the right of Madras not merely to take steps to secure the exercise of its rights but to refuse consent to Mysore building any reservoir that will interfere with its rights. The other point is that the Agreement clearly has in view possible extensions of irrigation by Madras and that is why on its true construction it contemplates the extent of Madras rights being determined not once for all with reference to the state of things in 1892, but from time to time as each particular work may be proposed by Mysore. The Agreement undoubtedly assumes the right of Madras to use the water for irrigation and does not look upon the user either as wrongful or as permissive. Its object is not to secure to, or create in favour of, Madras a right which it would not otherwise have, but to obviate any difficulties which Madras may create in the way of Mysore extending its irrigation by raising objections on the score of interference with riparian right. Prescription is not the basis of the right of Madras but merely the measure of its right so far as its rights come into conflict with the claims of Mysore, and subject to such prescriptive rights being left uninjured, the Agreement frees Mysore from the limitations which the common law doctrine imposes upon an upper riparian owner in the matter of his taking the water of a river for irrigation purposes. Thus understood, the Agreement is not only quite intelligible but absolutely fair to Mysore. The insinuation of coercion in paragraph 25 My.—1 is absolutely baseless and the letter from which a mutilated extract is quoted lends no support to it.

Second issue.

17. We now come to the second issue.

18. On our interpretation of the law of prescriptive rights as stated above in paragraph 12 Result of "prescription" as interpreted by us. it will not be necessary to enter into any detailed discussion of the several conditions

laid down in the books with reference to prescriptive easements under the ordinary law. We are entitled to have as much water as we have required and used in the past, though in particular years or in particular periods we may not have had or may not have used quite so much as in other years, and so long as we do not need more water than before, Mysore would have no reason to complain or take advantage of any particular works that we may construct or any expansion of irrigation that we may be able to effect. The quantity of water we have been taking must be decided not with reference to any specific period but by a survey of a fairly long period making allowance for full years as well as short and not taking into account the effects of our recent irrigation works.

19. Assuming, for the sake of argument, that the rights of Madras are to be ascertained as if on the footing that the ordinary law of prescriptive easements relating to water applied, what is the result?

20. One preliminary question in this connection is, what is the period of enjoyment to be shown and how is it to be reckoned? Mysore takes it to be a period of twenty years

beginning from about 1890. The question will, to some extent, depend upon whether the rule to be applied is that known as common law prescription or that of statutory prescription. The difference between the two is that for the application of the statutory rule of prescription the enjoyment must be shown for 20 years and must extend to within two years of the suit (see section 15 (2) of the Easements Act), whereas under the common law prescription the court holds a right proved by immemorial user, though the other side has the opportunity to show that the user is not immemorial. *Prima facie* the contracting parties in this case must have had something like common law prescription in view. There is no statutory law as to easements in Mysore, and anyhow it

Arguments against applicability of "statutory rule." will be out of the way to presume that Mysore intended to be governed by a statute of the Indian Legislature when the Agreement itself does not say so. The point, however, is not of much practical importance except to show that Mysore cannot confine our rights by the user at or about 1890. Under the rule of common law prescription we can avail ourselves of the rights we were enjoying even prior to 1890, if we have not since done anything to abandon our rights. Even under the Easements Act the Privy Council held that other modes of acquisition are not excluded by the Act (*vide Rajrup Koer v. Abdul Hossein*, I.L.R., 6 Calcutta, 394). The law of prescription has been known and applied in India independently of statute (*vide Ponnusami Tevar v. Collector of Trichinopoly*, 5 Madras High Court Reports, page 6); and there is no reason why, while the Agreement speaks of the law relating to prescription, it should be confined to any particular statutory rule. It may also be pointed out that there will be some inappropriateness in applying the rule of statutory prescription in this case, because there cannot be said to be any suit in the present instance, and the condition that the enjoyment must be within two years next before the institution of a suit can have no application here. It may be suggested that the Arbitration proceedings must be regarded as equivalent to a suit, but a reference to Arbitration, is a course open only to Mysore (for Madras can never claim a reference to Arbitration, unless Mysore proposes

Even if statutory rule applicable.

a particular work), and it will thus be an one-sided right of suit. But even assuming this step, in so far as any argument could be based on the allegation that the user prevailing in earlier years had not been continued up to within two years of the Arbitration, the answer is that there has been no non-user or interruption of user by act of the other party, and in the eye of the law the prior enjoyment will be regarded as continuing even in the absence of actual user, so long as there has been no interruption by the other party and nothing done by us to warrant an inference of abandonment (*cf. Koylas Chunder v. Sonatun Chung*, 7 Calcutta, 132, and *Janhavi Chowdhurani v. Bindu Bashini*, 26 Calcutta, 593).

21. It may be well to dispose here once for all of certain arguments of Mysore which seek to bring in consequences which under the ordinary law arise from non-user. In this case there has been no non-user at all in the proper sense of the term. At best there have been variations in the quantity of water taken or in the extent of land irrigated or in the manner of the distribution or regulation of the water, but none of these is analogous to non-user. The consequences which in the law of easements are said to follow from non-user arise only from absolute non-user (*vide* paragraph 26 *infra*), never from partial user in assertion of a general right to take what we want.

22. Apart from particular objections, the general argument of Mysore under the head of prescription is as follows:—

(1) As the dispute began in 1910 and as twenty years' peaceful enjoyment is necessary for the acquisition of a prescriptive right, Mysore's general arguments on limitation stated. Madras is entitled to a supply of water to the area irrigated and the quantity of water actually used about the year 1890.

(2) If the Madras Government have not been enjoying any of the rights claimed continuously for twenty years after 1890, they have no claim to them now. If the Madras Government imply (by their statement) that more water was used before the re-modelling of the Upper Anicut, they have lost the right to such supply since the re-modelling took place. Similarly, any special right claimed by Madras after the re-modelling cannot constitute a prescriptive right. They must prove that whatever quantity is claimed as due to them has been peacefully enjoyed without interruption for twenty years.

23. Having regard to the admitted fact that the Upper Anicut was re-modelled in 1899—1902 and that it did effect some changes in the pre-existing irrigation arrangements (though certainly not to the detriment of Mysore), the above argument of Mysore, if seriously taken, must lead to the logical result that Madras has no prescriptive right at all to anything. Before dealing with the argument in detail, it is necessary to invite attention to what may be called a fundamental fallacy underlying this argument.

24. The contention above stated ignores the whole history of Madras irrigation prior to 1890. It is intelligible only on the assumption that up to 1890 Madras had no rights at all and further not even a user in fact, and that only in 1890 we made the commencement of a user (then without any right) which must be continued for twenty years from that date to ripen into a prescriptive right. The user of Cauvery water for Madras irrigation is literally immemorial, and by centuries of such user Madras had, not to speak of her natural rights, acquired a right to the water. Taking things as they stood about 1835, the condition of affairs was then as follows.

There was no weir at the head of Srirangam Island, where the Upper Anicut now stands across the left of the two branches into which the main river, here called the Aganda Cauvery, divides at this place.

There were in existence large areas of irrigation under both these branches, but much the larger under the Cauvery, which is on the right side and is also the high level branch. As a consequence, the low water-supply almost all passed down the Coleroon, which is the left branch, and to adequately supply the large area of lands under the right branch, namely, the Cauvery Delta, a very large total flow of water was required in the main river above the point of division.

Thus, at that time, in order, therefore, to give adequate supplies to the Cauvery Delta lands, very considerable floods were required, and under the conditions described there can be no doubt that a much greater total discharge in the main river (the Aganda Cauvery) was required to pass adequate river supply to the Cauvery Delta than what would, under the subsequently existing conditions, have sufficed for such a purpose. As a fact, much loss of crops through inadequate supplies was then of frequent occurrence, and as the river flow was in those days certainly not less and was probably more than it is now, the inference is that the water required at the Upper Anicut site for the supply of the irrigated area below it was larger in quantity and the limit flow which could give an adequate supply was much greater than under the conditions which obtained after the construction of the Upper Anicut which was built in 1836.

The average yearly area of irrigation in the Cauvery Delta in the years 1832 to 1836 was 601,035 acres, and such an area in a river of very fluctuating flow, such as the Cauvery, required, whenever available, and certainly made use of, flow up to 7 feet into the right branch, and could not have been irrigated without fairly frequent freshes at least up to 6 feet passing into the head of the Cauvery.

Under the conditions existing before 1836, it is calculated that the total flow in million cubic feet in 24 hours in the main river (the Aganda Cauvery) required to produce depths of flow stated past the Cauvery head into the right branch was approximately as under:—

Depth, Cauvery head.	Discharge, Coleroon.	Discharge, Cauvery.	Total, Aganda Cauvery.
	M. C. FT.	M. C. FT.	M. C. FT.
5 feet	1,630	1,000	2,630
6 „	2,700	1,625	4,325
7 „	3,650	2,300	5,950

The above being the state of affairs prior to 1835, the proper way of looking at the question is to see if we have since lost the right to flow to the extent then required for user.

There is no suggestion that Mysore did anything to deprive us of our right, nor any suggestion of any adverse enjoyment as against us. Then, have we done anything to surrender our rights?

What we have done is briefly stated below.

In 1836 we built across the head of Coleroon (the left branch of the Aganda Cauvery) a solid weir called the Upper Anicut which stood 6 to 8 feet above the river bed. The effect of this was to divert into the right branch of the river (the Cauvery) much of the water which under previously existing conditions would have passed down the Coleroon. This had the effect of greatly improving the supply which, with the same customary discharges in the river, it was possible to pass to the lands constituting the Cauvery Delta system.

The table below displays the greatly improved conditions under which supplies could be passed to the Cauvery, and this may be compared with the conditions tabulated prior to 1836:—

Gauge- reading, Cauvery.	Discharge, Coleroon.	Discharge, Cauvery.	Total discharge, Aganda Cauvery.
	M. C. FT.	M. C. FT.	M. C. FT.
5 feet	Nil.	1,000	1,000
6 „	72	1,625	1,697
7 „	644	2,300	2,944

In order to protect the Coleroon irrigation from which supplies were diverted as above explained, a new anicut, called the Lower Coleroon Anicut, was built just below the head of the Vadavar, the feeder channel to the Veeranam tank. This work, which was situated some 70 miles below the Upper Anicut, enabled existing wet lands which would have suffered from the building of the Upper Anicut to be effectively supplied with the smaller flow now passed down the Coleroon.

Again, in 1899—1902, further changes in both Upper and Lower Coleroon Anicuts were carried out, in both cases, the solid crest level of these works being cut down 4 feet and lift shutters 6 feet high installed on the truncated works. This had the effect of giving still more efficient power of regulation and diversion of the flow of the Aganda Cauvery which was delivered at the Upper Anicut and facilitated the more efficient distribution and use of that flow.

Full details as regards the nature of the works here briefly referred to are given later.

25. In deciding the question of the effect of these changes certain well-established principles must not be lost sight of. During the time that a prescriptive right is being acquired certain Principles in determining “loss” of pre-existing rights. conditions have no doubt to be conformed to as to the nature of the enjoyment; and assuming, for the sake of argument, that prior to the acquisition of a prescriptive right mere fluctuations in the user may be prejudicial to the acquisition of a right, once a prescriptive right has been acquired, it cannot be lost by any subsequent act not amounting to a surrender even though such act would have, previous to the acquisition of such right, rendered the user precarious and made a prescriptive acquisition impossible (*Commissioners of French Hoek v. Hugo*, L.R. 10 Ap. Ca., 336).

26. As to extinction by lapse of time, there must be, as laid down by Chancellor Kent, a total cessation of the exercise of the right to the servitude during the entire period necessary to raise the presumption of extinguishment (3 Kent's Comm., 449 marginal page; vide also section 47 of the Easements Act). This is certainly not the case here.

27. As to abandonment (of our right to have as large a quantity of water as we had in prior periods). This is a question of intention and the presumption of abandonment cannot be made from the mere fact of non-user of the same quantity since (per *Alderson B. in Ward v. Ward*, 7 Ex., 838). In the last cited case it was held that an immemorial right of way was not lost by a non-user for upwards of twenty years, the user having been discontinued merely by reason of the party having had a more convenient right of way. Apart from statute, discontinuance will not have the effect of extinguishing an easement unless the surrounding circumstances are such as to warrant an inference of a release (*cf. James v. Stevenson*, 1893 Ap. Cas. 162 and *Kristodone Mitter v. Nandavini*, I.L.R. 35 Cal., 889).

28. An early case of *Hale v. Oldroyd* (1845), 14 M. and W., 789, is instructive on this point. The defendant was the owner of a close containing a well the water from which had flowed immemorially into an old pond situated in one of three closes belonging to the plaintiff. Some time about 1812 the plaintiff made three new ponds, one in each of his three closes, and having conducted the water into them ceased to use the old pond which became filled

with rubbish and overgrown with grass. In 1843 the defendant diverted the water and hence the action. On account of the intervention of a life tenancy a prescriptive right had not been acquired in respect of the new ponds as such, and the plaintiff's argument was that the new ponds were a mere substitution for the old one and that by abandoning the latter he had not lost his right altogether. So far as the abandonment was concerned, Pollock, C.B., said: "It appears to me that the plaintiff is right and that being defeated as to the three new ponds he is entitled to resort to the other and it is no objection that the old pond is not in a fit state to be used by him." Baron Parke observed: "The use of the old pond was given up by the plaintiff only because he had the same advantage from the other three ponds. He did not abandon his right but merely exercised it in a different spot, and a substitution is not an abandonment."

29. It is, therefore, impossible to contend that by virtue of anything we have done in connection with the Upper Anicut we have lost our pre-existing right.

30. In so far as we may rely on a prescriptive right acquired by enjoyment prior to 1890, Argument based on joint possession prior to rendition. one argument suggested in Sir K. Seshadri Ayyar's Memorandum of 1890, though not now put forward by Mysore, is that prior to the rendition we were in possession of Mysore also and that this unity of possession excludes the acquisition of any prescriptive right during that period. Unity of possession unaccompanied by unity of ownership could at the worst only suspend the acquisition of an easement. But in what sense can it be asserted that there was any unity of ownership or even of possession in the pre-rendition period? If the same person happens to be the trustee for the dominant and the servient owners, how can the common trusteeship affect the rights of the one or the other *cestui que trust*? The very argument shows the inappropriateness of applying private law to a case like this. One answer to this argument is that, if the usage of that period cannot be availed of to found a prescriptive right upon, the case may fall under the principle of section 13 of the Easements Act, and the result of the severance brought about by the rendition would be to entitle us to all privileges of irrigation that we enjoyed at the time of the rendition (*see Maria Susai v. Secretary of State*, 14 M.L.J., 350). Anyhow, even assuming that the principle of section 13 will not apply, it will be too much to contend that after the rendition we start with an absolutely clean slate and that the result of the joint occupation was to sweep away all irrigation rights which Madras might have enjoyed for centuries prior thereto. Unity of possession for a time is not fatal to a claim by virtue of immemorial user as distinguished from statutory prescription, *see Aynsley v. Glover*, L.R. 10 Ch. Appeals, 283; and that is the basis of the rule of common law prescription.

Principle of section 13 of the Easements Act. Joint occupation does not destroy pre-existing rights. the joint occupation was to sweep away all irrigation rights which Madras might have enjoyed for centuries prior thereto. Unity of possession for a time is not fatal to a claim by virtue of immemorial user as distinguished from statutory prescription, *see Aynsley v. Glover*, L.R. 10 Ch. Appeals, 283; and that is the basis of the rule of common law prescription.

31. Coming now directly to the question of the extent of our rights, the Mysore Government, in paragraph 4 of their case, say: "Madras is entitled under the Agreement to a supply of water to the area irrigated and the quantity of water actually used about the year 1890." It is not quite clear what exactly this means. Does it mean that we are entitled to the quantity of water necessary to irrigate the same area whether it now requires more water or less water, or to that quantity of water whether it now irrigates a larger area or a smaller area, or that we should satisfy both conditions, namely, that we can take the same quantity of water and irrigate the same area, but not take more to irrigate the same area or take the same water and irrigate a larger area. In our reply in the last sub-paragraph of paragraph 4 we say that our prescriptive right is in no way limited to the actual extent of land irrigated or amount of water used in three years before and three years after 1890. We object to attaching any particular importance to the year 1890 and also to confining our rights to the actual quantity we have used or the acreage we have irrigated. Our case is that we are entitled to a particular limit flow in the river and to certain minor additions.

32. It is no doubt generally laid down in the authorities that the measure of a prescriptive right is the extent of user, and we do not dispute this as a general proposition. But it is not a complete statement, and the question still remains, how is the extent of user to be measured? The extreme contention of Mysore we may take to be that we are entitled only to such water as may now (or in fact under possible future conditions) be necessary to irrigate the particular area which we can show we have been irrigating for the last twenty years (*vide* Rejoinder by the Mysore Darbar, paragraph 29 and conclusion). This is untenable. The true principle is indicated in section 28 of the Easements Act which provides that the extent of any easement and the mode of its enjoyment must be fixed with reference to the probable intention of the parties and the purpose for which the right was acquired, and it is only in the absence of evidence as to such intention and purpose

that it is provided that the extent and mode of enjoyment must be determined by the accustomed user of the right. The evidence as to intention and purpose may be direct or circumstantial. The following statement in Mr. Doss's Tagore Lectures on "Riparian Rights," page 324, may be taken as correctly summarising the law:—

Does. "Where water rights are acquired by prescription, their extent must be determined by the accustomed user, that is to say, the user upon which such right is grounded; but this must not be understood to imply that the riparian owner who has acquired the right is bound to use the water in the same precise manner and to the same precise extent or apply to the same mill, that he must not enlarge the area under cultivation or change the mode of it or enlarge the dimensions of the wheels or the horse-power of his machinery or change the site of his mill, for that would really prevent the growth of agriculture and stop all improvements in machinery. The principal rule is that he may change the mode, the object and even the place of using the water, provided the variation thereby effected is not so material as to sensibly prejudice the rights of other riparian proprietors. A difficulty may, however, arise if the user has been varying in extent. It has been held that in such cases the court is not bound to found its judgment solely upon the actual user proved, but may also take into consideration the surrounding circumstances."

33. Thus, if we make use of the same quantity of water now, but by a better arrangement and economy we serve a larger area with it, it is difficult to see how this in any way operates to the injury of Mysore or gives them any ground to reduce our supply.

34. To the same effect Angell, in his book on "Water Courses," in paragraph 230, says: Angell. "It should be observed that the fact of how much water has been actually used is not always decisive of the nature and extent of the right. That is, if for the space of twenty years a certain quantity of water has run uninterruptedly and as of right to a certain mill, the right to have that quantity run becomes an appurtenance to the mill, though the whole of it may not have been necessary for the purposes for which the mill has been employed. . . . In *Taylor v. Wilkinson* it appeared that a certain quantity of water had been accustomed to run in an artificial channel called Sergeant's Trench leading from the main stream, and Justice Story, in giving judgment, said: 'The proprietors of Sergeant's Trench are entitled to the use of so much of the water of the river as has been accustomed to flow through that trench to and from their mills whether actually used or necessary for the same mills or not, during the twenty years last before the institution of the suit.' At paragraph 227 the same author observes that, where once the right has been acquired to use a certain quantity of water, a change in the mode and objects of use is justifiable, the only restriction in America as in England being that the alterations made from time to time shall not be injurious to those whose interests are involved."

35. In Farnham on "Waters" the rule is thus stated: "The right which is acquired by the adverse use of the water of a stream is measured by the extent to which the claim was asserted and maintained. The claimant cannot on the one hand gain a right which is in excess of his claim. On the other hand, he will gain a right to all he claims although he does not make use of it to the full extent." (Section 542.)

36. The nature of our claim and the intention underlying our user are best shown by the instructions of our department with reference to the regulation of the supply at the Upper Anicut. How our "claim" shown.

37. Coming next to the particular grounds on which the extent of our claim is controverted by Mysore, the chief are: (a) that we are not entitled to the seven-feet depth claimed as a uniform measure and (b) that we are not entitled to any supply for Coleroon irrigation and the Veeranam tank. Specific objections of Mysore.

38. The second point may be shortly disposed of. One ground of objection under this head is that the claim was only recently put forward by us. This is explained in our reply. It is next alleged that it is based on recent practice. If, as a matter of fact, the Coleroon was receiving a supply before the re-modelling of the anicut, the fact that by the re-modelling the supply is distributed in a somewhat different way between the Cauvery and the Coleroon or that we now allow the Coleroon only the leakage or wastage from the Cauvery does not matter, so far as Mysore is concerned. It will not deprive us of our rights or make our claim one of recent origin (*cf. Hale v. Oldroyd supra*).

39. The objection of Mysore to the seven-feet claim is based on several grounds. Some of them are arguments only of fairness and reasonableness. Those sought to be based on legal grounds are (1) that in five months out of nine the seven-feet depth is rarely reached and therefore it cannot be said that this right is being continually enjoyed, (2) that before 1899 the

discharge passed down for irrigation was not seven feet, but somewhat less, (3) that in several months in the year either on account of local rains or on account of harvest, etc., it is not necessary to use the Cauvery water for irrigation, (4) that much of the water claimed will often run waste and there could be no prescriptive right to a wasteful use, and (5) that when the proposed Mettur reservoir is built, the former irrigated area can be supplied by a smaller supply of water in the Cauvery and that this entitles Mysore to a reduction in the quantity of water hitherto used by Madras.

40. The assumptions of fact underlying these several arguments are dealt with lower down, but even taking those assumptions to be correct, the legal conclusions do not follow as contended for by Mysore.

Assumptions of fact not correct.

41. Before dealing with the above arguments in detail, it may be pointed out that there is no warrant, as a matter of law, apart from any test of fairness, for the claim to break up the year into months and fortnights and distribute the supply of water according to the needs and supplies of particular months and fortnights.

Discussion of the several grounds.

Division into months and fortnights.

It will be impossible to ascertain the basis of a prescriptive right on such varying considerations. If the claim itself of Madras or the user all along has been definitely limited to particular days or months, that may be a different matter. The mere fact that in some years or in some months we do not get all the supply that we want, or the fact that at times we may not utilize all the water that is available, will not in law be an

"Infrequency of use" of seven feet.

impediment to our acquiring a prescriptive right to the water flowing in the usual way in those months so as to be capable of being used by us, if and as we want; and the fact that in several years the seven-foot supply was not reached during particular months will not deprive the user of its character of continuity necessary to a prescriptive right. The Mysore Government take the period between 1890 and 1910 and point out that during this period the seven-foot supply was only rarely reached in certain months. For the reasons already stated, there is no

Infrequency of supply of seven feet.

particular reason why the investigation should be confined to these twenty years, and as to the infrequency in the opportunities for the exercise of the right, rights to do things at long intervals are not unknown to the law. Thus in *Simpson v. Godmanchester Corporation*, L.R., 1897, 4p. Ca., 696, the House of Lords upheld an easement claimed by the respondents to open the gates of certain sluices or locks belonging to the appellant upon the river Ouse in times of flood or likelihood of flood in order to prevent damage to their own property. In the very nature of things the right could be exercised only in times of flood. And as for the argument of continuity, the law never considers an interruption due to seasons or other similar natural causes to be a breach of continuity. Thus in an early case of *Hall v. Swift* (4 Bing. N.C., 381) in answer to the argument

Illustrated by *Hall v. Swift*.

that a water-course in respect of which the easement was claimed had not flowed for three years at all and consequently there was no continuous enjoyment for twenty years, the court observed: "This might have arisen from natural causes, from perhaps a defect of springs or in consequence of dry seasons. It would be too much to say that the rights of parties to water-courses should depend upon a combination of

Angell on water-courses (n. 211).

"such fortuitous circumstances." Angell after citing *Hall v. Swift* quotes an American case of *Winnipeg Lake Company v. Younge* in which Boll, C.J., observed: "It is said the bill 'does not allege any certain height at which the water was kept up at any time. It is not perhaps necessary to state such a fact. The water may be liable to great fluctuations and if in substance it is alleged that it was kept up as high as their dam would raise it when there was water, its being drawn by the plaintiffs for their own purposes would not prevent their acquiring a right to the extent of their claim. . . . If the plaintiffs claimed right to 'keep the water in their dam at its full height whenever they chose and had water to fill it and 'exercised that right for twenty years agreeably to their claim, it would be conclusive that they 'possessed the right.' In India also there is abundant authority to the same effect. In

Indian cases on the point.

Perumal v. Ramasami, I.L.R., 11 Mad., at page 18 in answer to a similar argument the court observed that it would be altogether unreasonable to hold in this country, many parts of which depend upon only rainfall for their irrigation, that no right of easement can be acquired in relation to it, because there may be failure of rain in particular years or during the time of cultivation and to that extent the supply may be precarious or casual (see also *Budhu Mandal v. Mahat Mandal*, I.L.R., 30 Cal., 1077; *Krista Das v. Joy Narain*, 8 Cal. Weekly Notes, 158; and *Ghasiram Mandal v. Asirbad Mahto*, 13, Cal. L.J., 670). These cases also establish that the user need not be incessant or even annual, so long as there was no interruption to the claimant using the water whenever it was available and he chose to take it. It is not correct to base the

Rule of "average" inapplicable.

calculation, as the Mysore Government does, on averages, because we want to take and have been taking as much water as is available from time to time up to the particular limit of 7 feet. The fact the average works out at a lower figure is no reason why our rights should be confined to that figure.

42. The argument based on local rains does not require to be noticed at any length. It is too uncertain and shifting a factor to base any definite calculations upon and, so long as it cannot be said that the claim put forward by Madras in former years has been limited to particular months or to particular seasons, our rights cannot be cut down with reference to the mere possibility of rains.

Argument as to "rains."

43. It is difficult to understand what exactly Mysore means by the argument that there can be no prescriptive right to a wasteful use. If what is meant is that we could acquire no right to water that has merely been flowing waste, this may be so, but if they mean that we could acquire no right to a quantity of water which we were actually using, merely because it was not an economical use or it was not the best use, there is no warrant for the proposition. It must also be remembered that as part of our user even in the best conceivable way a certain quantity of water must run waste, because all the water in the river could not be put on the land, but a certain amount of water in the river is necessary merely for the purpose of raising the water-level so as to make irrigation possible. This cannot properly be regarded as waste, for without it the required supply of water could not be put on the land.

Argument of "wasteful" use.

44. Lastly, it is not easy to follow the argument based upon the re-modelling of the Upper Anicut or our proposed Mettur reservoir. We have already seen that a change in the user, even though it be to our advantage, does not affect our rights. It is not suggested that the re-modelling of the anicut has in any way increased the burden on Mysore. Prior to the re-modelling we required more water and were taking more water in order to irrigate the same area as we now do. We have only sought to better utilize and control the water by the re-modelling of the anicut, and the limit flow of 7 feet is the claim we have all along been making and acting up to. Mysore has no right to claim that we should not make better use of the water that we are entitled to. They can complain only if we make the easement more onerous to them. It cannot be said that the mere fact that by the improvements in our works we should be utilizing the water more regularly or more to our advantage is itself an aggravation of the burden of the easement or an alteration in the

No "aggravation" of burden.

mode of enjoyment which deprives us of our right. In *Hall v. Swift* already referred to, the court ask: "Suppose, for instance, a party had a right to water and that he thought proper to 'straighten the bank. Would he therefore lose his right? Again, suppose a party had a right 'of pathway over the field of another and he straightened or narrowed the way. Would therefore his right be gone and would the owner of the field have a right to obstruct him?" As pointed out by Angell (section 226), "Although the extent of the right is to be measured and 'regulated upon the enjoyment upon which the right is founded, the party is yet allowed 'freedom in the manner of exercising it." And in note 4 to section 228 the author cites a case of *Carter v. Shipman*, in which it was held that where the grant of an easement in the use of water is measured by the height in the dam to which the plaintiff is entitled, it is no objection that he has increased the capacity of his mill, so long as he demands the use of no more water than before. The case of *R. v. Tippet* (3 B. and Ald., 193), though a case of a public right of way, is instructive in this connection. By the side of a river there was a public towing path

R. v. Tippet.

which was used and could be used only at high tide; but the river was since altered so as to become navigable at all times and the towing path thenceforth came to be used at all times. It was argued that the burden on the servient tenement was thereby greatly increased and therefore the right of way was lost. The court held that it was not lost and in the course of the judgment Abbot, C.J., observed: "It was urged on behalf of the defendant that before the 'alteration vessels could be moved only at certain times of the tide which would include only a 'few hours of the natural day at any season and a very small portion during the season of neap tides; whereas since the alteration vessels may be moved at any hour in any season. . . . The purpose for which the path was used continues the same. The public had a right to use 'the path before the alteration at all times and seasons when it could practically be used. The 'right was not limited or restrained by any ordinance of man and had in truth no limit, but 'such as was imposed by the course of nature. . . . The use made of the place in question 'is of the same kind now as heretofore and the public right is of the same kind as formerly 'and we cannot say that the right is lost by those measures which have expanded its exercise 'over a greater number of hours than the natural state of the river formerly allowed."

45. In a similar case decided by the Judicial Committee and reported in I.L.R., 13 Cal., 136 (*Jadulall v. Gopalchandra*), the parties

Privy Council in 13 Cal., 136.

were owners of contiguous houses and periodically some three or four times a year scavengers hired by the plaintiffs passed through a passage belonging to the defendant to clean the plaintiffs' backyard. After 1876 municipal scavengers were doing the same thing daily. It was argued on behalf of the defendant that the change of system thus brought about operated as a breach of the user and so destroyed the possibility of a prescriptive title. The Privy Council said: "Their Lordships cannot see that 'the change of system works any discontinuance of the prior user. In point of frequency the 'user is much more active than before. The purpose is still the purpose of cleansing the privy

" It is argued that the change from the [practice of cleansing at long intervals to the practice of cleansing daily is so great that the servitude gained by the user is materially aggravated, indeed that it is applied to a new purpose which the plaintiffs have no legal right to do. It is difficult to see how the servitude is aggravated It cannot be much more onerous to the defendant that a small quantity of refuse should be removed daily than that a large quantity should accumulate and be removed at long intervals of time A servitude gained for one purpose cannot lawfully be used for another. What then is the servitude which the plaintiffs have acquired over the defendant's land? There is nothing in the proved facts to indicate a limit to the user of the passage, except the limit that it must be a reasonable user for the purpose of cleansing."

46. The real question therefore is, what is the nature of the easement right we had? Have we in any way changed it or made it more onerous to the servient owner? Unless Mysore can sustain the position that we are entitled only to such water as may be necessary to irrigate the particular area that has been under irrigation continuously for the last twenty years, no argument can be based on the way in which we use the water that we say we are entitled to. When a servient owner complains that he is injured by the altered user of an easement, the onus is upon him to prove such injury to his interest (see *Baxendale v. McMurray*, 2 Chancery Appeals, page 790). It need hardly be pointed out that, as stated by Sir K. Seshadri Ayyar in paragraph 4 of his memorandum of 1899, the injury that Mysore must show must be with reference to the rights existing at the date of the controversy or arbitration and not with reference to possible future works contemplated by them.

Exhibit Ma. 7 (a).

G.O. NO. 343 I., DATED 15TH JULY 1889.

GOVERNMENT OF MADRAS.

PUBLIC WORKS DEPARTMENT.

Irrigation.

READ—again the following paper:—

G.O. No. 242 I. dated 17th May 1889.

READ—also the following paper:—

[Subject.—Construction of tanks in the Mysore Province in the Chitravati river basin.]

[Reference.—Collector of Anantapur's letter, dated 11th April 1889, No. 192, forwarding report made by Head Assistant Collector.]

Memorandum by the Executive Engineer.

The Mysore Government are now constructing a large tank across one of the principal affluents of the Chitravati, about 2 miles east of Periasamudram, in a direction 48 miles N.N.E. from Bangalore. The bund of the tank abuts on a western spur of the hill marked Chikapille, which is a trigonometrical station.

2. The following are the particulars which I was able to learn on the ground respecting the work:—

Length of bund (which is between two hills) 900 feet.

Comparative levels, the lowest point bed of river being taken as zero.

Bed of river	..	..	..	..	..	..	..	0-00
Level of sluice	..	..	..	..	..	..	..	30-00
Do. of waste weir	..	..	..	..	..	..	..	60-00
Do. of top of bund	..	..	..	..	..	..	..	72-00

Capacity of tank = 12,000,000 cubic yards, which is independent of the quantity contained between 0-00 and 30-0, which will probably be another 3,000,000.

Area of waterspread	..	..	..	..	..	..	470 acres.
Catchment area	..	..	..	..	..	..	47 sq. miles.

3. The catchment area is generally hilly, and what other tanks there are in the basin do not appear to be of a large size.

Still they will retain some of the rainfall; their united capacity might be one-fifth of that of this intended large tank.

The rainfall is probably about 30 inches; the nearest rain gauge is that at Chika Ballapur, which has an average of 36 inches.

From Binnie's experiments at Nagpur, a rainfall of 30 inches would have a flow off of 8 inches nearly.

A flow off of 4 inches only would give a supply of 16,176,272 cubic yards or sufficient to fill the tank.

Eight inches would be the double this amount. But it must be borne in mind that the supply would be spread over both monsoons, that there would be irrigation going on, that the other tanks I have mentioned above will absorb some of the supply. I should estimate therefore that a total quantity of 20 million cubic yards would be retained by this proposed large tank.

4. The tank in the Madras Presidency, which is more immediately affected by the proposed Periasamudram tank, is that of Bookapatam. It is at a distance of 50 miles below Periasamudram, and there is no other tank across the main stream although there are several anicuts between.

5. There is some difficulty without further inquiry of estimating the proportionate damage which will be done to Bookapatam. One thing is certain, it means the absolute abstraction of 20 millions of cubic yards; the question is—What proportion is that amount of its present supply?

6. The annexed map will perhaps explain more fully what is meant. The rainfall in the Anantapur Collectorate does not average more than 17 inches, which would only allow of a flow off of 2 inches.

The flow off in the Mysore Province may vary from 3 inches at Bangapille to 8 inches at Chikapille or say an average of 4 inches. I may remark here that the rainfall is decidedly more than what obtains in Anantapur; the whole country is greener, becoming more and more so as Chika Ballapur is approached, the trees are larger and more numerous.

Allowing that one-half is absorbed by tanks and anicuts already in existence, the supply of Bookapatam will be as follows:—

	C. YDS.
Madras, 295 square miles at 2" =	 50,765 960
Mysore, 330 do. at 4" =	 113,578,080
	164,344,040
Deduct half for other tanks and anicuts	 82,172,020
	82,172,020

In the basin of the proposed Periasamudram tank the rainfall must be large, for even at the end of the hot weather there was a stream discharging 6 cubic feet a second, so that I do not think the allowance of a flow off of 8 inches is excessive.

7. It appears therefore that the supply to Bookapatam tank will be diminished in ordinary years by $\frac{1}{4}$ th.

From a section of the bund and allowing an area of waterspread of 3 square miles, I calculate the capacity of the Bookapatam tank as roughly 50 millions of cubic yards, the ayacut underneath is 2,168 acres. The bund is 70 feet high in the rear; there is silt in the front, but even then it would appear there is 25 feet to 30 feet depth of water near the bund.

The average supply, it will be seen, I estimate as about 80 millions of cubic yards, and were this to be depended upon for the greater number of years, there would be nothing on the part of the action of the Mysore Government to protest against.

This, however, is not the case; the rainfall is frequently far below the average, varies more indeed in the Anantapur district than in Mysore. Even now the Bookapatam tank does not fill every year.

8. The information that I have been able to get is to the effect that the Bookapatam tank fills seven years out of ten years; in the remaining three years the level of the water is 5 feet below waste weir level, so that in those years it only holds 35 millions of cubic yards. Any further loss of water in those years such as would arise from the impounding of even 15 millions in Mysore would mean that only half the cultivation could be carried on. In the other seven years, if what the Tahsildar reports is correct, viz., that the Bookapatam discharges 15 days at an average of 9 inches depth over the waste weirs 1,300 feet long, this will be a probable discharge of about 140 millions of cubic yards. In these years the proposed Mysore tank will not be so detrimental, although it should be here noted that the Dharmavaram tank below the Bookapatam, which occasionally fills as it did last year from its own independent catchment basin of about 324 square miles, yet that is not often, generally fills in large part from the overflow of the Bookapatam.

This bears out what I have been urging, viz., that the rainfall in Anantapur is so scanty and the flow off from the ground so little that these large tanks are more dependent upon their supply from the Mysore side than from British territory.

9. There is another project similar to the above of Periasamudram which I understand is to be carried out afterwards.

On the Chitravati, about 4 miles above Bangapille, at a place called Cargur, a large tank is also proposed. The site is favourable; there is an anicut already there.

A. on sketch-map.

10. Should this tank be also constructed and should it with its much larger drainage area of 180 square miles impound another 20 millions of cubic yards, not merely in three years out of the ten will the Bookapatam tank be nearly dry, but in even more favourable years will its supply be short, so that in only three of the years of maximum rainfall out of the ten years will it fill at all.

11. I believe the Mysore Government will urge that after all they are only impounding water derived from rain falling entirely on their own territory to which they have a natural right. And this no doubt would be the case had these tanks proposed by them been constructed before either Bookapatam or Dharmavaram, to

• Five channels in Cuddapah district.
(Intld.) G.T.W.

say nothing of the many anicuts* across the Chitravati. These tanks in the Madras territory, however, are many hundred years old; they have established by precedent and long usage a right to the water, and the burden of the proof that no injury will be done them by the construction of one or both of these proposed tanks really lies not with the Madras Government, but with that of Mysore. It is for the latter to prove that there will be no injury, not so much for the former to prove that there will.

31st May 1889.

H. W. CLIFT,
Executive Engineer.

No. 659.

Endorsement on original letter No. 579, dated 1st June 1889, from the Executive Engineer, Bellary division, to the Superintending Engineer, III Circle.

Forwarded to the Chief Engineer for Irrigation with reference to G.O. No. 242 I., dated 17th May 1889.

BELLARY,
12th June 1889.

H. SMALLER, Col., R.E.,
Superintending Engineer, III Circle.

No. 72 I.

Note by the Acting Chief Engineer for Irrigation.

The Superintending Engineer, III Circle, has, with his endorsement No. 659, dated 12th June 1889, forwarded the report by the Executive Engineer, Bellary division, called for in G.O. No. 242 I., dated 17th May 1889, from which it is evident that the large tank which the Mysore Government is now constructing on the head waters of the Chitravati river will deprive certain irrigation works in British territory of a large portion of their supply of water when it is most needed.

2. The most important of those works are the Bookapatam tank (No. 27 of list of Imperial irrigation works) which irrigates upwards of 2,000 acres, and five channels (Nos. 27 to 31 of the Imperial list) which irrigate upwards of 1,200 acres.

3. It appears also that the Mysore Government is intending to construct another large tank to impound water from the same affluent of the Chitravati which would still further lessen the supply to the tanks and channels in British territory which depend on that river.

4. In a letter (No. 60/8, dated 9th April 1889) addressed to the Assistant to the Resident in Mysore by the Public Works Secretary to the Government of Mysore about proposed works on the head waters of the Papaghni river (which will be separately dealt with) that officer says "it is considered that, under the law and custom of all countries, Mysore has the right to utilize to the fullest extent the natural water-courses flowing through its territory," but with reference to this the Resident in Mysore says in his No. 1967-818, dated 14th June 1889, to the Chief Secretary to Government of Madras that the general proposition "is untenable" and that the Government of Mysore has, by him, been informed that "it has no right to interfere with such watercourses in any way that may be detrimental to the interests of subjects of another power lower down their streams."

5. I recommend that the suspension of the Mysore works under notice be obtained.

OOTACAMUND,
4th July 1889.

G. T. WALCH,
Ag. Chief Engineer for Irrigation.

To the Secretary to Government, Public Works department.

Order—No. 343 I., dated 15th July 1889.

The Mysore Government will be at once addressed in the Political department with a view to the suspension of all new works which it is constructing or contemplating on streams which supply existing irrigation works in British territory and especially those on the head waters of the Chitravati.

2. The principle stated by the Secretary to the Mysore Government, Public Works department, as quoted in paragraph 4 of the note by the Acting Chief Engineer for Irrigation cannot be accepted by this Government, and it is satisfactory to see that it is rejected by the Resident.

(True Extract.)

G. T. WALCH,
Ag. Secretary to Govt., P.W.D.

To the Chief Engineer for Irrigation.
„ Superintending Engineer, III Circle.
„ Revenue Department.
„ Political „

Exhibit Ma. 8.

MADRAS CASE.

PART II.—HISTORICAL AND DESCRIPTIVE.

Description of conditions of run-off and of Madras Irrigation under the Cauvery with descriptive and Historical notes on the Delta.

REGULATION WORKS.

1. *Character of rainfall in the Cauvery basin.*—The Cauvery and its principal tributaries in Mysore rise amid the Western Ghats in Coorg and Malabar, and it is to the heavy rainfall of the south-west monsoon in these hilly tracts that by far the greater part of the flow during the period of this monsoon from about the middle of June to middle of September is to be attributed in a normal year, and still more in a year of deficient rainfall.

In the southern part of India the rainfall of the south-west monsoon is not generally heavy on the east of the Western Ghats. Speaking generally, in the plains catchment of the Cauvery, the rainfall increases as the season progresses. The average is heavier in August than in July and heavier in September than in August. During the north-east monsoon, October to December, the rainfall in the Cauvery catchment on the east coast is generally heavy but diminishes inland and becomes less the further west and north one goes. The rainfall in the north-east monsoon in the hills of Coorg and the west coast is much lighter than during the south-west monsoon. In October only is there any considerable and certain rainfall. During the north-east monsoon, under normal conditions of rainfall, the Cauvery flow may be said to depend most on the run-off from the plain catchments and from the hills forming part of the catchment of the lower tributaries, the Bhavani, Amaravati, etc., while the flow of the earlier part of the year depends almost altogether on the run-off from the hill catchments of Coorg, Malabar and Mysore. In addition, there is some hill catchment in the Bhavani basin, mostly in the Nilgiri district, which receives fairly heavy rain in the south-west monsoon. The catchment of this river, indeed, gets a fairly good supply from both monsoons.

2. *Supplies in south-west monsoon dependent on hill catchment.*—Speaking generally, therefore, in a normal year the supplies of water in the Cauvery are, in the earlier part of the irrigation season, June to September, mainly dependent on the precipitation of rainfall in the hills in Coorg, Mysore and Malabar. These hill tracts form only a small proportion of the area of the Cauvery catchment—2,830 square miles out of 26,000 square miles—but it is on the run-off from this small area that in a normal year the greater part of the whole flow of the river is derived in the south-west monsoon. In the north-east monsoon (October to December) the whole catchment, and more particularly the southern and eastern portions, contribute the flow.

The rainfall of the south-west monsoon in the hills, while varying very considerably in quantity, is always heavy and in this respect never fails, although in a bad year the flow of the Cauvery is generally smaller than is required for direct irrigation of existing areas.

3. *Rainfall in north-east monsoon variable.*—The rainfall of the north-east monsoon is not nearly so dependable as the rainfall in the hills in the south-west monsoon, and this specially is so as regards the heavy rain near the coast. In a bad year the water-supplies in the Cauvery dwindle to a small fraction of the normal, and the whole flow of the river is inadequate to give the necessary water to the irrigated areas under it.

As an instance, the average rainfall in the Tanjore district during the months of October, November and December is 26.62 inches, but the rainfall in the year 1904 was only 15.98 inches, the monthly variation is much greater.

4. *Flow of the Cauvery in south-west monsoon.*—In consequence of the above conditions, the flow of the Cauvery in a normal year is during the south-west monsoon, to a very great extent, dependent on the run-off from the hilly catchment above the Sivasamudram anicut, and during this season the fluctuating contributions from the tributaries joining it below this, with the single exception of the Bhavani, are not to be depended on and generally are insufficient to make up for the losses in transmission from percolation, evaporation, etc. The Bhavani, however, can generally be counted on to contribute materially to the main river throughout the greater part of the south-west monsoon. In a bad year, this flow is, however, insufficient to make up for the draw-off of the Cauvery channels between the Bhavani confluence and the Upper Anicut.

5. *Conditions of flow in north-east monsoon.*—The north-east monsoon conditions are normally different and the flow of the river between Sivasamudram and the Upper Anicut is generally a progressively increasing quantity during this season. In a bad year, however, this is not the case as the contributions of the tributaries having their catchments in the plains are insufficient to balance the losses in transmission. There is a large area (94,000 acres) of direct irrigation under the Cauvery between the confluence of the Bhavani and the Upper Anicut, and it is found from the record of gaugings that in a bad year the draw-off for this area together with the losses by percolation and evaporation exceeds the inflow from tributaries, including the Bhavani and Amaravati.

6. Attention is also invited to Sir John Benton's description of the country in paragraph

Character of the Cauvery river.

- The river drains mountainous tracts, those on the west having a heavy rainfall of over 96 inches; the declivity of the channel is steep, and the floods frequent, rapid and torrential. The rise and fall of the river at the head of the Madras Delta corresponds to every important shower in the catchment area. In Appendix I to this Note, I have given the dates of occurrence of the various floods which have occurred in the twenty years ending with 1909-10. It will be seen that the floods and freshets have been very numerous. The diagrams of the gauge readings are far more serrated than those on almost any other large river in India.

the existing conditions of flow of the river without grave risk of finding that the forecasts are not realized.

8. *Large area under direct irrigation by the Cauvery.*—In comparison with its mean total discharge the Cauvery irrigates by direct flow a very extraordinary extent of land, greater, it is believed, than that under any other considerable river under similar conditions.

The fact that this extent has not increased in recent years is a certain indication that the limits of fairly scoured irrigation by direct flow have been reached. In regard to this matter, reference is invited to Sir John Benton's Note, above referred to, which brings out this feature very clearly. This being so, it will be clear that in a bad year the supplies are likely to be deficient and such is, as a fact, the case. In the year 1899-1900, which is the worst recorded year, remissions of revenue in the Cauvery Delta amounted to Rs. 6,27,295. A computation of the losses which would be entailed on the ryots in a year in which such remissions are given shows that they would amount to about 70 lakhs at prices which formed the basis of the assessment valuation, and to about 90 lakhs at prices ruling in the year 1899. In this year, the total flow of the river at the Upper Anicut was only 203,744 million cubic feet, of which about 45,000 million cubic feet had to be involuntarily surplused.

9. *Supplies in bad years compared with minimum estimated requirement.*—The estimated requirement of existing irrigation under a system in which the supplies of water are under control and given out from a large storage reservoir in accordance with requirements was fixed in the Madras Cauvery Reservoir Project at 190,050 million cubic feet yearly (Volume I, paragraph 56), and even this estimate took no account of an area of 27,000 acres in French territory, which was omitted by oversight, involving a further requirement of about 5,000 million cubic feet.

As the total quantity of water required for irrigation is from 30 to 50 per cent. greater if drawn from an uncertain and fluctuating source of supply than if drawn from a reservoir in the quantities actually required, it will be realized that in 1899 the river supplies fell very far short of what was required. The same occurred in the years 1904, 1905 and 1908 to a very material, although much less, extent.

10. *Necessity for receiving all water now delivered to irrigation.*—From the above it will be realized that the withdrawal from the existing irrigated lands in a bad year of any of the water which would, under existing conditions, be available for irrigation cannot but prejudice the success of the cultivation and Madras prescriptive rights and that it is essential that no water which is, under existing circumstances, in the enjoyment of Madras should be permitted to be impounded or diverted to any other use.

11 of his note, dated 12th May 1911, re-produced in the margin * and to paragraphs I and II of Appendix E, Mysore Cauvery project.

7. *Forecasts of character of season impossible.*—

From the characteristics described above, it will be clear that the river is of a nature which does not allow a forecast of probable flow a few days ahead to be made with any reasonable accuracy. The character of the earlier part of the season affords no indication whatever of what may be expected later, and it is not possible to economise water by forecasting probabilities from

BRIEF DESCRIPTION OF MADRAS IRRIGATION ON THE CAUVERY.

11. *Madras irrigation above the confluence of the Bhavani.*—The irrigation under the Cauvery in the Madras Presidency commences seven miles above the new anicut built in 1900-1901 at Sivasamudram by the Mysore Engineers in connection with their Electric Power Installation, and consists of 764 acres under the Danakarai Anicut. The catchment area above the Sivasamudram Anicut is 8,500 square miles, comprising 2,829 square miles of hill catchment. The area of Madras Irrigation between Sivasamudram and the confluence of the Bhavani, a distance of 115 miles, is only about 128 acres, and it is all within a few miles of the Sivasamudram Anicut. For the supply of this irrigation, a vent of 3 feet x 3 feet is left in the Kollegal section of the Mysore-Sivasamudram Anicut.

12. *Madras irrigation between the confluence of the Bhavani and the Upper Anicut.*—It is believed there is no other irrigation in Madras by direct flow from the Cauvery between Sivasamudram and the confluence of the Bhavani, 115 miles below Sivasamudram. Below the confluence of the Bhavani, however, down to the Upper Anicut numerous channels for irrigation of marginal lands take off on both sides of the Cauvery in the districts of Salem, Coimbatore and Trichinopoly. These channels generally raise two crops of rice, and in addition there is a considerable area of sugarcane and garden crops, requiring perennial irrigation.

The lands are fertile and valuable and the cultivation has been practised for very many years. The channels are old ones and were in existence before the country came under the British rule. The total area so cultivated, which in previous reports, based on erroneous statement in the Madras Cauvery Project, was stated at 61,000 acres, is now found to be 94,000 acres.

A list of channels and acreage is appended (Appendix III).

13. *Delta irrigation under the Cauvery.*—The Upper Anicut, which is 82 miles below the confluence of the Bhavani and 197 miles below Sivasamudram Anicut, may be regarded as the head of the delta systems of irrigation.

These systems are known as—

	About.
	ACS.
(a) The Cauvery Delta System	890,000
(b) The Lower Coleroon Anicut System	112,000
There is also under the Cauvery System—	
(c) French Irrigation System	27,000
Total	1,029,000

14. *General description of river branches below the Upper Anicut.*—The Upper Anicut is situated at the upstream end of Srirangam Island, and the Cauvery, here known by the name of the Agunda Cauvery, at this place divides into two branches. The left branch is called the Coleroon; it is the main branch of the river and the natural carrier of the greatest portion of the discharge. The right branch, however, retains the name of the Cauvery.

Srirangam Island is about 18 miles long, and in this length constitutes the tract of land dividing the Cauvery and the Coleroon.

Near the tail of Srirangam Island, the Cauvery again bifurcates, the right branch being called the Vennar. At the tail of the island, the Cauvery divides into two branches, the left of which re-joins the Coleroon thus making Srirangam an island, while the Cauvery continues its course separated from the Coleroon by a deltaic tract of country gradually widening in extent.

The two rivers, the Cauvery and the Vennar, are the sources of supply of water to the Cauvery Delta System.

HISTORICAL NOTES REGARDING CONSTRUCTION OF REGULATING WORKS.

15. *Original construction of the Grand Anicut.*—In the early years of the nineteenth century, the Grand Anicut was the only effective work for diverting water for irrigation from the Cauvery or the Coleroon.

This work is one of considerable antiquity and was built during the time of one of the Chōla kings. It consisted of a solid weir of stone in mud hearting faced with cutstone in channam. The work served to block the river channel between the tail of Srirangam Island and the left side of the Cauvery Delta thus forcing water down the Cauvery which would, under other circumstances, have passed into the Coleroon through this channel. Under the conditions introduced by the construction of the Grand Anicut, the Coleroon, which is naturally the branch of the river taking the greater part of the water, was gradually becoming scoured deeper, while the Cauvery (the right branch) had its bed more and more silted up and the irrigation under it was suffering from inadequate supply.

In 1830, ten scouring sluices, 4 feet by 3 feet, were built in the right end of the Grand Anicut for scouring away the sand. The sills of these sluices were ten feet below the level of the crest of the dam.

16. *Construction of the Upper Anicut in 1836.*—The silt difficulties could not be remedied by so small a work, and to deal fully with the matter the construction of the Upper Anicut was undertaken and finished in 1836. The work as then built consisted of a weir across the Coleroon (the left branch) at the head of Srirangam Island. The weir was originally divided by two islands into three lengths, but subsequently one island was removed and the weir carried over the site and converted to two lengths—

The South branch was 2,097½ feet long.

The North branch was 464 feet long.

It was, however, found that this solid dam gave rise to great accumulations of sand above this work, and in 1845 scouring-sluices were constructed spaced at irregular intervals along the length of the dam and a narrow arched bridge, from which the sluices could be worked, was built on the foundations of the existing work.

17. *Construction of the Cauvery Dam in 1845.*—After the construction of the Upper Anicut, it was found that there was a tendency for the Cauvery bed to scour out, and not only was an undue amount of water passed down the Cauvery in floods, but there was danger of command of marginal lands being in some cases lost. To obviate this, in 1845, the Cauvery Dam was built across the head of the Cauvery (the right branch).

The work is of the nature of a floor or grade wall merely intended to prevent erosion of the bed and margins of this branch at its head.

18. *Construction of 150-yard calingulah.*—At the same time a surplus escape, known as the "150-yard calingulah", was built in the left bank of the Cauvery, 3 miles below the Cauvery Dam. This is a weir allowing water to pass over it into the Coleroon as soon as the depth in the Cauvery exceeds a certain height.

19. *Bridges and Regulation at the old Vennar Head.*—About 2½ miles above the Grand Anicut the Cauvery bifurcated into two branches, the right branch being the Vennar, while the left retained the name of the Cauvery. Over the Vennar and the Cauvery at this place a narrow bridge spans the rivers—

Over the Vennar 18 arches of 30-feet span.

Over the Cauvery 30 arches of 30-feet span.

At this place a certain amount of regulation of water was carried out by wood planks or shutters 1½ feet high. These planks could only be worked during the periods of low flow and were never efficient means of regulation.

20. *Alterations to the Grand Anicut.*—About 1840, a bridge was built over the Grand Anicut being carried on the existing work as a foundation.

Writing in 1874, Major Oakes describes the conditions at the Grand Anicut as follows:—

"The waterway of the dam is 960 feet, which is reduced to 735 feet by dam stones for 2½ feet above the crest which is not very level. With 6 feet of water at the Cauvery Dam, the water begins to pass over this weir when 17,600 cubic feet per second are passing down the Cauvery, but by means of the shutters the water can be retained 2 feet higher when 23,650 cubic feet would pass down the Cauvery."

21. *Construction of the Lower Anicut, 1836.*—The Lower Anicut was built about 1836 across the Coleroon about 70 miles below the Upper Anicut.

The object of the work was to ensure the adequate supply to the lands dependent on the Coleroon after the construction of the Upper Anicut had effected a diversion into the Cauvery of much of the water which under natural conditions passed down the Coleroon.

The anicut consisted of two branches with an island about 1,280 feet wide between them. At the same time, the North Rajan Voikal (channel) was dug to supply lands previously irrigated by four separate channels taking off from the left bank of the Coleroon. A channel (the South Rajan Voikal) was also dug to supply lands on the right side of the river in Mayavaram and Shiyali taluks of the Tanjore district.

22. *Construction of Cauvery and Vennar regulators and new Vennar Head, 1888.*—In the years 1886–1888, a material change in the works at the Grand Anicut was undertaken. A new head for the Vennar was cut from the Cauvery right side just below the Grand Anicut into the Vennar. Two regulators, being bridges with the openings controlled by shutters worked by screw-gearing, were constructed across both the Cauvery and the Vennar just below the Grand Anicut. The Grand Anicut was also fitted with falling shutters, 2 feet 10 inches high, enabling water to be held up to a height of 2 feet 7 inches above the crest of that work. These shutters replaced the dam stones mentioned by Major Oakes. Thus, from 1888 fairly efficient control of the regulation of the water passing over the Cauvery Dam was for the first time obtained. The Old Vennar head taking off the Cauvery 2½ miles above the Grand Anicut was not, however, closed till 1894, and up to then the supplies to the Vennar were received in part through the old head and in part through the Vennar regulator at the Grand Anicut.

23. *Remodelling of Upper, Lower and Grand Anicuts, 1899–1902.*—In 1899 to 1902, the crest levels of both Upper and Lower Anicuts were cut down 4 feet, and on these crests throughout their whole length were installed long lift shutters, 6 feet high, capable of entirely blocking the waterway up to the level of their top when resting on the crest (or sill) of the anicuts. Similar shutters were installed throughout the length of the Grand Anicut, but the crest level of that work was not altered. The under-sluices of the Upper Anicut were done away with at this time, but those of the Lower and Grand Anicuts were left unaltered.

The above works gave greatly increased powers of control and diversion of river flow.

DETAILS OF THE CONDITIONS OF REGULATION AND IRRIGATION AT DIFFERENT PERIODS.

24. *Proposed arrangement of matters to be described.*—For the purposes of consideration of the various conditions of irrigation which obtained at different periods, three periods will be noted on:—

(a) The conditions before the construction of the Upper and Lower Anicuts by the Madras Government about 1836.

(b) Conditions from the period after construction of the Upper and Lower Anicuts till the remodelling of these works and fitting with large lift shutters in 1899 to 1902.

(c) The conditions subsequent to remodelling the Upper, Lower and Grand Anicuts in 1899–1902 up to the present date, and the nature of the works after remodelling will also be fully described.

In dealing with these the conditions will generally be considered separately with reference to the following places:—

(1) The Upper Anicut,

(2) The Lower Anicut,

(3) The Grand Anicut,

and these will be separately described and the conditions of water control at each place noted on.

25. *1890 to 1899 taken generally as representative of conditions prior to remodelling of anicuts.*—The works at the Upper, Lower and Grand Anicuts were modified and improved from time to time between 1836 and 1899, but no material alterations were made between 1890 and 1899. The general irrigation conditions, except as regards control of floods at the Grand Anicut, were not very greatly altered in this period. The conditions obtaining in 1890 to 1899 will be described as representative of those which existed during the period prior to the remodelling of the anicuts.

26. *Irrigation conditions prior to construction of Upper Anicut, 1836, and its effect on irrigation.*—In this period there were no regulation works or diversion works of any kind at the Upper or Lower Anicut sites and the bifurcation of the river and the proportion of flow of the Agunda Cauvery which passed down each branch was left to nature.

The construction of the Grand Anicut, however, barred the return to the Coleroon past the tail of Srirangam Island of any of the low water or normal stage flow which passed into the right branch at the head of Srirangam Island.

Under these conditions, a large proportion of the flow passed down the Coleroon, and there was no need of any anicut to divert water into the channels taking off from the Coleroon for the direct irrigation of lands on both sides but especially on the left side of this river or for the supply of the Veeranam tank through the Vadavar. During normal supply periods there was more than ample water in the Cauvery for all direct supply, and during freshes the Veeranam tank was filled through the Vadavar and the storage served to protect the irrigation under it during periods of low supply.

The conditions then existing connoted ample supplies to the Coleroon irrigation, but frequently deficient supplies to the Cauvery and Vennar Systems.

27. *Conditions at the Upper Anicut prior to 1899 and after construction of the Upper and Lower Anicuts.*—The construction of the Upper Anicut diverted into the Cauvery almost all the low flow of the Agunda Cauvery and a large proportion of the normal flow. As regards the floods, this construction also served to divert into the Cauvery a considerable increase of flood water. As a consequence of this construction, the irrigation under the Cauvery and the Vennar was at once relieved from the normal conditions of deficient supplies; but, on the other hand, during floods much damage and loss was sometimes occasioned by water passing down them in excess of what those rivers would carry. The Cauvery bed at the head of Srirangam Island commenced to open out and to deepen while accumulation of silt formed at the head of the Coleroon above the anicut. This led to the construction in 1846 of the Cauvery Dam to hold the river-bed at the head of the Cauvery from erosion and of the scouring sluices in the Upper Anicut to remove the sand accumulated at the head of the Coleroon.

The effect of these works was eminently satisfactory in the improved supplies of water passed to the Cauvery Delta System, and considerable extension of irrigation was realized in the thirty years which followed the construction of the Upper Anicut.

Trouble was, however, experienced from the accumulations of sand in the Coleroon head and also from excess of water in great floods passing down the Cauvery which could not be surplused in sufficient quantity at the Grand Anicut. Further, in years of flow below the

average it was found that there was occasionally deficient supply of water to the areas under the Cauvery and the Vennar. It was not practicable to raise the Upper Anicut in the existing form of a solid weir as this would have had the effect of accumulating more sand above the Coleroon and accentuating the difficulties experienced from excess water in the Cauvery during high floods, and the remodelling of the Upper Anicut was the remedy applied and the details of the working under such conditions will be described later.

UPPER ANICUT.

28. *The Upper Anicut as it existed before the remodelling.*—The anicut was composed of two branches, North and South, with an island between them. Both branches were spanned by a bridge with arched openings.

The North Branch.—The North Branch had 12 spans: 4 of 33 feet 6 inches clear and 8 of 35 feet 3 inches clear.

In the 6th and 7th spans, there were eight under-slucies with shutters 6 feet span and 8 feet high with screw gearing.

The sill level of the under-slucies was 1.14 feet below the zero of the Cauvery Dam gauge, and the shutters could be raised till their lower edges were at level of 9.5 feet above the sill.

The top of the crest of the anicut in the other vents was at level of 5.91 feet above the zero of the Cauvery Dam north gauge.

South Branch.—The South Branch consisted of 57 spans of slightly varying lengths approximately as below:—

5 spans of 30 feet 2 inches.
9 " of 30 " 10 "
8 " of 33 " 10 "
13 " of 33 " 4 "
5 " of 31 " 11 "
5 " of 32 " 6 "
5 " of 34 "
7 " were fitted with under-slucies.
—
57 spans.
—

The under-slucies were 17 in number of spans varying from 6 to 7 feet width and averaging 6½ feet. The sill level varies from + 236.45 to + 236.90 and averages + 236.75 or 0.49 foot above the zero of the Cauvery Dam gauge. The shutters could be raised so that their lower edges were on a level averaging 8.96 feet above the zero of the Cauvery Dam gauge.

The crest of the South Branch anicut in the 50 spans of bridge was of somewhat irregular level, but the average crest level was 5.7 feet above the zero of the Cauvery Dam north gauge.

29. *Rules for the Regulation of the Upper Anicut before remodelling.*—Between 1882 and 1899, two sets of rules of regulation for the guidance of the Superintendent at the Upper Anicut were in force. The first set was in force up to 1895 when they were altered at the instance of Col. Smart, R.E.

The two sets of rules are attached (Appendix I) and are referred to as the rules of 1882 and of 1896.

30. *General conditions of the Cauvery Delta supply under rules of 1882.*—During this period 1880 to 1899, the area irrigated below the Upper Anicut did not materially differ from the present irrigated area, but the conditions of supply were somewhat different from what they are at present. The power of regulation at will and diversion of water of the Agunda Cauvery at the Upper Anicut from one branch to another was small.

The construction of the Upper Anicut had the effect of diverting into the Cauvery much water which would otherwise have passed down the Coleroon, but when this was done there was no power or option left as to the division of the water between the two branches and the proportion of flow in each branch was not capable of any regulation or variation.

The accumulation of silt above the new work led to the construction of scouring sluices which were designed primarily for the removal of the sand which accumulated above the solid anicut.

These under-slucies were for those days large and powerful, but their effect in altering the proportion of distribution of water between the two branches of so large a river was comparatively small.

The rules drawn up for working these sluices in 1882 had in view primarily the scouring of sand, and it was laid down that, when there was no scarcity of water, the opening of the sluices should commence when water rose to 6½ feet on the Cauvery Dam gauge, but in time of scarcity the sluices should be opened only after water rose to 7 feet.

It is desirable to consider the actual effect of this rule turned into discharges and the conditions under which it has been exercised.

First of all, the difference in the conditions and amount of discharges of the Cauvery Dam produced by opening the sluices of the old Upper Anicut will be considered. Suppose a rising flood under conditions allowing such opening as will maintain the gauge of not less than 6½ feet. The discharge due to the full opening of all the under-slucies when 6½ feet of water was passing over the old Upper Anicut is calculated at 725 million cubic feet in 24 hours. The discharge over the solid anicut with 6½ feet gauge is 366 million cubic feet. The total discharge into the Coleroon is 1,091 million cubic feet. The total discharge of the Agunda Cauvery under this condition is 3,041 million cubic feet. In the event of the under-slucies not being opened, the same discharge would be passed with a gauge-reading of 7 feet (Cauvery Dam gauge).

The effect of opening the under-slucies has thus been to keep down the level of water half a foot and connotes a reduction in the supply of water delivered to the Cauvery and the Vennar of 300 million cubic feet per day allowing for discharge over the 150-yard calingulah. Thus the rules provided for scouring the sand at a time when water was not scarce at a sacrifice of water to the Cauvery system of 300 million cubic feet per 24 hours.

The rules, however, recognize that after a period of low supply the gain to be obtained by scouring does not compensate for the loss of water, and 7 feet on the Cauvery is provided for before allowing use of water for scouring. The above is on the supposition that all under-slucies are fully opened. Unfortunately the registers do not show the height to which each sluice was opened and the extreme case of all fully opened is the condition described above.

It is to be recognized that the opening of the under-slucies at gauge-reading of 6½ feet was not in order to surplus water which was not useful, but with a view to utilizing water for scour purposes. Further, the water so passed was used in supplying the Veeranam tank, and this was no doubt a consideration; but the main purpose for which the water used to be passed was for scour, and it was only so passed if the conditions of previous supply had been fairly favourable but not otherwise.

It is to be realized that the rules of 1882 were drawn up fully recognizing that, under the circumstances existing, it would be of constant occurrence for water which rose to 6½ feet to rise to considerably higher levels and that such floods could not, under then existing conditions, be excluded from the delta.

The construction of the Cauvery-Vennar regulators in 1886 to 1888 first gave the power of exclusion, but this was not fully availed of till 1894 when the old Vennar head was finally closed.

The rules of 1882 had to steer between the evils, first of deficient supply and second of excessive flooding, and in addition the less important, but by no means negligible, matter of scour of sand had to be provided for as well as the supply for the Veeranam tank.

An examination of the water registers showing the working of the under-slucies for the twelve years 1882 to 1886 and 1889 to 1895 has shown that in these twelve years, under the operation of these rules, the opening of the sluices only took place with a less depth than 7 feet on the Cauvery Dam gauge on twenty-six occasions and that, with the exception of nine, all these occasions were in the north-east monsoon (October to December).

Thus the rules of 1882, in actual practice, provided generally for a gauge-reading of 7 feet on the Cauvery Dam being realized before opening the under-slucies.

31. *Rules of 1896.*—It was, however, recognized by Col. Smart, when on special duty investigating the conditions of the Cauvery Delta, that the danger of over-flooding being gone, it was better to risk accumulation of sand than to take a risk of not passing sufficient supplies to the Cauvery Delta lands. At the instance of this officer the rules of 1896 were sanctioned. The rules of 1896 allow 7 feet on the Cauvery Dam before opening the under-slucies.

32. *The Upper Anicut as remodelled, 1899 to 1902.*—In 1899 to 1902, the Upper Anicut was remodelled. The crest was cut down and re-made to a uniform level of 2 feet above the zero of the Cauvery Dam gauge. The under-slucies were blocked up. On the whole of the length of both the branches large lift shutters, 6 feet high, worked from the bridge above were installed, and these shutters can be lifted so that their under-sides are above any recorded flood level.

The anicut, after remodelling, consists of 55 bays of 40 feet each, the shutters being 6 feet high and the crest of the solid weir 2 feet above the zero of the Cauvery Dam gauge.

33. *Altered conditions through remodelling the Upper Anicut.*—The conditions of control and power of diversion of the flow of the Agunda Cauvery was, it will be recognized, greatly altered and extended by remodelling. It became at once possible to pass over the Cauvery Dam all the flow of the river up to a gauge-reading of 8 feet.

The table below shows the minimum flow in the Agunda Cauvery which can give the gauge readings recorded at the Cauvery Dam before and after remodelling :—

Gauge at Cauvery Dam.		Before remodelling, minimum discharge, Agunda Cauvery.	After remodelling, minimum discharge, Agunda Cauvery.
		M.C.FT.	M.C.FT.
5.6	.. .. .	1,365	1,365
6.0	.. .. .	1,696	1,625
6.5	.. .. .	2,286	1,950
7.0	.. .. .	2,944	2,300
7.5	.. .. .	3,613	2,650
8.0	.. .. .	4,450	3,020

It will be seen what greatly increased power is given by remodelling in the distribution of the available flow. It will further be recognized that some of the water which under old conditions would go down the Coleroon to the Lower Anicut, is, under the rules of regulation now in force, passed into the Cauvery Delta. The lowering of the crest of the Upper Anicut has obviated the necessity for constant attention to the matter of scouring sand, while the system of passing floods at the lower level of the crest has prevented the accumulations which gave so much trouble prior to remodelling. The effect of this diversion of water on the Lower Anicut System is considered later.

It is, however, to be recognized that, under the conditions of the remodelled anicut, it is still quite practicable to pass water in the same proportions and with the same distribution of flow between the Coleroon and the Cauvery as obtained prior to remodelling.

34. *Rules of Regulation of the remodelled Upper Anicut.*—There have been two sets of rules of regulation of the Upper Anicut after remodelling which are given in Appendix I. These rules were framed in 1902 and 1905 and are alluded to by reference to these years.

The rules of 1902, so far as supplies passed over the Cauvery Dam are concerned followed as closely as practicable the spirit of the rules of 1896, *viz.*, they provided for passing on a rising fresh all water possible into the Cauvery until the gauge-reading of 7 feet was attained, and on a falling flood it was laid down that a gauge-reading of 8 feet should be maintained as long as possible. These rules were introduced on the authority of the Executive Engineer.

The rules of 1905 which were sanctioned by the Chief Engineer are those still in force. They are very similar to those of 1902; as regards irrigation supplies, the 8 feet level on falling flood is eliminated, and a specific authority to modify regulation to meet any abnormal contingencies is given to the Executive Engineer.

LOWER ANICUT.

35. *Description of the Lower Anicut prior to 1899.*—The Lower Anicut was built across the Coleroon about 70 miles below the Upper Anicut. At this place the river is divided into two branches by an island some 1,200 feet wide. The anicut is thus divided in two branches, each branch being a solid anicut surmounted by an arched bridge, each branch having 30 vents of $33\frac{1}{2}$ feet span each, the total effective length of the anicut on each branch being thus 1,000 feet.

The level of the crest of the north branch was + 51.42 and of the south branch + 51.0. In each branch there are four sets of scouring sluices, each set being two sluices, the dimensions of each opening being 6 feet $\times$ 5 feet.

The sets of sluices are spaced along each branch between every sixth and seventh span.

The sill level of the sluices of north branch is + 42.78.

The sill level of the sluices of south branch is + 43.30.

From each flank of the anicut, take off irrigation channels—

- | | |
|-------------------|---|
| On the right side | { The South Rajan voikal sill level, + 43.36.
Kumikimanniar sill level, + 42.36. |
| On the left side | { The North Rajan voikal sill + 43.93
The Vadavar zero of gauge + 44.80.
In 1905 the zero level was altered to + 45.02. |

The three first named channels supply by direct flow only.

The Vadavar, however, is the supply channel of the Veeranam tank as well as irrigating 10,600 acres by "direct flow."

The direct irrigation under the Lower Anicut system is about 60,000 acres, and there is 52,400 acres under the Veeranam tank.

The "direct flow" channels have head sluices which are under regulation. The Vadavar, however, has an open head and there are no surplus works throughout its length and it is capable of carrying into the Veeranam tank all water entering at the head up to the highest

recorded flood level. The Vadavar is the oldest of the channels taking off at the Lower Anicut and was in existence long before the Lower Anicut was built in 1836. The primary purpose of the Vadavar is that of a supply channel to the Veeranam tank.

The Veeranam tank is an old reservoir of a capacity of 918 million cubic feet and a catchment area of 256 square miles and with a bund about 10 miles long.

It depends for the supply of its ayacut during the south-west monsoon chiefly on the Vadavar which gets its supply from the Coleroon. During the north-east monsoon a considerable part of its supply comes from its own catchment.

The capacity of the tank is very small in relation to the 52,400 acres irrigated, and the tank can only hold enough water to fully supply this area for ten to twelve days while a run-off of 1.6 inches from the catchment area more than suffices to fill it.

It will be shown later that the tank plays a very important role in the supply of the Lower Anicut irrigation, and without it the irrigation would be of a very precarious nature and would frequently fail for want of water. Prior to the construction of the Upper Anicut when the major portion of both floods and ordinary flow of the Agunda Cauvery passed down the Coleroon, the supplies of the Veeranam tank ayacut through the Vadavar was fairly well secured.

The construction of the Upper Anicut, which diverted most of the low and ordinary stage of flow of the river from the Coleroon and left only the higher freshes for filling the Veeranam tank, made the construction of the Lower Anicut just below the head of the Vadavar necessary to secure the Veeranam tank ayacut and the directly irrigated area under the Vadavar.

The construction of the anicut, however, brought difficulties in its train and served to divert into the head of the channel great quantities of silt, and the bed level has been gradually rising in spite of silt clearances, working of scouring sluices, etc. The following description of the Vadavar as it existed in 1886 is extracted from a report by Mr. T. Lobb, Executive Engineer, Lower Coleroon Irrigation Project Division, dated 19th June 1886 :—

36. *"The Vadavar channel.*—This channel, in addition to its own irrigation, has to convey water into the Veeranam tank. It is $14\frac{1}{2}$ miles long 100 feet broad at its head "diminishing to 60 feet at its junction with the Veeranam tank, the bed-width being somewhat irregular. At the head of this channel near the Lower Anicut there is a bridge on the Madras-Kumbakonam road of three spans consisting of one centre opening of 60 feet and two side openings of 20 feet each.

"The present available supply.—As before stated in paragraph 41, at anicut crest level this channel only receives one-third of full supply; at 2.56 feet above the crest level it receives "full supply."

This description may be considered as fairly representing the state of the Vadavar and the conditions of supply from 1880 until the Lower Anicut was remodelled in 1899–1900.

37. *Working conditions of the Lower Anicut prior to remodelling in 1899.*—The construction of the Upper Anicut in 1836 altogether changed the conditions of supply of the areas irrigated by the Coleroon. In place of low flow of the river passing down the Coleroon and dividing with the Cauvery the flow in higher stages the positions were reversed and the Cauvery became, under conditions of low or medium flow, the predominant partner.

The changes so effected made it necessary to construct the Lower Anicut and also a new supply channel, the North Rajan voikal, to secure the supplies of the existing irrigation in South Arcot. The conditions of supply were so altered that the flow in the Coleroon became frequently only sufficient to supply the area of "direct irrigation" under the Lower Anicut, and in case of low flow the first enjoyment of water was transferred from the Coleroon to the Cauvery system. It was only after the Cauvery was getting a good supply that the Coleroon could expect to enjoy the same.

The height of the Coleroon Lower Anicut as constructed was sufficient to secure full supply to the direct supply irrigation channels when the river water stood at the level of the anicut crest, but it was quite insufficient to allow an adequate supply to be passed down the Vadavar to feed by direct flow the irrigation depending on it, *viz.*—

10,600 acres direct.

52,400 acres through the Veeranam tank.

Under these conditions, it will be realized that the Veeranam tank could only receive water for impounding in times when the Lower Anicut was passing water to an appreciable depth over the weir; that is, it was necessary in order to fill the Veeranam tank and to furnish adequate supplies to the area under the Vadavar that water much in excess of what was actually run on the fields should be passed down to the Lower Anicut, and also that it was only during considerable freshes that the Veeranam tank could impound any Coleroon water.

Under the conditions existing prior to 1899 the supplies to the Coleroon system for gauge-readings at the Cauvery Dam under 5.5 feet was restricted to—

(1) Percolation under the Upper Anicut, Grand Anicut and other works.

(2) Supplies received through the under-sluices of the Grand Anicut or Upper Anicut.

In times when the Cauvery Dam gauge is below 5.5 feet in the south-west monsoon the supplies to the Coleroon as well as to the Cauvery were deficient.

As the Cauvery Dam gauge-readings became greater, the supplies automatically passed into the Coleroon greatly increased as noted below:—

Cauvery Dam gauge.						Discharge over the Upper Anicut.	Discharge through under sluices, Upper Anicut.	Discharge over 150 yards Calingulab.	Total discharge into the Coleroon.
						CUSECS.	CUSECS.	CUSECS.	CUSECS.
6.0	..	..	..	..	..	828	..	492	1,320
6.5	..	..	..	..	..	3,884	8,396	1,030	13,310
7.0	..	..	..	..	..	7,466	8,938	1,584	17,978
7.5	..	..	..	..	..	11,141	9,341	2,215	22,697
8.0	..	..	..	..	..	16,547	9,671	2,912	29,130
8.5	..	..	..	..	..	22,341	9,934	3,669	35,944
9.0	..	..	..	..	..	31,666	10,081	4,483	46,230

38. Turning to the Lower Anicut the state of affairs there was as follows—

The total area under irrigation was about 112,000 acres.

This, at a duty of 50 acres per cusec, requires for full supply a flow of 2,240 cusecs. Of this area, 52,000 acres are under the Veeranam tank requiring a draw-off of 1,040 cusecs so that the direct supply area is 60,000 acres requiring a flow of 1,200 cusecs.

The area of direct supply under the Vadavar is about 11,000 acres requiring 220 cusecs.

The other channels can be supplied fully with water just up to anicut crest.

The draw-off for these channels is 980 cusecs.

Table of discharges and draw-off in cusecs.

Crest depth.		Reading on the Vadavar gauge.	Total discharge, Lower Anicut.	Discharge of Vadavar, Gaugings by Mr. V. I. Srinivasa Ayyangar.	Draw-off for direct irrigation in the Vadavar.	Balance for the Veeranam tank.	Daily draw-off, Veeranam tank.	Balance—debit or credit.
North branch.	South branch.							
Nil.	Nil.	6.2	Nil.	320	220	100	1,040	— 940
0.08	0.5	6.7	1,802	470	220	250	1,040	— 790
0.58	1.0	7.2	5,556	615	220	395	1,040	— 645
1.08	1.5	7.7	10,579	770	220	550	1,040	— 490
1.58	2.0	8.2	16,584	935	220	715	1,040	— 325
2.08	2.5	8.7	23,434	1,100	220	880	1,040	— 160
2.58	3.0	9.2	31,048	1,360	220	1,140	1,040	+ 100
3.08	3.5	9.7	39,322	1,640	220	1,420	1,040	+ 380
3.58	4.0	10.2	48,234	1,960	220	1,740	1,040	+ 700

It will be seen that the Veeranam tank does not begin to impound until water in excess of over 2½ feet is passing over the South Branch Lower Anicut, which connotes a discharge over the whole anicut of 23,434 cusecs and a total flow required of the Lower Anicut of 23,434 + 2,240 = 25,674 cusecs. This connotes about 7.6 feet at the Upper Anicut with the under-sluices open.

Under these conditions it may be roughly taken that a gauge-reading of 7.6 feet at Upper Anicut meant full supply to the Lower Anicut but no impounding.

A gauge-reading in excess of 7.6 feet permitted impounding in the Veeranam tank.

The time which it would take to fill or empty the Veeranam tank with different gauge-readings on the Vadavar gauge is noted, on the supposition that no supply is received from the tank catchment.

The capacity of the tank was 918 million cubic feet.

Vadavar gauge.	Vadavar discharge.	Loss or gain per day after supplying irrigation.		Days to empty full tank at this rate.	Days to fill empty tank at this rate.	Passing over Lower Anicut.
		Loss.	Gain.			
	CUSECS.	M.C.FT.	M.C.FT.			CUSECS.
6.2	320	81.2	..	11	..	Nil.
6.7	470	68.2	..	14	..	1,802
7.2	615	55.7	..	17	..	5,556
7.7	770	42.3	..	22	..	10,579
8.2	935	28.1	..	33	..	16,584
8.7	1,100	13.8	..	67	..	23,434
9.2	1,360	..	8.6	..	107	31,048
9.7	1,640	..	32.8	..	28	39,322
10.2	1,960	..	60.5	..	15	48,234

The above table shows the very great importance of floods in the Coleroon for giving impounding water to the Veeranam tank and further that even direct flow supplies to the Coleroon system were quite insufficient unless considerable quantities of water were surplusing over the Lower Anicut and ordinarily by inference over the Upper Anicut or Grand Anicut.

Under the conditions described it is perfectly clear that if the surpluses over the Lower Anicut were curtailed to any considerable degree, the Veeranam tank irrigation must suffer. If all, or nearly all, surpluses were cut off, this irrigation must fail.

The conditions of supply before the remodelling of the Lower Anicut were certainly unsatisfactory, and to these conditions is to be attributed the fixing of the level of the top of the lift shutters on remodelling of this work 2 feet above the crest level of the old work.

39. *Description of Lower Anicut after remodelling.*—The Lower Anicut was remodelled in 1899—1901 by cutting down the crest to a level of + 47.42, four feet below the previous level of the North Branch, and installing on the crest throughout its length 60 lift shutters of 30 feet length and 6 feet in height which can be worked from the bridge above. The under-sluices were left unaltered.

The level of the top of the shutters, when fully lowered, is + 53.42. The zero of the Vadavar gauge is + 44.80. It may here be mentioned that in 1907—1909 the crest was further lowered by 2 feet, the shutters being made 8 feet in height. The level of the top of the shutters when closed remains unaltered, and this change does not have any effect on water-supplies or regulation although it facilitates passing large volumes of water in high floods.

40. *Reasons for remodelling Lower Anicut.*—The description given of the conditions of supply of the Vadavar and the Veeranam tank prior to 1899 shows that these conditions were unsatisfactory, and this was clearly recognized.

The solid anicut could not be raised because it was known that even with its existing height it had badly breached in floods on three occasions.

The decision to remodel the Upper Anicut in such a fashion as to reduce the quantity of water passed to the Coleroon in ordinary stages of river flow rendered a corresponding change in the Lower Anicut necessary, because the condition of the Vadavar required that considerable and frequent freshes should be passed down to the Lower Anicut.

The system of remodelling carried out had the effect of enabling supplies to be passed into the Vadavar in quantities equivalent to what would have been possible by raising the anicut crest to + 53.42. At the same time no tendency to increase of sand deposits was caused. Further the passing of large floods down the Coleroon without increase in risk to the Lower Anicut was made practicable.

It is possible that, even if the Upper Anicut had not been remodelled, the conditions of the Vadavar supply would have necessitated remedial measures.

41. *Conditions of irrigation supply to the Lower Anicut System after remodelling the Upper and Lower Anicuts.*—The remodelling of the Upper Anicut and the rules of regulation introduced after remodelling had the effect of passing down to the Lower Anicut of materially less water for stages of Agunda Cauvery flow between 1,500 million cubic feet and 3,000 million cubic feet.

On the other hand, the changes made at the Lower Anicut were such that it was possible to pass on to the fields all the flow of the Coleroon received at the Upper Anicut up to a reading of 8.62 feet on the Vadavar gauge connoting a discharge of 1,070 cusecs (*vide* table below.)

Compare this with the previous conditions when the limit gauge was 6.2 feet and the discharge 320 cusecs.

The change in conditions of the Lower Anicut more than compensates for the shorter supplies passed for gauge-readings of under 7 feet at the Cauvery Dam.

While the new works have altered and improved the supplies of water available for the Cauvery System, the general supplies to the Coleroon System have also been improved and supplies can now be forced down the Vadavar without anything being passed into the sea up to a stage of discharge of the Vadavar of 1,070 cusecs as against a stage of 320 cusecs, the previous limit.

It is, however, to be recognized that, notwithstanding this great improvement, the supply of 1,070 cusecs is insufficient for feeding the direct irrigation under the Vadavar and the Veeranam tank by 190 cusecs and the tank capacity is required to supplement direct supply at all times when the Lower Anicut is not discharging. Floods are still required for the efficient working of the system, and the irrigation could not be adequately supplied without passing occasional freshes down the river of which a large percentage must be passed over the anicut to the sea.

Lower Anicut after remodelling.

TABLE of discharges and draw-off in cusecs.

Reading Vadavar gauge.	Discharge over the Lower Anicut.	Discharge of the Vadavar.	Draw off for direct irrigation, Vadavar.	Balance for the Veeranam tank.	Draw-off Veeranam tank.	Balance, debit or credit.
6.2	<i>Nil.</i>	320	220	100	1,040	— 940
6.7	<i>Nil.</i>	470	220	250	1,040	— 790
7.2	<i>Nil.</i>	615	220	395	1,040	— 645
7.7	<i>Nil.</i>	770	220	550	1,040	— 490
8.2	<i>Nil.</i>	935	220	715	1,040	— 325
8.7	• 6,430	1,100	220	880	1,040	— 160
9.0	† 15,510	1,260	220	1,040	1,040	<i>Nil.</i>
9.2	† 22,040	1,360	220	1,100	1,040	+ 100
9.7	† 40,410	1,640	220	1,420	1,040	+ 380
10.2	† 56,670	1,960	220	1,740	1,040	+ 700

* Co-efficient, 0.5.

† Co-efficient, 0.625.

‡ Co-efficient, 0.75.

Comparing this table with that given in paragraph 38, the new conditions will be seen as tabulated below:—

Reading Vadavar gauge.	Discharge of the Vadavar.	Total discharge of the Coleroon to give gauge-reading.		Discharge over the Lower Anicut.	
		Before remodelling.	After remodelling.	Before remodelling.	After remodelling.
	CUSECS.	CUSECS.	CUSECS.	CUSECS.	CUSECS.
6.20	320	1,300	1,300	<i>Nil.</i>	<i>Nil.</i>
6.70	470	3,252	1,450	1,802	<i>Nil.</i>
7.20	615	7,151	1,595	15,556	<i>Nil.</i>
7.70	770	12,329	1,750	10,579	<i>Nil.</i>
8.20	935	18,499	1,915	16,584	<i>Nil.</i>
8.62	1,070	24,114	2,050	22,064	<i>Nil.</i>
8.70	1,100	25,614	2,510	23,434	6,430
9.20	1,360	33,338	24,380	31,048	22,040
9.70	1,640	41,942	43,080	39,322	40,410
10.20	1,960	51,174	59,610	48,234	56,670

The most material difference is that under new conditions a supply of 1,070 cusecs can be passed down the Vadavar without opening the shutters, that is, with a supply in the Coleroon which previous to remodelling would only have enabled less than one-third that quantity to be passed.

The rules for the regulation of the Lower Anicut both before and after remodelling are given in Appendix I.

42. *Veeranam tank water registers.*—In the statement (Appendix IV) an extract is given of the weekly water levels standing in the Veeranam tank in the months June to January for the years 1890 to 1909.

Above the level figures when the tank is full, letters serve to indicate the principal source from which the impounded supplies appear to have been received, that is, whether from the Coleroon through the Vadavar or from the catchment area of the tank; a study of the table will assist in enabling a fair estimate to be formed of the nature and extent of the part filled by the tank in bringing to maturity and securing the wet cultivation commanded by it.

THE GRAND ANICUT.

43. *Conditions of irrigation and regulation at the Grand Anicut.*—From the time of construction of the Cauvery Dam about 1846 to the building of the Cauvery-Vennar Regulators, 1886—1888, the conditions of supply and regulation at the Grand Anicut remained unaltered in any very material degree.

In this period the supplies to the Vennar passed through the old Vennar head three miles above the Grand Anicut, and all the water flowing in the Cauvery at that work which was not passed into the Coleroon over the Grand Anicut or through the scouring sluices passed down the Cauvery. The means of regulation of discharge of the Grand Anicut during this period was slight. The scouring sluices were of small power and had no material effect in times of full supply in the matter of water distribution. The Grand Anicut had along its crest dam stones 2½ feet high, and it was only by blocking the spaces between these stones with earth and turfs that it was practicable to hold up water to a higher level than that of solid anicut crest without at the same time permitting any flow into the Coleroon.

Under these conditions, the undesirable fluctuations of supply from which all the Cauvery irrigation suffers were materially greater than after remodelling the anicut.

The Cauvery Delta suffered alternately from excess supply in floods and deficient supply in the intervals.

44. *Description of the Grand Anicut prior to remodelling.*—The following is a brief description of the Grand Anicut from the time of installing falling shutters (about 1886) till remodelling by fitting large span controlled lift shutters in 1899.

The anicut consists of 30 bays of 32 feet length each.

In each bay was fitted four automatic falling shutters, 2 feet 10 inches high, with top of shutter when raised at level + 191.75. The solid crest of the weir was at level + 188.92. The sill level of the Cauvery and the Vennar regulators is + 184.25.

The shutters were adjusted to fall automatically when the water level was such that it just commenced to spill over the top of the shutters.

The shutters were installed throughout 27½ bays. The remaining 2½ bays were occupied by the scouring sluices. The under-sluices were ten in number, each of sectional area 4 feet × 3 feet.

The sill level was + 179.6. The work was remodelled in 1899 by removing the falling shutters and installing in all the 30 arches lift shutters 5 feet high and 32 feet span.

No alteration to crest level or under-sluices was effected.

45. *Remarks on conditions of working.*—The installation of falling shutters about 1886 was an advance on the previous system but still unsatisfactory. The shutters were liable to fall when not desired from the action of wind and waves. They were designed to fall automatically as soon as the water rose to the level of their top and the falling was not controlled from the bridge above the work. The raising of the shutters had to be done by hand by men standing on the weir crest, and the shutters could not be raised with more than about a foot of water passing over the weir. As a result, water was passed over the Upper Anicut which would, had power of regulation been available, have been passed into the delta.

The construction of Cauvery-Vennar Regulators, 1886—1888, gave increased power of distributing the available flow between the Cauvery and the Vennar and of excluding from both flood water which would prior to their construction have passed down into the delta and which was in excess of useful requirements.

The rules for regulation of the Cauvery-Vennar Regulators introduced on the construction of these works aimed at exclusion of excess water from the delta while passing down into it water up to the limit of useful enjoyment. The rules in force prior to the remodelling of the Grand Anicut, 1899, are given in Appendix I.

It will be seen that the rules of 1892 provide for passing into the delta all supplies practicable up to a reading of 7 feet on rear gauge of the Cauvery and 8 feet on the rear gauge of the Vennar.

A regular proportion for distribution of supplies between the Cauvery and the Vennar is laid down up to a total available stage of river flow of 7 feet in front of the regulators; and from the rules it would appear that there was anxiety as regards the proportionate distribution for purposes of irrigation of river water available up to a front gauge reading of 7 feet.

After this stage is reached, strict proportions are abandoned.

The inference is that water was considered of such value up to 7 feet that very careful distribution between the two main irrigation rivers was necessary so as to divide the total supply fairly between the two.

As regards the first rule, some remarks seem to be called for.

It will be noticed it has no executive value and gives no executive direction, but is of the nature of an expression of opinion.

The supplies stated in the rule to be "full and ample" are at a rate of 3 cubic yards per acre per hour to the Cauvery area and 2 cubic yards to that of the Vennar. These supplies were what had been laid down by several authorities and are constantly referred to in old records as what was recognized as the supplies required for the adequate irrigation of the areas under these rivers; that is the basis of duties to be aimed at.

This did not imply that the maximum useful supply of the very fluctuating flow available was at this rate, but the average supply to be aimed at was based on these duties which connote 44 and 66 acres per cusec respectively.

Reference to the executive portions of the rules shows that careful distribution of water in the proportions of 3 to Cauvery and 2 to Vennar is laid down up to a stage of flow much higher than this, and it is clear from the whole tenor of the rules that the supply referred to in the first rule relates to average requirements and to the supply which, if given daily, would amply satisfy these.

This matter is treated of in the Madras Cauvery Project (Volume III, page 28, paragraph 34) when considering the duties of water for the existing cultivated area. It is here stated: "The maximum steady duty contemplated for the transplantation season has been 44 acres per cusec for the Cauvery and 66 acres per cusec for Vennar. The river flow being very fluctuating, the rules provide for carrying water in excess of these duties in both rivers when available."

The rules of 1894 were introduced on the closing of the old Vennar head which had been left open till then although the new head was in work from 1888.

46. *Conditions after the Grand Anicut was remodelled in 1899.*—The remodelling of the Grand Anicut only materially affected the irrigation conditions in rendering it possible on all occasions to pass into the Cauvery and the Vennar the whole flow available at the Grand Anicut up to the limit required for irrigation of the Cauvery Delta and, except in times of really high floods, to exclude from the delta all water not required.

There was, after this remodelling, no involuntary surplus of water which could be useful and was actually required. The conditions in this respect, which obtained during the "upright stone" and the "falling shutter" periods, ceased after the fitting of fully controlled lift shutters.

The rules of regulation after remodelling, dated 1902 and 1905, are given in Appendix I. The rules chiefly refer to action to be taken in time of flood. Limits of flow are, however, given for the Cauvery and the Vennar to serve as a guide to the regulation establishment in the absence of other instructions. In actual practice, the limits 4.5 feet on the Cauvery and 7 feet on the Vennar are exceeded almost invariably unless after considerable quantities of rainfall in the irrigated areas.

47. A table (Appendix II) has been prepared from the water registers at the Grand Anicut showing for 1900 to 1908 the number of times water was carried purposely in excess of 4.5 feet in the Cauvery and 7 feet in the Vennar in comparison with the number of times it was practicable to do this. In the year 1909, owing to breaching of the Grand Anicut, regulation was abnormal and water was kept as low as possible and very free surplusing was resorted to owing to the unstable condition and failure in July of the right end of the Grand Anicut.

This table shows that it is customary in July and August and September frequently to pass supplies in excess of the levels stated.

In October and November the practice is variable and follows the character of the season; the stated levels are, however, not infrequently exceeded.

The table shows that the officers in charge of the works availed themselves very freely of the power afforded by the rules to call for additional water if required.

Further the tables, Appendix VIII, show for 20 years 1890 to 1910 the actual daily gauge readings of the Vennar and Cauvery and give thus a measure of the actual flow passed in practice. Prior to 1888, much involuntary flow passed down the Cauvery and Vennar and the gauge readings do not therefore give valuable evidence of enjoyment and use.

THE MADRAS CASE.

PART II.—HISTORICAL AND DESCRIPTIVE.

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APPENDIX I.

(i)

Rules for the guidance of the Superintendent, Upper Coleroon Anicut.

I. Except after periods of scarcity, the sluices of North and South Branches will be opened when water rises to 6.5 feet on the Cauvery Dam gauge.

II. The sluices of the South Branch will be closed when water falls to 6.0 feet on the Cauvery Dam gauge and those of the North Branch when water falls to crest level.

III. After a period of scarcity, that is, when during the previous week the water level has not exceeded 6.0 feet at the Cauvery Dam, the sluices of both branches will not be opened until water rises to 7.0 feet on the Cauvery Dam gauge.

IV. In opening the sluices the Superintendent should begin with the middle ones, and in closing with the end ones.

In the South Branch, numbering the sluices from the south end, the following will be the order for opening them: 4, 3, 5, 2, 6, 1, 7; and for closing the reverse order: 7, 1, 6, 2, 5, 3, 4. Numbering similarly the vents in the North Branch they will be opened in the order 4, 5, 3, 6, 2, 7, 1, 8; and closed in the order 8, 1, 7, 2, 6, 3, 5, 4.

Note.—The Cauvery Dam gauge to which levels are referred is the enamelled iron gauge at the north end of dam.

27th July 1882.

J. BEATTY, Col., R.E.,
Superintending Engineer, VI Circle.

Approved by the Chief Engineer for Irrigation in Memorandum No. VI/2-T.J., dated 19th February 1882.

(ii)

Rules for the Regulation at the Upper Anicut.

The under-sluices never to be opened, except on orders, before the Cauvery Dam gauge-reading falls below 7 feet.

2. On a rising flood, under-sluices not to be opened till the Cauvery Dam gauge reads 7 feet.

3. On a falling flood, under sluices to be gradually closed so as to keep 8.0 feet on the Cauvery Dam gauge for as many days as possible.

4. In the case of heavy rain in the Trichinopoly basin draining into the Cauvery below the Cauvery Dam and when an express is received from a recognized authority, all the under-sluices of Upper Anicut to be opened.

5. In opening the sluices, the Superintendent should begin with middle ones, and in closing with end ones. In the South Branch, numbering the sluice from the south end, the following will be the order for opening them: 4, 5, 3, 6, 2, 7, 1; and for closing, the reverse order: 7, 1, 6, 2, 5, 3, 4. Numbering similarly in the North Branch, they will be opened in the order 4, 5 and 3, 6 and 2, 7 and 1, 8 and closed in the order 8, 1, 7, 2, 6, 3, 5, 4.

Note.—The Cauvery Dam gauge to which levels are referred to is the enamelled iron gauge at north end.

6th May 1896.

A. W. SMART, Lieut.-Col., R.E.,
Superintending Engineer on Special duty.

(iii)

Rules for the Regulation of water at different heads in the Tanjore Division.

AGANDA CAUVERY.

Upper Anicut.

The under-sluices never to be opened except on orders while the Cauvery Dam gauge-reading is below 7 feet.

2. On a rising flood, under-sluices not to be opened till the Cauvery Dam gauge reads 7 feet.

3. On a falling flood, under-sluices to be gradually closed, so as to keep 8 feet on the Cauvery Dam gauge for as many days as possible.

In case of heavy rain in the Trichinopoly basin draining into the Cauvery below the Cauvery Dam and when an express is received from a recognized authority, all the under-sluices of the Upper Anicut to be opened.

In opening the sluices, the Superintendent should begin with the middle ones, and in closing with the end ones. In the South Branch, numbering the sluices from the south end, the following will be the order for opening them: 4, 5, 3, 6, 2, 7, 1; numbering similarly in the North Branch, they will be opened in the order 4, 5 and 3, 6 and 2, 7 and 1, 8, and closed in the order 7, 1, 6, 2, 5, 3, 4 and 8, 1, 7, 2, 6, 3, 5, 4 respectively. The Cauvery Dam gauge to which levels are referred to is the enamelled iron gauge at the north end.

Printed in the year 1890.

(iv)

Rules for the Regulation of water at different heads in the Tanjore Division.

AGANDA CAUVERY.

Upper Anicut.

The under-sluices never to be opened, except on orders, while the Cauvery Dam gauge-reading is below 7 feet.

2. On a rising flood, under-sluices not to be opened till Cauvery Dam gauge reads 7 feet.

On a falling flood, under-sluices to be gradually closed so as to keep 8 feet on the Cauvery Dam gauge for as many days as possible.

In case of heavy rain in the Trichinopoly basin draining into the Cauvery below the Cauvery Dam and when express is received from recognized authority, all the under-sluices of the Upper Anicut to be opened.

In opening the sluices, the Superintendent should begin with the middle ones, and in closing with the end ones. In the South Branch, numbering the sluices from the south end, the following will be the order for opening them: 4, 5, 3, 6, 2, 7, 1; numbering similarly in the North Branch, they will be opened in the order 4, 5 and 3, 6 and 2, 7 and 1, 8 and closed in the order 7, 1, 6, 2, 5, 3, 4 and 8, 1, 7, 2, 6, 3, 5, 4, respectively. The Cauvery Dam gauge to which levels are referred to is the enamelled iron gauge at the north end.

20th January 1902.

H. H. O'CONNELL,
Executive Engineer, Tanjore Division.

(v)

Rules for the Regulation at the Upper Anicut.

The following rules are for the guidance of the Sub-Divisional Officer and the Superintendent.

They may only be departed from by the Executive Engineer, Tanjore, who may regulate the Cauvery and the Coleroon at his discretion in the case of breaches or threatened breaches or other abnormal contingencies in the delta.

In cases of great emergency, the Tanjore Sub-Divisional Officer may use his discretion but must report the circumstances and his action to the Executive Engineer with the least possible delay.

1. The normal supply level for the delta is 7.0 feet on Cauvery Dam north gauge, and this level should be maintained as long as possible by raising or lowering the anicut shutters.

2. Should water tend to rise above 7.0 feet on the Cauvery Dam with the anicut shutters raised 6 feet, the latter should be raised clear.

3. Should water tend to fall below 7.0 feet on the Cauvery Dam, the shutters should be lowered so as to maintain 7.0 feet.

4. Should water fall below 7.0 feet on the Cauvery Dam with the shutter closed, leakage should be prevented as far as possible by means of clay and straw.

5. Should a message be received from the Grand Anicut Superintendent that water is rising there above normal supply level and the Upper Anicut shutters are not raised clear, he should at once raise them clear even though by so doing water may fall below 7.0 feet on the Cauvery Dam.

(Note.—This rule is necessary to provide for local rainfall causing drainage into the Cauvery below the dam.)

6. On receipt of a message from the Grand Anicut Superintendent that water there has fallen again to normal supply level, the Upper Anicut Superintendent should at once lower the shutters so as to maintain 7.0 feet on the Cauvery Dam.

7. All sets of shutters should ordinarily be regulated by raising or lowering them uniformly, the height of the opening being invariably recorded. Should it be impossible or

inadvisable under certain circumstances to keep the openings uniform, the varying heights should be accurately recorded.

8. Water should on no account be allowed to overtop the shutters.

TANJORE DIVISIONAL OFFICE,
19th May 1905.

A. H. MORIN,
Executive Engineer.

Approved by the Chief Engineer for Irrigation in his No. 1932, dated 19th June 1905.

(vi)

Rules for Regulation observed at the Lower Anicut prior to remodelling in 1899-1900.

Whenever water rises to 1.5 feet over crest of Coleroon Anicut in North Branch, all under sluices of both the branches are opened, and when water has fallen to 1 foot over the crest all sluices are closed.

The full supply allowed on rear gauges of head sluice of Lower Anicut during irrigation season when there is no rain is 6 feet for North and South Rajan voikals and 8 feet for the Vadavar and the Kumukimanniar.

(vii)

Revised Rules for the Regulation of Water at different heads in the Tanjore Division, Lower Coleroon Anicut.

1. In no case is water to be allowed to pass over the top of the shutter.

2. When floods come down, the shutters to be kept closed until the water rises to within an inch of the top of the shutter. If the floods still rise, all the shutters to be raised alike and raised gradually until there is 7 feet on the sill of the anicut; the shutter should then be raised or lowered so as to maintain 7 feet on the sill. If the flood continues to rise after the shutters have been lifted 7 feet, the shutters may be lifted clear of the water as long as flood is above 7 feet on the sill of the anicut.

3. When the flood falls, the shutters to be lowered so as to maintain 7 feet on the sill of the anicut.

4. The under-sluices shutters will be worked when there is a cushion of 2 feet on the lower apron.

5. Whenever the water, with all the shutters closed, falls below the top of the shutters, the North Rajan voikal shall be closed two days a week. If the water falls one foot or more below crest level, then the South Rajan voikal shall also be closed for the same two days that the North Rajan voikal is closed. In both cases, water shall not be allowed to rise and go over the shutters.

6. Whenever water falls below the top of shutters, every effort should be made to stop leakage by plugging with clay and straw.

2nd December 1904.

H. H. O'CONNELL,
Executive Engineer, Tanjore Division.

(viii)

Rules for the Regulation of Water now in force at the Lower Anicut.

1. In no case is water to be allowed to overtop the shutters.

2. When freshes come down the river, the shutters will be kept closed until water rises to the top. Should water continue to rise, the shutters will ordinarily be so regulated as to maintain a front reading of 7 feet.

3. Should, however, the Executive Engineer, South Arcot, or the Sub-Divisional Officer, Chidambaram, intimate to the Superintendent that more than 7 feet is required, the shutters, etc., may be so regulated as to maintain a front reading of not more than 8½ feet, according to the requirements of the Vadavar.

4. In carrying out rules 2 and 3, the five shutters adjacent to the North and South Rajan channels, respectively, will be raised more than the others, with a view to keeping the heads of those channels clear of sand.

5. Should water tend to rise above the required front reading, the ten shutters referred to in rule 4 will first be raised clear, and if this does not have the effect of reducing water to the required reading, the under-sluices will then be opened.

6. Should water still continue to rise above the required reading, the remaining shutters will be regulated accordingly. They will finally be raised clear as soon as the unobstructed flow gives the required reading or more.

7. Whenever the front gauge reads 13 feet, 14 feet and 15 feet, respectively, the Superintendent will intimate the fact to the Superintendent, Grand Anicut, by telephone, stating in each case whether water is rising, falling or steady.

8. When water finally begins to fall after a flood, the same procedure as that laid down for a rising flood will be followed, but in the reserve order.

9. Should water fall to 2 feet below top of shutters, all shutters and under-sluiques being closed, the North Rajan head-sluique may, on the requisition of the Executive Engineer, South Arcot, or the Sub-Divisional Officer, Chidambaram, be closed from 6 A.M. on Sunday to 6 A.M. on Tuesday, for the benefit of the Vadavar. In order that the Vadavar may get the full benefit of this morai, the South Rajan head-sluique and the Kumukimanniar will, as soon as the North Rajan head-sluique is closed, be so regulated as to give the same rear reading as there may have been immediately before the commencement of the morai. Although this reading may fall during the 48 hours' turn, the South Rajan and Kumukimanniar head-sluiques must not be regulated again during the period.

10. Should water fall to 3 feet or more below top of shutters, the South Rajan and Kumukimanniar head-sluiques will be closed from 6 A.M. on Sunday to 6 A.M. on Tuesday for the benefit of the Vadavar. The North Rajan shall also be closed during the same period unless the Executive Engineer specially requires it to be opened. Should water tend to overtop the anicut shutters during this period, it will be kept down by slightly opening the North and South Rajan and Kumukimanniar head-sluiques equally.

11. Throughout the short supply season leakage under the anicut shutters should be prevented as far as possible by means of clay and straw.

12. In order to get rid of abnormal shoals above the anicut, any of the shutters may be worked as scouring sluices at the discretion of the Mayavaram Sub-Divisional officer.

Approved in G.O. No. 184 I., dated 3rd May 1909.

(ix)

Rules for the Distribution of the Water for Irrigation.

CAUVERY AND VENNAR REGULATORS.

1. A full and ample supply to the delta is considered to be passing when there is a discharge of 11,240 cubic feet per second into the Cauvery and 6,101 cubic feet per second into the Vennar.

2. When there are no local floods in the delta, the Vennar regulator is to be kept open as long as water does not rise to above 7.0 feet on front gauge and the shutters of the Cauvery regulator adjusted so as to give proportionate discharges to the two rivers according to the following table:—

Cauvery.		Vennar.	
Cubic yards per hour per acre.	Total discharge. Cubic feet per second.	Cubic yards per hour per acre.	Total discharge. Cubic feet per second.
4	15,000	2½	8,140
3	11,240	2	6,104
2½	9,370	1½	5,080
2	7,492	1¼	4,070
1½	5,620	1	3,052
1	3,746	¾	2,030
¾	1,873	½	1,015

NOTE.—The intermediate readings to be interpolated.

3. When water reaching the regulator is more than will give the discharges stated in rule 2, water will be admitted into the Cauvery up to 7.0 on rear gauge.

4. If water still continues to rise, it will be passed into the Vennar until the rear gauge reads 8.0 feet, unless the Superintendent has received information that the Vennar is in danger from local drainage, in which case the water should be reduced to 6.5 feet. On orders from the Executive Engineer, the Vennar regulators may be closed entirely.

5. If water in front of the regulators rises above the level required to give gauge depths stated in rules 3, and 4, 7.5 may be admitted to the Cauvery; and if the rise continues, the shutters of the Cauvery regulators must be raised so that the difference of level in front and rear shall not exceed 4½ feet.

26th September 1892.

Approved in Chief Engineer for Irrigation's Memorandum No. V/3-T.J., dated 11th January 1893.

(x).

Rules for Regulation of Water at Grand Anicut.

CAUVERY AND VENNAR REGULATORS.

1. If water rises above 7 feet on front gauge, open Cauvery shutters till rear gauge of Cauvery reads 6.2. Cauvery and Vennar shutters will now be fully open.

2. If water still rises, keep on opening both regulators exceeding, with no exception, 9.4 feet on Vennar rear gauge or 6.5 feet on the Pillai gauge and as a rule 7.5 feet on Cauvery rear gauge.

3. But if the water still continues to rise, let water down the Cauvery, taking care that the difference of front and rear levels of water does not exceed 4½ feet.

4. If you see heavy rain in the south-east of Grand Anicut, reduce rear gauge of Vennar to 6.5. Reduce still further when you receive reports that Vennar is in danger from local drainage.

5. If the cross bank at Vennar old head breaches, act according to former printed rules.

2nd August 1894.

J. C. JOHNSTON,
Executive Engineer.

Approved in Chief Engineer for Irrigation's Memorandum No. V/80-T.J., dated 28th August 1894.

(xi)

Rules for the Regulation of Water at different heads in the Tanjore Division.

CAUVERY:

CAUVERY-VENNAR REGULATORS.

Regulation of water during floods.

1. During floods the safe limit to which water may be allowed to rise on rear gauge of Cauvery is 7.5 and of Vennar is 9.0.

2. When front gauge of Vennar is 8.3 and rear gauge 8.0 and Cauvery at or about 4.5 on rear gauge, and river rising, open out Cauvery until rear gauge reads 6.2.

3. If the water is still rising, begin to open the under-sluiques. If after the under-sluiques are fully opened, there is still further rise, open out both Vennar and Cauvery sufficiently to give 7.5 on rear gauge of Cauvery and 9.0 on rear gauge of Vennar.

4. If the river still continues to rise, begin to lift the Grand Anicut shutters. The shutters to be all lifted evenly, 2 or 3 inches at a time, and to be gradually fully lifted as the flood rises.

5. When the rear gauges of the Cauvery and Vennar begin to fall below 7.5 and 9.0 respectively, then begin to lower the lift shutters gradually and evenly for the whole length of anicut.

6. When the lift shutters are fully closed and rear gauges of Cauvery and Vennar still falling, begin to close the under-sluiques gradually.

7. If there is heavy rain to the south-east of Grand Anicut, the Superintendent will reduce the rear gauge of Vennar to 6.5 on his own initiative; but, if he receives information from the Superintendent of Vennar-Vettar head that there is danger below, he may reduce the rear gauge to 4.0, provided the difference between front and rear gauges of Vennar regulator is not more than 6 feet.

8. If the Cauvery banks are in danger during high floods, the rear gauge of the Cauvery will be reduced, on orders received from the Executive Engineer, provided that the difference between the front and rear gauges of the Cauvery is not more than 6 feet.

Regulation in non-flood season.

On Monday and Tuesday full supply will be sent down the Cauvery, and what surplus there is will be sent down the Vennar. On Wednesday and Thursday full supply will be sent down the Vennar, and what surplus there is will be sent down the Cauvery. On Friday, Saturday and Sunday the water will be sent down the Vennar and Cauvery proportionately.

2. Full supply in the Cauvery is 4.5 feet on rear gauge and full supply in the Vennar is 8 feet on rear gauge.

20th January 1902.

H. H. O'CONNELL,
Executive Engineer, Tanjore Division.

CAUVERY-VENNAR REGULATORS.

Rules for Regulation during floods.

1. The Anicut Superintendent will, in the absence of any requisitions from the Executive Engineers, Tanjore and Negapatam, regulate the water so as to maintain 7 feet on the rear gauge of Vennar and 4.5 feet on the rear gauge of the Cauvery.

2. Should the Anicut Superintendent notice heavy rain to the south-east in the basin of the Vennar, he will at once lower the rear gauge of the Vennar to 6 feet without waiting for orders.

3. Should he receive requisition from the Executive Engineer, Tanjore or Negapatam, to alter the depth of water on the rear gauges of the Cauvery or Vennar, he will promptly carry out these requisitions *as long as the front gauge of the Lower Anicut is below 13 feet*. After receiving intimation that the front gauge of Lower Anicut reads 13 feet, he will cease to comply with such requisitions and maintain 7 feet on the rear gauge of the Vennar and 4.5 feet or more on the rear gauge of the Cauvery.

4. Should water rise in front of the regulators, he will regulate the shutters so as to maintain 7 feet in Vennar and 4.5 feet in Cauvery or whatever the Executive Engineers of Tanjore and Negapatam have asked for, and open first the under-sluices and then the Grand Anicut shutters so as to reduce the height of water in front of the regulators to give the necessary head to maintain the above depths in the Cauvery and Vennar.

5. Should water go on rising, he will go on lifting the Grand Anicut shutters until there is 4 feet on the crest of the Grand Anicut when he will lift the shutters clear and keep them clear as long as water rises. Should water fall below 4 feet on crest, he will again lower the shutters and regulate the water as laid down in rule 4 and, if necessary, again close the under-sluice shutters.

6. If the water, instead of falling as indicated in rule 5, still continue to rise, he will leave the Grand Anicut and under-sluice shutters fully open and gradually open the Cauvery shutters so as to keep the depth of water in rear of the Cauvery regulator just 6 feet below the depth in front.

N.B.—The maximum on rear gauge of Cauvery is not to exceed 7.5 feet.

7. When the Superintendent receives intimation from the Lower Anicut that water has risen to 13 feet on front gauge, he will raise water in the Cauvery to 6 feet.

8. If further intimation is received that water has risen to 14 feet, he will raise water in the Cauvery to 7.5 feet.

9. If further intimation is received that the water has risen to 15 feet, he will open the Vennar regulator and raise water to 9 feet on the Vennar rear gauge.

10. He must maintain this condition of things until he hears that water has sunk to below 15 feet on front gauge of Lower Anicut when he will reduce Vennar to 7 feet. On hearing that water has fallen below 14 feet at Lower Anicut he will reduce the Cauvery to 6 feet, and when the water at Lower Anicut has fallen to 13 feet he will regulate the Cauvery so as to keep it 6 feet below the water in front.

11. When the water has fallen to below 13 feet at Lower Anicut, he will regulate again as laid down in rules 1, 2, 3, 4 and 5.

Regulation during low supply.

The present morai will be adhered to until further orders, viz.,

Full supply to Vennar for two days and full supply to Cauvery for two days and a proportionate supply to the Cauvery and Vennar for three days, the proportion being 3 to Cauvery and 2 to Vennar.

June 1905.

A. H. MORIN,
Executive Engineer, Tanjore Division.

Approved in Chief Engineer for Irrigation's Memorandum No. 1931, dated 19th June 1905.

*Rules for Regulation of Water at Cauvery-Vennar Regulators.**Regulation during floods.*

1. The Anicut Superintendent will, in the absence of any requisitions from the Executive Engineers, Cauvery and Vennar, regulate the water so as to maintain 7 feet on the rear gauge of Vennar and 4.5 feet on the rear gauge of the Cauvery.

2. Should the Anicut Superintendent notice heavy rain to the south-east in the basin of the Vennar, he will at once lower the rear gauge of the Vennar to 6 feet without waiting for orders.

3. Should he receive requisition from the Executive Engineers, Cauvery or Vennar, to alter the depth of water on the rear gauge of the Cauvery or Vennar, he will promptly carry out these requisitions *as long as the front gauge of the Lower Anicut is below 13 feet*. After receiving intimation that the front gauge of the Lower Anicut reads 13 feet, he will cease to comply with such requisitions and maintain 7 feet on the rear gauge of the Vennar and 4.5 feet or more on the rear gauge of the Cauvery.

4. Should water rise in front of the regulators, he will regulate the shutters so as to maintain 7 feet in Vennar and 4.5 feet in Cauvery or whatever the Executive Engineers, Cauvery and Vennar, may have asked for, and open first the under-sluices and then the Grand Anicut shutters so as to reduce the height of water in front of the regulators to give the necessary head to maintain the above depths in the Cauvery and Vennar.

5. Should water go on rising, he will go on lifting Grand Anicut shutters until there is 4 feet on the crest of the Grand Anicut when he will lift the shutter clear and keep them clear as long as water rises. Should water fall below 4 feet on crest, he will again lower the shutters and regulate the water as laid down in rule 4 and, if necessary, again close the under-sluice shutters.

6. If the water, instead of falling as indicated in rule 5, still continue to rise, he will leave the Grand Anicut and under-sluice shutters fully open and gradually open the Cauvery shutters so as to keep the depth of water in rear of the Cauvery regulator just 6 feet below the depth in front.

N.B.—The maximum on rear gauge of Cauvery is not to exceed 7.5 feet.

7. When the Superintendent receives intimation from the Lower Anicut that water has risen to 13 feet on front gauge, he will raise water in the Cauvery to 6 feet.

8. If further intimation is received that water has risen to 14 feet, he will raise water in the Cauvery to 7.5 feet.

9. If further intimation is received that the water has risen to 15 feet, he will open the Vennar regulator and raise water to 9 feet on the Vennar rear gauge.

10. He must maintain this condition until he hears that water has fallen to below 15 feet on front gauge of the Lower Anicut when he will reduce Vennar to 2 feet. On hearing that water has fallen below 14 feet at Lower Anicut, he will reduce the Cauvery to 6 feet, and when the water at Lower Anicut has fallen to 13 feet he will regulate the Cauvery so as to keep it 6 feet below the water in front.

11. When the water has fallen to below 13 feet at Lower Anicut, he will regulate again as laid down in rules 1, 2, 3, 4, and 5.

Regulation during low supply.

12. As soon as water falls below full supply in both rivers regulation shall be made in the proportion of 3 to Cauvery and 2 to Vennar, the proportion being determined by the tables of calculated discharges furnished to the Superintendent by the Executive Engineer.

13. The Executive Engineer, Cauvery Division, with the concurrence of the Executive Engineer, Vennar Division, may order that a weekly *morai* may be introduced when supply is low, provided that such order shall in no circumstances be given till the water in both rivers has fallen below two-thirds normal full supply.

S. D. PEARS,
Superintending Engineer, V Circle.

Approved in Chief Engineer for Irrigation's Memorandum No. 1542, dated 30th April 1909.

APPENDIX II.

TABLE showing occasions of carrying water in Cauvery and Vennar at depth exceeding full supply stated in the rules.

The Cauvery.

Year and month.	Total number of days, when passing over 4.5 was practicable.	Number of days readings realised within limits.					Total number of days extra water carried on account of flood conditions.	Number of days extra water carried for irrigation only, columns 7-8.
		4.6 to 4.9.	5.0 to 5.4.	5.5 to 5.9.	6 feet and over.	Total over 4.5.		
1	2	3	4	5	6	7	8	9
1900.								
June	4	..	2	1	1	4	..	4
July	31	2	10	4	15	31	..	31
August	28	3	..	2	19	24	1	23
September	14	3	8	3	2	14	..	14
October	6	..	3	..	3	6	..	6
November	..	..	..	..	..	..	..	..
December	..	..	..	..	..	..	..	..
1901.								
June	3	1	1	..	1	3	..	3
July	20	1	11	2	3	17	..	17
August	13	2	9	..	..	11	..	11
September	4	..	..	1	1	2	..	2
October	19	1	1	3	2	7	..	7
November	10	..	..	..	..	..	..	..
December	..	..	..	..	..	..	..	..

The Vennar.

Year and month.	Total number of days, when passing over 7 feet was practicable.	Number of days carried.							Total number of days extra water carried on account of flood conditions.	Number of days extra water carried for irrigation only, columns 10-11.
		7.1 to 7.2.	7.3 to 7.4.	7.5 to 7.6.	7.7 to 7.8.	7.9 to 8.0.	8.1 to 8.4.	8.5 and over.		
1	2	3	4	5	6	7	8	9	10	11
1900.										
June	7	..	..	2	..	5	..	..	7	7
July	31	..	..	..	..	16	4	11	31	31
August	31	..	..	1	..	1	3	26	31	31
September	20	1	1	1	2	8	3	..	16	16
October	13	2	2	1	1	7	..	..	13	13
November	1	..	..	..	..	1	..	..	1	1
December	..	..	..	..	..	..	..	..	..	..
1901.										
June	7	..	1	1	..	5	..	..	7	7
July	22	..	1	..	..	15	3	3	22	22
August	26	2	1	1	2	22	..	..	26	26
September	4	1	..	..	2	..	..	..	3	3
October	21	..	1	1	..	5	2	..	9	9
November	12	..	..	..	..	..	..	..	..	..
December	..	..	..	..	..	..	..	..	..	..

Table showing occasions of carrying water in Cauvery and Vennar at depth exceeding full supply stated in the rules—*cont.**The Cauvery.*

Year and month.	Total number of days, when passing over 4.5 practicable.	Number of days readings realised within limits.					Total number of days extra water carried on account of flood conditions.	Number of days extra water carried for irrigation only, columns 7-8.
		4.6 to 4.9.	5.0 to 5.4.	5.5 to 5.9.	6 feet and over.	Total over 4.5.		
1	2	3	4	5	6	7	8	9
1902.								
June	..	..	..	..	..	..	..	..
July	17	1	2	4	6	13	2	11
August	2	1	1	..	..	2	..	2
September	18	2	4	4	2	12	..	12
October	14	..	..	1	2	3	..	3
November	11	..	..	..	..	..	..	..
December	14	..	..	..	..	..	..	..
1903.								
June	..	..	..	..	..	..	..	..
July	16	..	..	1	16	16	..	16
August	30	..	9	2	7	18	3	16
September	24	..	..	..	..	..	..	..
October	24	2	10	2	..	14	..	14
November	15	1	5	1	2	9	3	6
December	12	..	..	..	..	..	..	..

The Vennar.

Year and month.	Total number of days, when passing over 7 feet practicable.	Number of days carried.							Total over 7 feet.	Total number of days extra water carried on account of flood conditions.	Number of days extra water carried for irrigation only, columns 10-11.
		7.1 to 7.2.	7.3 to 7.4.	7.5 to 7.6.	7.7 to 8.	7.9 to 8.0.	8.1 to 8.4.	8.5 and over.			
1	2	3	4	5	6	7	8	9	10	11	12
1902.											
June	1	..	..	..	..	1	..	..	1	..	1
July	21	1	1	1	1	12	4	..	20	1	19
August	7	1	1	..	1	4	..	..	7	..	7
September	17	..	..	1	2	5	1	..	9	..	9
October	10	1	1	1	..	..	..	..	3	..	3
November	1	..	..	..	..	..	..	..	..	..	..
December	9	..	..	..	..	..	..	..	..	..	..
1903.											
June	..	..	..	..	..	..	..	..	..	..	Nil.
July	16	..	1	..	..	4	7	4	16	Nil.	16
August	16	..	4	..	..	1	1	2	8	1	7
September	8	..	..	..	..	..	..	..	..	..	Nil.
October	14	..	..	..	..	..	..	..	..	..	..
November	12	..	1	..	..	..	..	..	1	1	..
December	12	..	..	..	..	..	..	..	..	..	..

Table showing occasions of carrying water in Canvery and Vennar at depth exceeding full supply stated in the rules—*cont.*

The Cauvery.

[illegible]

The Vennar.

[illegible]

Table showing occasions of carrying water in Cauvery and Vennar at depth exceeding full supply stated in the rules—*cont.*

The Cauvery.

[illegible]

The Vennar.

[illegible]

Table showing occasions of carrying water in Cauvery and Vennar at depth exceeding full supply stated in the rules—*cont.*

The Cauvery.

Year and month.	Total number of days, when passing over 4.5 was practicable.	Number of days readings realised within limits.					Total number of days extra water carried on account of flood conditions.	Number of days extra water carried for irrigation only, columns 7 — 8.
		4.6 to 4.9.	5.0 to 5.4.	5.5 to 5.9.	6 feet and over.	Total over 4.5.		
1	2	3	4	5	6	7	8	9
1908.								
June	..	..	..	..	..	..	..	..
July	19	5	9	..	..	14	..	14
August	17	4	13	..	..	17	..	17
September	3	..	..	..	..	..	..	..
October	..	..	..	..	..	..	..	..
November	..	..	..	..	..	..	..	..
December	..	..	..	..	..	..	..	..

The Vennar.

Year and month.	Total number of days, when passing over 7 feet was practicable.	Number of days carried.							Total over 7 feet.	Total number of days extra water carried on account of flood conditions.	Number of days extra water carried for irrigation only, columns 10 — 11.
		7.1 to 7.2.	7.3 to 7.4.	7.5 to 7.6.	7.7 to 7.8.	7.9 to 8.0.	8.1 to 8.4.	8.5 and over.			
1	2	3	4	5	6	7	8	9	10	11	12
1908.											
June	..	..	..	..	..	..	..	..	..	..	..
July	16	..	..	..	..	..	..	..	..	..	..
August	15	..	..	..	..	..	..	..	..	..	..
September	2	..	..	..	..	..	..	..	..	..	..
October	..	..	..	..	..	..	..	..	..	..	..
November	3	..	..	..	..	..	..	..	..	..	..
December	..	..	..	..	..	..	..	..	..	..	..

APPENDIX III.

STATEMENT showing the area of irrigation under the Cauvery above the Upper Anicut.

Main river.	Tributary.	Number of channels.	Number of tanks.	Year.	Area irrigated in acres in year given in column 5.	Year.	Area irrigated in acres as verified by the Collector for years given in column 7.
1	2	3	4	5	6	7	8
Cauvery L. ..	Raja channel including Mohanur. .	1	..	1909	5,146	1912	5,641
Do. R. ..	Pogalur channel	1	..	1901	2,328	..	2,328
Do. R. ..	Vangal do.	1	..	..	1,115	..	1,115
Do. R. ..	Nerur do.	1	..	..	1,760	..	1,760
Do. L. ..	Komarapalam channel	1	..	1884	1,634	..	1,005
Do. L. ..	Aiyalur do.	1	..	..	1,081	..	329
Do. L. ..	Siplapathur do.	1	..	..	661	..	663
Do. R. ..	Krishnarayapuram channel	1	..	..	1,192	..	1,224
Do. R. ..	Mahadanapuram do.	1	..	..	804	..	804
Do. L. ..	Thottiam Chinna voikal	1	..	..	2,878	..	2,811
Do. L. ..	Do. Peria voikal	1	..	..	751	..	751
Do. R. ..	Marudur Vattu voikal	1	..	..	5,856	..	5,881
Do. L. ..	Sreenivasanallur channel	1	..	..	328	..	337
Do. L. ..	Musiri voikal	1	..	..	4,195	..	4,111
Do. L. ..	Amer do.	1	..	..	354	..	354
Do. R. ..	Nangam voikal	1	..	..	2,320	..	1,643
Do. R. ..	Yakondan channel	1	..	..	25,627	..	24,736
Do. R. ..	Ramavaikal channel	1	..	..	1,177	..	1,748
Do. L. ..	Konasekam channel	1	..	..	365	..	365
Do. L. ..	Peruvali channel	1	..	1907	15,086	..	15,086
Do. L. ..	Panguni channel	1	..	..	6,629	..	6,629
Do. L. ..	Aiyar channel	1	..	..	14,737	..	14,737
	Total	..	..	..	96,024	..	94,058

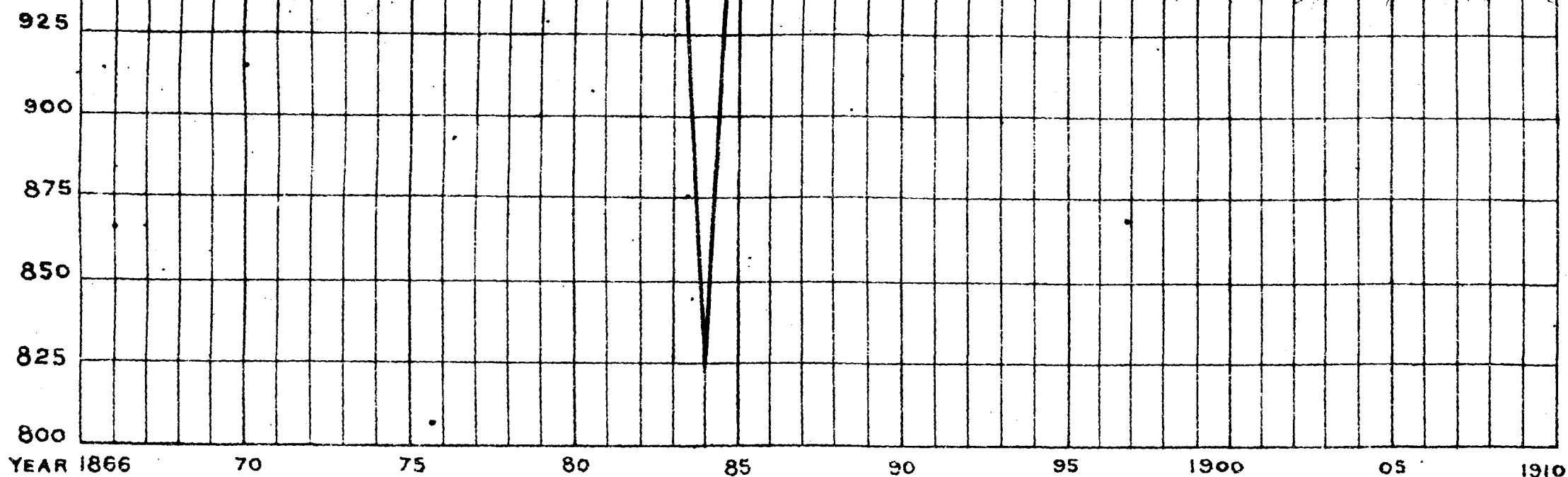
AP FENDIX IV.

STATEMENT showing water-level recorded at Boodangudi sluice at north end of Viranam tank.

[When the tank is full the letters over the figures indicate the probable source from which the impounded water was obtained. C meaning from the catchment area : D meaning from the Coleroon through the Vadavar. The full level of the tank at capacity 918 million cubic feet is + 43.50. The deep bed of the tank is at level about + 38.0.]

Month.	June.				July.				August.				September.			
Date.	1st.	8th.	15th.	24th.	1st.	8th.	15th.	24th.	1st.	8th.	15th.	24th.	1st.	8th.	15th.	24th.
1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17
Year.																
1890-1891	..	..	..	..	..	..	..	..	38.70	39.19	39.29	39.69	40.49	42.59	C 43.79	42.19
1891-1892	..	..	..	..	..	..	39.39	39.49	40.79	39.99	38.29	38.59	37.09	36.49	37.19	..
1892-1893	..	..	..	36.36	39.09	39.19	40.59	40.29	41.19	42.69	D 43.09	C 43.59	43.19	43.49	43.09	42.79
1893-1894	..	..	..	..	38.79	40.39	40.89	41.09	41.29	40.09	39.59	40.49	40.39	35.09	38.59	40.09
1894-1895	..	35.09	35.09	34.79	37.34	39.99	40.09	38.69	38.59	40.19	38.39	37.39	39.99	43.09	43.39	Not available.
1895-1896	..	..	..	..	36.19	40.89	41.94	41.09	38.99	38.79	39.69	40.29	40.59	40.29	39.09	C 42.79
1896-1897	..	..	..	..	..	39.89	D 43.69	42.39	43.29	43.4	42.99	42.19	42.79	41.89	41.69	41.19
1897-1898	..	..	..	..	38.79	42.09	41.99	41.49	42.69	41.69	43.09	D 45.39	D 43.79	D & C 44.19	D 44.14	D & C 43.69
1898-1899	..	37.99	..	..	38.89	40.59	40.59	40.39	39.39	29.29	41.09	40.39	38.69	37.89	39.89	40.09
1899-1900	..	..	..	..	38.89	40.59	41.29	42.19	41.89	39.69	38.79	..	..	38.59	40.29	40.09
1900-1901	..	..	..	..	..	38.79	41.39	42.39	D 43.79	C & D 43.49	42.99	D 44.79	D 44.09	D & C 43.79	C 43.69	D & C 44.29
1901-1902	..	..	..	..	..	40.99	40.09	41.89	42.69	42.29	42.29	42.09	41.69	41.99	41.29	C 43.79
1902-1903	..	..	..	..	..	..	..	..	D 43.69	43.0	42.59	41.59	40.39	38.29	35.59	C & D 39.49
1903-1904	..	39.79	39.39	39.19	..	..	D ..	..	41.29	41.39	45.99	43.29	42.59	42.19	43.39	C & D 44.69
1904-1905	..	..	..	..	..	42.19	43.69	44.29	43.39	42.59	42.59	42.19	42.19	41.49	41.39	39.59
1905-1906	..	..	..	..	..	..	38.79	41.49	41.19	40.79	41.69	41.69	43.49	42.79	43.89	43.39
1906-1907	..	..	..	..	..	..	..	..	..	41.09	42.79	42.79	C & D 43.79	C & D 43.89	43.19	42.99
1907-1908	..	39.19	38.89	..	..	..	..	41.69	39.99	39.89	39.99	42.49	42.89	42.49	42.69	42.09
1908-1909	..	..	..	..	..	..	37.49	40.69	40.99	41.89	42.09	42.19	41.39	38.99	C 43.99	C 44.49
1909-1910	..	..	..	..	..	..	40.59	40.59	43.59	43.29	43.49	C & D 44.29	C 43.49	C & D 43.99	C & D 45.09	C & D 44.29

TOTAL AREA CHARGED AS IRRIGATION



NOTE — THE DECREASE OF 1884 WAS DUE TO THE LOSSES OF CROP DUE TO SERIOUS DAMAGES OCCASIONED BY THE FLOODS OF THAT YEAR.
THE AREAS IN FIG. 1 ARE TAKEN FROM TRIENNIAL IRRIGATION REPORT FOR TRIENNIAL ENDING 1901-1902 FOR THE AREAS 1866 TO 1901-1902.
THE SUBSEQUENT AREAS ARE FROM THE SUBSEQUENT TRIENNIAL REPORTS.
THE AREAS FIG. 2 FROM 1893 ARE EXTRACTED FROM THE TRIENNIAL REPORTS FROM 1874 TO 1879 FROM C. VINCENT'S MONOGRAPH — ON CAUVERY DELTA AND LOWER ANICUT SYSTEM.
THE AREAS OF REMAINING YEARS ARE EXTRACTED FROM ANNUAL IRRIGATION ADMINISTRATION REPORTS.

Reg. No. 974
Carnegie - 70 + 335

Vandyke, Survey Office, Madras.

Station

[When the tank is full the letters over the figures indicate the probable source from which the impounded water was obtained. C meaning from the catchment area: D meaning from the Coleroon through the Vadavar. The full level of the tank at capacity 918 million cubic feet is + 43.50. The deep bed of the tank is at level about + 38.0.]

Month.	October.				November.				December.				January.			
	1st.	8th.	15th.	24th.	1st.	8th.	15th.	24th.	1st.	8th.	15th.	24th.	1st.	8th.	15th.	24th.
	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32	33
Year.																
1890-1891 ..	40.39	41.69	42.09	41.69	C	U	C	42.19	40.39	39.09	38.79	C	35.39	34.94	35.54	37.59
1891-1892 ..	36.09	38.19	39.19	43.5	C	C	44.39	43.09	41.69	40.69	44.89	45.49	44.49	43.59	42.59	41.59*
1892-1893 ..	41.29	41.09	40.84	41.29	40.89	39.99	38.09	C	37.79	38.49	C	37.99	37.79	37.29	35.99	34.99
1893-1894 ..	40.59	40.29	43.39	C & D	43.44	44.29	45.09	46.99	44.49	43.49	42.89	41.99	40.69	40.29	40.09	39.59
1894-1895 ..	C	C	Not available.	C	C	C	42.79	43.49	44.39	44.19	42.79	41.49	40.59	39.39	38.59	35.39
1895-1896 ..	44.79	43.89	44.59	46.09	44.59	44.49	42.99	43.39	44.29	42.89	41.39	39.49	47.44	43.69	42.69	41.79
1896-1897 ..	41.89	42.59	42.09	41.39	41.19	40.59	44.49	45.69	43.69	44.44	43.54	44.59	43.29	42.49	41.09	39.99
1897-1898 ..	D & C	D & C	D & C	D	42.59	41.79	40.84	38.54	39.34	39.69	38.34	37.89	34.99	C	38.59	35.49
1898-1899 ..	44.49	43.49	43.59	43.69	42.59	41.79	40.84	38.54	39.34	39.69	38.34	37.89	34.99	C	38.59	35.49
1899-1900 ..	D & C	D & C	D & C	D & C	C	C	D & C	D & C	C	C	C	C	44.79	43.99	43.49	43.19
1900-1901 ..	43.89	44.14	44.99	44.19	44.89	46.84	44.79	43.69	46.44	44.30	43.19	41.99	44.79	43.99	43.49	43.19
1901-1902 ..	39.89	38.79	38.09	44.79	44.69	43.89	43.29	41.79	40.29	40.59	39.79	38.19	C	C	C	C
1902-1903 ..	42.69	42.79	41.59	41.49	41.19	40.49	39.29	45.09	44.19	43.69	42.69	44.99	43.99	42.89	41.99	41.49
1903-1904 ..	C	C & D	C & D	C	C	C	C	C	C & D	C	C	C	40.79	42.29	43.39	42.89
1904-1905 ..	44.09	44.49	44.09	43.09	42.69	43.79	44.69	44.49	43.79	43.39	43.39	42.29	40.79	42.29	43.39	42.89
1905-1906 ..	C	C	C & D	C & D	C	C & D	C	C	C	C	C	C	43.69	42.29	43.39	42.89
1906-1907 ..	43.49	43.19	43.39	44.13	44.59	44.79	44.49	44.99	44.69	47.09	44.79	44.09	43.69	44.39	43.69	43.29
1907-1908 ..	C & D	C & D	C & D	C	D	C	C & D	C & D	C & D	C & D	C	C	44.69	43.99	43.69	43.69
1908-1909 ..	44.83	44.09	43.69	43.59	43.69	43.69	44.49	44.19	44.00	44.19	44.09	44.19	44.69	43.99	43.69	43.69
1909-1910 ..	43.09	42.39	43.59	44.69	44.59	43.89	42.79	40.69	37.79	C	C	41.09	40.89	40.29	39.79	39.39
1910-1911 ..	41.89	40.99	44.39	43.99	42.79	40.29	48.09	44.99	44.89	43.69	42.49	40.19	38.49	38.59	C	42.59
1911-1912 ..	41.79	40.39	40.39	44.99	44.59	48.59	47.19	45.19	C	C	C	C	44.49	44.09	43.19	42.29
1912-1913 ..	42.89	44.59	43.89	42.79	43.79	47.09	43.99	43.99	43.39	41.89	41.19	42.99	43.39	42.99	42.59	42.19
1913-1914 ..	42.39	41.49	40.79	45.79	45.89	44.59	43.29	40.69	38.89	35.09	C	C	39.29	43.79	43.79	43.39
1914-1915 ..	41.49	41.79	43.29	44.09	42.69	41.69	40.59	39.79	38.69	C	C	C	36.19	35.89	37.29	C

* Bill of sluice—34.59—zero of the gauge.

APPENDIX VI.

REGISTER of readings of the Cauvery dam, North gauge.

1880-1881.

Month.	1st.	2nd.	3rd.	4th.	5th.	6th.	7th.	8th.	9th.	10th.	11th.	12th.	13th.	14th.	15th.
1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
June ..	4.8	4.9	4.8	4.7	4.8	4.7	4.9	4.9	4.6	4.8	5.2	4.10	4.8	4.5	4.3
July ..	5.8	7.3	8.1	9.9	8.11	8.1	7.6	7.10	7.7	7.0	8.6	7.9	8.4	8.8	8.2
August ..	7.3	7.0	6.8	6.7	6.6	6.7	6.11	6.3	6.7	8.10	8.6	8.0	7.9	7.2	6.8
September ..	4.11	5.0	6.11	6.4	6.1	6.0	5.6	5.7	5.0	4.11	4.10	4.11	6.5	6.2	5.7
October ..	4.3	4.2	4.1	4.7	4.1	4.7	4.11	5.3	5.5	6.4	5.9	5.10	5.10	5.11	6.8
November ..	7.3	7.4	6.11	6.9	6.0	5.6	5.6	5.6	5.6	5.9	5.9	6.1	6.0	6.0	6.1
December ..	9.4	8.1	7.10	8.1	7.3	6.9	6.6	6.3	6.0	5.11	5.9	5.8	5.7	5.4	5.3
January ..	4.6	4.5	4.4	4.3	4.2	4.1	4.1	4.0	4.0	4.0	4.0	3.11	3.11	3.10	3.10

Month.	16th.	17th.	18th.	19th.	20th.	21st.	22d.	23rd.	24th.	25th.	26th.	27th.	28th.	29th.	30th.	31st.
	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32
June ..	4.1	3.10	3.9	4.4	4.4	4.9	4.8	4.8	4.8	4.6	4.5	4.4	4.3	4.3	4.5	7.2
July ..	8.0	7.5	7.2	7.11	6.8	6.6	6.7	6.10	6.9	6.7	6.5	6.5	6.7	6.8	6.9	8.3
August ..	6.5	7.10	7.10	6.10	6.5	6.1	5.10	5.8	5.7	5.6	5.5	5.2	4.11	4.9	4.7	4.5
September ..	5.4	5.2	5.2	5.3	5.5	5.5	5.8	5.8	5.5	5.2	4.11	4.9	4.7	4.6	4.5	7.8
October ..	6.4	6.7	6.8	6.0	5.2	5.8	6.0	6.4	6.2	5.11	6.3	7.1	9.2	8.9	8.1	7.8
November ..	6.8	6.2	5.11	5.7	5.6	5.3	6.9	6.9	6.9	11.6	9.1	7.8	7.0	7.7	8.4	4.8
December ..	5.2	5.1	5.0	5.0	4.10	4.9	4.10	4.9	4.8	4.8	4.9	4.7	4.8	4.10	4.7	4.8
January ..	3.10	3.10	3.10	3.10	3.10	3.9	3.9	3.9	3.9	3.9	3.4	3.8	3.7	3.7	3.7	3.7

1881-1882.

Month.	1st.	2nd.	3rd.	4th.	5th.	6th.	7th.	8th.	9th.	10th.	11th.	12th.	13th.	14th.	15th.
1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
June ..	3.5	3.6	3.4	3.3	3.2	3.0	3.0	3.0	2.90	2.80	2.80	2.80	2.80	2.80	2.75
July ..	3.10	3.10	3.0	2.9	3.0	3.10	5.95	6.70	7.40	7.10	6.70	6.90	6.90	8.20	8.30
August ..	4.50	4.40	4.20	4.0	3.90	3.90	6.50	9.40	9.30	8.50	7.70	7.20	6.70	6.40	6.40
September ..	6.20	6.10	5.90	5.60	5.30	5.15	5.10	4.90	4.50	5.10	4.75	5.60	4.60	4.40	4.35
October ..	5.15	4.90	5.40	6.20	6.10	5.50	5.10	4.85	4.80	4.80	4.50	4.40	4.40	4.30	4.15
November ..	3.80	3.80	4.5	3.20	4.0	4.0	5.40	5.50	5.40	5.30	5.15	5.20	5.10	5.10	5.10
December ..	3.90	3.70	3.60	3.40	3.30	3.30	3.20	3.15	3.10	3.10	3.0	3.0	3.0	2.95	2.95
January ..	2.80	2.80	2.85	4.40	4.30	4.90	4.70	4.40	4.10	3.90	3.80	3.40	3.80	3.30	3.15

Month	16th.	17th.	18th.	19th.	20th.	21st.	22nd.	23rd.	24th.	25th.	26th.	27th.	28th.	29th.	30th.	31st.
	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32
June ..	3.0	3.2	3.20	3.30	3.30	3.30	3.30	3.20	3.10	3.3	3.4	3.5	3.2	3.20	3.0	..
July ..	8.0	7.60	7.20	6.50	6.90	5.80	6.40	6.30	6.0	5.70	5.30	5.20	5.0	4.85	4.70	4.6
August ..	6.40	6.35	6.10	5.90	5.70	5.50	5.60	5.90	6.30	6.20	6.0	5.80	5.90	6.20	6.30	6.4
September ..	4.40	4.90	4.80	5.30	6.10	6.80	6.0	5.80	5.40	5.40	5.50	5.60	5.35	5.0	5.30	..
October ..	4.0	4.0	4.10	4.40	4.90	4.85	4.90	4.80	4.50	4.30	4.10	4.60	3.90	3.70	3.60	3.4
November ..	5.30	5.40	5.0	5.10	4.90	4.90	5.30	6.60	6.50	5.30	4.90	4.60	4.35	4.10	3.90	..
December ..	3.40	3.60	3.70	3.50	3.50	3.20	3.10	3.10	3.10	3.0	2.95	2.90	2.90	2.85	2.80	2.8
January ..	3.10	3.5	3.0	2.90	2.80	2.75	2.70	2.70	2.70	2.50	2.40	2.30	2.20	2.20	2.10	2.0

Register of readings of the Cauvery dam, North gauge—cont.

1882-1883.

Month.	1st.	2nd.	3rd.	4th.	5th.	6th.	7th.	8th.	9th.	10th.	11th.	12th.	13th.	14th.	15th.
1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
June ..	4.30	4.10	3.80	3.70	3.50	3.30	3.10	3.00	2.90	5.80	8.00	8.20	9.70	10.00	10.50
July ..	5.20	6.00	4.80	4.80	4.60	4.90	6.20	8.60	11.50	12.80	12.50	11.90	11.20	10.50	9.80
August ..	8.40	8.40	9.10	9.70	9.50	8.70	8.20	7.80	7.70	8.20	9.30	9.70	8.90	8.40	8.10
September ..	7.80	7.50	6.80	6.30	6.20	6.20	6.00	6.20	6.30	6.50	6.70	6.90	6.90	6.80	6.90
October ..	5.60	5.70	5.60	5.40	5.20	5.30	5.60	6.00	5.80	6.20	6.90	7.10	6.90	7.00	7.4
November ..	5.50	5.20	5.10	4.90	5.00	4.90	6.00	6.50	7.10	6.70	6.60	6.00	6.70	5.90	5.70
December ..	6.00	5.90	5.90	6.10	5.80	5.60	5.30	5.20	4.90	4.80	4.60	4.60	4.40	4.20	4.10
January ..	3.20	3.10	3.10	3.00	2.90	2.80	2.80	2.80	2.80	2.80	2.70	2.70	2.70	2.50	2.50

Month.	16th.	17th.	18th.	19th.	20th.	21st.	22nd.	23rd.	24th.	25th.	26th.	27th.	28th.	29th.	30th.	31st.
	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32
June ..	10.80	10.70	10.60	10.10	9.30	8.50	7.10	7.00	6.40	6.00	5.90	5.70	5.60	5.70	5.40	..
July ..	9.70	10.60	11.70	12.50	11.90	12.40	12.60	13.00	13.00	12.00	10.70	9.80	9.80	9.80	9.30	8.70
August ..	7.80	7.60	7.40	7.10	6.80	6.80	6.40	6.60	6.70	6.40	6.70	6.80	6.90	6.60	6.50	6.90
September ..	6.80	6.40	6.20	6.00	5.80	5.70	5.70	5.80	6.00	7.20	6.80	6.70	6.10	5.90	5.70	..
October ..	7.60	7.50	7.30	7.20	6.90	7.20	8.00	8.60	8.60	8.80	8.00	7.30	6.70	6.30	6.10	5.70
November ..	5.50	5.20	5.20	5.80	5.90	5.70	6.70	6.80	5.50	5.50	6.00	6.10	6.50	6.40	6.20	5.70
December ..	4.00	3.80	3.70	3.60	3.50	3.50	3.50	3.50	3.40	3.40	3.30	3.30	3.30	3.20	3.10	3.20
January ..	2.50	2.50	2.40	2.30	2.30	2.30	2.20	2.20	2.20	2.20	2.10	2.10	2.00	2.00	2.00	2.00

1883-1884.

Month.	1st.	2nd.	3rd.	4th.	5th.	6th.	7th.	8th.	9th.	10th.	11th.	12th.	13th.	14th.	15th.
1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
June ..	3.00	2.70	2.80	3.00	2.80	2.70	2.70	2.80	2.70	2.50	2.40	2.60	2.60	4.80	5.00
July ..	6.30	7.80	7.80	6.70	6.60	6.30	6.00	5.60	5.10	4.70	4.50	8.70	9.30	8.90	8.50
August ..	8.60	7.60	7.10	6.50	6.30	6.10	5.90	6.10	6.20	6.20	6.30	6.20	7.30	6.50	6.50
September ..	9.50	9.40	9.20	8.70	8.00	7.30	6.80	6.40	6.40	7.40	7.30	7.60	7.00	6.50	6.20
October ..	4.50	4.40	4.30	4.30	4.60	4.40	4.90	5.70	6.10	5.90	6.16	5.80	6.50	7.90	8.20
November ..	6.20	6.50	7.10	7.20	8.50	8.30	7.60	8.70	8.90	9.70	8.50	7.70	7.20	6.40	6.50
December ..	5.00	4.90	4.70	4.60	4.50	4.40	4.36	4.20	4.20	4.10	4.10	4.10	4.20	4.60	5.30
January ..	4.30	4.20	4.10	4.00	3.90	3.90	3.90	3.90	3.90	3.90	3.70	3.60	3.50	3.50	3.50

Month.	16th.	17th.	18th.	19th.	20th.	21st.	22nd.	23rd.	24th.	25th.	26th.	27th.	28th.	29th.	30th.	31st.
	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32
June ..	4.60	4.90	5.00	5.10	5.50	5.50	5.20	4.50	4.20	3.90	3.60	3.30	3.30	3.60	3.60	..
July ..	8.25	8.80	8.80	8.40	7.90	7.60	6.80	6.60	6.90	8.80	10.30	10.70	9.80	9.10	8.90	8.50
August ..	7.70	8.06	7.70	7.60	6.80	7.00	7.50	7.10	6.60	6.50	6.50	6.60	7.00	7.60	8.70	9.10
September ..	6.00	5.90	5.80	5.60	5.50	5.40	5.30	5.20	5.10	5.00	4.90	4.80	4.70	4.60	4.50	..
October ..	9.70	8.00	7.40	6.60	7.90	7.70	6.70	6.00	6.20	6.00	6.00	6.20	6.00	5.90	6.00	5.90
November ..	6.30	6.00	5.80	5.80	5.80	6.00	5.80	6.00	5.80	5.80	5.60	5.60	5.60	5.40	5.20	5.10
December ..	5.50	6.00	6.50	6.60	6.40	6.10	5.90	5.60	5.30	5.00	4.90	4.70	4.60	4.60	4.50	4.40
January ..	3.40	3.30	3.30	3.20	3.20	3.40	3.50	3.40	3.30	3.20	3.10	3.10	3.10	3.00	3.00	3.00

Register of readings of the Cauvery dam, North gauge—cont.

1884-1885.

Month.	1st.	2nd.	3rd.	4th.	5th.	6th.	7th.	8th	9th.	10th.	11th.	12th.	13th.	14th.	15th.
1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
June ..	3.0	2.90	2.80	2.60	2.40	2.20	2.20	2.10	2.0	2.0	2.0	2.50	3.0	2.80	2.70
July ..	4.60	4.10	3.70	3.50	3.20	3.0	2.90	2.90	4.0	4.25	4.0	3.70	3.60	3.50	5.0
August ..	5.50	5.50	6.90	7.40	8.60	9.0	8.90	8.50	7.70	7.0	6.50	6.20	6.0	6.0	5.80
September..	10.40	10.10	9.20	8.10	7.25	6.70	6.20	6.20	6.0	6.0	6.10	6.0	5.85	5.80	5.60
October ..	5.80	6.0	5.90	6.20	5.90	5.55	5.40	5.20	5.70	6.40	5.60	6.0	6.0	5.50	5.0
November..	5.70	5.70	5.40	5.20	5.30	5.50	6.0	6.50	6.30	5.90	5.80	5.60	7.10	6.70	8.0
December..	4.80	4.60	4.50	4.30	4.20	4.10	4.0	3.90	3.80	3.90	4.20	4.90	4.50	4.20	4.10
January ..	3.90	3.80	3.80	3.80	3.60	3.30	3.20	3.0	2.90	2.80	2.80	2.70	2.70	2.60	2.60

Month.	16th.	17th.	18th.	19th.	20th.	21st.	22nd.	23rd.	24th.	25th.	26th.	27th.	28th.	29th.	30th.	31st.
17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32	
June ..	2.60	2.30	2.0	1.90	1.85	1.70	1.50	1.30	1.20	1.20	1.20	1.80	3.30	5.30	5.2	..
July ..	7.20	7.20	6.80	6.10	5.80	5.50	5.40	5.30	5.40	5.10	4.70	4.40	4.20	4.05	4.1	5.80
August ..	5.60	5.40	5.20	5.0	4.80	4.70	4.60	4.40	4.30	4.20	4.20	4.35	4.30	4.60	8.6	10.30
September..	5.40	5.30	5.10	4.90	4.90	4.80	4.80	4.90	5.30	5.60	5.70	5.70	5.60	5.50	5.8	..
October ..	5.0	4.90	5.20	7.0	7.30	7.70	7.10	6.70	6.80	6.70	6.30	6.40	6.0	6.0	6.6	6.20
November..	7.40	6.70	6.20	5.90	5.50	5.30	5.20	5.10	4.70	4.60	4.70	4.70	5.40	5.0	5.0	..
December..	3.80	3.80	5.80	7.80	6.30	6.40	6.50	5.80	5.60	5.30	5.0	4.80	4.60	4.40	4.2	4.10
January ..	2.50	2.50	2.40	2.40	2.30	2.30	2.30	2.30	2.20	2.0	2.0	1.90	1.90	1.90	1.9	2.0

1885-1886.

Month.	1st.	2nd.	3rd.	4th.	5th.	6th.	7th.	8th.	9th.	10th.	11th.	12th.	13th.	14th.	15th.
1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
June ..	3.80	3.40	3.10	3.10	3.90	4.0	4.80	4.20	4.10	4.70	4.50	4.50	4.80	5.70	6.0
July ..	6.20	6.10	7.20	7.40	7.0	6.60	6.30	6.60	6.40	7.20	7.10	6.70	6.40	6.10	5.90
August ..	6.70	6.50	6.20	6.0	5.80	5.70	5.50	5.30	4.90	4.70	4.40	4.20	4.0	3.90	5.40
September ..	5.60	5.40	5.30	5.10	5.0	4.80	4.70	4.70	4.60	4.50	4.90	4.50	4.50	4.30	5.80
October ..	4.70	5.0	6.0	6.50	6.70	6.10	5.90	6.40	6.80	6.10	6.70	6.20	6.60	6.80	6.90
November ..	6.90	6.10	5.80	5.60	5.0	4.70	4.80	4.50	4.20	4.0	3.90	5.0	5.60	4.90	4.30
December ..	3.20	3.0	2.90	2.80	2.70	2.60	2.60	2.60	2.60	2.70	3.0	3.60	3.10	3.0	2.90
January ..	4.60	4.10	3.80	3.70	3.50	3.40	3.30	3.30	3.30	3.10	3.0	2.90	2.80	2.80	2.70

Month.	16th.	17th.	18th.	19th.	20th.	21st.	22nd.	23rd.	24th.	25th.	26th.	27th.	28th.	29th.	30th.	31st.
17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32	
June ..	5.70	5.30	5.0	4.50	4.40	4.50	4.50	4.70	5.80	5.60	6.80	6.50	6.80	6.40	6.0	..
July ..	5.80	5.50	5.40	5.60	5.90	5.80	5.50	5.70	6.90	7.90	8.20	8.10	7.90	8.0	7.80	7.30
August ..	9.30	9.70	9.60	9.60	9.70	9.50	8.80	7.90	7.10	6.60	6.0	5.70	5.70	5.80	5.70	5.80
September ..	5.0	5.20	4.80	4.50	4.20	4.0	3.80	3.70	3.70	3.50	3.60	3.50	3.50	4.30	3.70	..
October ..	6.70	6.30	6.20	6.30	6.90	6.60	7.90	6.80	6.20	6.10	5.90	5.60	5.90	5.80	7.80	7.80
November ..	4.10	4.30	6.70	6.10	5.90	5.70	5.20	4.80	4.40	4.10	4.0	3.80	3.60	3.60	3.30	..
December ..	2.80	2.90	4.50	4.50	4.70	4.60	5.70	5.80	6.0	5.60	5.40	5.60	5.10	4.70	4.90	4.60
January ..	2.70	2.60	2.50	2.60	2.50	2.40	2.20	2.20	2.10	2.0	2.0	2.0	1.90	1.80	1.80	1.80

Register of readings of the Cauvery dam, North gauge—cont.

1886-1887.

Month.	1st.	2nd.	3rd.	4th.	5th.	6th.	7th.	8th.	9th.	10th.	11th.	12th.	13th.	14th.	15th.
1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
June ..	4.60	4.30	4.10	3.90	3.60	3.70	3.70	3.20	2.20	3.0	3.10	3.50	4.20	4.70	4.50
July ..	4.40	4.20	4.0	4.20	4.60	4.50	4.20	4.90	5.30	5.10	6.30	5.90	5.30	4.60	5.30
August ..	6.90	6.80	6.90	6.30	7.50	7.20	6.20	6.20	6.20	7.0	7.20	6.70	6.50	6.10	6.40
September.	5.30	5.40	5.50	5.40	5.50	6.0	6.20	6.70	7.0	6.80	7.0	6.60	6.70	6.60	6.70
October ..	5.60	5.40	5.30	5.20	4.80	4.50	4.30	4.20	4.0	4.0	3.70	3.80	4.50	4.40	4.40
November.	5.0	5.60	5.70	7.40	6.80	6.20	5.90	5.50	5.10	4.80	4.40	4.20	7.30	6.70	6.40
December ..	2.90	2.70	2.60	2.50	2.40	2.40	2.40	2.40	2.30	2.40	2.50	2.40	2.30	2.30	2.50
January ..	1.50	1.40	1.40	1.30	1.20	1.10	1.10	0.90	0.90	1.0	0.90	0.80	0.60	0.60	0.60

Month.	16th.	17th.	18th.	19th.	20th.	21st.	22nd.	23rd.	24th.	25th.	26th.	27th.	28th.	29th.	30th.	31st.
17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32	
June ..	4.20	4.0	6.20	6.10	8.70	8.50	7.90	7.40	7.10	6.50	5.80	5.70	5.40	5.0	4.60	..
July ..	7.30	8.0	8.20	8.70	9.20	8.40	7.80	6.90	6.60	9.0	9.70	9.80	9.40	7.80	7.20	7.10
August ..	6.40	6.60	6.50	6.70	7.0	7.20	7.20	6.90	6.50	6.0	5.80	5.60	5.60	5.30	5.10	5.20
September.	6.20	6.20	5.90	5.60	5.40	5.10	5.0	5.20	5.20	7.80	7.0	6.70	6.20	5.90	5.90	..
October ..	4.40	4.90	4.70	4.30	4.20	4.0	3.90	3.80	3.70	3.60	3.30	3.70	4.30	4.50	5.70	5.40
November ..	6.0	5.50	5.20	4.80	4.40	4.10	4.0	3.80	3.70	3.40	3.0	2.90	2.80	2.80	2.90	..
December ..	2.50	2.40	2.60	2.50	2.50	2.40	2.40	2.30	2.30	2.20	2.20	1.90	1.80	1.90	1.90	1.50
January ..	0.50	0.50	0.50	0.50	0.40	0.40	0.40	0.40	0.40	0.40	0.40	0.40	0.40	0.40	0.40	0.30

1887-1888.

Month.	1st.	2nd.	3rd.	4th.	5th.	6th.	7th.	8th.	9th.	10th.	11th.	12th.	13th.	14th.	15th.
1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
June ..	1 70	1 60	3 80	3 80	3 50	3 10	3 60	3 0	2 70	2 20	2 80	3 40	5 70	6 10	5 80
July ..	4 50	4 0	4 10	4 50	4 30	4 10	4 40	5 50	6 30	7 20	7 10	6 80	7 70	7 0	7 20
August ..	5 70	5 50	5 50	5 40	5 20	5 20	4 90	4 90	4 80	4 70	4 50	4 40	4 30	4 50	4 50
September.	4 30	4 10	3 90	4 10	5 00	5 40	5 40	5 50	5 90	6 40	5 90	5 50	5 10	4 90	5 50
October ..	3 50	3 30	3 10	3 10	3 10	3 10	3 20	3 70	5 50	5 20	12 10	10 10	9 80	8 40	7 60
November.	6 10	6 10	6 00	6 40	6 50	7 90	8 00	7 50	6 00	6 40	6 40	6 50	6 30	6 90	7 10
December ..	5 60	5 30	5 00	4 80	4 60	4 50	4 40	4 30	6 40	5 80	5 70	6 60	5 90	5 50	5 10
January ..	5 90	5 50	5 20	5 00	4 70	4 50	4 40	4 30	4 20	4 10	3 90	3 70	3 60	3 60	3 60

Month.	16th.	17th.	18th.	19th.	20th.	21st.	22nd.	23rd.	24th.	25th.	26th.	27th.	28th.	29th.	30th.	31st.
	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32
June ..	6 30	6 20	5 80	6 10	6 50	7 20	7 20	6 80	6 20	5 90	5 60	5 30	5 20	4 80	4 80	..
July ..	8 90	10 10	9 70	8 80	7 70	6 50	5 80	5 60	5 40	5 70	5 70	5 70	6 10	6 30	6 10	5 90
August ..	4 70	4 80	5 00	5 10	5 20	5 20	5 10	5 10	4 90	4 70	5 10	5 30	5 40	4 90	4 50	4 40
September.	6 50	6 00	5 80	5 40	5 20	4 90	4 70	4 40	4 30	4 20	4 10	4 00	3 90	3 80	3 60	..
October ..	6 90	6 70	6 20	5 90	6 40	6 60	6 20	5 90	5 60	5 40	7 10	5 80	5 80	5 50	5 60	..
November.	6 40	6 00	5 90	5 60	5 30	5 10	5 70	5 10	5 00	4 90	5 30	5 90	5 80	5 70	5 70	..
December	4 90	4 70	4 50	4 30	4 20	4 10	4 00	4 10	4 20	4 80	4 40	4 50	4 80	6 20	6 90	6 00
January ..	3 50	3 30	3 30	3 20	3 10	3 10	3 10	3 00	3 00	3 00	2 90	2 90	2 90	2 90	2 80	2 80

Register of readings of the Cauvery dam, North gauge—cont.

1888-1889.

Month.	1st.	2nd.	3rd.	4th.	5th.	6th.	7th.	8th.	9th.	10th.	11th.	12th.	13th.	14th.	15th.
1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
June ..	2.80	3.00	3.60	4.00	4.30	4.60	4.20	3.90	3.70	3.50	3.20	3.10	3.80	4.40	6.00
July ..	5.00	5.30	5.80	6.90	7.20	6.80	6.30	6.10	6.80	6.80	6.30	6.80	9.20	8.50	7.80
August ..	6.20	7.30	6.90	6.40	6.00	6.20	5.90	6.30	6.60	6.50	6.80	6.60	6.60	6.50	6.90
September ..	5.90	5.70	5.60	5.40	5.30	5.40	5.20	5.00	4.90	4.70	4.80	4.70	5.40	4.90	4.90
October ..	6.00	6.10	5.70	5.50	5.10	4.90	4.90	5.00	4.90	5.00	5.40	5.40	4.80	4.50	4.70
November ..	4.30	4.00	3.90	4.20	5.20	6.50	7.00	6.50	6.00	5.80	5.80	6.50	6.90	6.10	6.00
December ..	Not available.														
January ..	2.7	2.70	2.60	8.40	2.20	2.20	2.20	2.20	2.0	1.90	1.80	1.80	1.80	1.80	2.0

Month.	16th.	17th.	18th.	19th.	20th.	21st.	22nd.	23rd.	24th.	25th.	26th.	27th.	28th.	29th.	30th.	31st.
17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32	
June ..	6.10	6.20	6.30	6.00	5.70	5.90	6.90	7.00	6.60	6.10	6.00	5.80	5.40	5.00	5.00	..
July ..	7.20	7.60	7.50	7.60	7.80	7.30	6.80	6.40	6.10	6.30	8.00	7.80	6.20	6.40	6.30	..
August ..	6.70	6.70	6.50	6.10	5.90	5.90	6.20	6.50	7.50	7.70	7.30	6.80	6.40	6.40	6.20	6.00
September ..	5.80	5.50	5.20	5.30	5.10	4.90	4.80	4.60	4.60	4.80	5.00	5.60	6.50	6.50	6.60	..
October ..	4.30	4.90	4.30	4.20	4.10	3.90	3.70	3.50	3.30	3.30	3.20	3.20	3.40	3.40	5.10	4.70
November ..	6.00	5.60	5.30	4.90	4.80	4.50	4.30	4.00	3.80	3.70	3.70	4.00	3.80	3.90	4.40	..
December ..	Not available.															..
January ..	1.80	1.80	1.80	1.80	1.80	1.80	1.80	1.80	1.70	1.70	1.70	1.70	1.50	1.50	1.40	1.20

1889-1890.

Month.	1st.	2nd.	3rd.	4th.	5th.	6th.	7th.	8th.	9th.	10th.	11th.	12th.	13th.	14th.	15th.
1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
June ..	2.20	2.90	2.40	2.20	2.0	2.0	2.0	2.0	2.20	2.20	2.20	5.30	6.0	5.70	5.80
July ..	4.80	6.60	6.50	6.30	6.0	6.0	5.80	5.80	5.70	5.60	5.60	5.40	5.40	5.30	6.20
August ..	5.90	6.10	6.30	6.0	5.90	5.70	5.60	5.60	5.60	5.90	7.90	8.0	7.60	7.80	6.90
September ..	7.0	7.20	7.0	7.60	8.40	7.10	6.40	6.30	7.60	7.50	7.70	7.10	7.10	6.90	6.80
October ..	7.10	7.0	6.70	6.60	6.40	6.10	6.50	7.10	7.40	8.20	10.0	8.80	9.0	9.40	8.30
November ..	5.40	5.80	5.10	5.10	5.10	5.20	4.90	4.80	4.70	4.50	4.30	4.10	3.90	3.80	3.70
December ..	3.50	3.50	3.40	3.40	3.30	3.20	3.0	3.10	3.10	3.0	3.0	2.90	2.80	2.80	2.90
January ..	3.10	3.10	3.20	3.40	3.60	3.40	3.20	3.10	3.0	2.90	2.80	2.70	2.80	2.80	2.80

Month.	16th.	17th.	18th.	19th.	20th.	21st.	22nd.	23rd.	24th.	25th.	26th.	27th.	28th.	29th.	30th.	31st.
17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32	
June ..	5.10	4.80	4.50	4.30	4.20	4.30	5.00	4.90	5.40	5.10	4.90	4.70	4.50	4.70	..	..
July ..	5.0	6.70	7.60	8.70	8.50	9.0	8.60	8.10	7.70	7.60	6.90	6.40	6.0	6.10	6.0	5.90
August ..	6.50	6.30	6.0	6.30	6.40	6.80	7.0	7.0	7.0	7.0	7.10	6.70	6.40	6.50	7.50	7.40
September ..	8.70	8.30	7.50	6.90	6.50	6.70	7.10	7.60	7.30	7.0	7.30	8.60	8.60	7.90	7.50	..
October ..	8.70	9.60	9.60	9.0	9.0	8.60	8.10	7.80	7.30	7.0	6.60	6.10	6.0	5.90	5.70	5.60
November ..	3.70	3.70	3.50	3.50	4.0	4.0	3.90	3.70	4.0	4.30	3.80	3.70	4.60	3.80	3.60	..
December ..	2.80	2.80	3.0	3.10	3.0	2.90	4.10	3.50	3.20	3.0	2.90	2.90	2.90	2.90	2.80	2.80
January ..	2.70	2.70	2.70	2.70	2.70	2.60	2.70	2.40	2.40	2.30	2.30	2.30	2.30	2.0	2.0	..

Register of readings of the Cauvery dam, North gauge—cont.

1890-1891.

Month.	1st.	2nd.	3rd.	4th.	5th.	6th.	7th.	8th.	9th.	10th.	11th.	12th.	13th.	14th.	15th.
1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
June ..	3.8	3.1	3.2	3.4	3.2	3.1	3.8	3.7	2.3	2.2	2.2	2.3	2.3	2.2	2.1
July ..	4.5	4.2	4.0	4.2	5.7	5.9	5.5	5.5	5.3	4.8	4.2	3.8	3.6	4.3	4.6
August ..	7.1	6.5	6.3	6.3	6.1	5.9	5.8	5.7	6.7	7.5	8.1	8.1	7.7	7.2	6.8
September ..	5.0	4.9	4.6	4.3	4.4	4.7	5.9	5.3	4.9	4.5	4.3	4.2	4.2	4.0	3.9
October ..	3.5	3.6	3.7	4.3	5.7	5.7	5.6	5.7	5.5	5.1	5.0	4.7	4.3	4.1	4.1
November ..	6.7	6.0	7.3	8.6	9.0	9.0	8.3	8.6	7.7	8.4	7.0	6.4	5.8	5.5	5.3
December ..	2.9	2.9	2.8	2.8	2.7	2.7	3.0	3.2	3.2	3.2	3.8	3.7	3.3	3.2	3.1
January ..	1.5	1.5	1.4	1.4	1.4	1.4	1.3	1.2	1.2	1.2	1.2	1.0	..	..	..

Month.	16th.	17th.	18th.	19th.	20th.	21st.	22nd.	23rd.	24th.	25th.	26th.	27th.	28th.	29th.	30th.	31st.
17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32	
June ..	2.3	2.3	2.4	2.6	2.4	3.1	3.6	4.2	5.2	5.4	5.1	4.9	4.6	4.9	4.8	..
July ..	4.7	4.9	5.3	5.5	5.1	4.8	4.8	6.6	8.5	9.1	8.8	8.9	8.4	7.9	7.3	..
August ..	6.4	6.1	5.9	5.9	5.8	7.5	5.4	5.2	5.2	5.2	5.1	5.3	5.4	5.6	5.5	5.6
September ..	3.9	3.8	4.0	3.9	3.9	4.0	3.9	3.9	3.9	3.8	3.6	3.5	3.5	3.2	3.3	..
October ..	4.1	4.3	4.0	3.8	3.8	3.7	3.6	3.3	3.3	3.1	3.2	3.5	3.3	3.9	7.7	7.8
November ..	5.2	5.0	4.7	4.5	4.3	4.1	3.9	3.8	3.6	3.5	3.3	3.3	3.2	3.1	3.0	..
December ..	3.1	3.0	3.0	2.9	2.8	2.7	2.6	2.6	2.5	2.5	2.5	2.4	2.1	1.6	1.6	1.6
January ..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..

1891-1892.

Month.	1st.	2nd.	3rd.	4th.	5th.	6th.	7th.	8th.	9th.	10th.	11th.	12th.	13th.	14th.	15th.
1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
June ..	1.8	2.4	2.5	2.4	2.3	3.1	4.6	4.8	4.3	3.9	3.7	3.4	3.2	2.8	2.7
July ..	2.7	2.6	2.5	2.3	3.4	4.7	7.0	7.4	7.2	7.7	7.5	7.2	7.1	7.1	6.5
August ..	9.3	8.5	7.7	7.0	6.6	6.5	6.7	8.3	8.4	8.1	7.5	7.4	7.7	7.2	6.7
September ..	5.9	5.5	5.1	5.0	5.7	6.2	6.0	5.7	5.4	5.2	5.0	4.9	4.9	4.7	4.9
October ..	3.6	5.7	5.0	4.7	5.8	4.8	5.7	5.1	5.7	5.8	5.5	4.9	5.9	6.5	5.4
November ..	5.7	5.4	5.5	6.7	6.7	5.5	5.3	4.8	4.7	4.5	4.6	5.5	5.0	5.2	5.1
December ..	2.7	2.6	2.5	2.4	2.3	2.3	2.2	2.3	2.3	2.2	2.2	2.2	2.2	2.1	2.0
January ..	2.9	2.8	2.6	2.6	2.4	2.4	2.4	2.3	2.2	2.3	2.2	2.0	2.0	2.0	2.0

Month.	16th.	17th.	18th.	19th.	20th.	21st.	22nd.	23rd.	24th.	25th.	26th.	27th.	28th.	29th.	30th.	31st.
17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32	
June ..	2.5	2.5	2.4	2.3	2.3	3.8	3.9	4.2	4.1	3.8	3.5	3.4	3.0	3.0	2.9	..
July ..	6.0	5.6	5.2	5.0	4.8	5.3	5.0	6.2	8.7	9.5	10.2	10.0	9.6	9.3	9.4	9.5
August ..	6.3	6.1	6.0	5.8	5.7	5.6	5.5	6.2	5.1	5.3	5.2	5.1	5.7	5.6	5.5	5.4
September ..	4.8	4.7	4.6	4.4	4.2	4.0	3.9	3.9	3.8	3.7	3.5	3.5	3.6	3.6	3.6	..
October ..	5.7	6.5	6.3	6.0	7.2	7.1	7.7	7.0	6.4	6.0	5.9	5.6	5.4	6.8	6.0	5.9
November ..	4.6	4.4	4.4	4.3	4.1	3.9	3.8	3.7	3.5	3.4	3.3	3.2	3.0	2.9	2.8	..
December ..	2.2	3.5	3.2	2.9	2.7	2.7	2.6	2.6	3.8	3.7	3.6	3.4	3.2	3.5	3.2	3.1
January ..	2.0	2.0	1.8	1.9	1.7	1.6	1.6	1.2	1.2	1.1	1.0	1.0	1.0	0.9	0.8	0.8

Month.	1st.	2nd.	3rd.	4th.	5th.	6th.	7th.	8th.	9th.	10th.	11th.	12th.	13th.	14th.	15th.
1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
June ..	3.2	3.0	3.1	3.0	2.8	3.0	4.4	4.7	4.7	4.4	3.9	3.8	3.7	4.1	4.7
July ..	6.7	5.7	5.9	5.4	4.7	4.6	3.7	3.4	3.2	4.2	5.4	7.9	8.8	8.9	8.9
August ..	8.1	7.8	7.5	7.6	7.5	7.4	7.2	7.3	7.8	7.2	7.2	7.0	6.7	6.5	7.1
September..	7.8	7.3	6.9	6.5	6.4	6.8	6.7	7.0	6.7	6.5	6.4	6.2	6.1	6.0	6.1
October ..	5.2	5.0	5.2	5.1	5.3	5.5	5.5	5.2	5.5	5.1	4.9	4.6	5.2	5.2	5.0
November..	4.8	4.5	4.4	4.1	4.0	3.9	3.8	3.9	3.8	3.7	3.9	3.7	3.6	3.4	3.1
December ..	2.1	2.2	2.0	1.9	1.8	2.0	1.8	1.7	1.7	2.0	2.0	1.8	1.7	1.6	1.6
January ..	1.7	1.7	1.7	1.6	1.6	1.7	1.4	1.2	1.2	1.2	1.2	1.2	1.1	1.0	1.0

Month.	16th.	17th.	18th.	19th.	20th.	21st.	22nd.	23rd.	24th.	25th.	26th.	27th.	28th.	29th.	30th.	31st.
	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32
June ..	5.7	5.4	4.9	5.5	4.4	4.1	3.9	3.7	3.6	3.5	3.5	3.4	3.7	3.8	6.4	..
July ..	8.6	8.3	7.8	7.0	6.2	5.9	5.9	10.9	12.0	10.3	10.6	10.2	9.9	9.8	9.3	8.5
August ..	6.4	6.2	6.3	6.3	6.1	6.0	6.2	6.4	6.6	6.6	6.7	6.8	6.4	6.5	6.4	7.0
September ..	5.9	5.7	5.5	5.4	5.1	5.0	5.0	5.1	5.2	5.3	5.1	4.9	4.9	4.9	4.7	..
October ..	5.8	6.1	6.1	5.8	5.9	5.6	6.2	5.8	5.6	5.8	5.3	5.0	5.0	5.0	4.7	4.5
November..	3.0	3.0	2.9	2.9	2.8	2.7	2.7	2.7	2.6	2.6	2.4	2.7	2.5	2.1	2.2	..
December ..	1.6	2.0	1.9	2.0	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.8	1.8	1.7	1.7	1.7
January ..	1.0	0.9	0.9	0.9	0.9	1.0	1.0	0.9	0.9	1.4	0.9	0.9	0.9	0.8	0.8	0.8

Month.	1st.	2nd.	3rd.	4th.	5th.	6th.	7th.	8th.	9th.	10th.	11th.	12th.	13th.	14th.	15th.
1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
June ..	3.2	3.4	3.4	3.4	3.6	4.4	4.9	5.0	6.0	6.1	6.1	5.5	5.0	5.6	5.4
July ..	6.4	6.2	6.2	6.1	5.8	5.6	5.3	5.1	5.2	5.1	5.3	5.5	6.2	6.2	6.1
August ..	5.9	5.7	5.7	5.9	6.4	7.6	7.5	8.0	7.7	7.4	7.1	6.7	7.0	6.6	6.0
September..	5.8	5.5	6.1	5.9	5.7	5.5	5.4	7.4	7.1	6.7	6.2	6.0	5.8	6.1	6.3
October ..	4.5	5.3	5.3	5.8	5.6	5.6	6.4	7.6	7.2	7.5	8.4	8.6	9.9	8.5	8.3
November ..	5.7	5.4	5.0	4.8	4.5	4.5	4.7	4.2	4.2	4.4	7.2	5.9	5.6	6.5	8.2
December ..	5.6	5.5	5.1	5.0	4.8	4.7	4.6	4.4	4.3	4.2	4.2	4.0	4.0	3.9	3.8
January ..	2.8	2.8	2.8	2.8	2.8	2.8	2.8	2.8	2.7	2.7	2.6	2.6	2.6	2.6	2.6

Month.	16th.	17th.	18th.	19th.	20th.	21st.	22nd.	23rd.	24th.	25th.	26th.	27th.	28th.	29th.	30th.	31st.
	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32
June ..	5.1	4.9	6.3	6.7	8.0	7.9	7.8	7.1	6.5	6.6	6.6	6.5	6.3	6.4	6.6	..
July ..	6.2	6.2	6.1	5.9	5.7	5.5	5.5	5.3	5.2	5.3	6.1	5.3	5.7	5.5	5.2	6.1
August ..	6.0	5.6	5.4	5.2	5.0	4.9	4.7	4.7	4.6	4.5	4.5	4.6	5.0	5.8	6.1	6.0
September..	6.3	6.5	6.2	5.9	5.6	5.4	5.1	4.9	4.7	4.5	4.3	4.2	4.0	4.4	4.4	..
October ..	7.2	6.5	6.2	6.3	6.1	5.9	5.8	5.8	7.0	7.1	6.7	7.0	7.6	7.1	6.5	6.0
November..	9.1	7.6	8.1	7.0	6.4	6.3	5.9	6.5	7.5	6.8	6.4	6.2	5.9	6.8	5.8	..
December ..	3.7	3.7	3.6	3.5	3.4	3.3	3.3	3.2	3.2	3.0	3.0	3.0	2.9	2.9	2.8	2.8
January ..	2.6	2.5	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.0	2.0	2.0	2.0	2.0	2.0	1.9

[illegible][illegible]

Register of readings of the Cauvery dam, North gauge—*cont.*

1896-1897.

Month.	1st.	2nd.	3rd.	4th.	5th.	6th.	7th.	8th.	9th.	10th.	11th.	12th.	13th.	14th.	15th.
1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
June ..	2.7	2.5	2.7	2.3	2.8	3.0	2.9	2.8	2.6	2.5	2.7	2.0	1.7	2.0	1.9
July ..	9.2	9.8	9.7	9.2	8.7	8.2	7.9	7.4	7.1	6.7	6.4	6.0	5.7	5.6	5.5
August ..	18.3	13.5	12.5	11.7	1.1	10.6	10.4	9.7	9.7	8.9	8.2	7.8	8.1	8.6	8.2
September ..	6.4	6.3	6.3	6.1	6.9	6.0	5.7	6.5	6.5	6.3	6.0	5.8	5.7	5.6	5.3
October ..	6.3	7.0	7.1	7.5	7.3	7.3	6.4	6.1	5.7	5.4	5.4	5.4	5.2	5.1	5.1
November ..	3.9	3.8	3.6	3.5	3.6	3.5	3.5	3.4	3.2	3.1	3.0	2.9	2.8	2.9	2.8
December ..	4.9	5.0	4.9	4.7	4.3	4.1	4.1	6.0	7.0	6.1	5.8	5.4	5.0	4.7	4.4
January ..	3.7	3.5	3.4	3.3	3.2	3.2	3.1	3.0	2.9	2.9	2.8	2.7	2.7	2.7	2.7

Month.	16th.	17th.	18th.	19th.	20th.	21st.	22nd.	23rd.	24th.	25th.	26th.	27th.	28th.	29th.	30th.	31st.
	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32
June ..	2.1	4.0	3.8	3.3	3.8	4.1	7.4	9.7	10.5	0.7	0.2	10.5	9.4	8.6	9.2	..
July ..	8.5	10.1	10.2	9.9	9.0	7.9	7.3	6.7	6.3	15.9	5.9	8.1	10.2	12.3	13.0	13.8
August ..	7.7	9.1	9.3	9.0	9.1	8.6	7.9	7.3	6.9	6.6	6.3	6.3	6.2	6.6	6.6	6.6
September ..	5.2	5.1	5.0	5.0	5.0	5.0	5.2	5.1	4.9	5.4	5.1	5.6	8.7	6.7	6.6	..
October ..	4.9	4.7	4.5	4.4	4.3	4.2	4.5	4.5	4.6	4.4	4.6	4.4	4.5	4.2	4.3	4.2
November ..	2.7	5.1	5.0	5.3	5.1	6.0	5.3	5.6	5.7	5.9	6.4	6.4	5.9	5.5	5.2	..
December ..	4.2	4.1	4.2	5.1	6.3	6.4	9.3	5.5	4.9	4.6	4.4	4.3	4.0	3.9	3.8	3.7
January ..	2.6	2.6	2.6	2.6	2.6	2.6	2.5	2.4	2.4	2.4	2.4	2.3	2.2	2.2	2.2	2.1

1897-1898.

Month.	1st.	2nd.	3rd.	4th.	5th.	6th.	7th.	8th.	9th.	10th.	11th.	12th.	13th.	14th.	15th.
1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
June ..	1-9	2-0	3-0	3-4	3-3	2-9	2-9	2-8	3-0	3-6	3-7	3-6	3-3	3-3	3-1
July ..	5-7	5-3	4-9	4-6	4-3	4-0	3-8	3-7	3-8	4-2	7-4	9-6	10-6	10-4	10-6
August ..	9-0	8-9	8-9	8-3	7-7	7-2	6-7	6-6	9-0	12-0	12-2	12-2	12-3	12-3	11-5
September ..	8-3	8-3	7-6	7-0	6-5	6-5	6-7	6-8	6-3	6-1	6-2	6-3	5-9	5-8	8-7
October ..	9-8	10-5	0-3	8-3	7-5	7-0	6-5	6-6	6-3	5-9	5-7	5-6	6-2	8-3	7-7
November ..	4-4	5-1	4-8	4-7	5-2	5-1	4-9	4-5	4-3	4-1	4-0	3-9	4-3	3-7	4-0
December ..	3-4	3-9	3-3	3-6	3-3	3-2	3-2	2-9	2-8	2-8	2-8	2-8	2-6	2-6	2-7
January ..	2-1	2-1	2-0	2-0	2-0	1-9	1-8	1-8	1-8	1-8	1-7	1-7	1-7	1-7	1-7

Month.	16th.	17th.	18th.	19th.	20th.	21st.	22nd.	23rd.	24th.	25th.	26th.	27th.	28th.	29th.	30th.	31st.
	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32
June ..	3-6	3-6	3-7	4-2	5-9	9-0	9-9	10-0	9-9	9-0	8-5	7-6	7-2	6-7	6-1	...
July ..	10-0	8-9	7-8	7-1	6-4	5-9	5-7	6-3	6-6	6-4	6-1	6-0	6-2	6-6	6-3	7-8
August ..	10-6	9-5	8-9	8-5	8-6	7-8	7-3	7-0	6-6	6-5	6-4	6-4	6-8	6-8	8-2	7-6
September ..	5-3	5-3	5-1	4-8	5-0	5-7	8-3	8-1	8-4	8-4	8-3	7-0	6-8	6-8	10-1	...
October ..	8-3	7-8	8-5	8-0	7-1	6-3	5-8	5-6	5-2	5-1	4-9	4-8	4-7	4-7	4-6	4-8
November ..	4-9	4-0	3-8	3-6	3-4	3-3	3-2	3-0	2-9	2-9	2-9	2-9	2-9	3-0	3-1	3-4
December ..	2-6	2-5	2-3	2-3	2-3	3-8	2-2	2-2	2-3	2-3	2-2	2-2	2-2	2-2	2-1	2-1
January ..	1-7	1-7	1-6	1-6	1-6	1-6	1-6	1-6	1-5	1-5	1-5	1-5	1-5	1-6	1-6	1-6

Register of readings of the Cauvery dam, North gauge—*cont.*

1898-1899.

Month.	1st.	2nd.	3rd.	4th.	5th.	6th.	7th.	8th.	9th.	10th.	11th.	12th.	13th.	14th.	15th.
1	2	3	4	5	6	7.	8	9	10	11	12	13	14	15	16
June ..	2.7	2.6	2.6	2.5	2.5	2.4	2.4	2.5	2.4	2.4	2.5	2.3	2.2	1.8	1.9
July ..	4.4	4.2	3.9	3.5	3.4	3.2	3.3	4.6	5.9	6.0	6.0	5.8	5.5	5.3	4.9
August ..	9.3	8.3	7.6	7.0	6.5	6.3	6.2	6.1	6.1	7.8	6.8	6.5	6.2	5.9	5.7
September ..	4.9	4.3	4.2	4.7	4.7	4.8	5.7	6.3	7.4	6.4	6.0	5.7	5.4	5.3	5.6
October ..	8.3	9.3	7.8	7.1	6.7	7.1	7.1	7.2	7.1	7.5	7.4	7.3	7.3	7.0	6.7
November ..	6.5	6.1	6.0	5.7	5.6	5.7	6.0	6.5	7.2	7.5	7.7	7.9	9.6	9.3	10.8
December ..	5.9	6.4	6.5	6.1	5.9	5.5	5.4	5.1	4.9	4.6	4.4	4.3	4.2	4.0	4.0
JANUARY ..	5.8	5.1	4.7	4.4	4.2	4.0	3.9	3.8	3.6	3.5	3.4	3.4	3.3	3.2	3.2

Month.	16th.	17th.	18th.	19th.	20th.	21st.	22nd.	23rd.	24th.	25th.	26th.	27th.	28th.	29th.	30th.	31st.
	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32
June ..	2.9	4.7	6.5	6.9	7.2	7.5	7.2	7.2	6.9	6.4	6.0	5.7	5.3	4.9	4.7	..
July ..	4.7	3.5	4.4	4.6	4.9	4.6	4.4	4.3	4.3	4.7	6.6	7.5	8.7	9.3	9.9	9.9
August ..	5.4	5.1	5.5	5.5	5.3	5.1	4.9	4.5	1.5	4.3	4.1	4.4	4.5	5.3	5.3	4.9
September ..	6.2	6.9	6.7	6.2	5.8	5.7	5.8	5.7	5.8	6.3	6.5	6.9	7.2	8.8	8.2	..
October ..	6.4	6.3	6.7	7.4	8.1	7.1	6.3	5.9	5.9	5.5	5.3	4.9	5.3	4.9	6.6	7.0
November ..	10.5	9.1	9.0	7.2	6.7	6.2	5.9	5.6	5.5	5.3	5.2	6.0	4.9	4.9	5.2	..
December ..	3.9	3.7	3.6	3.5	3.5	3.4	3.4	3.4	3.4	3.4	3.7	4.1	4.9	5.7	5.6	6.5
January ..	3.1	3.1	3.1	3.0	3.0	3.0	2.9	2.9	2.9	2.8	2.7	2.7	2.7	2.5	2.5	2.4

1899-1900.

[illegible]

Register of readings of the Cauvery dam, North gauge—cont.

1900-1901.

Month.	1st.	2nd.	3rd.	4th.	5th.	6th.	7th.	8th.	9th.	10th.	11th.	12th.	13th.	14th.	15th.
1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
June ..	3.05	3.2	2.7	2.5	2.15	1.9	1.8	2.25	3.0	28.5	2.7	2.25	1.95	1.65	1.50
July ..	8.1	8.6	8.6	8.5	8.8	9.8	9.5	8.9	8.5	8.8	8.7	9.4	10.1	10.3	10.4
August ..	8.1	7.8	8.3	8.3	7.7	8.9	11.0	11.9	11.8	11.5	11.8	11.7	12.5	13.2	13.6
September ..	5.6	5.9	6.0	5.6	5.5	5.4	5.5	5.8	6.0	6.3	6.2	7.3	6.8	6.8	7.6
October ..	5.3	5.4	6.1	7.4	6.9	5.8	5.2	4.8	4.4	4.0	3.7	3.5	3.5	3.4	3.3
November ..	4.8	4.3	4.6	4.3	4.1	4.0	3.7	3.5	3.4	3.2	3.1	3.3	3.0	3.0	2.9
December ..	2.2	2.5	2.5	2.3	2.3	2.1	2.0	2.0	2.0	2.0	1.8	1.9	1.8	1.8	1.8
January ..	1.9	1.9	1.9	1.9	1.8	1.8	1.8	1.8	1.7	1.7	1.5	1.5	1.5	3.4	3.3

Month.	16th.	17th.	18th.	19th.	20th.	21st.	22nd.	23rd.	24th.	25th.	26th.	27th.	28th.	29th.	30th.	31st.
17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32	
June ..	1.4	3.0	3.75	4.2	4.15	7.4	7.2	6.3	5.65	5.25	5.05	6.65	6.35	7.65	7.9	..
July ..	10.5	10.5	11.4	11.3	9.9	8.5	7.9	7.5	7.1	6.7	6.4	6.3	6.9	7.0	6.7	7.5
August ..	12.9	11.9	11.0	9.7	8.5	7.6	7.0	6.7	6.5	6.1	5.9	6.7	5.9	5.9	5.9	5.7
September ..	7.7	6.8	6.5	6.1	5.7	5.4	5.3	5.1	4.9	4.7	4.3	4.7	4.8	4.8	4.7	4.7
October ..	3.7	4.8	8.0	7.5	7.3	6.9	5.9	5.5	5.6	5.1	4.7	4.3	4.1	4.7	4.9	4.7
November ..	2.9	2.6	2.5	2.4	3.2	3.1	3.1	3.2	3.3	3.4	3.3	3.1	2.9	2.7	2.7	..
December ..	2.4	2.5	2.5	2.1	2.5	2.3	2.4	2.6	2.5	2.1	2.3	2.1	2.0	2.1	2.1	2.0
January ..	2.8	2.4	2.2	2.1	2.0	1.9	1.8	1.8	1.8	1.9	1.8	1.6	1.5	1.3	1.3	1.1

1901-1902.

Month.	1st.	2nd.	3rd.	4th.	5th.	6th.	7th.	8th.	9th.	10th.	11th.	12th.	13th.	14th.	15th.
1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
June ..	2.5	2.3	2.3	2.7	2.8	3.3	2.8	2.7	2.5	2.4	2.2	2.2	3.5	3.6	3.3
July ..	5.3	3.1	3.8	3.5	3.4	6.3	8.3	9.1	9.1	9.2	8.8	9.1	10.3	10.0	9.3
August ..	8.0	7.4	6.9	6.4	6.1	6.2	3.1	6.4	7.7	7.6	7.1	6.8	6.4	6.3	6.2
September ..	5.1	5.0	4.8	4.7	4.6	4.5	4.4	4.1	4.7	4.3	4.8	5.1	5.4	5.2	4.9
October ..	7.4	7.1	7.2	8.3	7.6	7.2	7.0	7.7	7.2	6.7	6.4	6.5	6.0	5.4	5.3
November ..	5.9	5.5	5.5	5.3	5.1	4.7	5.1	5.0	7.6	7.7	8.2	7.3	6.6	6.2	5.6
December ..	3.7	5.8	3.8	4.1	4.2	4.1	3.9	3.7	3.8	3.7	3.5	3.5	3.6	3.6	3.6
January ..	2.8	2.6	2.6	2.6	2.6	2.7	2.8	3.4	3.6	5.0	5.0	4.1	3.7	3.3	3.2

Month.	16th.	17th.	18th.	19th.	20th.	21st.	22nd.	23rd.	24th.	25th.	26th.	27th.	28th.	29th.	30th.	31st.
17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32	
June ..	5.9	5.7	5.5	6.9	6.9	7.7	7.3	6.6	5.9	5.3	4.8	4.4	3.7	3.5	3.3	..
July ..	8.5	7.9	7.8	7.6	7.7	7.5	6.9	6.9	6.4	5.8	5.8	5.7	5.8	5.5	5.5	8.0
August ..	6.4	6.7	7.7	8.0	7.5	6.9	6.6	6.2	6.2	5.9	5.8	5.6	5.5	5.5	5.5	5.4
September ..	4.6	5.7	5.1	6.4	6.1	5.9	5.4	5.1	5.1	5.0	5.8	7.3	7.1	7.2	..	..
October ..	5.0	4.8	4.6	4.3	4.1	3.8	4.9	4.8	5.2	7.3	6.9	7.2	8.1	8.1	7.3	6.5
November ..	5.2	4.7	4.9	5.5	7.9	7.5	7.2	6.5	5.9	5.4	5.1	4.8	4.5	4.2	4.1	..
December ..	3.5	3.4	3.4	3.3	3.2	3.1	3.1	3.0	3.0	3.0	2.9	2.9	2.8	2.7	2.7	2.7
January ..	3.0	3.0	2.9	2.8	2.8	2.7	2.7	2.7	2.6	2.5	2.5	2.5	2.5	2.4	2.4	2.3

Register of readings of the Cauvery dam, North gauge—cont.

1902-1903.

Month.	1st.	2nd.	3rd.	4th.	5th.	6th.	7th.	8th.	9th.	10th.	11th.	12th.	13th.	14th.	15th.
1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
June ..	2.7	2.5	2.8	2.9	2.8	2.7	2.4	2.3	2.1	2.0	1.6	1.6	1.6	1.5	1.3
July ..	2.2	2.1	2.0	1.9	1.8	1.6	1.6	1.5	2.9	3.8	7.7	7.8	7.7	7.3	6.8
August ..	5.8	7.2	1	6.7	6.4	6.1	5.8	5.9	5.5	5.3	5.1	4.7	4.7	4.4	4.3
September ..	4.9	4.6	4.6	5.3	7.5	7.4	7.1	6.4	5.9	5.7	7.0	8.0	8.2	8.0	7.6
October ..	4.6	4.1	4.4	3.9	3.8	3.8	3.4	3.6	3.2	5.1	7.1	7.8	7.1	7.4	7.4
November ..	5.6	5.4	5.4	5.9	5.6	5.5	4.0	5.1	5.1	5.6	5.3	4.8	4.7	4.7	4.4
December ..	4.2	4.3	4.1	4.5	5.2	7.1	8.0	7.9	6.4	7.7	7.4	6.5	7.4	6.3	5.7
January ..	3.7	3.6	3.6	3.5	3.5	3.4	3.4	3.4	3.4	3.4	3.3	3.2	3.1	3.1	3.5

Month.	16th.	17th.	18th.	19th.	20th.	21st.	22nd.	23rd.	24th.	25th.	26th.	27th.	28th.	29th.	30th.	31st.
17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32	
June ..	1.4	3.0	2.8	6.1	5.4	5.1	4.7	4.1	3.6	3.3	3.0	2.9	2.7	2.5	2.2	..
July ..	7.1	7.1	11.5	12.3	11.7	11.2	10.4	9.0	7.7	6.9	7.0	6.8	6.5	6.3	6.0	5.8
August ..	4.1	3.9	4.2	3.8	3.8	3.6	3.4	3.3	3.1	3.7	5.1	5.4	5.0	5.2	5.0	5.1
September ..	7.4	7.4	6.9	6.7	6.5	6.3	6.3	5.8	5.4	5.2	5.0	4.7	5.0	5.0	4.9	..
October ..	8.0	6.4	6.0	5.9	5.4	4.8	4.3	4.0	3.7	5.9	5.8	5.2	6.9	5.8	5.3	5.0
November ..	4.3	5.3	4.7	4.4	4.4	4.6	4.8	4.8	4.8	4.5	4.4	4.2	4.1	4.1	4.3	..
December ..	5.3	5.8	5.8	6.4	5.9	5.5	5.1	5.1	4.9	4.8	4.5	4.3	4.2	4.1	3.9	3.8
January ..	2.9	3.0	3.0	2.9	2.9	2.9	2.8	2.8	2.8	2.8	2.8	2.8	2.8	2.8	2.8	2.8

1903-1904.

Month.	1st.	2nd.	3rd.	4th.	5th.	6th.	7th.	8th.	9th.	10th.	11th.	12th.	13th.	14th.	15th.
1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
June ..	2.8	2.8	3.1	3.1	3.9	2.8	2.7	2.3	2.3	2.8	3.0	3.7	3.9	3.9	3.9
July ..	3.1	3.0	2.9	3.2	3.8	3.8	3.4	3.2	3.0	2.8	2.7	3.7	3.0	3.4	3.1
August ..	12.3	12.0	11.5	10.6	9.2	8.4	8.0	8.0	7.7	7.3	5.9	5.8	6.5	6.3	6.4
September ..	5.8	6.5	7.2	7.0	5.2	5.2	5.0	4.0	5.5	5.3	5.5	5.5	5.5	5.5	5.5
October ..	7.8	8.5	7.7	8.8	7.5	6.8	6.3	6.1	6.5	6.5	6.6	6.3	6.0	6.7	5.5
November ..	5.9	5.4	5.0	5.0	4.9	5.1	5.3	5.9	6.2	7.0	7.2	7.8	9.9	12.1	11.6
December ..	8.1	7.2	6.3	6.3	6.5	7.9	6.3	6.5	6.5	6.5	6.2	5.8	5.6	5.4	5.0
January ..	4.5	5.4	5.2	5.1	5.0	4.5	4.2	3.9	3.9	3.8	3.6	3.5	3.4	3.3	3.4

Month.	16th.	17th.	18th.	19th.	20th.	21st.	22nd.	23rd.	24th.	25th.	26th.	27th.	28th.	29th.	30th.	31st.
17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32	
June ..	3.9	4.5	5.4	4.5	5.5	5.0	4.6	4.2	3.8	3.5	3.6	3.4	3.3	3.7	3.2	..
July ..	8.5	9.4	9.9	10.2	9.7	9.0	8.2	7.3	7.6	8.0	8.4	8.5	8.5	10.0	11.3	11.5
August ..	6.0	6.0	6.0	6.0	6.1	6.1	6.0	7.0	7.0	7.0	7.0	6.9	6.7	6.3	6.0	..
September ..	5.5	5.7	5.5	5.5	5.5	6.0	5.9	5.7	6.0	5.7	5.9	6.0	6.2	6.7	6.6	..
October ..	5.7	5.9	5.9	6.3	6.1	7.4	7.4	6.7	7.1	7.7	7.5	8.3	7.7	6.5	6.5	6.7
November ..	11.1	9.6	8.0	7.0	6.3	6.2	6.1	6.0	5.9	5.7	5.6	5.5	5.4	5.3	6.4	..
December ..	4.9	4.8	4.6	4.6	4.5	4.5	4.7	5.0	4.6	4.4	4.2	4.1	3.9	3.8	3.8	3.7
January ..	1.5	1.5	1.4	1.3	1.3	1.3	1.3	3.0	2.9	2.9	2.8	2.8	2.8	2.7	2.7	2.6

Register of readings of the Cauvery dam, North gauge—cont.

1904-1905.

Month.	1st.	2nd.	3rd.	4th.	5th.	6th.	7th.	8th.	9th.	10th.	11th.	12th.	13th.	14th.	15th.
1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
June ..	4.9	5.1	5.6	5.7	5.5	4.9	4.4	4.0	3.8	5.1	4.6	4.4	6.5	5.8	6.3
July ..	7.4	7.4	7.4	8.0	8.4	10.9	11.0	10.8	10.3	9.4	8.5	8.3	8.6	7.8	7.2
August ..	5.7	5.4	5.2	5.2	5.5	6.3	7.5	7.5	7.5	7.6	7.5	7.6	7.6	7.5	7.5
September ..	3.6	3.5	3.5	3.4	3.3	3.2	3.1	3.0	3.1	3.0	2.9	2.9	2.9	3.0	3.0
October ..	3.4	3.3	3.2	3.1	3.0	3.0	3.1	3.4	3.9	3.3	3.3	3.5	3.9	3.5	4.3
November ..	4.2	3.5	3.2	3.0	2.8	2.8	2.7	2.7	2.7	2.0	1.8	2.7	2.8	2.6	1.8
December ..	0.7	0.7	0.6	0.6	0.6	0.5	0.5	0.5	0.5	0.4	0.4	0.4	0.5	0.4	0.4
January ..	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4

Month.	16th.	17th.	18th.	19th.	20th.	21st.	22nd.	23rd.	24th.	25th.	26th.	27th.	28th.	29th.	30th.	31st.
	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32
June ..	7.1	6.8	6.0	5.2	4.5	6.0	6.4	7.6	8.8	6.4	7.3	7.0	6.7	6.8	6.8	..
July ..	7.6	7.5	7.3	7.1	7.0	7.3	7.1	6.9	7.0	7.5	7.5	7.5	7.5	7.1	6.5	6.1
August ..	7.5	7.5	7.1	6.7	6.5	6.2	5.8	5.5	5.2	4.9	4.7	4.5	4.4	4.2	4.0	3.7
September ..	3.5	3.5	3.0	2.7	2.5	2.1	1.8	1.4	1.1	0.9	0.8	0.8	0.8	0.8	0.8	..
October ..	3.5	3.3	3.1	3.2	3.6	4.2	5.5	5.7	5.0	5.2	5.2	5.0	5.8	6.3	5.7	4.8
November ..	1.9	1.9	1.6	1.4	1.5	1.5	1.4	1.3	1.1	1.0	0.9	0.9	0.8	0.7	0.7	..
December ..	0.4	0.4	0.5	0.6	0.5	0.5	0.5	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4
January ..	0.4	0.4	0.4	0.4	0.4	0.4	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.4

1905-1906.

Month.	1st.	2nd.	3rd.	4th.	5th.	6th.	7th.	8th.	9th.	10th.	11th.	12th.	13th.	14th.	15th.
1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
June ..	3.2	3.0	2.9	2.7	2.4	2.4	2.1	3.0	2.7	2.5	2.2	2.2	2.0	2.1	2.3
July ..	6.2	6.5	7.4	7.5	7.5	7.4	6.6	5.8	5.0	4.5	4.5	4.5	7.0	7.5	6.0
August ..	7.5	7.5	7.5	7.2	6.6	6.4	6.1	5.7	5.3	4.8	4.5	4.3	4.1	4.0	3.9
September ..	6.4	6.4	6.5	6.5	5.5	4.9	4.8	4.7	4.6	4.7	5.0	5.0	4.0	4.0	5.8
October ..	2.8	2.8	2.7	2.7	2.7	2.8	5.3	4.2	3.6	4.9	6.0	6.0	5.9	5.6	5.3
November ..	3.0	2.9	2.8	2.7	2.6	2.1	2.4	2.2	2.2	2.2	2.3	2.3	2.3	3.2	2.7
December ..	2.9	2.8	2.7	2.8	2.9	2.8	2.7	2.7	2.6	2.4	2.3	2.2	2.1	2.1	2.0
January ..	0.7	0.7	0.6	0.5	0.5	0.5	0.4	0.4	0.2	0.2	0.2	0.2	0.2	0.1	0.1

Month.	16th.	17th.	18th.	19th.	20th.	21st.	22nd.	23rd.	24th.	25th.	26th.	27th.	28th.	29th.	30th.	31st.
	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32
June ..	2.0	1.7	1.5	1.9	1.9	1.7	1.5	4.1	3.9	6.6	5.7	4.9	4.3	4.1	4.7	..
July ..	5.4	4.8	4.2	3.9	3.8	3.8	4.2	7.0	8.8	9.2	9.8	8.6	7.7	7.0	7.0	7.0
August ..	3.8	4.1	4.6	4.2	3.9	3.8	4.4	4.9	5.4	5.4	5.4	5.3	5.4	5.5	5.8	5.8
September ..	5.5	5.1	5.6	4.5	4.3	5.6	4.5	4.1	3.7	3.5	3.4	3.1	2.9	2.8	2.8	..
October ..	7.1	6.3	6.3	6.6	5.8	5.0	4.5	5.0	5.0	4.7	4.3	4.0	3.8	3.5	3.8	3.2
November ..	2.6	2.6	2.4	2.3	2.5	3.0	2.8	2.7	2.7	2.7	2.7	2.8	4.0	3.4	3.1	..
December ..	1.9	1.9	1.9	1.9	1.3	1.7	1.7	1.6	1.3	1.3	1.2	1.2	1.0	1.1	0.9	0.7
January ..	0.1	0.2	0.4	0.3	0.3	0.4	2.8	2.0	1.8	1.6	1.4	1.3	1.1	1.2	1.0	0.9

Register of readings of the Cauvery dam, North gauge—cont.

1906-1907.

Month.	1st.	2nd.	3rd.	4th.	5th.	6th.	7th.	8th.	9th.	10th.	11th.	12th.	13th.	14th.	15th.
1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
June ..	0.7	0.7	0.7	0.7	0.9	0.9	0.9	0.8	1.5	1.0	1.0	0.9	0.8	0.8	0.9
July ..	3.7	3.2	2.9	2.8	2.7	2.4	2.1	1.8	1.6	2.3	1.4	3.8	4.1	4.5	4.2
August ..	7.0	7.5	7.5	7.4	7.0	6.6	6.2	5.8	5.9	6.1	5.7	5.4	7.0	6.0	6.3
September ..	7.7	6.7	7.0	7.0	7.0	6.7	6.7	6.4	6.6	7.0	6.7	6.1	5.6	5.0	4.8
October ..	4.0	3.7	3.7	3.7	3.3	4.0	5.1	5.9	7.8	6.9	7.0	7.2	7.5	7.5	7.0
November ..	4.1	3.7	3.5	3.3	3.1	3.0	3.0	2.9	3.7	4.3	4.2	4.5	4.1	4.1	4.2
December ..	3.0	3.0	3.4	3.0	2.9	2.8	2.6	2.8	2.9	4.1	3.9	3.7	3.4	3.1	3.0
January ..	3.2	3.8	3.4	3.0	2.9	2.8	2.7	2.7	2.7	2.6	2.6	2.6	2.5	2.5	2.5

Month.	16th.	17th.	18th.	19th.	20th.	21st.	22nd.	23rd.	24th.	25th.	26th.	27th.	28th.	29th.	30th.	31st.
	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32
June ..	1.0	1.3	2.0	1.7	1.5	1.3	1.1	0.9	1.1	2.9	3.1	2.8	4.5	4.8	4.2	..
July ..	4.7	4.6	4.1	3.9	3.5	4.4	3.0	3.5	9.6	9.9	9.3	8.6	7.8	7.0	7.0	7.0
August ..	6.9	5.5	7.0	7.5	8.9	6.6	6.0	6.0	6.0	6.0	6.0	7.7	9.2	9.7	9.0	9.0
September ..	4.8	5.0	5.3	5.7	5.3	5.4	4.9	4.7	5.4	6.0	5.5	5.1	5.3	5.0	4.4	..
October ..	7.0	6.5	6.2	6.0	5.2	5.5	4.7	4.6	4.4	4.1	4.9	4.9	4.4	4.3	4.3	4.2
November ..	6.6	4.9	3.9	4.2	3.4	3.2	3.0	3.0	3.0	3.2	3.1	4.8	3.7	3.3	3.1	..
December ..	2.9	2.8	2.8	2.7	2.7	2.7	2.6	4.7	6.0	4.8	4.3	3.7	3.8	3.0	3.2	3.4
January ..	2.4	2.5	2.4	2.2	2.0	1.9	1.9	1.9	1.8	1.8	1.8	1.8	1.8	1.6	1.6	1.6

1907-1908.

Month.	1st.	2nd.	3rd.	4th.	5th.	6th.	7th.	8th.	9th.	10th.	11th.	12th.	13th.	14th.	15th.
1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
June ..	2.3	3.0	2.8	2.6	2.6	2.5	2.8	2.8	3.3	3.3	3.0	2.9	2.8	2.7	2.6
July ..	3.2	4.3	5.6	8.0	7.3	6.6	6.9	6.0	6.0	5.6	5.4	5.2	4.9	4.6	4.0
August ..	8.3	7.5	6.8	6.5	7.0	9.1	9.7	9.5	9.8	10.5	11.1	10.5	9.8	9.6	9.6
September ..	7.0	7.0	7.0	7.1	6.7	6.3	6.3	6.2	6.1	6.0	5.6	5.6	5.2	5.1	4.8
October ..	7.0	7.4	7.2	7.1	5.7	5.4	4.8	4.5	5.3	4.9	4.7	4.3	4.0	3.7	3.7
November ..	3.2	3.1	3.0	2.9	3.0	3.3	3.4	6.0	3.7	4.1	6.3	5.0	4.3	5.0	4.7
December ..	2.9	2.9	3.0	3.0	2.9	2.8	2.8	2.7	2.7	2.7	2.5	2.5	2.7	2.9	3.0
January ..	2.7	2.5	2.4	2.3	2.3	2.2	2.1	2.1	2.0	1.9	1.8	1.7	1.7	1.7	2.2

Month.	16th.	17th.	18th.	19th.	20th.	21st.	22nd.	23rd.	24th.	25th.	26th.	27th.	28th.	29th.	30th.	31st.
	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32
June ..	2.4	3.0	4.8	5.2	4.8	6.6	6.6	7.0	6.2	5.8	5.2	4.4	3.9	3.4	3.1	..
July ..	4.0	3.8	3.5	3.2	3.3	3.7	3.6	3.6	5.3	8.1	9.4	4.4	10.3	9.8	10.0	9.1
August ..	9.6	9.7	9.3	8.7	8.0	7.4	7.5	7.5	7.5	7.5	7.5	7.5	7.5	7.5	7.5	7.5
September ..	4.5	4.4	4.3	4.0	4.0	4.2	4.2	4.0	3.8	4.4	5.8	5.3	6.3	5.9	6.7	..
October ..	3.3	3.1	3.0	3.0	3.0	3.3	3.1	3.5	5.8	5.8	6.7	6.0	4.7	4.6	3.9	3.4
November ..	4.1	4.7	4.3	4.4	4.9	5.6	4.7	4.2	3.9	3.5	3.3	3.2	3.2	3.1	3.0	..
December ..	2.9	3.1	3.1	3.0	3.0	3.2	3.4	3.2	2.9	2.8	2.8	2.8	2.8	2.8	2.8	2.8
January ..	2.2	2.0	1.7	2.0	2.2	3.0	2.8	2.5	2.2	2.2	1.9	1.8	1.7	1.8	1.6	1.6

Register of readings of the Cauvery dam, North gauge—cont.

1908-1909.

Month.	1st.	2nd.	3rd.	4th.	5th.	6th.	7th.	8th.	9th.	10th.	11th.	12th.	13th.	14th.	15th.
1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
June ..	2.4	2.2	2.0	1.8	1.6	1.5	1.5	1.1	1.1	1.0	1.1	1.0	0.9	3.2	2.9
July ..	2.8	3.2	3.6	4.4	4.4	7.5	8.2	7.3	7.0	7.2	7.5	6.7	6.1	5.5	5.2
August ..	8.1	7.7	7.1	7.2	8.0	8.5	8.9	9.3	9.4	8.9	8.6	8.0	7.7	7.4	7.3
September ..	4.6	4.7	6.0	6.5	6.9	6.9	5.7	5.3	5.0	4.8	4.0	4.4	3.7	4.3	4.0
October ..	2.9	2.9	2.8	2.8	3.0	3.0	3.3	3.1	4.0	3.4	4.1	3.9	3.8	3.2	3.2
November ..	6.1	4.7	4.6	4.1	4.2	4.0	3.8	3.9	3.3	3.0	3.0	2.8	2.8	2.7	2.6
December ..	0.9	0.9	0.8	1.8	1.1	1.1	1.5	1.5	1.6	1.6	1.5	1.4	1.2	1.2	1.2
January ..	1.7	5.3	6.5	7.0	6.0	5.9	5.0	4.2	3.8	3.5	3.3	3.1	2.9	2.6	2.8

Month.	16th.	17th.	18th.	19th.	20th.	21st.	22nd.	23rd.	24th.	25th.	26th.	27th.	28th.	29th.	30th.	31st.
17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32	
June ..	2.6	2.2	1.9	1.9	2.0	1.8	2.7	2.8	3.4	4.2	4.0	4.0	3.4	3.0	2.8	..
July ..	5.2	5.9	6.8	6.7	6.9	7.1	7.2	7.6	8.3	8.4	8.0	7.8	8.2	8.8	8.7	8.4
August ..	7.2	7.0	6.6	6.3	6.3	6.2	6.0	5.8	5.7	6.9	5.8	5.7	5.5	5.2	5.0	4.8
September ..	3.7	4.1	3.8	3.5	3.3	3.2	3.0	2.9	2.9	2.8	2.8	2.7	2.7	2.8	2.9	..
October ..	3.0	2.9	2.9	2.8	2.8	2.8	2.8	3.0	5.6	5.2	5.5	4.8	5.8	7.0	4.8	5.6
November ..	2.5	2.3	2.3	2.1	1.8	1.8	1.8	1.8	1.8	1.7	1.7	1.5	1.4	1.1	0.9	..
December ..	1.1	1.3	1.5	1.4	1.4	1.4	1.4	1.5	1.1	1.5	1.4	1.3	1.3	1.3	1.3	1.3
January ..	2.7	2.5	2.4	2.3	2.1	2.0	2.0	1.8	1.7	1.6	1.5	1.4	1.2	1.2	1.2	1.2

1909-1910.

Month.	1st.	2nd.	3rd.	4th.	5th.	6th.	7th.	8th.	9th.	10th.	11th.	12th.	13th.	14th.	15th.
1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
June ..	2.4	2.4	2.4	2.4	2.7	2.7	2.8	5.9	7.0	8.3	9.0	8.3	7.5	6.8	6.4
July ..	7.0	7.8	7.6	7.3	6.6	6.8	6.7	6.7	6.6	7.3	7.0	7.3	8.0	8.0	8.7
August ..	8.0	7.8	7.7	8.0	8.0	8.0	8.0	7.9	7.7	7.6	7.5	7.5	7.1	7.3	6.6
September..	6.7	5.9	7.5	7.5	6.8	7.3	6.4	5.9	5.8	5.6	5.5	5.1	4.9	4.9	5.5
October ..	3.7	3.6	4.2	5.0	4.9	5.4	5.5	8.1	7.0	6.8	6.5	7.0	6.7	6.8	6.5
November..	4.0	3.9	4.6	5.6	5.8	6.4	6.4	5.8	5.3	4.9	4.6	4.0	4.0	3.7	3.7
December ..	3.3	3.2	3.0	2.8	2.6	2.5	2.3	2.2	2.1	2.1	1.9	1.8	1.7	1.7	1.7
January ..	1.4	1.3	1.2	1.2	1.1	1.4	.8	.7	.6	.6	.5	.5	.4	.4	.4

Month.	16th.	17th.	18th.	19th.	20th.	21st.	22nd.	23rd.	24th.	25th.	26th.	26th.	27th.	28th.	29th.	30th.	31st.
	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32	
June ..	5.9	5.3	6.8	6.5	6.0	5.5	5.1	4.7	4.4	4.2	3.2	3.7	2.9	3.9	4.3	..	
July ..	8.9	9.2	9.3	9.5	9.0	8.3	8.0	7.7	7.4	7.8	6.9	6.9	8.0	10.2	9.8	8.7	
August ..	6.4	6.1	5.6	5.3	5.7	6.2	5.8	5.8	4.3	5.0	5.0	5.5	5.4	6.7	6.5	6.4	
September..	5.2	5.0	4.7	4.3	4.2	4.0	3.7	3.6	3.5	3.8	3.3	3.5	3.6	3.9	4.0	..	
October ..	6.5	6.5	7.8	7.0	6.5	6.5	6.5	6.5	6.3	6.0	5.6	5.1	4.8	4.5	4.3	4.1	
November..	3.2	3.2	3.0	2.9	2.8	2.7	2.6	2.5	2.4	2.3	2.2	2.4	2.4	2.4	2.8	..	
December ..	1.7	1.9	2.3	2.3	2.4	2.5	2.4	2.3	2.0	1.8	1.8	1.7	1.6	1.6	1.6	1.5	
January ..	.4	.4	.4	.4	.4	.4	.4	.4	.4	.4	.4	.4	.4	.4	.4	.4	

APPENDIX VII.

Provisional Rules defining the method of passing down supplies required for irrigation in Madras Presidency.

The total flow in the river up to a limit of 29,300 cusecs, as measured at the anicut at Sivasamudram, shall be considered as the supply required by Madras during the months of August, September, October and first half of November. During the months of June, July, second half of November and all December, January and February, the required supply shall be 26,700 cusecs.

2. Any flow in the river in excess of this limit will be considered as available for storage in Mysore.

3. From 1st March to end of May the entire flow in the river will be available for impounding within Mysore limits.

4. If it is found impossible to measure the discharge of the river at Sivasamudram, the flow in the Cubbahi river on any day shall be deducted from 26,700 cusecs and the remainder shall be the amount to be issued from the reservoir before storage can begin. The amount so issued to be measured as described below.

5. The following arrangements will be made for gauging the discharges in the river in connection with the proposed provisional rules for passing down supplies for irrigation in the Madras Presidency..

Gauges will be established at the following sites :—

- (1) Kalhalli Anicut on the Hemavati.
- (2) Chamaraja Anicut on the main Cauvery river.
- (3) Ayerhalli Katti on the Lakshmanathirta.
- (4) River-bed immediately below the site of reservoir dam at Kannambadi.
- (5) The lowest anicut on the Cubbani.

The gauging at these sites will be maintained till the reservoir is constructed.

6. After the reservoir is constructed, the inflow and outflow will be measured at the reservoir itself; but whenever any difficulty is experienced in doing so, the measurement will be taken at the gauge sites mentioned above.

7. The gauge at each station will be observed twice a day, namely, at 6 A.M. and 6 P.M., and the average taken as the mean rate of discharge for the day.

8. A register of gauge discharges shall be maintained on a printed form for each station.

9. Copies of the record of observations at the several gauge stations shall be forwarded from day to day to the Madras Government; similarly the daily observations at the Bhavani bridge and the Cauvery Dam shall be forwarded from day to day to the Officer in charge of the Cauvery Reservoir. From the date the reservoir comes into operation, the daily discharges from the Cauvery Dam and the Bhavani bridge shall be communicated by wire to the officer in charge of the scheme. The charges in this connection to be borne by the Mysore Darbar.

APPENDIX VIII.

REGISTER of daily gauge readings at Cauvery and Vennar regulators.

1890-1891.

Date.	June.				July.				August.				September.			
	Cauvery.		Vennar.		Cauvery.		Vennar.		Cauvery.		Vennar.		Cauvery.		Vennar.	
	Front.	Rear.	Front.	Rear.	Front.	Rear.	Front.	Rear.	Front.	Rear.	Front.	Rear.	Front.	Rear.	Front.	Rear.
1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17
1st ..	5.70	0.5	5.6	1.6	4.8	2.2	4.6	4.6	7.0	5.6	6.6	6.5	5.2	2.7	4.8	4.8
2nd ..	5.4	0.6	5.3	1.4	4.4	1.8	4.2	4.2	7.0	5.0	6.6	6.5	5.2	2.5	4.8	4.7
3rd ..	4.3	0.7	4.2	..	1.1	1.6	3.9	3.9	6.7	4.8	6.3	6.2	4.9	2.1	4.6	4.5
4th ..	5.7	0.7	5.6	..	4.2	1.6	4.0	4.0	6.5	4.6	6.1	6.0	4.5	1.8	4.2	4.1
5th ..	2.7	2.4	3.1	..	4.1	1.6	3.9	3.9	6.4	4.4	5.9	5.9	4.9	2.2	4.6	4.5
6th ..	2.3	1.9	1.9	..	6.0	4.2	5.8	5.8	6.2	4.2	5.7	5.7	4.3	1.7	4.1	4.0
7th ..	1.8	1.6	1.4	..	5.6	3.7	5.4	5.4	6.2	4.1	5.7	5.7	5.9	3.9	5.6	5.6
8th ..	3.0	0.2	2.4	2.4	5.5	3.4	5.3	5.3	6.0	3.8	5.5	5.5	5.5	3.1	5.1	5.0
9th ..	2.7	..	2.2	2.2	5.5	3.4	5.3	5.3	6.7	4.8	6.2	6.2	6.2	2.7	4.9	4.8
10th ..	2.5	0.3	2.0	2.0	5.1	2.8	4.8	4.8	7.0	5.8	6.6	6.5	4.7	2.0	4.3	4.3
11th ..	2.3	0.2	1.9	1.9	4.7	2.0	4.4	4.4	7.6	6.8	7.2	7.1	4.5	1.7	4.1	4.1
12th ..	2.3	0.2	1.9	1.9	4.2	1.5	3.9	3.9	7.7	6.9	7.3	7.2	4.2	1.4	3.8	3.8
13th ..	2.4	0.3	2.0	2.0	4.0	1.2	3.7	3.7	7.4	6.6	7.0	6.9	4.2	1.4	3.8	3.8
14th ..	2.2	0.3	1.8	1.8	3.6	1.0	3.3	3.3	7.0	6.1	6.6	6.5	4.0	1.3	3.7	3.7
15th ..	2.2	0.3	1.9	1.9	4.8	2.2	4.6	4.6	7.0	5.8	6.6	6.5	4.0	1.1	3.6	3.6
16th ..	2.3	0.2	1.9	1.9	4.6	2.0	4.4	4.4	6.7	4.8	6.4	6.3	3.7	1.0	3.3	3.3
17th ..	2.2	0.2	1.9	1.9	4.9	2.5	4.7	4.7	6.3	4.4	5.9	5.9	3.7	1.0	3.3	3.3
18th ..	2.3	0.2	1.9	1.9	5.1	2.8	4.9	4.9	6.0	4.0	5.6	5.6	3.9	1.0	3.5	3.5
19th ..	2.5	0.1	2.1	2.1	5.4	3.4	5.2	5.2	6.1	4.1	5.7	5.7	3.8	1.1	3.4	3.4
20th ..	2.4	..	2.1	2.1	5.3	3.1	5.1	5.1	6.0	4.0	5.6	5.6	3.6	1.0	3.2	3.2
21st ..	2.3	0.1	2.0	2.0	5.0	2.6	4.8	4.8	5.7	3.6	5.3	5.3	3.9	1.2	3.5	3.5
22nd ..	3.3	0.7	2.9	2.9	4.9	2.4	4.7	4.7	5.5	3.8	5.1	5.1	3.7	1.0	3.3	3.3
23rd ..	3.7	1.0	3.4	3.4	5.1	2.8	4.9	4.9	5.4	3.0	5.0	5.0	3.6	1.0	3.2	3.2
24th ..	4.5	1.8	4.2	4.2	6.7	6.8	6.9	6.7	5.4	3.0	5.0	5.0	3.6	1.0	3.2	3.2
25th ..	5.5	3.4	5.3	5.3	7.8	7.0	7.7	7.6	5.4	3.0	5.0	5.0	3.5	0.9	3.1	3.1
26th ..	5.2	2.2	5.1	5.1	7.6	6.8	7.4	7.3	5.3	2.9	4.9	4.9	3.8	0.8	2.9	2.9
27th ..	5.1	3.0	5.0	5.0	7.7	6.9	7.5	7.4	5.3	2.9	4.9	4.9	3.2	0.8	2.8	2.8
28th ..	4.9	2.6	4.7	4.7	8.0	7.0	7.7	7.6	5.5	3.1	5.1	5.1	3.1	0.7	2.7	2.7
29th ..	4.8	2.2	4.6	4.6	7.6	6.8	7.3	7.2	5.7	3.4	5.8	5.8	3.0	0.6	2.6	2.6
30th ..	5.1	2.7	4.9	4.9	7.2	6.5	6.8	6.7	5.4	3.0	5.0	5.0	3.0	0.5	2.6	2.6
31st ..	..	..	..	..	7.0	6.1	6.6	6.5	5.7	3.6	5.3	5.3	..	..	..	..

Date.	October.				November.				December.				January.			
	Cauvery.		Vennar.		Cauvery.		Vennar.		Cauvery.		Vennar.		Cauvery.		Vennar.	
	Front.	Rear.	Front.	Rear.	Front.	Rear.	Front.	Rear.	Front.	Rear.	Front.	Rear.	Front.	Rear.	Front.	Rear.
18	19	20	21	22	23	24	25	26	27	28	29	30	31	32	33	34
1st ..	3.3	0.7	2.9	2.9	6.7	5.4	6.5	6.5	1.9	0.9	2.2	2.1	1.0	0.2	1.0	1.0
2nd ..	3.6	1.0	3.2	3.2	6.1	4.2	5.8	5.8	1.8	0.8	2.1	2.0	0.3	0.2	0.7	0.6
3rd ..	4.1	1.3	3.7	3.7	6.9	6.1	7.0	6.9	1.8	0.8	2.1	2.0	0.4	0.3	0.7	0.6
4th ..	4.8	2.2	4.4	4.4	8.3	7.0	8.4	8.2	1.9	0.7	1.9	1.9	0.9	0.4	0.8	0.8
5th ..	6.3	4.5	5.9	5.9	8.0	7.0	8.2	7.5	1.7	0.6	1.8	1.8	0.8	0.6	0.7	0.7
6th ..	6.1	4.0	5.7	5.7	7.6	6.7	7.7	7.6	1.8	0.7	1.9	1.9	0.9	0.6	0.8	0.8
7th ..	6.1	4.1	5.7	5.7	7.5	6.6	7.5	7.4	1.8	0.7	1.9	1.9	0.8	0.7	0.8	0.8
8th ..	5.6	3.3	5.2	5.2	7.6	6.9	7.8	7.7	1.8	0.7	1.9	1.9	0.7	0.7	0.7	0.7
9th ..	5.8	3.7	5.4	5.4	6.8	6.8	7.1	7.0	2.5	1.2	2.5	2.4	0.3	0.6	0.5	0.4
10th ..	5.3	3.0	4.9	4.9	6.6	6.1	6.9	6.8	2.2	0.9	2.2	2.2	0.3	0.7	0.3	0.3
11th ..	5.3	2.8	4.9	4.9	6.5	5.5	6.6	6.5	2.7	1.3	2.7	2.7	0.7	0.9	0.7	0.7
12th ..	5.0	2.8	4.6	4.6	6.5	5.3	6.6	6.5	2.8	1.4	2.8	2.8	0.9	0.9	0.8	0.8
13th ..	4.5	1.7	4.1	4.1	6.3	4.7	6.3	6.2	2.6	1.2	2.6	2.6	0.9	0.8	0.8	0.8
14th ..	4.3	1.4	3.9	3.9	5.9	4.8	5.9	5.8	2.4	1.1	2.4	2.4	0.3	0.8	0.3	0.3
15th ..	4.2	1.4	3.9	3.9	5.6	3.9	5.6	5.5	2.2	1.0	2.2	2.2	0.3	0.9	0.3	0.3
16th ..	4.3	1.6	4.0	4.0	5.8	3.4	5.8	5.2	2.1	0.9	2.2	2.1	0.3	0.9	0.3	0.3
17th ..	4.5	1.7	4.1	4.1	5.1	2.9	5.0	4.9	1.9	0.9	2.1	2.1	0.3	0.9	0.3	0.3
18th ..	3.6	1.7	3.2	3.2	4.9	2.6	4.8	4.7	1.8	0.8	2.0	2.0	0.8	0.95	0.7	0.7
19th ..	3.1	1.4	2.8	2.8	3.9	2.6	4.1	4.0	1.7	0.7	1.9	1.9	0.9	0.95	0.8	0.8
20th ..	2.9	1.3	2.6	2.6	3.7	2.3	3.8	3.7	1.7	0.6	1.8	1.8	0.9	0.95	0.8	0.8
21st ..	2.9	1.3	2.6	2.6	3.5	2.1	3.6	3.5	1.6	0.5	1.7	1.7	0.3	0.9	0.3	0.3
22nd ..	2.6	1.1	2.3	2.3	3.3	1.8	3.4	3.3	1.5	0.4	1.6	1.6	0.3	0.8	0.3	0.3
23rd ..	2.4	0.9	2.1	2.1	3.1	1.6	3.2	3.1	1.5	0.4	1.6	1.6	0.3	0.8	0.4	0.4
24th ..	2.1	0.7	1.9	1.9	3.0	1.5	3.1	3.0	1.4	0.3	1.5	1.5	0.3	0.8	0.4	0.4
25th ..	1.9	0.6	1.7	1.7	2.7	1.4	2.9	2.8	1.4	0.3	1.5	1.5	0.4	0.5	0.6	0.5
26th ..	2.1	0.8	1.9	1.9	2.6	1.3	2.8	2.7	1.3	0.2	1.4	1.4	1.1	0.7	1.0	1.0
27th ..	2.3	0.9	2.1	2.1	2.5	1.3	2.7	2.6	0.7	0.3	1.1	1.1	1.1	0.8	1.0	1.0
28th ..	3.9	2.3	3.7	3.7	2.5	1.2	2.6	2.5	0.5	0.2	0.9	0.5	1.1	0.8	1.0	1.0
29th ..	5.0	2.8	4.8	4.8	2.3	1.1	2.4	2.3	1.1	0.0	1.1	1.1	1.0	0.8	0.9	0.9
30th ..	7.9	6.7	8.0	8.0	2.2	1.0	2.3	2.2	1.0	0.1	1.0	1.0	1.0	0.8	0.9	0.9
31st ..	7.8	6.9	7.9	7.3	..	..	..	..	1.0	0.1	1.0	1.0	0.4	0.7	0.4	0.4

NOTE.—Figures in italics show water levels below zero of gauge.

Register of daily gauge readings at Cauvery and Vennar regulators—cont.

1891-1892.

Date.	June.				July.				August.				September.			
	Cauvery.		Vennar.		Cauvery.		Vennar.		Cauvery.		Vennar.		Cauvery.		Vennar.	
	Front.	Rear.	Front.	Rear.	Front.	Rear.	Front.	Rear.	Front.	Rear.	Front.	Rear.	Front.	Rear.	Front.	Rear.
1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17
1st ..	0.7	0.6	0.7	0.7	1.4	0.2	1.3	1.3	9.0	6.0	8.9	7.0	5.4	4.2	5.1	5.1
2nd ..	0.7	0.6	0.7	0.7	1.3	0.1	1.2	1.2	7.3	6.1	7.2	7.1	5.1	4.1	4.7	4.7
3rd ..	1.2	0.7	1.2	1.2	1.3	0.1	1.2	1.2	6.9	5.9	6.6	6.6	4.7	3.6	4.3	4.3
4th ..	1.4	0.2	1.4	1.4	1.0	0.3	1.0	1.0	6.7	5.7	6.4	6.4	4.5	3.3	4.1	4.1
5th ..	1.0	0.0	1.2	1.2	0.8	0.5	0.8	0.8	6.8	5.3	6.0	6.0	4.9	3.7	4.5	4.5
6th ..	1.5	0.3	1.5	1.5	2.7	1.7	2.6	2.6	6.1	5.2	5.9	5.9	5.7	4.7	5.3	5.3
7th ..	2.3	2.0	2.8	2.8	6.5	5.5	6.4	6.3	6.6	5.6	6.4	6.4	5.8	4.7	5.4	5.4
8th ..	3.5	3.1	3.8	3.8	6.8	5.9	6.7	6.6	7.8	6.2	7.6	7.2	5.2	4.2	4.9	4.9
9th ..	3.5	2.8	3.5	3.5	6.8	5.9	6.7	6.6	8.1	6.2	7.9	7.2	4.9	3.8	4.6	4.6
10th ..	2.8	2.0	2.8	2.8	7.0	6.6	7.0	6.8	7.5	6.2	7.3	7.2	4.5	3.5	4.2	4.2
11th ..	2.7	1.7	2.6	2.6	6.9	6.5	6.9	6.7	6.9	6.1	6.7	6.7	4.5	3.5	4.2	4.2
12th ..	2.4	1.4	2.3	2.3	6.9	6.0	6.7	6.6	6.7	5.8	6.5	6.5	4.5	3.4	4.2	4.2
13th ..	2.1	1.0	2.0	2.0	6.8	5.8	6.6	6.6	6.8	6.1	6.6	6.6	4.2	3.1	3.9	3.9
14th ..	2.0	0.7	1.8	1.8	6.9	5.9	6.7	6.6	6.7	5.8	6.5	6.5	4.0	3.0	3.7	3.7
15th ..	2.0	0.6	1.8	1.8	6.4	5.3	6.1	6.1	6.5	5.6	6.3	6.3	4.1	3.0	3.8	3.8
16th ..	1.7	0.5	1.6	1.6	5.8	4.7	5.4	5.4	6.3	5.4	6.1	6.1	4.1	3.0	3.8	3.8
17th ..	1.7	0.5	1.6	1.6	5.0	4.1	4.7	4.7	5.9	5.1	5.8	5.8	3.9	2.9	3.6	3.6
18th ..	1.5	0.3	1.4	1.4	4.6	3.6	4.3	4.3	5.5	4.7	5.4	5.4	3.7	2.7	3.4	3.4
19th ..	1.5	0.3	1.4	1.4	4.3	3.2	4.0	4.0	5.4	4.6	5.2	5.2	3.6	2.6	3.3	3.3
20th ..	1.6	0.4	1.5	1.5	4.0	2.9	3.6	3.6	5.2	4.4	5.0	5.0	3.4	2.3	3.1	3.1
21st ..	2.6	1.7	2.6	2.6	4.5	3.4	4.2	4.2	4.9	4.1	4.7	4.7	3.4	2.3	3.1	3.1
22nd ..	2.8	1.8	2.7	2.7	4.5	3.4	4.1	4.1	4.8	3.8	4.6	4.6	3.1	2.0	2.8	2.8
23rd ..	2.8	1.8	2.7	2.7	5.3	4.2	4.9	4.9	4.6	3.7	4.4	4.4	3.0	1.8	2.7	2.7
24th ..	3.2	2.3	3.1	3.1	6.5	5.3	6.0	6.0	4.5	3.5	4.3	4.3	3.0	1.8	2.7	2.7
25th ..	2.8	1.8	2.7	2.7	8.1	7.0	8.0	7.8	4.8	3.9	4.6	4.6	2.9	1.8	2.6	2.6
26th ..	2.5	1.4	2.4	2.4	8.8	7.0	8.6	8.4	4.7	3.8	4.5	4.5	3.0	1.8	2.6	2.6
27th ..	2.2	1.1	2.1	2.1	8.8	7.0	8.7	8.5	4.6	3.6	4.4	4.4	2.8	1.6	2.6	2.6
28th ..	1.9	0.7	1.8	1.8	9.6	6.0	9.5	7.0	5.2	4.3	5.0	5.0	2.7	1.4	2.4	2.4
29th ..	1.7	0.5	1.6	1.6	9.0	6.0	8.9	7.0	5.1	4.2	4.9	4.9	2.8	1.6	2.5	2.5
30th ..	1.5	0.3	1.4	1.4	9.0	6.0	8.9	7.0	5.1	4.1	4.8	4.8	2.6	2.5	2.6	2.6
31st ..	..	..	..	..	9.2	6.0	9.1	7.0	4.9	3.9	4.6	4.6	..	..	..	..

Register of daily gauge readings at Cauvery and Vennar regulators—cont.

1892-1893.

Date.	June.				July.				August.				September.			
	Cauvery.		Vennar.		Cauvery.		Vennar.		Cauvery.		Vennar.		Cauvery.		Vennar.	
	Front.	Rear.	Front.	Rear.	Front.	Rear.	Front.	Rear.	Front.	Rear.	Front.	Rear.	Front.	Rear.	Front.	Rear.
1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17
1st ..	1.7	1.1	1.5	1.5	6.8	5.3	6.1	6.0	7.0	6.2	6.6	6.6	7.5	6.6	7.2	6.8
2nd ..	1.6	0.8	1.5	1.5	5.9	4.4	5.2	5.1	7.0	5.8	6.6	6.6	7.0	6.0	6.6	6.6
3rd ..	1.6	0.6	1.5	1.5	5.6	4.2	5.0	4.9	6.8	5.7	6.4	6.4	6.8	5.6	6.4	6.4
4th ..	1.8	0.6	1.7	1.7	5.0	3.6	4.4	4.3	6.7	5.6	6.3	6.3	6.5	5.3	6.1	6.1
5th ..	1.7	0.4	1.6	1.6	4.5	3.1	3.9	3.9	6.8	5.6	6.4	6.4	6.2	5.1	5.8	5.8
6th ..	1.6	0.4	1.5	1.5	3.5	2.2	3.0	3.0	6.7	5.5	6.3	6.3	6.6	5.4	6.2	6.2
7th ..	2.0	0.7	1.8	1.8	3.1	1.7	2.6	2.6	6.8	5.5	6.3	6.3	6.5	5.3	6.1	6.1
8th ..	3.7	2.4	3.2	3.2	2.5	1.3	2.2	2.2	6.8	5.5	6.3	6.3	6.9	5.7	6.4	6.4
9th ..	4.1	2.8	3.6	3.6	2.3	1.0	2.0	2.0	6.9	5.6	6.4	6.4	6.6	5.6	6.2	6.2
10th ..	3.7	2.4	3.1	3.1	2.7	1.5	2.4	2.4	6.8	5.5	6.3	6.3	6.3	5.1	5.9	5.9
11th ..	3.1	1.9	2.7	2.7	4.1	2.8	3.8	3.6	6.7	5.5	6.2	6.2	6.1	5.0	5.7	5.7
12th ..	2.7	1.5	2.4	2.4	6.6	5.1	6.0	5.9	6.7	5.4	6.2	6.2	6.1	4.9	5.7	5.7
13th ..	2.3	1.2	2.1	2.1	7.6	6.6	7.0	6.9	6.9	5.6	6.4	6.4	5.7	4.7	5.3	5.3
14th ..	2.4	1.3	2.2	2.2	7.8	6.7	7.2	7.1	6.6	5.4	6.1	6.1	5.5	4.5	5.1	5.1
15th ..	2.8	1.6	2.5	2.5	7.9	6.8	7.5	7.1	6.8	5.5	6.3	6.3	5.6	4.6	5.2	5.2
16th ..	5.6	3.8	4.7	4.6	7.8	6.7	7.4	7.1	6.8	5.2	5.8	5.8	5.5	4.5	5.1	5.1
17th ..	5.3	3.8	4.6	4.5	7.6	6.6	7.2	6.9	5.8	4.9	5.3	5.3	5.3	4.2	4.9	4.9
18th ..	4.8	3.3	4.1	4.0	7.3	6.3	6.9	6.7	5.9	4.7	5.4	5.4	5.1	4.0	4.7	4.7
19th ..	4.1	2.7	3.4	3.4	6.9	5.6	6.5	6.4	6.3	5.0	5.8	5.8	5.0	3.8	4.6	4.6
20th ..	3.7	2.3	3.1	3.1	6.7	5.5	6.3	6.2	6.1	4.9	5.4	5.4	4.8	3.6	4.3	4.3
21st ..	3.6	2.2	3.0	3.0	6.2	5.0	5.7	5.7	5.9	4.8	5.4	5.4	4.7	3.4	4.2	4.2
22nd ..	2.9	1.7	2.5	2.5	6.0	4.8	5.5	5.5	6.1	4.9	5.6	5.6	4.5	3.3	4.1	4.1
23rd ..	2.8	1.4	2.4	2.4	8.5	7.0	8.1	7.5	6.3	5.0	5.8	5.8	4.5	3.3	4.1	4.1
24th ..	2.5	1.2	2.2	2.2	11.1	7.6	11.1	8.7	6.8	5.6	6.3	6.3	4.8	3.6	4.4	4.4
25th ..	2.3	1.0	2.0	2.0	10.7	7.4	10.8	7.9	6.6	5.5	6.2	6.2	4.9	3.7	4.5	4.5
26th ..	2.1	0.9	1.9	1.9	9.8	7.1	9.9	6.9	6.2	5.0	5.8	5.8	4.7	3.5	4.3	4.3
27th ..	2.1	0.8	1.9	1.9	8.5	7.0	8.5	7.0	7.0	5.9	6.7	6.6	4.6	3.3	4.1	4.1
28th ..	2.0	0.7	1.8	1.8	8.7	7.0	8.7	6.6	6.4	5.2	5.9	5.9	4.5	3.3	4.1	4.1
29th ..	2.2	1.0	2.0	2.0	8.6	7.0	8.6	6.6	6.5	5.3	6.1	6.1	4.4	3.2	4.0	4.0
30th ..	3.8	2.5	3.2	3.2	8.1	6.9	8.0	6.6	6.2	5.0	5.8	5.8	4.4	3.2	4.0	4.0
31st ..	..	..	..	..	7.3	6.4	6.9	6.9	6.8	5.7	6.4	6.4	..	..	..	..

Date.	October.				November.				December.				January.			
	Cauvery.		Vennar.		Cauvery.		Vennar.		Cauvery.		Vennar.		Cauvery.		Vennar.	
	Front.	Rear.	Front.	Rear.	Front.	Rear.	Front.	Rear.	Front.	Rear.	Front.	Rear.	Front.	Rear.	Front.	Rear.
18	19	20	21	22	23	24	25	26	27	28	29	30	31	32	33	34
1st ..	4.9	3.6	4.4	4.4	4.3	2.9	4.2	2.8	0.9	2.4	2.4	2.8	0.95	2.4	2.4	2.4
2nd ..	4.8	3.5	4.3	4.3	4.1	2.7	4.0	4.0	0.9	3.1	3.1	2.8	0.95	2.6	2.6	2.6
3rd ..	4.9	3.6	4.4	4.4	3.6	2.5	3.6	3.6	0.9	3.6	3.3	2.6	0.8	2.4	2.4	2.4
4th ..	4.7	3.4	4.2	4.2	3.5	2.3	3.6	3.6	0.9	2.6	2.6	2.1	0.85	1.9	1.9	1.9
5th ..	6.1	3.7	4.6	4.6	3.4	2.0	3.3	3.3	0.6	2.4	2.4	2.2	0.85	2.0	2.0	2.0
6th ..	5.1	3.8	4.6	4.6	3.4	1.9	3.3	3.3	1.0	0.0	1.1	..	2.2	2.0	2.0	2.0
7th ..	5.1	3.8	4.6	4.6	3.3	1.8	3.2	3.2	1.0	0.4	1.1	..	2.2	2.2	2.2	2.2
8th ..	5.0	3.7	4.6	4.6	4.0	1.6	3.8	3.8	2.8	0.95	2.4	2.4	2.5	2.3	2.3	2.3
9th ..	5.4	4.1	4.9	4.9	4.0	1.3	3.8	3.8	3.3	0.95	3.1	3.1	2.7	2.3	2.3	2.3
10th ..	4.7	3.4	4.2	4.2	3.9	1.4	3.7	3.7	2.9	0.6	2.7	2.7	2.6	1.9	1.9	1.9
11th ..	4.5	3.3	4.1	4.1	4.0	1.5	3.8	3.8	2.5	0.6	2.3	2.3	2.5	0.8	..	..
12th ..	4.1	2.9	3.7	3.7	3.8	1.3	3.6	3.6	2.5	0.6	2.3	2.3	2.5	0.8	..	..
13th ..	4.4	3.0	3.9	3.9	3.7	1.2	3.5	3.5	2.4	0.7	2.2	2.2	2.5	0.8	..	..
14th ..	5.4	4.1	4.9	4.9	3.9	0.9	3.7	3.7	2.9	0.95	2.6	2.6	2.5	0.8	..	..
15th ..	5.1	3.7	4.5	4.5	3.6	0.7	3.4	3.4	3.1	0.95	3.4	2.8	0.5	0.8	..	..
16th ..	6.0	4.7	5.5	5.4	3.4	0.6	3.2	3.2	2.5	0.8	2.8	2.4	0.5	0.8	..	..
17th ..	5.6	4.2	5.1	5.0	3.4	0.6	3.2	3.2	2.4	0.8	2.2	2.2	0.4	0.8	..	..
18th ..	6.2	4.9	5.8	5.7	3.3	0.5	3.1	3.1	2.8	0.6	2.4	2.4	0.4	0.85	..	..
19th ..	5.7	4.5	5.3	5.2	3.1	0.3	2.9	2.9	2.6	0.5	2.4	2.4	0.4	0.85	..	..
20th ..	5.3	4.1	4.9	4.8	3.0	0.3	2.8	2.8	3.1	0.95	2.2	2.9	0.5	0.8	..	..
21st ..	5.3	4.1	4.9	4.9	2.9	0.2	2.8	2.8	3.2	0.95	3.0	3.0	0.5	0.8	..	..
22nd ..	5.3	4.1	4.9	4.9	2.9	0.1	2.7	2.7	2.3	0.7	2.5	2.5	0.5	0.8	..	..
23rd ..	5.6	4.5	5.4	5.3	2.8	0.0	2.6	2.6	2.3	0.8	2.2	2.2	0.5	0.8	..	..
24th ..	4.9	4.0	4.7	4.7	2.7	0.1	2.5	2.5	2.3	0.8	2.1	2.1	0.5	0.8	..	..
25th ..	5.3	4.3	5.1	5.0	2.7	0.3	2.5	2.5	2.4	0.8	2.2	2.2	0.5	0.8	..	..
26th ..	4.9	3.9	4.7	4.7	3.4	0.9	3.2	3.2	3.0	0.95	2.8	2.3	0.5	0.8	..	..
27th ..	4.4	3.6	4.3	4.3	3.7	0.9	3.5	3.5	3.1	0.95	2.9	2.9	2.5	0.8	..	..
28th ..	4.6	3.6	4.4	4.4	2.7	0.1	2.5	2.5	2.8	0.8	2.4	2.4	2.3	0.9	2.1	2.1
29th ..	4.6	3.4	4.4	4.4	2.3	0.5	2.2	2.2	2.3	0.8	2.1	2.1	2.5	0.85	2.2	2.2
30th ..	4.1	3.1	4.1	4.1	2.6	0.6	2.4	2.4	2.3	0.8	2.1	2.1	2.3	0.9	2.1	2.1
31st ..	4.3	2.7	4.0	4.0	..	..	..	..	2.3	0.8	2.1	2.1	2.4	0.95	2.2	2.2

Note.—Figures in italics show water levels below zero of gauge.

Register of daily gauge readings at Cauvery and Vennar regulators—cont.

1893-1894.

Date.	June.				July.				August.				September.			
	Cauvery.		Vennar.		Cauvery.		Vennar.		Cauvery.		Vennar.		Cauvery.		Vennar.	
	Front.	Rear.	Front.	Rear.	Front.	Rear.	Front.	Rear.	Front.	Rear.	Front.	Rear.	Front.	Rear.	Front.	Rear.
1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17
1st	3.0	0.2	2.9	2.9	6.7	4.4	6.5	6.5	5.9	3.4	5.7	5.7	5.9	3.4	5.6	5.6
2nd	3.2	0.2	3.1	3.1	6.5	4.0	6.3	6.3	5.7	3.0	5.4	5.4	5.5	3.1	5.2	5.2
3rd	4.0	0.8	3.8	3.8	6.3	3.9	6.1	6.1	5.6	2.9	5.3	5.3	5.9	3.5	5.6	5.6
4th	3.6	0.5	3.4	3.4	6.4	4.0	6.2	6.2	5.8	3.1	5.5	5.5	5.9	3.6	5.7	5.7
5th	3.7	0.6	3.6	3.6	6.0	3.5	5.8	5.8	6.1	3.6	5.9	5.9	5.6	3.2	5.3	5.3
6th	4.1	1.0	4.0	4.0	5.7	3.1	5.5	5.5	7.1	5.3	7.0	7.0	5.4	2.8	5.1	5.1
7th	4.8	1.8	4.6	4.6	5.4	2.7	5.2	5.2	7.0	5.7	7.0	7.0	5.4	2.8	5.1	5.1
8th	5.3	2.5	5.1	5.1	5.1	2.3	4.9	4.9	7.0	5.8	7.0	7.0	6.8	4.8	6.7	6.7
9th	5.9	3.5	5.7	5.7	5.1	2.3	4.9	4.9	7.0	6.0	7.0	7.0	7.1	5.3	7.0	7.0
10th	6.3	3.8	6.1	6.1	5.1	2.3	4.9	4.9	7.1	5.6	7.0	7.0	6.9	4.7	6.7	6.7
11th	6.9	4.4	6.6	6.6	5.3	2.5	5.1	5.1	7.2	5.1	7.0	7.0	6.4	4.1	6.1	6.1
12th	6.1	3.5	5.8	5.8	5.3	2.5	5.1	5.1	7.0	4.9	6.8	6.8	6.0	3.7	5.8	5.8
13th	5.4	2.6	5.1	5.1	6.3	3.9	6.1	6.1	7.2	5.0	7.0	7.0	5.7	3.3	5.5	5.5
14th	5.8	3.2	5.5	5.5	6.4	4.0	6.2	6.2	7.0	4.9	6.8	6.8	6.0	3.8	5.8	5.8
15th	5.7	3.0	5.4	5.4	6.3	3.8	6.1	6.1	6.3	4.0	6.1	6.1	6.1	3.9	5.9	5.9
16th	5.5	2.7	5.2	5.2	6.3	3.9	6.1	6.1	5.9	3.7	5.7	5.7	6.3	4.0	6.1	6.1
17th	5.1	2.2	4.8	4.8	6.3	3.8	6.1	6.1	5.7	3.3	5.5	5.5	6.5	4.4	6.3	6.3
18th	5.5	2.6	5.2	5.2	6.2	3.8	6.1	6.1	5.3	2.9	5.1	5.1	6.3	4.0	6.1	6.1
19th	7.1	4.7	6.8	6.8	5.9	3.5	5.8	5.8	5.2	2.6	5.0	5.0	5.9	3.7	5.8	5.8
20th	7.3	5.7	7.0	7.0	5.7	3.2	5.5	5.5	4.9	2.4	4.7	4.7	5.5	3.3	5.4	5.4
21st	7.3	6.0	7.0	7.0	5.5	2.8	5.3	5.3	4.7	2.0	4.5	4.5	5.2	2.9	5.1	5.1
22nd	7.2	6.0	7.0	7.0	5.4	2.7	5.2	5.2	4.6	1.9	4.4	4.4	4.9	2.5	4.8	4.8
23rd	7.3	5.4	7.0	7.0	5.3	2.5	5.1	5.1	4.6	1.8	4.4	4.4	4.7	2.1	4.5	4.5
24th	7.1	4.7	6.8	6.8	5.1	2.3	4.9	4.9	4.5	1.7	4.2	4.2	4.5	1.8	4.3	4.3
25th	6.9	4.4	6.6	6.6	5.0	2.2	4.8	4.8	4.5	1.5	4.2	4.2	4.3	1.5	4.1	4.1
26th	7.0	4.5	6.7	6.7	4.8	2.0	4.6	4.6	4.4	1.3	4.1	4.1	4.1	1.2	3.9	3.9
27th	6.9	4.5	6.7	6.7	5.1	2.3	4.9	4.9	4.4	1.3	4.1	4.1	3.9	1.0	3.7	3.7
28th	6.5	4.1	6.3	6.3	5.1	2.2	4.9	4.9	4.7	1.9	4.4	4.4	3.9	1.0	3.7	3.7
29th	6.6	4.3	6.4	6.4	5.5	2.8	5.3	5.3	5.4	2.8	5.1	5.1	4.3	1.7	4.2	4.2
30th	6.6	4.2	6.4	6.4	6.6	3.0	5.4	5.4	6.1	3.8	5.8	5.8	4.2	1.4	4.0	4.0
31st	..	..	..	..	6.2	3.7	6.0	6.0	6.1	3.9	5.9	5.9	..	..	..	..

Register of daily gauge readings at Cauvery and Vennar regulators—*cont.*
1894-1895.

Date.	June.				July.				August.				September.			
	Cauvery.		Vennar.		Cauvery.		Vennar.		Cauvery.		Vennar.		Cauvery.		Vennar.	
	Front.	Rear.	Front.	Rear.	Front.	Rear.	Front.	Rear.	Front.	Rear.	Front.	Rear.	Front.	Rear.	Front.	Rear.
1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17
1st	2.5	0.6	2.2	2.2	4.3	1.4	4.0	4.0	6.8	4.4	6.6	5.6	5.9	3.8	5.8	5.8
2nd	3.2	0.0	2.9	2.9	4.1	1.2	3.8	3.8	6.5	4.0	6.3	5.7	3.6	5.4	5.4	5.4
3rd	3.2	0.0	2.9	2.9	4.0	1.0	3.7	3.7	6.1	3.6	5.9	5.5	3.4	5.2	5.2	5.2
4th	3.8	0.6	3.4	3.4	3.7	0.7	3.4	3.4	5.7	3.4	5.6	5.7	3.6	5.4	5.4	5.4
5th	3.6	0.4	3.3	3.3	3.6	0.5	3.3	3.3	5.5	3.1	5.3	5.7	3.6	5.4	5.4	5.4
6th	3.9	2.2	2.9	1.2	3.6	0.5	3.3	3.3	5.3	2.9	5.1	5.6	3.5	5.3	5.3	5.3
7th	3.9	1.0	3.7	3.7	3.6	0.3	3.2	3.2	5.1	3.1	5.0	5.4	3.3	5.1	5.1	5.1
8th	3.5	0.5	3.3	3.3	3.6	0.3	3.2	3.2	5.6	3.7	5.5	5.5	3.5	5.3	5.3	5.3
9th	3.2	0.1	3.0	3.0	3.3	0.1	3.0	3.0	5.9	4.0	5.8	5.1	3.0	4.8	4.8	4.8
10th	3.1	0.0	2.9	2.9	3.4	0.2	3.1	3.1	6.2	4.3	6.1	5.1	3.0	4.8	4.8	4.8
11th	3.0	0.1	2.8	2.8	3.6	0.5	3.3	3.3	7.0	5.0	6.9	6.9	4.8	4.5	4.5	4.5
12th	3.3	0.3	3.1	3.1	3.7	0.6	3.4	3.4	7.1	5.5	7.0	7.0	5.1	4.8	4.8	4.8
13th	3.1	0.0	2.9	2.9	3.8	0.8	3.5	3.5	7.1	5.6	7.0	7.0	5.0	4.7	4.7	4.7
14th	2.8	0.3	2.6	2.6	4.3	1.5	4.0	4.0	7.1	5.4	7.0	7.0	5.2	4.9	4.9	4.9
15th	2.8	0.3	2.6	2.6	4.7	2.0	4.4	4.4	7.6	5.6	6.8	6.8	5.2	4.9	4.9	4.9
16th	3.1	0.2	3.1	3.1	5.9	3.1	5.6	5.6	6.7	4.7	6.5	6.5	5.0	4.7	4.7	4.7
17th	4.3	1.5	4.0	4.0	5.5	3.1	5.3	5.3	6.8	4.8	6.6	6.6	4.8	4.5	4.5	4.5
18th	3.7	0.6	3.4	3.4	5.8	3.4	5.6	5.6	6.5	4.5	6.3	6.3	4.7	4.4	4.4	4.4
19th	5.3	2.7	5.0	5.0	5.7	3.3	5.5	5.5	6.4	4.4	6.2	6.2	4.7	4.4	4.4	4.4
20th	5.3	2.8	5.0	5.0	5.4	2.9	5.2	5.2	7.0	5.0	6.8	6.8	4.9	4.6	4.6	4.6
21st	5.8	3.3	5.5	5.5	5.1	2.5	4.9	4.9	6.8	4.8	6.6	6.6	5.1	4.8	4.8	4.8
22nd	7.0	4.1	6.7	6.7	7.5	6.7	7.2	7.2	7.0	5.0	6.8	6.8	5.5	5.2	5.2	5.2
23rd	7.3	4.7	7.0	7.0	8.1	7.2	8.7	8.0	7.1	5.7	7.0	7.0	4.9	4.6	4.6	4.6
24th	7.2	4.7	6.9	6.9	8.1	7.1	8.4	8.0	7.0	6.3	7.0	7.0	4.6	4.3	4.3	4.3
25th	7.2	4.6	6.9	6.9	7.8	7.0	8.1	7.6	7.1	6.4	7.1	7.1	4.6	4.3	4.3	4.3
26th	6.1	4.2	6.4	6.4	7.1	6.4	7.2	7.0	7.2	5.2	6.9	6.9	4.2	3.9	3.9	3.9
27th	6.2	3.7	5.9	5.9	7.2	5.5	7.1	7.0	6.8	4.8	6.5	6.5	3.9	3.6	3.6	3.6
28th	5.6	3.0	5.3	5.3	7.1	4.6	7.0	6.9	6.6	4.5	6.3	6.3	4.0	3.7	3.7	3.7
29th	4.9	2.3	4.6	4.6	6.7	4.2	6.5	6.5	6.8	5.2	6.5	6.5	3.8	3.5	3.5	3.5
30th	4.6	1.8	4.3	4.3	6.5	4.1	6.3	6.3	6.5	4.4	6.2	6.2	3.6	3.3	3.3	3.3
31st	..	..	..	..	6.8	4.4	6.6	6.6	6.2	4.1	5.9	5.9	..	..	..	..

Date.	October.				November.				December.				January.			
	Cauvery.		Vennar.		Cauvery.		Vennar.		Cauvery.		Vennar.		Cauvery.		Vennar.	
	Front.	Rear.	Front.	Rear.	Front.	Rear.	Front.	Rear.	Front.	Rear.	Front.	Rear.	Front.	Rear.	Front.	Rear.
18	19	20	21	22	23	24	25	26	27	28	29	30	31	32	33	34
1st	3.6	1.3	3.3	3.3	4.5	2.1	4.0	4.0	3.3	0.5	3.0	2.9	1.8	0.85	1.7	1.7
2nd	3.5	1.2	3.2	3.2	5.0	2.6	4.5	4.5	3.3	0.5	3.0	2.9	1.7	0.90	1.6	1.6
3rd	3.3	1.0	3.0	3.0	7.5	5.3	7.2	7.0	3.3	0.5	3.0	3.0	1.8	0.9	1.6	1.6
4th	3.3	0.9	3.0	3.0	7.1	4.7	6.7	6.5	3.3	0.5	3.0	3.0	1.8	0.9	1.6	1.6
5th	3.1	0.8	2.8	2.8	6.3	3.9	5.9	5.7	3.9	1.1	3.6	3.6	1.8	0.9	1.6	1.6
6th	2.9	0.6	2.6	2.6	5.7	3.3	5.3	5.1	3.6	0.8	3.3	3.3	1.8	0.9	1.6	1.6
7th	2.8	0.5	2.5	2.5	5.3	2.8	4.9	4.7	3.2	0.6	2.9	2.9	1.8	0.9	1.6	1.6
8th	2.8	0.5	2.4	2.4	5.0	2.6	4.6	4.4	3.0	0.3	2.7	2.7	1.8	0.9	1.6	1.6
9th	2.7	0.4	2.3	2.3	4.3	2.3	3.9	3.9	2.9	0.2	2.6	2.6	1.8	0.9	1.6	1.6
10th	2.9	0.5	2.5	2.5	6.4	4.0	6.0	5.8	2.9	0.1	2.6	2.6	1.8	0.9	1.6	1.6
11th	2.9	0.6	2.5	2.5	6.2	3.8	5.8	5.6	2.8	0.0	2.5	2.5	1.8	0.9	1.6	1.6
12th	2.8	0.5	2.4	2.4	5.6	3.1	5.2	5.0	2.7	0.3	2.4	2.4	1.7	0.9	1.5	1.5
13th	2.9	0.6	2.5	2.5	5.2	2.7	4.8	4.6	2.6	0.3	2.3	2.3	1.8	0.9	1.6	1.6
14th	2.8	0.5	2.4	2.4	4.9	2.4	4.5	4.3	2.6	0.3	2.3	2.3	1.7	0.9	1.5	1.5
15th	3.0	0.8	2.7	2.7	4.7	2.2	4.3	4.1	2.3	0.4	2.2	2.2	1.8	0.9	1.6	1.6
16th	3.8	1.7	3.5	3.5	4.4	1.9	4.0	3.8	2.0	0.6	2.0	2.0	1.8	0.9	1.6	1.6
17th	4.3	2.1	4.0	4.0	4.2	1.7	3.8	3.6	1.9	0.6	1.9	1.9	1.8	0.9	1.6	1.6
18th	6.3	4.2	6.0	6.0	4.0	1.5	3.6	3.4	1.4	0.75	1.7	1.7	1.7	0.9	1.5	1.5
19th	6.7	4.9	6.5	6.5	3.7	1.3	3.3	3.2	1.5	0.85	1.6	1.6	2.0	..	1.8	1.8
20th	6.7	5.3	6.5	6.5	3.6	1.2	3.2	3.1	1.4	0.85	1.6	1.6	2.2	..	1.9	1.9
21st	6.8	5.3	6.6	6.6	3.7	1.3	3.3	3.2	1.4	0.85	1.5	1.5	2.2	..	1.9	1.9
22nd	6.9	5.5	6.6	6.6	3.5	1.2	3.1	3.0	1.5	0.85	1.5	1.5	0.4	0.85	..	..
23rd	7.0	4.9	6.6	6.6	3.5	1.1	3.1	3.0	1.5	0.85	1.5	1.5	0.6	0.8	..	..
24th	6.9	4.6	6.5	6.5	3.2	0.9	2.9	2.8	1.5	0.85	1.5	1.5	0.5	0.8	..	..
25th	6.8	4.5	6.4	6.4	3.2	0.9	2.9	2.8	1.7	0.85	1.6	1.6	0.4	0.85	..	..
26th	6.7	4.4	6.2	6.2	3.0	0.7	2.7	2.6	1.7	0.85	1.6	1.6	2.0	..	1.7	1.7
27th	6.3	4.0	5.8	5.8	2.9	0.7	2.6	2.5	1.7	0.85	1.6	1.6	2.2	..	1.9	1.9
28th	5.7	3.4	5.2	5.2	2.8	0.6	2.5	2.5	1.6	0.85	1.5	1.5	0.4	0.85	..	..
29th	5.3	3.0	4.8	4.8	2.8	0.6	2.5	2.5	1.6	0.85	1.5	1.5	0.3	0.85	..	..
30th	5.0	2.6	4.5	4.5	2.8	0.6	2.5	2.5	1.6	0.85	1.5	1.5	0.4	0.85	..	..
31st	4.7	2.3	4.2	4.2	..	..	..	..	1.8	0.85	1.6	1.6	0.4	0.85	..	..

NOTE.—Figures in italics show water levels below zero of gauge.

Register of daily gauge readings at Cauvery and Vennar regulators—*cont.*
1895-1896.

Date.	June.				July.				August.				September.			
	Cauvery.		Vennar.		Cauvery.		Vennar.		Cauvery.		Vennar.		Cauvery.		Vennar.	
	Front.	Rear.	Front.	Rear.	Front.	Rear.	Front.	Rear.	Front.	Rear.	Front.	Rear.	Front.	Rear.	Front.	Rear.
1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17
1st	1.7	0.95	1.5	1.5	6.8	4.4	6.6	6.5	7.3	5.5	7.1	7.0	6.5	4.1	6.5	6.2
2nd	1.7	0.95	1.5	1.5	7.2	5.1	7.1	7.0	7.4	5.6	7.1	7.0	6.1	3.6	5.8	5.8
3rd	1.8	0.95	1.6	1.6	7.3	5.5	7.2	7.1	7.8	6.9	7.6	7.3	5.8	3.3	5.5	5.5
4th	1.9	0.9	1.7	1.7	7.7	6.9	7.8	7.6	8.2	7.2	7.9	7.6	5.5	2.8	5.2	5.2
5th	2.2	0.85	2.0	2.0	7.8	7.0	7.8	7.5	8.1	7.1	7.9	7.7	5.4	2.7	5.1	5.1
6th	2.2	0.85	2.0	2.0	7.4	6.2	7.2	7.0	7.5	6.7	7.3	7.2	5.3	2.6	5.0	5.0
7th	2.2	0.85	2.0	2.0	7.4	5.5	7.2	7.0	7.3	6.4	7.1	7.0	5.3	2.6	5.0	5.0
8th	1.9	0.9	1.7	1.7	7.2	4.8	7.1	6.9	7.1	4.6	6.8	6.8	5.3	2.6	5.0	5.0
9th	1.9	0.9	1.7	1.7	6.8	4.5	6.7	6.6	6.9	4.0	6.6	6.6	5.1	2.4	4.8	4.8
10th	1.7	0.95	1.5	1.5	6.6	4.3	6.5	6.4	8.2	4.0	7.8	7.7	5.0	2.2	4.7	4.7
11th	1.7	0.95	1.5	1.5	6.2	3.8	6.0	6.0	8.4	4.0	8.0	8.0	4.9	2.1	4.6	4.6
12th	1.7	0.95	1.5	1.5	5.9	3.4	5.7	5.7	9.3	4.6	9.1	9.0	4.7	1.9	4.4	4.4
13th	1.9	0.9	1.7	1.7	5.8	3.3	5.6	5.6	8.9	4.4	8.6	8.5	4.7	1.7	4.4	4.4
14th	1.8	0.95	1.6	1.6	5.8	3.3	5.6	5.6	7.2	3.8	7.1	7.0	4.6	1.7	4.3	4.3
15th	1.7	0.95	1.5	1.5	6.1	3.6	5.8	5.8	7.0	4.7	6.9	6.8	4.7	1.8	4.4	4.4
16th	1.8	0.95	1.5	1.5	6.5	4.1	6.2	6.2	6.8	4.5	6.6	6.6	4.5	1.7	4.3	4.3
17th	1.7	0.95	1.6	1.5	6.8	4.4	6.5	6.5	6.9	4.6	6.7	6.7	4.6	1.9	4.4	4.4
18th	1.8	0.95	1.6	1.6	7.2	5.0	7.1	7.0	6.7	4.4	6.5	6.5	4.5	1.8	4.3	4.3
19th	2.4	0.8	2.1	2.1	7.0	4.7	6.9	6.8	7.0	5.4	7.0	7.0	4.5	1.7	4.3	4.3
20th	2.2	0.85	2.0	2.0	6.7	4.4	6.5	6.5	7.1	5.1	7.0	7.0	4.1	1.3	3.9	3.9
21st	1.7	0.85	1.5	1.5	6.4	4.1	6.2	6.2	7.1	4.8	6.9	6.9	4.3	1.4	4.1	4.1
22nd	8.1	6.7	8.3	1.7	6.4	3.9	6.1	6.1	6.9	4.6	6.7	6.7	4.3	1.5	4.1	4.1
23rd	8.1	6.9	8.3	8.1	6.5	4.1	6.2	6.2	6.7	4.4	6.5	6.5	4.5	1.7	4.3	4.3
24th	8.1	7.0	8.1	7.9	7.1	4.7	6.9	6.8	7.2	5.1	7.0	7.0	4.4	1.6	4.2	4.2
25th	7.5	6.7	7.5	7.3	7.2	5.2	7.1	7.0	6.8	4.5	6.6	6.6	5.0	2.3	4.9	4.8
26th	7.3	5.8	7.2	7.0	7.2	4.8	7.0	6.9	6.6	4.2	6.3	6.3	5.9	3.4	5.7	5.7
27th	7.3	4.9	7.1	7.0	6.7	4.3	6.4	6.4	6.4	4.0	6.1	6.1	5.5	2.9	5.3	5.3
28th	7.0	4.6	6.8	6.7	7.0	4.6	6.7	6.7	6.3	3.7	6.0	6.0	6.6	3.0	5.4	5.4
29th	7.0	4.6	6.8	6.7	6.5	4.1	6.2	6.2	6.5	4.1	6.2	6.2	6.8	4.8	6.6	6.6
30th	6.9	4.5	6.7	6.6	6.1	3.6	5.8	5.8	6.8	4.4	6.5	6.5	6.7	5.8	6.6	6.6
31st	..	..	..	..	6.4	3.9	6.1	6.1	6.9	4.5	6.6	6.6	..	..	..	..

Register of daily gauge readings at Cauvery and Vennar regulators—cont.

1896-1897.

Date.	June.				July.				August.				September.			
	Cauvery.		Vennar.		Cauvery.		Vennar.		Cauvery.		Vennar.		Cauvery.		Vennar.	
	Front.	Rear.	Front.	Rear.	Front.	Rear.	Front.	Rear.	Front.	Rear.	Front.	Rear.	Front.	Rear.	Front.	Rear.
1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17
1st ..	0.9	0.4	1.0	..	7.4	6.5	7.5	7.2	11.9	7.0	11.9	9.4	7.4	5.4	7.5	7.4
2nd ..	0.8	0.5	0.7	..	8.4	6.5	8.4	8.1	11.9	7.0	12.0	9.4	7.5	5.2	7.6	7.6
3rd ..	2.2	0.8	2.0	2.0	8.5	6.5	8.6	8.3	11.0	7.0	11.1	9.2	7.5	5.6	7.5	7.6
4th ..	2.3	0.7	2.1	2.1	7.9	6.5	8.0	7.8	11.4	7.0	10.5	9.4	7.3	6.0	7.5	7.4
5th ..	2.0	0.8	1.8	1.8	7.1	6.5	7.3	7.1	9.9	7.0	10.1	9.4	7.5	5.1	7.5	7.5
6th ..	3.5	..	3.3	3.3	7.1	6.1	7.2	7.0	9.3	7.0	9.7	9.4	7.6	4.7	7.5	7.5
7th ..	3.9	..	3.7	3.7	7.0	6.0	7.2	7.0	9.2	7.0	9.6	9.4	7.4	3.7	7.2	7.2
8th ..	1.0	0.1	1.0	..	7.1	5.6	7.1	7.0	9.7	6.0	9.9	8.5	7.5	5.1	7.5	7.5
9th ..	0.4	0.2	0.9	..	7.1	5.2	7.0	7.0	8.9	6.0	9.1	7.9	7.5	5.6	7.5	7.4
10th ..	2.3	0.7	2.1	2.1	7.1	5.3	7.0	7.0	7.3	6.4	7.7	7.6	7.5	5.2	7.5	7.4
11th ..	2.1	0.8	1.9	1.9	7.4	5.1	7.2	7.2	7.0	6.2	7.3	7.2	7.5	3.9	7.3	7.3
12th ..	1.8	0.9	1.6	1.6	7.1	4.7	6.9	6.9	7.1	6.4	7.4	7.3	7.4	3.7	7.2	7.2
13th ..	2.3	..	2.1	2.1	6.7	4.3	6.5	6.5	7.5	6.7	7.8	7.7	7.4	3.8	7.2	7.2
14th ..	2.5	..	2.3	2.3	6.5	4.1	6.3	6.3	7.4	6.7	7.7	7.6	7.8	2.5	7.5	7.5
15th ..	0.6	0.7	0.7	..	7.7	2.7	7.3	7.3	7.0	6.4	7.3	7.2	7.8	2.3	7.5	7.5
16th ..	0.6	0.8	0.7	..	7.3	6.7	7.4	7.3	7.6	6.9	8.0	7.9	6.3	4.2	5.8	5.8
17th ..	2.0	0.8	1.8	1.8	8.5	7.0	8.5	8.4	8.3	7.0	8.7	8.6	4.5	4.1	5.1	3.5
18th ..	3.7	0.8	3.5	3.5	8.9	7.0	8.8	8.7	8.0	7.0	8.4	8.3	4.6	3.5	4.9	4.7
19th ..	3.2	0.2	3.0	3.0	8.3	7.0	8.3	8.2	8.0	7.0	8.4	8.3	6.7	3.0	6.5	6.5
20th ..	4.3	..	4.1	4.1	7.6	6.9	7.6	7.5	7.8	7.0	8.3	8.2	6.6	2.8	6.3	6.3
21st ..	5.7	..	5.5	5.5	7.2	6.1	7.1	7.0	7.3	6.7	7.8	7.7	7.7	1.2	7.4	7.4
22nd ..	6.7	4.7	6.7	6.7	7.3	5.7	7.1	7.0	6.9	6.3	7.4	7.3	7.7	2.4	7.4	7.4
23rd ..	7.9	7.0	8.0	7.9	7.3	5.7	7.0	7.0	6.9	6.3	7.3	7.2	4.5	4.1	4.9	4.9
24th ..	9.2	7.0	9.3	8.9	7.4	5.3	7.1	7.1	6.8	6.2	7.2	7.1	4.5	4.1	5.0	3.1
25th ..	10.4	5.6	10.3	9.6	7.2	4.7	6.9	6.9	7.1	6.1	7.3	7.3	5.7	3.0	5.5	5.5
26th ..	10.6	5.9	10.5	9.6	7.1	4.6	6.8	6.8	7.3	5.6	7.5	7.4	6.4	2.7	6.3	6.3
27th ..	9.7	6.5	9.8	9.4	7.4	6.8	7.3	7.3	7.4	5.6	7.5	7.4	7.4	3.9	7.3	7.3
28th ..	7.7	6.6	8.0	7.7	8.0	7.0	7.8	7.8	7.4	5.6	7.5	7.4	7.6	4.8	7.5	7.5
29th ..	7.3	6.1	7.4	7.0	10.9	7.5	10.7	9.4	7.4	5.6	7.5	7.4	7.6	4.8	7.5	7.5
30th ..	7.7	6.5	7.8	7.5	12.2	7.7	12.2	9.4	7.3	6.0	7.5	7.4	7.5	5.6	7.5	7.5
31st ..	..	..	..	..	12.4	7.5	12.4	9.5	7.3	5.8	7.5	7.4	..	..	..	..

Date.	October.				November.				December.				January.			
	Cauvery.		Vennar.		Cauvery.		Vennar.		Cauvery.		Vennar.		Cauvery.		Vennar.	
	Front.	Rear.	Front.	Rear.	Front.	Rear.	Front.	Rear.	Front.	Rear.	Front.	Rear.	Front.	Rear.	Front.	Rear.
18	19	20	21	22	23	24	25	26	27	28	29	30	31	32	33	
1st ..	7.5	5.1	7.5	7.5	5.2	1.3	5.0	5.0	7.8	1.3	7.5	7.5	6.3	0.25	6.0	6.0
2nd ..	7.3	6.5	7.4	7.4	5.8	0.9	5.6	5.6	4.7	4.0	4.5	4.5	2.7	2.1	3.0	3.0
3rd ..	7.3	6.5	7.4	7.4	6.3	0.9	6.1	6.1	4.7	4.1	4.8	2.0	2.4	1.6	2.5	1.6
4th ..	7.4	6.6	7.5	7.5	3.6	2.9	4.0	4.0	4.7	2.9	4.5	4.5	3.3	0.8	3.1	3.1
5th ..	7.4	6.1	7.4	7.4	2.3	1.7	2.5	2.1	5.1	2.1	5.0	5.0	3.8	0.3	3.6	3.6
6th ..	7.4	6.6	7.5	7.5	3.3	1.1	3.1	3.1	5.0	1.8	4.8	4.8	3.7	0.1	3.5	3.5
7th ..	7.5	5.4	7.4	7.4	4.5	0.4	4.3	4.3	9.6	0.9	6.3	6.3	4.5	0.95	4.3	4.3
8th ..	7.7	4.8	7.5	7.4	4.3	0.2	4.1	4.1	7.8	0.0	7.5	7.5	4.9	0.9	4.7	4.7
9th ..	7.4	3.7	7.2	7.2	4.9	0.9	4.7	4.7	7.3	5.0	7.2	7.2	1.8	1.0	2.2	2.2
10th ..	7.0	3.3	6.8	6.8	5.2	0.95	5.0	5.0	5.6	3.0	5.6	5.5	1.7	0.4	1.7	1.5
11th ..	6.8	3.1	6.6	6.6	2.3	1.8	2.7	2.7	5.6	5.0	5.5	5.0	3.0	0.5	2.9	2.9
12th ..	7.7	2.5	7.5	7.5	1.7	0.8	1.8	1.8	6.3	3.6	6.2	6.2	3.1	0.6	2.9	2.9
13th ..	7.8	1.7	7.5	7.5	3.2	0.1	3.0	3.0	5.6	2.8	5.5	5.5	3.0	0.7	2.8	2.8
14th ..	4.3	3.8	4.8	4.8	4.1	0.0	3.9	3.9	7.0	0.4	6.6	6.6	3.7	0.95	3.5	3.5
15th ..	5.2	4.5	5.4	5.4	4.5	0.5	4.4	4.4	7.5	0.9	7.2	7.2	4.0	0.95	3.8	3.8
16th ..	5.5	3.1	5.4	5.4	4.8	0.95	4.6	4.6	6.5	1.1	6.4	6.4	1.5	0.1	1.5	1.5
17th ..	6.0	2.2	5.8	5.8	7.8	0.3	7.5	7.5	3.5	2.8	3.5	1.9	1.4	0.2	1.2	1.2
18th ..	5.7	1.9	5.5	5.5	4.7	4.2	4.9	4.5	3.8	2.2	3.6	3.6	1.3	0.3	1.2	1.2
19th ..	7.0	0.3	6.7	6.7	6.1	5.6	6.3	1.9	5.4	2.5	5.3	5.3	1.3	0.3	1.2	1.2
20th ..	7.5	0.6	7.3	7.3	5.6	4.1	5.5	5.5	7.1	4.1	7.0	7.0	1.3	0.5	1.1	1.1
21st ..	3.1	2.5	3.5	3.3	7.4	4.1	7.3	7.3	7.5	5.0	7.4	7.4	3.1	0.95	2.8	2.8
22nd ..	3.5	2.9	3.9	2.4	6.7	4.0	6.6	6.6	7.3	4.6	7.2	7.2	3.5	0.95	3.3	3.3
23rd ..	5.5	2.0	5.3	5.3	6.7	3.6	6.6	6.6	6.4	3.7	6.3	6.3	1.2	0.3	1.1	1.1
24th ..	5.8	2.0	5.6	5.6	7.0	6.0	7.2	6.8	7.5	0.5	7.1	7.1	1.1	0.75	1.0	1.0
25th ..	5.7	1.9	5.5	5.5	6.5	5.2	6.5	6.5	7.8	0.5	7.5	7.5	2.0	0.9	1.8	1.8
26th ..	7.3	0.1	7.0	7.0	7.5	6.0	7.4	7.4	7.0	1.0	6.8	6.8	2.5	0.9	2.3	2.3
27th ..	7.7	0.8	7.4	7.4	7.5	4.8	7.4	7.4	3.5	3.0	3.6	1.7	2.4	0.9	2.2	2.2
28th ..	3.9	3.4	4.1	4.1	7.0	4.8	6.9	6.9	4.1	1.7	3.8	3.8	2.9	0.95	2.7	2.7
29th ..	3.7	3.3	4.0	2.3	6.6	3.8	6.4	6.4	4.7	1.4	4.6	4.5	3.1	0.95	2.9	2.9
30th ..	5.2	2.0	5.0	5.0	7.3	2.3	7.0	7.0	4.6	1.2	4.4	4.4	0.9	0.8	0.9	0.9
31st ..	5.5	1.6	5.3	5.3	..	..	..	..	5.8	0.95	5.5	5.5	0.8	0.85	0.8	0.8

NOTE.—Figures in italics show water levels below zero of gauge.

Register of daily gauge readings at Cauvery and Vennar regulators—cont.

1897-1898.

Date.	June.				July.				August.				September.			
	Cauvery.		Vennar.		Cauvery.		Vennar.		Cauvery.		Vennar.		Cauvery.		Vennar.	
	Front.	Rear.	Front.	Rear.	Front.	Rear.	Front.	Rear.	Front.	Rear.	Front.	Rear.	Front.	Rear.	Front.	Rear.
1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17
1st ..	2.6	0.95	2.4	2.4	6.9	4.5	6.8	6.8	7.7	7.1	7.7	7.6	9.1	5.9	9.6	8.9
2nd ..	0.8	0.8	0.7	..	6.4	3.9	6.2	6.2	7.8	7.2	7.8	7.7	8.9	5.0	9.3	8.8
3rd ..	0.7	0.8	0.6	..	6.0	3.3	5.7	5.7	7.8	7.1	7.8	7.6	8.1	4.8	8.6	8.3
4th ..	3.1	0.4	2.9	2.9	6.9	0.9	6.5	6.5	7.6	6.8	7.6	7.6	7.7	4.7	8.2	8.0
5th ..	3.3	0.1	3.1	3.1	7.5	0.5	7.1	7.1	7.1	6.5	7.2	7.1	7.4	4.6	7.8	7.7
6th ..	2.9	0.4	2.7	2.7	4.0	3.5	3.7	3.7	7.1	5.9	7.1	7.0	7.9	4.7	8.1	8.0
7th ..	3.8	0.95	3.5	3.5	3.3	2.8	3.0	..	7.2	5.3	7.1	7.0	7.8	4.7	8.1	7.9
8th ..	4.1	0.95	3.8	3.8	4.0	1.8	3.4	3.4	7.3	5.7	7.3	7.2	7.8	4.7	8.1	7.9
9th ..	1.4	0.2	1.3	..	4.7	1.7	4.3	4.3	7.6	6.9	7.7	7.6	7.6	4.7	7.9	7.8
10th ..	2.2	1.0	2.3	1.2	5.0	2.3	4.7	4.7	9.9	7.5	10.0	9.4	7.2	4.5	7.5	7.4
11th ..	3.2	0.4	3.0	3.0	7.4	5.4	7.4	7.3	11.2	7.5	11.4	9.4	7.9	4.9	8.1	7.9
12th ..	3.6	0.4	3.4	3.4	7.8	6.9	7.8	7.7	11.5	7.5	11.7	9.4	7.9	5.0	8.1	7.9
13th ..	3.3	0.1	3.1	3.1	8.2	7.4	8.6	8.5	11.8	7.0	12.0	9.4	7.7	5.0	7.8	7.7
14th ..	4.9	0.95	4.6	4.6	8.1	7.5	8.5	8.4	11.9	7.0	12.1	9.4	7.2	4.8	7.4	7.3
15th ..	4.5	0.94	4.2	4.2	8.5	7.5	8.8	8.7	11.3	7.0	11.4	9.4	7.5	4.3	7.4	7.3
16th ..	4.5	0.95	4.2	4.2	8.3	7.5	8.5	8.3	10.1	7.0	10.3	9.4	7.3	4.1	7.4	7.3
17th ..	4.1	1.1	4.1	4.1	7.5	7.1	7.6	7.4	8.8	7.0	8.2	9.0	7.3	4.1	7.4	7.3
18th ..	3.5	0.5	3.4	3.4	7.3	6.1	7.2	7.0	8.1	7.0	8.6	8.4	7.6	3.5	7.6	7.5
19th ..	3.4	0.3	3.2	3.2	7.3	5.4	7.1	7.0	7.6	7.0	8.3	8.1	7.6	3.1	7.6	7.5
20th ..	4.7	4.2	4.8	4.8	7.3	5.2	7.1	7.0	7.5	7.0	8.3	8.1	4.7	4.5	6.8	6.8
21st ..	7.0	6.5	7.5	7.5	7.3	5.1	7.1	7.0	7.3	6.7	7.8	7.7	6.1	5.5	6.6	6.6
22nd ..	7.1	6.4	7.5	7.5	7.8	4.9	7.1	7.0	6.9	6.5	7.5	7.4	8.2	5.5	8.6	8.3
23rd ..	7.7	6.9	8.2	8.1	7.3	5.3	7.1	7.0	7.1	6.7	7.6	7.6	8.6	5.6	9.2	7.9
24th ..	8.0	7.1	8.5	8.3	7.8	5.9	7.1	7.0	6.9	6.6	7.3	7.3	8.9	5.5	9.6	8.0
25th ..	7.5	6.8	7.8	7.7	7.3	5.9	7.1	7.0	7.4	7.0	7.9	7.7	8.4	5.5	9.0	7.9
26th ..	7.1	6.6	7.5	7.4	7.3	5.2	7.1	7.0	7.4	6.9	7.9	7.7	8.4	5.5	9.0	8.0
27th ..	6.9	5.8	7.1	7.0	7.4	5.0	7.2	7.0	7.1	6.7	7.5	7.4	7.3	5.3	7.9	7.7
28th ..	6.9	5.8	7.1	7.0	7.4	5.2	7.2	7.0	7.9	6.0	8.1	8.0	7.1	5.2	7.7	7.7
29th ..	6.9	6.1	7.1	7.0	7.3	5.9	7.2	7.1	8.1	6.7	8.3	8.2	7.1	5.3	7.7	7.6
30th ..	7.4	5.3	7.4	7.3	7.4	5.2	7.2	7.1	8.5	5.8	8.9	8.7	10.4	5.5	10.7	6.6
31st ..	..	..	..	..	7.4	5.5	7.2	7.1	8.1	5.7	8.5	8.3	..	..	..	..

Register of daily gauge readings at Cauvery and Vennar regulators—*cont.*
1898-1899.

Date.	June.				July.				August.				September.			
	Cauvery.		Vennar.		Cauvery.		Vennar.		Cauvery.		Vennar.		Cauvery.		Vennar.	
	Front.	Rear.	Front.	Rear.	Front.	Rear.	Front.	Rear.	Front.	Rear.	Front.	Rear.	Front.	Rear.	Front.	Rear.
1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17
1st ..	4.1	0.9	4.0	4.0	3.6	3.5	4.3	2.4	7.9	7.0	8.7	8.4	4.2	4.1	4.4	4.4
2nd ..	3.3	0.4	3.2	3.2	4.4	2.3	4.4	4.4	7.0	6.5	7.9	7.7	3.8	3.3	3.7	2.6
3rd ..	3.1	0.2	3.0	3.0	4.6	1.9	4.6	4.6	6.6	6.2	7.4	7.3	3.8	2.6	3.8	3.7
4th ..	2.9	0.1	2.8	2.8	4.4	1.6	4.3	4.3	7.1	6.1	7.7	7.5	5.0	2.3	5.0	4.9
5th ..	1.2	0.7	1.1	..	5.7	0.6	5.5	5.5	7.4	5.2	7.7	7.5	6.4	2.8	5.3	5.3
6th ..	1.1	0.5	1.1	..	5.7	0.6	5.5	5.5	7.3	4.9	7.4	7.3	6.7	0.8	6.5	6.5
7th ..	3.3	0.8	3.2	3.2	2.0	1.9	2.5	2.5	7.2	4.8	7.3	7.2	7.7	2.6	7.6	7.5
8th ..	3.8	0.9	3.7	3.7	2.9	2.7	3.5	2.3	7.1	4.7	7.2	7.1	5.8	5.1	6.6	6.3
9th ..	3.3	0.3	3.2	3.2	5.9	4.1	6.0	6.0	5.9	5.3	6.2	6.1	7.1	6.8	7.7	6.4
10th ..	3.2	0.3	3.1	3.1	6.8	4.3	6.8	6.8	6.8	6.4	7.3	7.2	6.6	5.2	6.8	6.7
11th ..	3.0	0.2	2.9	2.9	6.6	4.1	6.6	6.6	7.4	5.7	7.7	7.6	6.9	4.4	6.9	6.9
12th ..	1.2	0.7	1.2	..	7.3	3.5	7.2	7.2	7.5	5.1	7.6	7.5	6.6	3.9	6.5	6.4
13th ..	1.1	0.6	1.1	..	7.7	2.4	7.5	7.5	6.4	5.5	6.8	6.7	7.7	1.7	7.7	7.3
14th ..	2.8	0.9	2.7	2.7	4.4	4.2	4.9	4.8	7.0	4.4	7.1	6.9	7.7	1.4	7.5	7.5
15th ..	3.5	0.9	3.3	3.3	4.5	4.3	5.0	2.2	6.6	4.0	6.6	6.5	4.9	4.5	5.5	5.5
16th ..	3.5	0.7	3.6	3.5	4.5	2.9	4.5	4.5	7.6	2.7	7.5	7.4	6.1	5.6	6.5	2.8
17th ..	5.4	2.5	5.3	5.3	5.1	2.4	5.0	5.0	7.7	2.5	7.5	7.5	6.6	4.4	6.7	6.7
18th ..	6.3	3.6	6.3	6.3	4.9	2.2	4.8	4.8	6.2	4.8	6.5	6.4	7.4	5.1	7.5	7.5
19th ..	7.3	5.6	7.6	7.6	7.0	0.2	6.7	6.7	5.6	5.2	5.9	5.1	7.0	4.6	7.1	7.0
20th ..	7.0	6.2	7.6	7.6	7.7	0.7	7.5	7.5	5.8	4.0	6.8	6.7	7.8	3.0	7.5	7.5
21st ..	7.3	6.1	7.7	7.6	3.9	3.6	4.2	4.2	6.1	3.5	6.1	6.0	7.7	2.7	7.6	7.5
22nd ..	7.2	6.0	7.7	7.6	3.6	3.4	4.0	2.0	5.8	3.2	5.8	5.7	6.2	4.1	5.0	5.0
23rd ..	7.9	5.0	8.0	7.9	3.7	2.6	3.8	3.8	7.5	0.9	7.2	7.2	6.4	4.9	5.7	2.6
24th ..	7.7	5.0	7.8	7.7	4.7	2.0	4.6	4.6	7.8	0.3	7.6	7.6	5.7	4.0	5.7	5.6
25th ..	7.5	4.9	7.6	7.5	5.2	2.5	5.1	5.1	3.6	3.2	3.6	2.6	6.9	4.5	7.0	7.0
26th ..	6.9	4.3	7.0	6.9	7.3	4.7	7.3	7.2	3.6	3.2	3.7	3.7	7.1	5.0	7.4	7.4
27th ..	6.6	3.9	6.5	6.5	7.6	5.5	7.7	7.6	3.8	2.5	3.7	3.7	7.0	5.6	7.5	7.5
28th ..	7.0	2.7	7.0	7.0	7.5	6.8	8.1	7.9	5.0	2.1	4.8	4.7	7.2	6.0	7.8	7.8
29th ..	7.7	1.4	7.7	7.6	8.1	7.0	8.6	8.3	5.6	2.9	5.5	5.4	7.2	6.0	7.8	7.8
30th ..	3.5	3.4	4.6	4.6	8.8	7.0	9.3	8.4	7.3	2.8	7.2	7.1	7.2	6.5	7.8	7.7
31st ..	..	..	..	..	8.7	7.0	9.3	8.4	7.7	2.3	7.6	7.5	..	..	..	..

Date.	October.				November.				December.				January.			
	Cauvery.		Vennar.		Cauvery.		Vennar.		Cauvery.		Vennar.		Cauvery.		Vennar.	
	Front.	Rear.	Front.	Rear.	Front.	Rear.	Front.	Rear.	Front.	Rear.	Front.	Rear.	Front.	Rear.	Front.	Rear.
18	19	20	21	22	23	24	25	26	27	28	29	30	31	32	33	
1st ..	6.8	6.0	7.5	7.4	7.3	5.1	7.6	7.5	8.4	3.8	8.5	3.2	6.7	4.7	6.9	2.6
2nd ..	6.2	6.5	8.5	8.3	6.9	4.6	7.2	7.1	8.4	3.8	8.5	3.2	5.9	4.5	6.0	2.4
3rd ..	6.7	6.2	7.2	7.1	6.9	4.6	7.2	7.1	8.5	3.8	8.5	3.2	5.2	2.4	5.0	5.0
4th ..	6.6	6.1	6.9	6.9	6.0	5.0	6.3	5.0	8.0	3.8	8.0	3.2	4.7	1.8	4.5	4.5
5th ..	7.3	5.6	7.4	7.4	8.5	3.2	7.4	3.1	6.4	3.3	6.4	4.4	6.0	0.6	5.7	5.6
6th ..	7.1	6.6	7.4	7.3	7.4	2.9	7.4	3.1	6.2	3.5	6.0	6.0	6.2	0.8	5.8	5.8
7th ..	7.3	6.0	7.4	7.3	7.9	2.9	7.9	3.1	5.8	3.1	5.6	5.6	4.7	1.2	4.6	4.6
8th ..	7.4	6.3	7.5	7.4	8.5	3.0	8.5	3.8	5.5	2.9	5.4	5.4	3.9	0.8	3.6	3.6
9th ..	7.4	6.3	7.5	7.4	8.5	3.0	8.5	3.8	5.5	2.9	5.4	5.4	3.9	0.7	3.5	3.5
10th ..	7.6	6.4	7.6	7.5	8.7	3.7	8.9	5.2	7.6	0.3	7.5	7.4	3.7	0.6	3.4	3.4
11th ..	7.4	6.3	7.4	7.3	8.8	3.7	8.9	5.7	4.0	3.3	4.2	2.7	3.5	0.4	3.2	3.2
12th ..	8.2	5.0	8.0	7.9	8.1	4.7	8.3	5.7	5.8	4.1	5.4	5.0	3.4	0.4	3.2	3.2
13th ..	8.2	4.8	8.1	8.0	9.7	5.0	9.9	5.7	4.0	3.3	4.2	2.7	3.5	0.4	3.2	3.2
14th ..	7.8	4.8	7.6	7.5	10.2	5.0	10.4	6.3	4.2	2.1	4.0	4.0	3.4	0.4	3.2	3.2
15th ..	7.5	4.8	7.4	7.3	10.8	5.2	10.9	6.9	4.5	1.7	4.4	4.4	3.3	0.3	3.1	3.1
16th ..	7.7	4.5	7.5	7.5	11.3	3.2	11.4	6.5	4.5	1.6	4.3	4.3	3.3	0.2	3.0	3.0
17th ..	7.7	4.8	7.6	7.5	9.7	4.8	9.9	5.9	5.8	0.7	5.5	5.4	3.1	0.1	2.8	2.8
18th ..	7.7	4.8	7.6	7.5	8.1	4.5	8.2	5.5	6.1	0.7	5.7	5.7	3.1	0.1	2.8	2.8
19th ..	7.7	5.0	7.6	7.5	7.0	4.1	7.2	5.3	4.3	2.2	4.4	4.0	3.1	0.1	2.8	2.8
20th ..	8.1	6.0	8.1	8.0	6.5	4.0	6.6	5.8	3.0	2.1	3.2	2.3	3.0	0.0	2.7	2.7
21st ..	7.6	5.9	7.6	7.5	6.0	4.2	5.9	6.7	3.5	1.3	3.4	3.3	2.9	0.0	2.7	2.7
22nd ..	6.6	5.4	6.8	6.7	6.7	4.2	6.7	6.4	3.7	1.0	3.7	3.7	2.9	0.0	2.7	2.7
23rd ..	7.1	4.7	7.1	7.1	6.5	3.9	6.4	6.2	3.7	0.9	3.7	3.7	1.8	0.5	2.0	2.0
24th ..	7.2	4.6	7.2	7.1	6.4	3.7	6.3	7.1	4.8	0.5	4.5	4.5	1.6	0.5	1.8	1.7
25th ..	6.6	4.1	6.7	6.6	7.7	2.0	7.5	4.8	3.0	2.2	3.0	2.3	1.0	0.0	0.8	..
26th ..	7.6	2.5	7.4	7.3	7.7	4.8	3.9	4.8	3.9	3.2	4.2	2.3	1.2	0.0	0.8	..
27th ..	7.8	1.7	7.5	7.4	4.8	3.9	4.9	5.1	4.2	3.5	4.5	2.3	1.2	0.1	1.7	1.6
28th ..	6.0	4.2	6.3	6.3	4.8	4.2	4.9	5.1	7.5	4.9	7.7	2.7	1.9	0.1	2.0	2.0
29th ..	4.7	4.4	5.2	2.9	5.4	3.2	5.2	3.1	7.5	4.8	7.3	2.6	2.5	0.4	2.4	2.4
30th ..	5.8	5.0	6.3	6.3	7.6	3.8	7.6	..	7.2	4.8	7.3	2.6	2.5	0.4	2.4	2.4
31st ..	7.2	5.2	7.6	7.5	..	..	..	..	7.8	5.0	8.0	2.8	2.8	0.5	2.3	2.3

NOTE.—Figures in italics show water levels below zero of gauge.

Register of daily gauge readings at Cauvery and Vennar Regulators—*cont.*
1899-1900.

Date.	June.				July.				August.				September.			
	Cauvery.		Vennar.		Cauvery.		Vennar.		Cauvery.		Vennar.		Cauvery.		Vennar.	
	Front.	Rear.	Front.	Rear.	Front.	Rear.	Front.	Rear.	Front.	Rear.	Front.	Rear.	Front.	Rear.	Front.	Rear.
1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17
1st ..	3.4	0.9	3.3	3.2	5.8	0.5	5.7	5.7	6.3	0.9	6.0	6.0	4.2	1.5	4.3	4.3
2nd ..	3.0	0.9	2.8	2.8	6.4	0.9	6.2	6.1	6.3	0.9	6.0	6.0	3.5	1.2	3.5	3.5
3rd ..	2.4	0.95	2.3	2.3	6.1	5.0	6.0	6.0	3.2	2.5	3.6	1.5	3.5	1.2	3.5	3.5
4th ..	2.2	0.95	2.1	2.1	8.3	5.8	8.2	8.2	2.9	2.1	3.3	1.4	2.9	2.1	3.4	2.0
5th ..	2.0	0.95	1.8	1.8	8.2	5.0	8.1	8.0	3.3	1.1	3.5	3.5	3.5	2.8	4.1	0.9
6th ..	2.6	0.95	2.4	2.4	8.3	6.1	8.2	8.0	3.5	0.6	3.4	3.4	6.7	1.0	6.5	6.5
7th ..	2.4	0.95	2.2	2.2	8.2	6.1	8.1	8.0	2.1	1.2	2.4	1.8	8.2	3.6	8.0	8.0
8th ..	1.9	0.95	1.8	1.8	8.2	6.1	8.1	8.0	1.9	0.9	2.2	1.4	7.4	4.3	7.2	7.2
9th ..	1.3	0.95	1.4	1.4	8.0	6.1	8.1	8.0	3.4	0.5	3.4	3.4	7.9	5.0	8.6	8.0
10th ..	1.5	0.95	1.5	1.5	8.1	5.4	8.1	8.0	4.7	0.9	4.6	4.6	7.9	4.2	7.7	7.7
11th ..	2.1	0.95	2.0	2.0	8.2	4.7	8.1	8.0	3.3	0.5	3.3	3.2	6.9	4.5	6.9	6.9
12th ..	2.6	0.95	2.4	2.4	8.2	4.3	8.1	8.0	2.7	0.7	2.6	2.6	7.1	4.5	7.1	7.1
13th ..	2.3	0.95	2.1	2.1	8.2	4.9	8.1	8.0	2.6	0.2	2.6	2.6	8.2	3.5	8.0	8.0
14th ..	1.7	0.95	1.6	1.6	8.2	5.7	8.1	8.0	1.2	0.0	1.3	1.3	8.2	2.7	8.0	8.0
15th ..	0.8	0.60	1.2	1.2	8.1	5.2	8.1	8.0	5.5	4.5	5.9	5.9	7.0	3.2	6.8	6.8
16th ..	0.8	0.40	1.1	1.1	8.1	4.5	8.1	8.0	7.7	2.9	7.4	7.4	5.8	3.0	5.8	5.8
17th ..	0.8	0.40	1.1	1.1	8.2	3.5	8.1	8.0	8.3	1.9	8.0	8.0	5.7	2.9	5.7	5.7
18th ..	4.6	1.8	4.5	4.5	8.2	2.9	8.1	8.0	6.3	3.5	6.0	6.0	4.3	3.5	4.9	4.0
19th ..	7.4	5.3	7.5	7.5	4.8	4.1	5.7	5.6	5.3	2.8	5.3	5.3	5.5	4.5	5.7	5.7
20th ..	7.8	4.8	7.7	7.6	5.0	4.3	5.6	1.9	4.9	2.3	4.9	4.9	7.9	6.2	8.1	8.0
21st ..	7.8	4.8	7.7	7.5	4.5	2.8	4.8	4.7	3.5	2.9	4.4	2.0	8.0	4.8	8.1	8.0
22nd ..	6.8	6.2	7.1	6.9	5.4	2.9	5.4	6.4	3.2	2.5	3.9	1.3	8.1	4.5	8.0	8.0
23rd ..	8.2	6.0	8.2	8.0	5.3	2.8	5.3	5.3	5.5	0.7	5.3	5.3	7.9	6.2	8.1	8.0
24th ..	8.4	4.5	8.0	8.0	4.0	3.1	4.5	2.5	6.3	0.9	6.1	6.1	8.0	4.8	7.8	7.8
25th ..	8.1	3.2	8.0	8.0	3.8	3.0	4.3	1.5	4.1	1.4	4.1	4.1	6.1	4.5	6.1	6.1
26th ..	5.7	4.1	5.6	5.5	5.5	0.3	5.4	5.3	3.6	0.9	3.6	3.6	5.3	4.5	5.7	5.7
27th ..	4.5	4.0	4.9	2.0	7.1	0.9	6.9	6.8	3.4	0.3	3.4	3.4	7.7	1.9	7.5	7.5
28th ..	4.2	2.6	4.2	4.2	5.2	2.2	5.4	5.4	1.8	0.9	2.5	2.0	8.3	0.8	7.9	7.9
29th ..	4.8	2.0	4.6	4.6	4.1	1.4	4.1	4.1	2.1	1.3	2.7	1.0	5.5	2.6	5.5	5.5
30th ..	4.5	1.7	4.4	4.4	4.2	1.4	4.1	4.1	4.0	0.7	4.0	4.0	4.4	1.9	4.3	4.3
31st ..	..	..	..	..	5.4	0.5	5.1	5.1	5.4	1.9	5.2	5.2	..	..	..	..

Register of daily gauge readings at Cauvery and Vennar regulators—cont.

1900-1901.

Date.	June.				July.				August.				September.			
	Cauvery.		Vennar.		Cauvery.		Vennar.		Cauvery.		Vennar.		Cauvery.		Vennar.	
	Front.	Rear.	Front.	Rear.	Front.	Rear.	Front.	Rear.	Front.	Rear.	Front.	Rear.	Front.	Rear.	Front.	Rear.
1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17
1st	4.1	..	3.9	3.9	8.1	6.5	8.4	8.3	8.7	6.7	8.8	8.7	7.9	4.2	7.6	7.6
2nd	4.0	..	3.8	3.8	8.0	6.7	8.4	8.3	8.5	6.6	8.6	8.5	8.2	4.4	7.9	7.9
3rd	4.3	..	4.1	4.1	8.4	7.2	8.7	8.6	8.6	6.7	8.8	8.7	8.3	4.5	8.0	8.0
4th	3.7	..	3.5	3.5	8.4	7.2	8.7	8.6	8.6	6.9	9.0	8.9	7.5	4.5	7.3	7.3
5th	3.1	..	2.9	2.9	8.1	5.0	8.1	8.0	8.7	6.5	8.7	8.6	8.0	3.2	7.6	7.6
6th	2.8	..	2.6	2.6	9.2	5.0	9.4	8.0	9.3	4.4	9.1	9.0	8.4	3.5	8.0	8.0
7th	2.5	..	2.3	2.3	9.1	5.0	9.3	8.0	9.3	5.0	9.9	9.0	8.1	4.2	7.7	7.7
8th	2.3	..	2.1	2.1	7.9	5.0	8.1	8.0	10.7	7.0	11.0	9.0	8.5	4.7	8.2	8.2
9th	2.6	..	2.4	2.4	7.8	5.0	8.2	8.0	10.9	7.0	11.2	9.0	8.2	4.3	7.8	7.8
10th	3.9	..	3.7	3.7	8.1	5.0	8.4	8.0	10.7	7.0	11.0	9.0	8.3	5.0	8.0	8.0
11th	3.9	..	3.7	3.7	7.8	5.0	8.0	8.0	10.6	7.0	10.9	9.0	8.3	4.7	8.0	8.0
12th	3.4	..	3.2	3.2	8.5	5.0	8.8	8.0	10.4	7.0	10.9	9.0	8.7	6.5	8.5	8.5
13th	2.9	..	2.7	2.7	9.7	5.0	10.0	8.0	11.3	7.0	11.7	9.0	8.3	6.2	8.0	8.0
14th	2.6	..	2.3	2.3	9.8	5.5	9.2	8.0	12.3	7.5	12.7	9.0	8.4	5.8	8.0	8.0
15th	2.2	..	2.0	2.0	8.7	6.5	9.2	8.0	12.7	7.5	13.1	9.0	8.0	7.1	8.1	7.5
16th	1.9	..	1.7	1.7	8.7	6.5	9.6	9.0	11.8	7.5	12.2	9.5	7.5	6.0	7.4	7.0
17th	1.7	..	1.5	1.5	9.3	6.5	10.2	9.0	10.5	7.5	11.0	9.0	7.4	5.0	7.3	7.0
18th	4.1	..	3.9	3.9	9.9	6.5	10.8	9.0	9.4	7.5	9.8	9.0	7.5	5.0	7.3	7.0
19th	2.2	1.9	2.9	0.7	10.5	7.0	9.2	9.0	8.5	7.5	8.7	8.5	7.1	4.7	6.8	7.0
20th	2.3	2.0	2.5	2.5	8.6	7.0	9.2	9.0	8.5	7.5	8.7	8.5	7.1	4.7	6.8	6.7
21st	8.0	4.5	8.2	8.0	8.6	7.0	9.1	9.0	8.6	7.5	8.6	8.6	6.9	4.1	6.6	6.5
22nd	8.1	5.5	8.2	8.0	8.7	7.0	8.7	9.0	8.6	6.6	8.6	8.6	6.6	3.8	6.2	6.2
23rd	8.2	4.5	8.2	8.0	8.4	7.0	8.0	8.6	9.5	4.5	9.1	9.0	6.4	3.7	6.1	6.1
24th	6.5	4.0	6.5	6.4	7.8	6.7	8.0	8.0	9.4	4.5	9.1	9.0	4.7	4.1	4.7	4.6
25th	4.4	4.0	4.5	4.5	8.0	6.7	8.0	8.0	9.4	4.5	9.1	9.0	6.4	4.5	5.6	5.4
26th	4.5	4.1	4.9	1.0	8.2	5.3	8.0	8.0	9.4	4.5	9.1	9.0	6.4	4.5	6.4	6.4
27th	7.6	3.5	7.3	7.2	8.2	5.1	8.0	8.0	8.3	4.6	8.1	8.1	8.4	1.2	8.1	8.0
28th	8.2	3.6	8.1	8.0	8.1	5.5	8.0	8.0	7.9	4.5	7.6	7.6	6.9	3.5	6.8	6.8
29th	8.0	5.3	8.1	8.0	8.0	7.9	8.0	8.0	8.7	4.9	8.4	8.4	6.1	3.4	5.8	5.7
30th	7.8	6.2	8.1	8.0	8.1	5.3	8.1	8.0	8.6	4.8	8.3	8.3	5.7	3.1	5.5	5.4
31st	..	..	..	..	7.9	6.0	8.0	8.0	8.3	4.5	8.0	8.0	..	..	..	..

Date.	October.				November.				December.				January.			
	Cauvery.		Vennar.		Cauvery.		Vennar.		Cauvery.		Vennar.		Cauvery.		Vennar.	
	Front.	Rear.	Front.	Rear.	Front.	Rear.	Front.	Rear.	Front.	Rear.	Front.	Rear.	Front.	Rear.	Front.	Rear.
18	19	20	21	22	23	24	25	26	27	28	29	30	31	32	33	
1st	6.9	4.3	6.9	4.3	8.5	0.7	8.1	8.0	2.3	0.3	2.3	2.3	1.1	0.9	1.6	0.8
2nd	6.9	4.5	6.8	5.7	6.7	3.0	6.5	6.5	2.3	0.3	2.3	2.3	2.4	0.9	2.3	2.3
3rd	7.4	4.2	7.2	7.1	5.5	2.9	5.3	5.3	1.9	0.7	2.3	1.0	2.8	0.9	2.7	2.7
4th	8.1	6.2	8.0	8.0	5.0	2.4	4.8	4.8	1.9	0.7	2.3	1.0	1.9	0.3	1.7	1.7
5th	8.8	5.7	8.1	8.0	4.5	2.7	4.4	3.0	3.6	0.8	3.4	3.4	1.3	0.7	1.3	1.3
6th	7.5	4.5	7.3	7.3	4.0	3.1	4.0	1.5	3.8	0.9	3.6	3.6	1.1	0.7	1.3	1.3
7th	6.5	3.9	6.3	6.3	5.6	1.0	5.2	2.5	0.1	2.4	2.4	0.9	0.9	0.7	1.1	0.7
8th	5.9	4.1	5.7	4.0	6.4	0.6	6.1	6.1	2.1	0.1	2.1	2.1	1.0	0.7	1.2	0.7
9th	5.0	4.2	5.2	2.1	4.4	1.8	4.2	4.2	2.1	0.1	2.1	2.1	2.3	0.9	2.2	2.2
10th	5.7	2.1	5.5	5.4	3.8	1.3	3.6	3.6	1.4	0.2	2.1	0.8	2.4	0.9	2.3	2.3
11th	7.4	0.1	7.1	7.1	3.8	1.2	3.5	3.5	1.3	0.2	2.0	0.8	1.4	0.7	1.4	1.4
12th	5.6	2.4	5.5	5.5	3.0	1.6	3.0	2.3	2.7	0.9	2.5	2.5	1.2	0.7	1.2	1.2
13th	4.7	2.1	4.5	4.5	2.5	1.7	2.9	1.3	3.4	0.9	3.2	3.2	1.2	0.7	1.2	1.2
14th	4.3	1.7	4.1	4.1	4.8	0.5	4.5	4.5	2.1	0.1	2.1	2.1	1.7	0.3	1.9	0.8
15th	3.4	2.4	3.7	2.5	5.1	0.9	4.9	4.9	1.8	0.9	1.8	1.8	2.8	1.7	3.0	0.7
16th	3.7	2.9	3.9	1.4	3.3	1.1	3.3	3.3	1.5	0.4	1.5	1.5	3.5	0.8	3.3	3.3
17th	6.8	1.5	6.6	6.6	2.9	0.8	2.8	2.8	1.7	0.7	2.2	0.8	3.8	0.9	3.6	3.6
18th	8.4	4.2	8.1	8.0	2.8	0.7	2.7	2.7	1.4	0.3	1.9	0.8	2.3	0.2	2.3	2.3
19th	8.4	6.0	8.1	8.0	2.0	1.0	2.3	1.8	3.5	0.9	3.3	3.3	1.5	0.5	1.5	1.5
20th	8.3	6.0	8.1	8.0	2.3	1.3	2.9	1.1	4.3	0.9	4.1	4.1	1.4	0.6	1.4	1.4
21st	8.3	5.2	8.1	8.0	4.3	1.0	4.0	4.0	2.4	0.4	2.4	2.4	0.9	0.5	1.4	1.4
22nd	7.8	4.5	7.6	7.5	6.0	0.8	5.7	5.7	1.8	0.1	1.8	1.9	1.1	0.6	1.6	0.7
23rd	6.2	4.5	6.0	6.0	4.3	1.5	4.2	4.2	2.3	0.3	2.3	2.3	2.2	0.9	2.1	2.1
24th	8.1	2.5	7.5	7.5	3.5	1.2	3.4	3.4	1.8	0.6	2.3	0.8	2.9	0.9	2.7	2.7
25th	8.5	1.6	8.1	8.0	3.8	1.4	3.7	3.7	1.6	0.4	2.1	0.8	1.9	0.1	1.9	1.9
26th	6.3	3.2	6.0	6.0	3.3	1.9	3.1	2.0	2.8	0.9	2.6	2.6	1.2	0.8	1.2	1.2
27th	5.2	2.5	4.9	4.9	2.5	1.6	2.8	1.0	3.4	0.9	3.2	3.2	1.1	0.9	1.1	1.1
28th	4.9	2.2	4.6	4.6	0.7	4.2	4.2	4.2	2.1	0.1	2.1	2.1	0.7	0.8	1.2	0.7
29th	5.2	3.6	5.1	4.0	4.7	0.85	4.4	4.4	1.8	0.2	1.8	1.8	0.7	0.8	1.2	0.6
30th	5.2	4.4	5.3	1.8	3.0	0.6	2.9	2.9	1.7	0.3	1.7	1.7	0.7	0.8	1.2	0.6
31st	6.8	2.0	6.5	6.5	..	..	..	..	1.2	0.1	1.7	0.9	0.7	0.8	1.2	0.6

NOTE.—Figures in italics show water levels below zero of gauge.

Register of daily gauge readings at Cauvery and Vennar regulators—cont.

1901-1902.

Date.	June.				July.				August.				September.			
	Cauvery.		Vennar.		Cauvery.		Vennar.		Cauvery.		Vennar.		Cauvery.		Vennar.	
	Front.	Rear.	Front.	Rear.	Front.	Rear.	Front.	Rear.	Front.	Rear.	Front.	Rear.	Front.	Rear.	Front.	Rear.
1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17
1st	2.1	1.1	2.2	2.2	2.5	1.6	3.2	3.2	8.1	5.0	8.3	8.0	4.8	2.9	5.1	5.1
2nd	1.6	0.6	1.9	0.7	2.8	2.1	3.4	0.9	8.1	5.0	8.3	8.0	4.4	3.6	5.2	2.0
3rd	1.6	0.6	1.9	0.7	4.8	0.6	4.4	4.4	8.1	5.0	8.3	8.0	4.4	3.7	4.9	2.0
4th	1.6	0.6	1.8	0.6	6.1	0.9	5.8	5.8	8.0	4.6	8.2	8.0	4.7	0.5	5.8	5.7
5th	1.9	1.0	2.1	0.6	3.9	1.6	3.9	3.9	7.0	4.5	7.2	7.1	3.8	2.3	4.1	4.0
6th	5.3	0.9	5.1	5.1	6.0	3.7	5.9	5.8	7.0	4.5	7.2	7.1	3.8	2.3	4.1	4.0
7th	3.4	1.0	3.3	3.3	8.3	5.1	8.1	8.0	8.2	4.4	8.1	8.0	3.7	2.2	4.0	4.0
8th	2.5	0.4	2.4	2.4	8.8	7.3	8.9	8.8	8.3	3.8	8.2	8.0	3.7	1.5	4.0	4.0
9th	2.5	0.4	2.4	2.4	8.8	7.2	8.9	8.8	8.2	5.0	8.2	8.0	3.7	1.5	4.0	4.0
10th	1.5	0.4	1.6	1.4	9.1	5.5	9.0	8.9	8.0	5.0	8.2	8.0	4.1	1.9	4.3	4.2
11th	1.4	0.3	1.6	0.7	9.1	4.5	8.9	8.8	7.9	5.0	8.1	8.0	6.4	0.6	6.2	6.2
12th	2.1	0.9	1.9	1.9	8.4	3.5	8.2	8.1	8.0	4.0	8.1	8.0	6.6	1.3	6.5	6.5
13th	4.5	0.9	4.3	4.3	10.1	4.0	10.2	8.0	8.0	4.0	8.1	8.0	4.8	3.2	5.0	5.0
14th	3.9	1.3	4.0	4.0	9.7	5.0	9.9	8.0	8.1	4.0	8.2	8.0	4.6	3.2	5.0	5.0
15th	3.1	1.1	3.2	3.2	8.8	5.0	9.0	8.0	8.1	5.0	8.0	8.0	4.3	2.5	4.7	4.7
16th	5.5	3.2	5.5	5.5	8.2	5.5	8.1	8.0	8.2	3.0	8.1	8.0	4.7	4.0	4.9	1.5
17th	5.0	4.3	5.1	4.9	8.1	5.5	8.1	8.0	8.2	3.0	8.1	8.0	4.7	4.4	5.5	1.5
18th	5.2	4.5	5.3	1.6	8.2	5.0	8.3	8.0	8.1	5.0	8.2	8.0	4.8	3.3	5.1	5.0
19th	8.3	4.2	8.1	8.0	8.2	5.0	8.3	8.0	8.1	5.0	8.2	8.0	6.8	4.5	6.8	6.5
20th	8.3	3.9	8.1	8.0	8.2	5.0	8.3	8.0	7.8	5.0	8.2	8.0	6.8	4.5	6.8	6.5
21st	8.2	6.2	8.1	8.0	8.2	5.0	8.3	8.0	7.8	4.9	8.2	8.0	5.2	3.5	5.5	5.5
22nd	8.2	5.6	8.1	8.0	8.2	5.0	8.3	8.0	8.0	4.4	8.1	8.0	5.3	3.6	5.8	5.7
23rd	8.2	4.7	8.1	8.0	8.2	5.0	8.3	8.0	6.6	4.5	6.8	6.7	4.2	3.8	5.1	2.5
24th	6.9	4.5	6.6	6.6	8.1	5.0	8.2	8.0	7.4	4.0	7.6	7.5	4.5	4.3	5.4	1.7
25th	5.6	4.5	5.5	3.5	8.1	4.1	8.2	8.0	7.3	4.0	7.4	7.3	6.6	0.8	6.2	6.1
26th	6.8	1.5	6.6	6.6	6.8	4.4	6.8	6.7	6.5	4.0	6.8	6.7	7.7	0.3	7.6	7.5
27th	7.9	0.8	7.6	7.6	6.1	4.0	6.1	6.1	6.0	4.0	6.3	6.2	6.6	4.5	6.7	6.6
28th	5.0	2.4	4.9	4.9	6.1	4.0	6.2	6.1	8.1	1.8	8.1	8.0	7.3	5.5	8.1	8.0
29th	4.1	1.7	4.1	4.1	6.7	4.5	6.9	6.7	8.1	2.0	8.1	8.0	6.3	6.2	6.2	6.9
30th	3.7	1.4	3.7	3.7	8.1	5.0	8.3	8.0	6.1	4.0	6.1	6.1	7.3	4.5	7.6	6.0
31st	..	..	..	..	8.1	5.0	8.2	8.0	5.1	3.1	5.3	5.3	..	..	..	..

Register of daily gauge readings at Cauvery and Vennar regulators—cont.

1902-1903.

Date.	June.				July.				August.				September.			
	Cauvery.		Vennar.		Cauvery.		Vennar.		Cauvery.		Vennar.		Cauvery.		Vennar.	
	Front.	Rear.	Front.	Rear.	Front.	Rear.	Front.	Rear.	Front.	Rear.	Front.	Rear.	Front.	Rear.	Front.	Rear.
1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17
1st	5.6	0.95	5.5	0.8	1.3	0.1	1.1	0.8	6.7	4.2	6.4	6.3	4.7	4.1	4.9	2.0
2nd	5.7	0.95	5.6	0.8	2.5	0.9	2.3	2.3	7.8	4.4	7.7	7.6	4.5	3.9	1.7	0.6
3rd	5.5	0.95	5.4	0.8	2.6	0.9	2.4	2.4	8.2	5.3	8.1	8.0	5.8	0.4	5.6	5.4
4th	6.1	0.95	6.0	0.8	1.7	0.9	1.6	1.6	8.2	4.5	8.1	8.0	8.1	0.8	7.8	7.7
5th	5.8	0.95	5.7	0.8	1.3	0.6	1.2	1.2	7.6	4.5	7.4	7.3	7.8	5.2	7.5	7.4
6th	5.7	0.95	5.6	0.8	1.1	0.8	1.0	1.0	8.2	3.2	8.1	8.0	8.2	5.5	8.1	8.0
7th	5.6	0.95	5.4	0.8	0.8	0.9	0.7	0.6	8.3	2.5	8.1	8.0	8.2	5.3	8.1	8.0
8th	5.1	0.95	5.0	0.8	0.7	0.9	0.7	0.6	6.7	4.2	6.4	6.3	7.0	5.0	6.8	6.7
9th	2.8	0.95	2.7	0.8	1.5	0.95	1.4	1.4	5.9	3.6	5.8	5.7	6.2	5.0	6.0	5.9
10th	0.6	0.95	0.5	0.5	5.3	0.9	5.0	5.0	5.7	3.2	5.5	5.4	8.0	1.7	7.9	7.8
11th	2.5	0.95	2.4	2.3	7.8	5.6	8.0	8.0	5.2	4.4	5.5	5.6	8.3	4.4	8.1	8.0
12th	2.5	0.95	2.4	2.3	7.9	6.1	8.0	8.0	5.0	4.4	5.2	5.3	8.3	6.4	8.2	8.1
13th	2.3	0.95	2.2	2.1	7.8	6.0	8.0	8.0	6.4	0.6	6.1	6.0	8.3	6.5	8.2	8.1
14th	2.2	0.95	2.1	2.0	7.9	5.5	8.1	8.0	7.5	0.2	7.1	7.0	7.3	5.5	7.1	6.5
15th	2.0	0.95	1.8	1.8	7.9	4.9	8.1	8.0	5.4	2.9	5.2	5.1	7.3	5.5	7.1	6.5
16th	0.7	0.8	6.5	0.6	8.0	5.0	8.1	8.0	4.9	2.2	4.6	4.5	7.3	5.5	7.1	6.5
17th	0.9	0.8	0.5	0.5	7.5	5.0	8.1	7.0	4.4	1.9	4.3	4.2	7.3	5.5	7.2	6.5
18th	2.8	0.8	2.3	2.3	10.9	5.0	11.3	7.0	3.5	3.9	3.5	3.2	7.0	4.0	7.1	6.5
19th	8.1	2.6	8.0	8.0	12.4	6.5	12.8	8.0	3.9	3.2	4.2	4.2	7.3	4.0	7.0	6.5
20th	6.2	4.1	6.2	6.2	11.5	6.5	12.2	8.2	4.9	0.2	4.2	4.2	7.3	3.0	7.0	5.6
21st	5.2	2.9	5.1	5.1	10.2	6.5	11.1	8.2	6.1	0.5	6.7	6.7	7.3	3.0	7.0	5.6
22nd	4.7	2.2	4.5	4.5	8.8	6.5	9.7	8.2	4.5	2.0	4.3	4.3	7.2	3.0	7.0	5.5
23rd	3.5	2.7	3.5	2.3	7.8	6.5	8.3	8.2	3.9	1.3	3.7	3.7	7.3	3.0	6.9	5.6
24th	2.9	2.3	2.9	1.0	8.1	4.5	8.0	8.0	3.9	1.1	3.7	3.6	6.8	4.1	6.6	5.5
25th	4.2	0.6	4.1	4.1	8.2	4.5	8.1	8.0	3.1	2.8	3.4	1.7	6.8	3.5	6.5	5.5
26th	4.6	0.9	4.5	4.5	8.3	4.5	8.1	8.0	3.7	3.2	3.7	1.0	6.1	3.1	5.9	5.8
27th	3.4	0.6	3.2	3.1	8.2	4.5	8.1	8.0	6.6	1.2	6.1	6.0	6.0	3.0	5.8	5.7
28th	2.9	0.1	2.4	2.4	8.1	4.5	8.1	8.0	7.8	0.3	7.4	7.4	5.7	2.7	5.5	5.4
29th	2.9	0.1	2.6	2.6	7.3	4.5	7.2	7.1	5.4	2.9	5.2	5.1	5.6	1.5	5.5	2.8
30th	1.5	0.3	1.4	1.0	8.2	3.4	8.1	8.0	5.3	2.8	5.1	5.0	4.9	4.3	4.8	2.3
31st	...	...	...	...	8.2	2.3	8.1	8.0	5.3	2.8	5.1	5.0	...	...	...	...

Date.	October.				November.				December.				January.			
	Cauvery.		Vennar.		Cauvery.		Vennar.		Cauvery.		Vennar.		Cauvery.		Vennar.	
	Front.	Rear.	Front.	Rear.	Front.	Rear.	Front.	Rear.	Front.	Rear.	Front.	Rear.	Front.	Rear.	Front.	Rear.
18	19	20	21	22	23	24	25	26	27	28	29	30	31	32	33	
1st	5.8	2.5	5.6	5.5	7.5	1.7	7.4	1.5	3.7	3.0	3.6	1.5	4.3	0.9	3.8	3.7
2nd	7.5	0.1	7.2	7.1	7.5	1.7	7.7	1.5	4.5	3.5	4.4	1.5	4.1	0.8	3.7	3.6
3rd	5.7	2.7	5.6	5.4	6.7	3.0	6.6	5.0	5.3	0.3	5.1	5.9	4.0	0.7	3.8	3.5
4th	5.2	2.0	4.8	4.7	6.5	3.0	6.1	5.0	5.4	1.3	5.1	5.9	3.9	0.6	3.5	3.4
5th	5.1	1.9	4.7	4.6	6.2	3.0	5.9	5.0	5.5	2.9	5.1	5.0	3.9	0.6	3.5	3.4
6th	3.7	2.9	3.5	1.8	5.9	3.0	5.5	5.0	8.2	3.5	8.0	5.0	3.8	0.6	3.5	3.4
7th	3.7	3.0	3.7	1.0	5.6	3.5	5.4	3.0	8.9	2.5	8.8	1.3	3.8	0.6	3.4	3.3
8th	4.5	0.7	4.3	4.2	5.6	3.5	5.1	5.0	9.9	4.1	9.7	1.2	3.8	0.6	3.4	3.3
9th	6.1	0.4	5.8	5.7	6.8	3.5	5.2	5.0	8.6	2.6	8.5	2.5	3.7	0.4	3.3	3.2
10th	6.1	3.0	5.9	5.8	5.6	4.6	5.7	2.0	8.2	2.2	8.1	2.1	3.7	0.4	3.3	3.2
11th	7.2	4.0	6.0	6.8	6.0	3.5	5.7	3.5	9.5	3.5	9.4	3.4	3.7	0.4	3.3	3.2
12th	8.3	6.5	8.2	6.5	5.2	3.5	5.0	3.5	8.4	2.4	8.2	2.2	3.5	0.3	3.2	3.1
13th	7.9	5.0	7.8	7.7	4.5	3.5	4.3	3.5	8.7	2.7	8.5	3.5	3.5	0.3	3.2	3.1
14th	7.6	6.3	7.3	7.2	4.7	3.5	4.5	3.5	8.0	2.0	7.8	4.5	3.4	0.2	3.0	2.9
15th	8.1	4.5	8.0	6.0	4.3	3.4	4.0	3.4	7.3	1.3	7.2	4.5	3.4	0.2	3.0	2.9
16th	9.2	3.0	8.9	6.0	4.2	2.5	3.7	3.5	6.9	0.9	6.8	4.5	4.0	0.1	3.8	3.2
17th	7.4	3.0	7.2	6.0	6.3	3.5	6.1	3.5	7.1	1.1	7.0	4.5	4.0	0.1	3.8	3.2
18th	7.2	3.0	7.1	6.0	5.5	3.5	5.4	3.5	7.0	1.0	6.9	4.5	3.7	0.1	3.8	3.2
19th	6.3	3.0	6.1	6.0	4.7	3.0	4.3	3.5	7.2	1.2	6.9	4.5	3.5	0.6	3.8	3.1
20th	6.4	3.0	6.2	6.0	4.2	2.8	3.8	3.5	7.4	1.4	7.3	4.5	3.1	0.0	3.7	3.0
21st	6.0	3.0	5.7	5.6	6.6	2.5	6.6	1.1	5.2	3.5	5.1	4.5	3.1	0.0	3.7	3.0
22nd	6.3	2.0	6.1	6.0	6.8	2.5	6.7	1.1	5.4	3.5	5.3	3.6	2.9	0.2	3.6	3.5
23rd	6.1	1.1	6.1	6.0	7.1	2.5	7.0	1.1	5.2	3.5	5.1	3.4	2.9	0.2	3.6	3.5
24th	5.3	2.3	5.1	5.0	6.7	2.5	6.6	1.0	5.5	2.7	5.2	4.5	2.9	0.2	3.5	3.4
25th	5.2	2.2	5.0	4.9	6.3	2.5	6.2	1.0	6.3	0.8	6.1	4.5	2.9	0.2	3.5	3.4
26th	7.1	3.0	6.9	6.0	6.1	2.5	6.0	1.0	4.8	1.8	4.6	4.5	2.8	0.3	3.4	3.3
27th	6.6	3.0	6.5	4.0	5.8	2.5	5.7	1.0	4.9	1.6	4.4	4.3	2.8	0.3	3.3	3.2
28th	9.0	3.0	8.8	4.0	5.3	2.5	5.2	0.7	4.8	1.3	4.2	4.1	2.8	0.4	3.2	3.1
29th	7.9	2.0	7.8	1.2	6.2	1.9	6.0	3.5	4.7	1.3	4.2	4.1	2.8	0.4	3.2	3.1
30th	7.4	2.0	7.2	2.0	6.5	2.0	6.3	4.0	4.5	1.1	4.0	3.9	2.6	0.4	3.1	3.0
31st	7.5	1.7	7.4	1.9	...	...	...	...	4.4	1.0	3.9	3.8	2.6	0.5	3.0	2.9

NOTE.—Figures in italics show water levels below zero of gauge.

Register of daily gauge readings at Cauvery and Vennar regulators—cont.

1903-1904.

Date.	June.				July.				August.				September.			
	Cauvery.		Vennar.		Cauvery.		Vennar.		Cauvery.		Vennar.		Cauvery.		Vennar.	
	Front.	Rear.	Front.	Rear.	Front.	Rear.	Front.	Rear.	Front.	Rear.	Front.	Rear.	Front.	Rear.	Front.	Rear.
1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17
1st ..	2.3	0.8	1.4	1.3	4.0	0.5	3.6	3.5	11.9	7.5	11.9	9.0	7.0	4.0	6.7	6.6
2nd ..	2.1	0.6	1.2	1.1	4.7	0.9	4.4	4.3	11.8	7.0	11.8	9.0	7.3	4.0	7.1	7.0
3rd ..	2.1	0.5	1.2	1.1	3.4	0.3	3.2	3.1	11.9	6.0	11.9	8.5	7.7	4.0	7.5	6.5
4th ..	2.5	1.1	1.5	1.5	3.2	0.1	2.9	2.8	11.4	5.0	11.2	7.5	7.5	4.0	7.3	6.0
5th ..	2.1	0.7	1.2	1.2	4.2	0.9	3.8	3.7	10.1	4.0	10.0	7.0	6.1	4.0	6.0	4.5
6th ..	2.5	0.1	1.8	1.7	3.0	2.0	2.7	1.5	8.8	4.0	8.7	6.5	6.8	3.0	6.6	4.5
7th ..	2.2	0.1	1.9	1.5	3.0	2.1	2.8	0.8	7.8	4.0	7.5	7.0	6.6	3.0	6.4	4.5
8th ..	2.4	0.5	2.1	2.0	4.2	0.6	3.8	3.7	7.2	4.0	7.1	7.0	6.5	3.0	6.3	4.5
9th ..	2.4	0.6	2.1	2.0	4.7	0.9	4.3	4.3	7.6	4.0	7.4	7.3	6.7	3.0	6.6	4.5
10th ..	1.7	0.2	1.3	0.8	3.3	0.4	3.2	3.2	7.7	4.0	7.4	7.3	6.3	3.0	6.2	5.0
11th ..	2.8	0.2	2.5	2.4	3.1	0.2	2.5	2.5	6.5	4.0	6.3	6.2	6.3	3.0	6.2	5.0
12th ..	3.7	0.4	3.5	3.2	2.7	0.3	2.4	2.3	6.3	4.0	6.2	6.0	6.4	3.0	6.3	5.0
13th ..	3.9	0.7	3.6	3.5	2.0	0.4	2.0	0.8	6.7	4.0	6.6	5.0	6.5	3.0	6.4	5.0
14th ..	4.1	0.8	3.7	3.6	2.9	1.7	2.5	0.8	7.0	4.0	6.9	5.0	6.4	3.0	6.2	5.0
15th ..	4.3	1.0	3.9	3.8	4.2	0.8	3.7	3.6	7.0	4.0	6.9	5.0	6.3	3.0	6.1	5.0
16th ..	4.1	0.8	3.7	3.6	7.5	5.5	7.2	7.0	7.0	5.0	6.9	6.0	6.2	3.5	6.1	5.0
17th ..	5.2	2.1	4.9	4.6	8.3	6.0	8.1	8.0	6.9	5.0	6.8	6.0	6.1	3.5	6.0	5.0
18th ..	4.9	2.0	4.8	4.7	8.6	6.0	8.5	8.0	7.3	5.0	7.2	5.0	6.1	3.5	5.8	5.0
19th ..	4.5	1.5	4.3	4.2	9.6	6.0	9.3	8.0	6.4	5.0	6.3	5.0	5.7	3.5	5.4	5.0
20th ..	4.9	3.8	4.6	4.5	8.5	6.5	8.5	8.3	6.5	5.3	6.3	6.2	5.7	3.5	5.4	5.0
21st ..	5.6	2.5	5.3	5.2	8.5	7.0	8.5	8.3	6.4	5.2	6.2	6.1	6.7	3.5	6.5	5.5
22nd ..	5.1	1.8	4.6	4.5	8.3	7.0	8.4	8.3	6.2	5.0	6.0	6.0	6.7	3.0	6.6	4.0
23rd ..	4.7	1.3	4.2	4.1	8.3	6.0	8.1	8.0	7.5	5.6	7.3	7.2	6.7	3.0	6.5	4.0
24th ..	4.2	0.9	3.8	3.7	8.5	6.3	8.4	8.3	8.4	6.0	8.3	8.0	7.5	3.0	7.3	4.0
25th ..	3.9	0.7	3.6	3.5	8.3	6.4	8.1	8.0	8.5	6.0	8.4	8.0	7.2	2.5	7.1	3.0
26th ..	3.9	0.7	3.6	3.5	8.4	7.0	8.3	8.2	7.8	6.0	7.6	6.0	7.5	2.5	7.4	3.0
27th ..	3.8	0.6	3.5	3.4	8.4	7.0	8.3	8.2	7.7	6.0	7.6	6.5	7.7	2.5	7.6	2.5
28th ..	3.6	0.4	3.3	3.2	8.7	7.0	8.6	8.5	7.3	5.5	7.1	7.0	7.7	2.5	7.6	2.5
29th ..	2.7	1.6	2.5	1.4	8.7	7.0	8.6	8.5	7.3	4.0	7.1	7.0	8.0	2.5	7.8	2.5
30th ..	2.6	1.5	2.4	0.8	9.5	7.0	9.4	9.0	7.1	5.0	6.9	6.8	8.5	2.5	8.4	2.5
31st ..	..	..	..	..	10.5	7.0	10.4	9.0	6.8	4.5	6.6	6.5	..	..	..	..

Register of daily gauge readings at Cauvery and Vennar regulators—cont.

1904-1905.

Date.	June.				July.				August.				September.			
	Cauvery.		Vennar.		Cauvery.		Vennar.		Cauvery.		Vennar.		Cauvery.		Vennar.	
	Front.	Rear.	Front.	Rear.	Front.	Rear.	Front.	Rear.	Front.	Rear.	Front.	Rear.	Front.	Rear.	Front.	Rear.
1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17
1st ..	7.4	..	7.3	0.7	8.1	5.5	8.0	7.5	6.3	3.3	6.1	6.0	7.5	0.8	7.2	7.0
2nd ..	6.3	1.0	6.1	3.0	7.3	5.5	7.2	6.5	5.7	2.9	5.6	5.5	5.4	2.3	5.2	5.0
3rd ..	6.6	1.0	6.5	4.0	7.2	5.5	7.0	5.0	7.2	1.5	7.1	7.0	4.5	1.5	4.3	4.2
4th ..	7.5	1.0	7.4	4.0	7.8	5.5	7.7	5.0	7.6	1.0	7.2	7.0	4.3	1.4	4.2	4.1
5th ..	7.0	1.0	6.9	4.0	7.5	5.5	7.3	5.0	6.3	3.2	6.1	5.9	3.9	3.0	3.9	1.0
6th ..	7.2	0.9	7.1	4.0	10.1	5.5	10.0	5.0	7.0	4.0	6.9	6.8	3.6	2.7	3.6	0.8
7th ..	6.5	0.9	6.3	4.0	10.7	6.5	10.6	6.0	8.7	5.5	8.6	8.0	5.7	0.9	3.6	5.5
8th ..	4.4	0.5	4.3	4.0	10.9	6.5	10.8	5.0	8.6	5.5	8.4	8.0	5.8	0.9	5.6	5.5
9th ..	3.9	0.8	3.4	3.4	10.3	6.0	10.2	4.3	8.4	5.5	8.3	8.0	4.3	1.4	4.2	4.1
10th ..	4.4	1.0	4.0	4.0	8.8	6.0	8.7	5.0	8.4	5.0	8.3	8.0	3.8	0.8	3.7	3.6
11th ..	5.3	1.5	5.0	5.0	7.0	6.0	6.9	5.0	8.7	4.5	8.5	8.0	3.7	0.7	3.6	3.5
12th ..	4.5	1.0	4.1	4.0	8.7	6.5	8.6	6.5	8.7	4.5	8.5	8.0	3.3	2.3	3.3	1.0
13th ..	7.8	1.5	7.5	5.0	7.8	4.5	7.7	6.5	7.0	4.5	6.8	6.5	2.8	1.7	2.7	0.6
14th ..	7.5	1.5	7.3	5.0	7.6	4.5	7.5	6.5	6.9	4.5	6.7	6.5	5.5	0.9	5.3	5.2
15th ..	6.4	3.4	6.2	6.1	7.6	4.5	7.5	6.5	7.0	4.5	6.8	6.5	6.2	0.9	6.0	5.8
16th ..	7.5	1.5	7.4	6.5	7.7	4.5	7.6	6.5	7.4	5.0	7.2	6.5	4.8	1.7	4.6	4.5
17th ..	7.7	1.7	7.6	6.0	8.0	4.5	7.9	6.5	7.5	5.0	7.3	6.8	5.8	2.9	5.6	5.5
18th ..	7.3	1.3	7.2	6.0	8.0	4.5	7.9	7.0	7.3	4.0	7.1	6.5	7.5	6.0	7.6	7.0
19th ..	7.0	1.0	6.9	6.0	7.0	5.5	6.9	6.5	7.1	4.0	6.6	6.5	6.7	5.0	6.6	6.5
20th ..	6.5	0.5	6.3	6.0	6.7	5.0	6.5	6.3	7.0	4.0	6.7	6.5	6.1	5.0	6.0	4.0
21st ..	6.5	0.5	6.3	6.0	7.8	4.7	7.6	7.5	7.1	4.0	6.7	6.5	6.8	3.2	6.6	6.5
22nd ..	7.1	0.5	6.9	6.0	7.8	4.7	7.6	7.5	6.6	4.0	6.4	6.3	6.8	2.5	6.5	6.5
23rd ..	8.2	2.2	8.0	6.0	7.2	5.0	7.1	7.0	6.3	3.8	5.9	5.8	6.2	3.2	6.0	5.9
24th ..	7.5	4.2	7.3	7.0	7.4	4.4	7.3	7.2	5.7	3.5	5.3	5.2	5.5	2.6	5.4	5.8
25th ..	7.9	4.6	7.7	7.4	8.3	5.0	8.2	7.8	5.2	3.3	4.8	4.7	6.2	3.2	6.0	5.9
26th ..	7.9	4.5	7.6	7.3	7.8	5.5	7.7	7.0	4.9	3.1	4.5	4.4	6.2	5.0	6.0	4.2
27th ..	7.4	5.0	7.1	7.0	7.7	5.2	7.6	7.5	4.9	2.9	4.4	4.3	6.2	5.0	6.0	3.5
28th ..	7.0	5.0	6.7	6.5	7.9	6.0	7.8	7.5	4.6	2.7	4.2	4.1	8.3	1.0	8.1	8.0
29th ..	6.4	5.0	6.2	6.0	7.6	5.0	7.4	7.0	4.8	3.6	4.8	2.0	7.3	1.0	7.1	7.0
30th ..	6.8	5.0	6.6	6.5	7.2	4.2	7.1	7.0	4.5	3.5	4.6	1.8	5.4	2.5	5.3	5.2
31st ..	..	..	..	..	6.7	3.6	6.6	6.4	6.6	0.8	6.1	6.0	..	..	..	..

Date.	October.				November.				December.				January.			
	Cauvery.		Vennar.		Cauvery.		Vennar.		Cauvery.		Vennar.		Cauvery.		Vennar.	
	Front.	Rear.	Front.	Rear.	Front.	Rear.	Front.	Rear.	Front.	Rear.	Front.	Rear.	Front.	Rear.	Front.	Rear.
18	19	20	21	22	23	24	25	26	27	28	29	30	31	32	33	
1st ..	4.7	1.7	4.6	4.5	5.0	2.0	4.8	4.7	1.8	0.9	1.7	1.6	0.9	0.95	0.9	0.9
2nd ..	4.8	1.7	4.6	4.5	4.7	1.6	4.4	4.3	1.1	0.9	1.0	1.0	0.9	0.95	0.9	0.9
3rd ..	4.5	3.5	4.4	1.2	6.8	0.9	6.1	6.0	1.1	0.9	1.0	1.0	0.6	0.9	0.5	..
4th ..	4.2	3.2	4.2	0.8	4.2	1.0	3.9	3.8	1.1	0.9	1.0	1.0	1.1	0.95	1.0	1.0
5th ..	5.2	0.8	5.1	5.0	3.7	0.5	3.4	3.3	0.8	0.7	0.7	0.7	1.1	0.95	1.0	1.0
6th ..	6.0	0.9	5.9	5.8	3.4	0.3	3.2	3.1	0.8	0.7	0.7	..	0.9	0.95	0.9	0.9
7th ..	4.5	1.6	4.4	4.3	2.8	1.7	2.8	1.0	1.6	0.9	1.5	1.5	0.9	0.95	0.9	0.9
8th ..	4.4	1.4	4.2	4.1	2.7	1.6	2.7	0.8	1.8	0.9	1.7	1.6	0.9	0.95	0.9	0.9
9th ..	4.8	1.9	4.7	4.6	4.1	0.9	3.8	3.7	1.4	0.8	1.3	1.3	0.8	0.9	0.5	..
10th ..	4.3	3.3	4.2	1.5	4.1	0.9	3.8	3.7	1.1	0.9	1.0	1.0	0.6	0.9	0.5	..
11th ..	4.3	3.3	4.2	1.0	3.3	0.2	3.0	2.9	0.8	0.95	0.8	0.8	1.1	0.95	1.0	1.0
12th ..	6.5	0.8	6.4	6.3	2.8	0.2	2.6	2.5	0.8	0.7	0.8	..	1.1	0.95	1.0	1.0
13th ..	7.4	0.1	7.1	7.0	3.8	0.3	3.2	3.1	0.8	0.7	0.7	..	0.9	0.95	0.9	0.9
14th ..	5.4	2.5	5.3	5.2	2.6	1.5	2.5	1.0	1.4	0.9	1.3	1.3	0.9	0.95	0.9	0.9
15th ..	5.1	2.2	5.0	4.9	2.4	1.3	2.3	0.8	1.4	0.95	1.3	1.3	0.9	0.95	0.9	0.9
16th ..	4.8	1.9	4.7	4.6	3.3	0.9	3.1	3.0	1.0	0.95	0.9	0.9	0.6	0.9	0.6	..
17th ..	4.2	3.2	4.1	1.0	4.0	0.9	3.8	3.7	1.0	0.95	0.9	0.9	0.6	0.9	0.6	..
18th ..	4.0	3.0	3.9	1.0	2.8	0.8	2.6	2.5	1.0	0.95	0.9	0.9	1.1	0.95	1.0	1.0
19th ..	5.7	0.8	5.6	5.5	2.3	0.5	2.1	2.0	1.1	0.7	1.0	..	1.1	0.95	1.0	1.0
20th ..	6.5	0.9	6.3	6.1	2.2	0.5	2.1	2.0	1.1	0.7	1.0	..	0.8	0.95	0.8	0.8
21st ..	4.7	3.0	4.6	3.0	1.5	0.1	1.5	0.7	1.8	0.9	1.7	1.6	0.8	0.95	0.8	0.8
22nd ..	5.8	4.6	5.7	3.0	1.4	0.2	1.4	0.4	2.0	0.95	1.9	1.8	0.8	0.95	0.8	0.8
23rd ..	6.8	5.0	6.7	3.0	2.3	0.9	2.2	2.1	1.1	0.7	1.0	..	0.6	0.9	0.6	..
24th ..	6.0	5.0	5.9	3.0	2.7	0.9	2.6	2.5	1.1	0.7	1.0	..	0.7	0.9	0.7	..
25th ..	5.8	4.5	5.7	3.0	1.7	0.7	1.7	1.6	1.1	0.7	1.0	..	1.1	0.95	1.0	1.0
26th ..	6.3	3.0	6.2	3.0	1.4	0.8	1.3	1.3	0.9	0.8	0.8	..	1.5	0.95	1.5	1.5
27th ..	6.2	3.0	6.1	3.0	1.4	0.8	1.3	1.3	0.9	0.8	0.8	..	1.0	0.9	1.0	1.0
28th ..	6.2	3.0	6.1	3.0	1.1	0.7	1.0	..	0.9	0.8	0.8	..	0.9	0.95	0.9	0.9
29th ..	6.2	3.0	6.1	3.0	1.1	0.7	1.0	..	0.9	0.8	0.8	..	0.9	0.95	0.9	0.9
30th ..	6.5	3.0	6.4	5.0	1.8	0.9	1.7	1.6	0.9	0.8	0.8	..	0.7	0.9	0.7	..
31st ..	5.2	3.0	5.1	5.0	..	..	..	..	0.9	0.95	0.9	0.9	0.7	0.9	0.7	..

NOTE.—Figures in italics show water levels below zero of gauge.

Register of daily gauge readings at Cauvery and Vennar regulators—cont.

1905-1906.

Date.	June.				July.				August.				September.			
	Cauvery.		Vennar.		Cauvery.		Vennar.		Cauvery.		Vennar.		Cauvery.		Vennar.	
	Front.	Rear.	Front.	Rear.	Front.	Rear.	Front.	Rear.	Front.	Rear.	Front.	Rear.	Front.	Rear.	Front.	Rear.
1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17
1st ..	2.7	1.5	2.5	2.4	6.1	5.3	6.0	3.0	8.7	5.0	8.5	8.0	9.5	4.5	9.5	7.0
2nd ..	3.4	0.5	2.1	3.0	7.4	6.0	7.5	3.0	8.8	5.0	8.6	8.0	7.4	4.5	7.2	7.0
3rd ..	3.3	0.2	3.1	3.0	7.6	6.0	7.6	3.0	9.1	5.0	8.9	7.0	9.0	5.0	9.0	5.0
4th ..	3.3	0.7	3.1	3.0	7.8	4.5	7.5	6.0	8.8	5.0	8.7	7.0	9.2	4.0	9.2	5.0
5th ..	2.8	0.4	2.3	2.2	7.9	4.5	7.6	6.0	8.7	5.0	8.6	7.0	9.0	4.0	9.0	5.0
6th ..	2.0	0.5	2.0	2.0	7.7	4.5	7.3	6.0	7.5	5.0	7.3	6.75	6.0	3.0	5.8	5.0
7th ..	1.9	0.6	1.8	1.8	8.2	3.5	7.7	7.0	6.9	4.5	6.5	6.4	7.3	2.0	7.2	5.0
8th ..	3.2	0.6	2.8	2.9	8.0	3.5	7.6	7.0	5.6	4.5	5.4	5.0	7.5	2.0	7.4	5.0
9th ..	2.9	0.7	2.6	2.6	6.6	3.2	6.0	5.9	7.4	2.0	7.1	7.0	7.5	2.0	7.4	5.0
10th ..	2.1	0.5	2.0	2.0	4.5	3.5	4.0	3.9	7.5	1.3	7.1	7.0	7.5	2.0	7.4	6.0
11th ..	2.0	0.5	1.8	1.8	4.6	3.5	4.1	3.9	5.7	2.7	5.5	5.4	7.9	2.0	7.7	6.0
12th ..	2.0	0.6	1.8	1.8	8.8	4.5	8.7	7.0	5.4	2.3	5.1	5.0	8.6	2.0	8.4	6.5
13th ..	3.2	0.95	2.9	2.9	9.3	4.5	9.2	7.0	5.1	2.0	4.8	4.7	8.5	3.0	8.5	6.5
14th ..	3.0	0.95	2.7	2.7	9.3	4.5	9.2	7.0	4.2	3.1	4.2	2.1	8.7	3.0	8.6	6.25
15th ..	2.0	0.5	2.0	2.0	7.3	4.5	7.1	7.0	4.1	3.1	4.1	..	8.4	3.0	8.3	6.25
16th ..	1.6	0.6	1.6	1.6	7.0	3.7	6.6	6.5	6.8	0.9	6.4	6.3	6.7	3.7	6.4	6.25
17th ..	1.3	0.8	1.3	1.3	5.5	4.5	5.5	..	6.5	1.0	6.1	6.0	6.5	3.4	6.3	6.1
18th ..	1.2	0.8	1.2	..	4.8	3.8	4.8	..	5.7	2.6	5.4	5.3	5.5	4.5	5.5	3.5
19th ..	0.9	0.7	0.9	..	7.3	0.9	6.6	6.5	5.2	2.2	5.0	4.9	4.9	3.9	5.0	2.2
20th ..	1.3	0.6	1.3	..	7.5	0.9	7.1	7.0	5.0	1.9	4.7	4.6	6.7	1.0	6.4	6.25
21st ..	2.5	0.95	2.3	2.3	5.4	2.3	5.1	5.0	4.0	2.9	4.0	1.6	7.0	1.3	6.7	6.5
22nd ..	2.2	0.95	2.0	2.0	5.2	2.0	4.8	4.7	4.4	3.4	4.4	..	6.0	3.0	5.8	5.6
23rd ..	4.6	1.3	4.2	4.1	8.5	5.0	8.3	7.0	7.4	0.5	7.1	7.0	5.2	2.1	5.0	4.8
24th ..	4.1	1.0	3.9	3.8	9.5	5.0	9.4	7.0	7.4	2.8	7.1	7.0	4.9	1.7	4.7	4.5
25th ..	7.1	4.5	6.6	6.6	9.6	5.0	9.5	7.0	7.4	2.4	7.1	7.0	3.7	2.7	3.7	1.5
26th ..	5.5	5.0	5.0	4.5	9.7	5.8	9.5	7.0	6.5	3.4	5.2	6.1	3.5	2.5	3.5	..
27th ..	4.7	4.0	4.1	3.0	9.5	3.6	9.3	7.0	6.5	3.4	6.2	6.1	5.9	0.9	5.5	5.4
28th ..	4.1	3.1	3.5	3.0	9.5	3.0	9.3	7.0	5.5	4.5	5.5	3.5	6.0	0.9	5.6	5.6
29th ..	4.1	2.5	3.1	3.0	9.6	3.0	9.3	7.0	5.5	4.5	5.5	3.6	3.9	0.8	3.7	3.6
30th ..	4.0	2.5	3.1	3.0	7.5	5.0	7.1	7.0	7.6	2.5	7.2	7.0	3.4	0.3	3.1	3.1
31st ..	..	..	..	..	8.4	5.0	8.2	7.0	7.5	3.8	7.2	7.0	..	..	..	..

Register of daily gauge readings at Cauvery and Vennar regulators—*cont.*
1906-1907.

Date.	June.				July.				August.				September.			
	Cauvery.		Vennar.		Cauvery.		Vennar.		Cauvery.		Vennar.		Cauvery.		Vennar.	
	Front.	Rear.	Front.	Rear.	Front.	Rear.	Front.	Rear.	Front.	Rear.	Front.	Rear.	Front.	Rear.	Front.	Rear.
1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17
1st ..	1.4	0.8	1.3	1.3	4.3	1.2	4.0	4.0	8.5	4.5	8.4	7.75	8.5	4.0	8.4	6.0
2nd ..	1.0	0.95	1.0	0.9	3.8	0.7	3.5	3.5	8.4	5.0	8.1	8.0	8.3	4.0	8.2	6.25
3rd ..	1.0	0.95	1.0	0.9	3.2	0.4	3.2	3.2	8.7	5.0	8.6	8.0	8.4	4.0	8.3	6.4
4th ..	1.4	0.8	1.3	1.3	3.2	0.2	3.0	2.9	8.7	4.5	8.6	8.0	8.4	4.0	8.3	6.4
5th ..	1.2	0.9	1.1	1.0	3.0	0.0	2.8	2.7	8.5	4.5	8.4	8.0	8.5	4.0	8.4	6.4
6th ..	1.2	0.9	1.1	1.0	2.7	0.3	2.4	2.3	8.2	4.0	8.1	7.25	7.6	4.0	7.5	6.4
7th ..	1.2	0.9	1.1	1.0	2.6	0.5	2.1	2.0	7.2	4.0	7.1	7.0	8.0	4.0	7.9	6.5
8th ..	1.2	0.9	1.1	1.0	2.0	0.6	1.7	1.7	8.1	4.0	8.0	8.0	7.5	4.0	7.4	6.5
9th ..	1.4	0.8	1.3	1.3	1.8	0.7	1.6	1.6	7.6	4.0	7.4	6.0	7.2	4.0	7.1	6.5
10th ..	1.4	0.8	1.3	1.3	1.4	0.8	1.3	1.3	7.3	4.0	7.2	6.0	8.0	4.0	7.9	6.5
11th ..	1.4	0.8	1.3	1.3	1.8	0.7	1.6	1.6	8.7	4.0	8.6	6.0	7.8	4.0	7.7	6.8
12th ..	1.4	0.8	1.3	1.3	4.0	0.6	3.5	3.4	8.2	4.0	8.1	6.0	6.6	4.0	6.5	6.4
13th ..	1.2	0.9	1.1	1.0	4.2	1.1	4.0	3.9	8.6	4.0	8.5	6.0	6.4	3.4	6.2	6.1
14th ..	1.2	0.9	1.2	1.0	4.6	1.6	4.3	4.2	6.5	3.5	6.4	6.0	6.8	2.8	6.3	5.4
15th ..	1.2	0.9	1.1	1.0	4.6	1.6	4.3	4.3	8.2	3.5	8.1	6.0	5.5	2.5	5.3	5.2
16th ..	1.0	0.95	1.0	0.9	4.5	1.5	4.2	4.2	8.2	3.0	8.1	6.0	5.5	2.4	5.2	5.1
17th ..	1.2	0.9	1.1	1.0	4.9	1.9	4.7	4.6	7.8	2.0	7.7	6.0	5.8	2.6	5.4	5.3
18th ..	1.4	0.8	1.3	1.3	4.8	1.7	4.6	4.5	7.9	2.0	7.8	6.0	6.0	3.0	5.7	5.6
19th ..	1.8	0.7	1.7	1.6	4.4	1.3	4.1	4.1	8.3	2.0	8.2	6.0	6.7	3.6	6.6	6.4
20th ..	1.5	0.8	1.4	1.3	4.1	1.0	3.9	3.8	8.7	4.5	8.6	7.0	6.0	3.1	5.9	5.8
21st ..	1.5	0.8	1.4	1.3	4.0	0.9	3.8	3.7	7.3	4.5	7.2	7.0	6.1	3.1	5.9	5.8
22nd ..	1.2	0.9	1.1	1.0	8.2	4.5	8.2	7.0	7.3	3.5	7.2	6.0	5.7	2.9	5.6	5.5
23rd ..	1.0	0.95	1.0	0.9	7.9	4.5	7.8	7.0	7.4	3.0	7.3	6.0	5.6	2.7	5.5	5.4
24th ..	1.0	0.95	1.0	0.9	9.7	4.5	9.7	7.0	7.7	3.0	7.6	6.0	6.2	3.2	6.0	5.9
25th ..	1.0	0.95	1.0	0.9	10.0	4.5	10.0	7.0	7.4	3.0	7.3	6.0	6.8	3.8	6.7	6.6
26th ..	2.6	1.1	2.5	..	9.8	4.75	9.7	7.5	7.4	2.75	7.3	6.0	6.2	3.3	6.1	6.0
27th ..	2.2	0.7	1.8	..	9.7	4.5	9.6	7.5	7.3	2.75	7.2	6.0	5.8	3.0	5.7	5.6
28th ..	4.8	1.9	4.6	4.6	9.5	4.75	9.4	7.5	7.7	2.75	7.5	6.0	6.1	3.1	5.9	5.8
29th ..	5.2	2.3	5.1	5.0	9.5	4.75	9.4	7.5	9.5	3.3	9.4	6.0	5.8	3.0	5.7	5.6
30th ..	4.7	1.7	4.6	4.5	8.0	4.5	7.8	7.75	9.6	4.5	9.5	7.0	5.3	2.3	5.1	5.0
31st ..	..	..	..	..	7.7	4.5	7.6	7.4	9.2	4.0	9.6	6.0	..	..	..	..

Date.	October.				November.				December.				January.			
	Cauvery.		Vennar.		Cauvery.		Vennar.		Cauvery.		Vennar.		Cauvery.		Vennar.	
	Front.	Rear.	Front.	Rear.	Front.	Rear.	Front.	Rear.	Front.	Rear.	Front.	Rear.	Front.	Rear.	Front.	Rear.
18	19	20	21	22	23	24	25	26	27	28	29	30	31	32	33	34
1st ..	5.0	2.0	4.8	4.7	4.9	2.3	4.6	4.5	3.5	1.0	3.4	..	3.3	2.2	3.4	..
2nd ..	4.8	1.8	4.6	4.5	5.0	1.8	4.6	4.5	5.2	1.0	5.1	..	6.4	..	5.1	5.1
3rd ..	5.0	2.0	4.8	4.7	4.7	1.5	4.3	4.2	5.2	1.0	5.1	..	6.2	..	5.8	5.8
4th ..	4.9	1.9	4.7	4.6	4.4	1.5	4.2	4.1	3.7	0.6	3.4	3.4	3.7	0.7	3.5	3.5
5th ..	4.5	1.6	4.4	4.3	3.3	2.3	3.4	..	3.4	0.3	3.1	3.1	3.8	0.3	3.1	3.1
6th ..	4.3	1.3	4.2	4.1	3.3	2.3	3.4	..	3.3	0.2	3.0	2.9	3.1	0.2	2.9	2.9
7th ..	5.1	2.2	5.0	4.9	5.3	0.95	4.8	4.8	3.1	0.1	2.9	2.8	2.4	1.2	2.4	..
8th ..	5.6	4.5	5.8	5.8	5.3	0.95	5.0	4.9	5.2	1.7	5.2	1.2	2.3	1.1	2.3	..
9th ..	7.3	4.5	7.2	7.0	4.5	1.5	4.3	4.2	4.2	1.4	4.2	1.0	3.5	..	3.2	3.2
10th ..	7.4	4.5	7.3	7.0	5.2	2.2	5.0	4.9	7.1	..	7.1	..	3.6	..	3.4	3.4
11th ..	7.3	4.5	7.1	7.0	4.8	1.7	4.6	4.5	6.9	..	6.8	..	2.6	0.3	2.3	2.3
12th ..	7.1	5.6	7.5	7.0	4.8	3.8	5.1	..	6.9	..	6.8	..	2.4	0.4	2.2	2.2
13th ..	6.8	5.0	6.7	6.0	5.4	3.9	5.5	..	6.7	..	6.6	..	2.3	0.5	2.0	2.0
14th ..	7.3	5.5	7.3	4.5	7.7	2.0	7.6	4.0	3.7	2.0	3.6	2.0	1.8	0.2	1.8	..
15th ..	7.4	5.5	7.5	4.5	7.0	1.0	7.0	..	3.1	1.4	3.1	1.4	1.8	0.2	1.8	..
16th ..	7.5	5.5	7.5	4.5	9.6	1.6	9.5	..	3.3	0.3	3.1	3.1	3.2	..	3.0	3.0
17th ..	5.6	4.5	5.6	4.5	7.8	0.8	7.6	2.0	2.8	1.6	2.7	..	3.0	..	2.8	2.8
18th ..	6.2	4.0	6.3	4.5	7.3	0.5	7.2	..	2.1	0.8	2.0	..	2.3	0.5	2.0	2.0
19th ..	6.4	3.0	6.3	4.5	7.3	0.5	7.2	..	4.0	..	3.7	8.7	2.3	0.5	2.0	2.0
20th ..	6.5	2.0	6.4	5.0	6.6	0.0	6.4	..	3.8	..	3.6	3.5	2.1	0.6	1.8	1.8
21st ..	7.4	1.0	7.2	4.25	6.2	0.0	6.1	..	2.8	0.8	2.6	2.5	1.7	0.7	1.6	1.6
22nd ..	6.9	1.0	6.7	4.25	5.9	0.0	5.8	..	2.6	0.3	2.4	2.3	1.5	0.8	1.4	1.3
23rd ..	6.7	1.0	6.5	4.25	5.9	0.0	5.8	..	4.7	1.7	4.5	4.5	1.5	0.8	1.4	1.3
24th ..	6.5	1.0	6.3	4.25	5.7	0.0	5.6	..	5.5	4.5	5.4	4.3	1.5	0.8	1.4	1.3
25th ..	6.5	0.5	6.3	4.0	6.0	0.0	5.9	..	5.3	4.3	5.5	..	1.5	0.8	1.4	1.3
26th ..	6.2	0.5	6.1	4.5	6.2	0.5	6.1	..	6.6	..	6.1	6.0	1.5	0.8	1.4	1.3
27th ..	6.5	0.5	6.3	4.0	7.1	0.5	7.0	..	6.3	..	6.2	4.0	1.5	0.8	1.4	1.3
28th ..	6.5	0.5	6.3	4.0	6.4	1.0	6.3	..	6.6	..	6.4	..	1.1	0.7	1.1	..
29th ..	6.3	0.5	6.1	4.0	5.8	1.0	5.7	..	6.4	..	6.3	..	1.1	0.7	1.1	..
30th ..	8.2	2.0	8.1	4.5	5.1	1.0	5.0	..	6.5	..	6.4	..	1.9	..	1.7	1.7
31st ..	7.5	2.0	7.4	4.5	..	..	..	..	4.7	3.7	4.8	..	1.9	..	1.7	1.7

NOTE.—Figures in italics show water levels below zero of gauge.

Register of daily gauge readings at Cauvery and Vennar regulators—*cont.*
1907-1908.

Date.	June.				July.				August				September.			
	Cauvery.		Vennar.		Cauvery.		Vennar.		Cauvery.		Vennar.		Cauvery.		Vennar.	
	Front.	Rear.	Front.	Rear.	Front.	Rear.	Front.	Rear.	Front.	Rear.	Front.	Rear.	Front.	Rear.	Front.	Rear.
1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17
1st ..	3.6	..	3.5	1.0	3.1	0.1	2.9	2.8	9.6	4.0	9.5	9.0	7.7	4.5	7.7	6.0
2nd ..	4.4	..	4.3	1.0	4.1	0.9	3.8	3.7	8.5	4.0	8.4	8.0	7.4	4.25	7.4	6.0
3rd ..	5.8	..	5.7	1.0	5.3	2.0	4.8	4.7	8.3	4.0	8.1	8.0	7.4	4.25	7.4	6.0
4th ..	5.7	..	5.6	0.7	8.9	4.5	8.9	5.5	8.0	4.5	7.7	7.6	8.0	4.0	7.9	6.0
5th ..	5.5	..	5.4	..	9.0	4.0	8.9	7.0	8.9	4.5	8.8	8.0	7.4	4.0	7.3	6.0
6th ..	5.3	..	5.2	..	8.6	4.0	8.5	6.0	8.9	5.0	8.8	8.0	7.7	4.0	7.6	7.0
7th ..	5.5	..	5.4	..	7.1	3.8	6.7	6.6	8.3	6.0	9.2	9.0	8.0	4.0	7.9	7.0
8th ..	5.6	..	5.5	..	7.3	3.9	6.9	6.7	8.7	5.0	8.6	8.0	8.0	4.0	7.9	7.0
9th ..	5.9	..	5.8	..	6.8	3.8	6.2	6.0	9.1	6.0	9.1	7.0	8.4	4.0	8.3	7.0
10th ..	2.5	1.5	2.4	0.7	6.4	3.1	5.8	5.8	9.6	6.5	9.5	9.0	8.2	4.0	8.0	7.0
11th ..	2.0	0.7	2.1	..	5.8	2.5	5.3	5.2	10.3	6.5	10.1	9.0	8.0	4.2	8.0	7.0
12th ..	2.1	0.8	2.1	..	5.7	2.4	5.2	5.1	10.0	6.5	9.9	9.0	6.7	3.7	6.5	6.5
13th ..	1.7	0.3	1.7	..	5.4	2.0	4.7	4.7	9.8	6.5	9.6	9.0	6.2	3.4	6.1	6.1
14th ..	1.6	0.1	1.6	..	5.7	2.4	5.2	5.1	9.4	6.5	9.3	9.0	6.1	3.2	5.9	5.9
15th ..	1.4	0.2	1.4	..	4.7	1.5	4.3	4.2	9.4	6.5	9.3	9.0	5.7	3.0	5.6	5.6
16th ..	1.3	0.4	1.3	..	4.5	1.1	4.0	3.9	9.4	6.5	9.3	9.0	4.5	4.1	4.9	..
17th ..	1.8	0.7	1.6	1.6	4.6	1.3	4.2	4.1	9.6	6.5	9.5	9.0	4.4	4.0	4.7	..
18th ..	3.6	0.7	3.5	3.5	4.2	1.7	3.6	3.5	9.4	6.5	9.3	9.0	7.4	..	7.0	7.0
19th ..	5.7	2.8	5.7	1.0	3.8	0.5	3.3	3.3	8.6	6.0	8.5	8.0	7.2	0.2	7.0	7.0
20th ..	3.5	2.7	3.7	1.0	3.6	0.3	3.1	3.1	8.3	6.0	8.2	8.0	5.2	2.4	5.1	5.1
21st ..	2.8	1.9	2.7	2.0	4.2	0.8	3.7	3.6	8.1	6.0	8.0	8.0	5.2	2.4	5.1	5.1
22nd ..	7.2	3.5	7.1	7.0	3.0	2.0	3.0	..	8.1	6.0	8.0	8.0	5.1	2.2	4.9	4.9
23rd ..	7.7	3.5	7.6	7.0	2.8	1.8	2.8	..	8.2	6.0	8.1	8.0	4.3	3.7	4.4	..
24th ..	8.6	3.0	7.9	7.0	5.9	2.6	5.4	5.3	8.2	6.0	8.1	8.0	4.3	3.7	4.4	..
25th ..	8.0	3.0	7.9	5.5	8.2	4.5	8.0	7.0	8.6	6.0	8.6	8.0	7.4	0.3	7.0	7.0
26th ..	6.3	2.0	6.1	5.5	8.4	5.0	8.2	7.0	8.3	5.1	8.2	7.9	7.5	3.1	7.1	7.0
27th ..	4.9	1.9	4.7	4.6	8.8	5.0	8.7	7.0	8.5	6.0	8.5	7.0	6.6	3.7	6.5	6.5
28th ..	4.4	1.2	4.1	4.0	8.5	6.0	8.5	7.0	8.6	6.0	8.6	7.0	6.2	3.5	6.1	6.1
29th ..	3.7	0.6	3.5	3.4	8.8	6.0	8.8	8.0	8.8	6.0	8.7	7.0	6.8	3.85	6.6	6.6
30th ..	3.5	0.3	3.2	3.1	9.5	6.0	9.4	9.0	8.2	5.5	8.2	6.0	6.0	4.5	6.1	6.1
31st ..	..	..	..	..	9.6	4.5	9.4	9.0	8.2	6.5	8.2	6.0	..	..	..	..

Register of daily gauge readings at Cauvery and Vennar regulators—cont.

1908-1909.

Date.	June.				July.				August.				September.			
	Cauvery.		Vennar.		Cauvery.		Vennar.		Cauvery.		Vennar.		Cauvery.		Vennar.	
	Front.	Rear.	Front.	Rear.	Front.	Rear.	Front.	Rear.	Front.	Rear.	Front.	Rear.	Front.	Rear.	Front.	Rear.
1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17
1st	1.9	0.95	2.1	..	3.1	0.1	3.9	3.8	8.1	4.75	8.0	7.0	5.3	2.25	5.2	5.0
2nd	1.5	0.4	1.7	..	3.5	0.4	3.3	3.2	8.1	4.75	8.0	7.0	5.3	2.4	5.3	5.1
3rd	1.2	0.2	1.3	..	4.0	0.85	3.8	3.7	7.2	4.75	7.1	7.0	5.6	2.75	5.7	5.4
4th	1.1	0.05	1.2	..	4.4	1.25	4.2	4.1	7.1	5.0	7.1	7.0	7.2	4.5	7.6	5.0
5th	1.0	0.05	1.2	..	5.1	2.0	4.9	4.8	7.9	5.0	7.8	7.0	7.1	4.5	7.2	5.0
6th	0.9	0.2	1.0	..	7.4	4.5	7.3	7.0	7.9	5.0	7.8	7.0	7.2	4.5	7.3	6.0
7th	1.0	0.55	1.0	1.0	7.3	4.5	7.1	7.0	8.1	5.0	8.0	7.0	7.7	4.5	7.8	5.0
8th	1.2	0.55	1.0	1.0	7.4	4.5	7.2	7.0	8.5	5.0	8.7	7.0	7.3	2.5	7.2	..
9th	0.9	0.7	0.8	0.8	7.4	4.5	7.2	7.0	8.6	5.0	8.8	7.0	7.0	2.5	6.9	..
10th	1.0	0.8	0.9	0.9	8.4	5.0	8.4	7.0	7.8	5.0	8.0	7.0	6.7	2.5	6.6	..
11th	2.1	..	1.8	1.7	8.0	5.0	8.0	7.0	7.8	5.0	8.0	7.0	6.0	2.5	6.0	..
12th	1.0	0.6	0.2	0.85	8.7	4.5	8.6	7.0	7.8	5.0	8.0	7.0	6.0	2.5	5.9	..
13th	1.0	0.8	0.9	0.9	7.4	4.15	7.1	7.0	7.8	5.0	8.0	7.0	4.4	2.5	4.5	4.0
14th	2.3	0.3	2.1	2.0	6.6	3.55	6.3	6.2	7.8	5.0	8.0	7.0	5.2	2.25	5.2	5.0
15th	3.6	0.6	3.5	3.4	6.2	3.1	5.8	5.7	8.4	5.0	8.5	7.0	4.8	1.8	4.8	4.6
16th	3.1	0.1	2.8	2.75	5.9	2.9	5.6	5.5	8.2	5.0	8.4	7.0	4.5	1.45	4.4	4.3
17th	2.5	0.2	2.3	2.2	6.8	3.65	6.4	6.3	7.3	5.0	7.5	7.0	4.9	1.8	4.8	4.6
18th	2.1	0.35	1.9	1.8	7.8	4.5	7.7	7.0	7.2	4.15	7.3	7.0	4.7	1.7	4.7	4.5
19th	1.9	0.45	1.6	1.5	8.3	4.5	8.2	7.0	6.9	3.95	6.9	6.7	4.6	1.45	4.6	4.3
20th	2.0	0.4	1.7	1.6	8.3	4.5	8.2	7.0	7.0	4.0	7.0	6.8	4.1	1.05	4.1	3.9
21st	2.0	0.4	1.7	1.6	8.3	4.5	8.2	7.0	6.8	3.95	6.9	6.7	4.1	2.25	3.3	..
22nd	1.7	0.5	1.5	1.4	8.5	5.25	8.4	7.0	6.5	3.65	6.5	6.3	2.7	2.0	3.0	..
23rd	3.1	0.1	2.9	2.8	8.4	5.25	8.3	7.0	6.2	3.5	6.2	6.1	4.4	..	4.2	4.1
24th	3.0	0.05	2.8	2.7	8.4	5.25	8.3	7.0	6.1	3.3	6.1	5.9	4.8	..	4.6	4.5
25th	4.8	1.8	4.7	4.6	8.4	5.25	8.3	7.0	6.3	3.55	6.4	6.2	3.6	0.6	3.5	3.4
26th	4.7	1.6	4.6	4.4	8.2	5.0	8.0	7.0	6.3	3.5	6.3	6.1	3.3	0.3	3.2	3.1
27th	4.7	1.6	4.6	4.4	8.2	5.0	8.0	7.0	6.3	3.5	6.3	6.1	3.1	0.1	2.9	2.8
28th	4.3	1.15	3.9	4.0	8.2	5.0	8.1	7.0	6.0	3.2	6.0	5.8	2.1	1.1	2.6	..
29th	3.6	0.6	3.5	3.4	8.2	5.0	8.1	7.0	5.6	2.75	5.6	5.4	2.3	1.3	3.0	..
30th	3.2	0.25	3.1	3.0	8.1	4.75	8.0	7.0	5.6	2.75	5.6	5.4	4.0	..	3.9	3.8
31st	..	..	..	..	8.1	4.75	8.0	7.0	5.4	2.5	5.4	5.2	..	..	..	..

Date.	October.				November.				December.				January.			
	Cauvery.		Vennar.		Cauvery.		Vennar.		Cauvery.		Vennar.		Cauvery.		Vennar.	
	Front.	Rear.	Front.	Rear.	Front.	Rear.	Front.	Rear.	Front.	Rear.	Front.	Rear.	Front.	Rear.	Front.	Rear.
18	19	20	21	22	23	24	25	26	27	28	29	30	31	32	33	
1st	4.2	..	4.1	4.0	7.3	0.75	7.1	4.0	0.2	0.9	0.3	..	2.0	0.3	2.0	1.9
2nd	3.6	0.8	3.5	3.4	7.2	0.25	7.0	4.0	1.1	..	1.0	0.9	3.2	0.3	3.2	3.1
3rd	3.3	0.25	3.1	3.0	7.0	0.1	6.1	4.0	1.6	..	1.5	0.9	4.5	0.3	4.5	4.4
4th	3.0	0.1	2.9	2.8	6.1	0.1	6.0	4.0	0.5	0.9	0.8	0.8	7.2	4.5	7.2	7.0
5th	2.8	1.8	3.1	..	6.1	0.1	6.0	4.0	0.4	0.9	0.4	0.4	5.4	4.5	5.7	5.8
6th	2.8	1.7	3.1	..	5.4	1.0	5.3	4.0	0.4	0.9	0.4	0.4	5.2	3.1	5.1	5.0
7th	5.5	..	5.3	5.2	8.2	1.0	8.1	4.0	0.2	0.9	0.3	..	5.4	4.4	5.0	..
8th	6.1	..	5.8	5.7	4.2	1.15	4.1	4.0	0.2	0.9	0.3	..	4.3	3.3	4.6	..
9th	6.3	2.5	5.3	5.2	3.8	0.7	3.6	3.5	1.1	..	1.0	0.9	4.9	1.05	4.7	4.6
10th	5.2	2.25	5.1	5.0	3.5	0.5	3.4	3.3	1.4	..	1.3	1.2	4.2	0.7	4.1	4.0
11th	5.0	1.9	4.8	4.7	3.4	0.3	3.2	3.1	1.1	0.9	1.0	0.9	3.7	0.95	3.6	3.5
12th	4.4	3.4	4.9	..	3.3	0.25	3.1	3.0	1.1	0.9	1.0	0.9	2.7	1.25	2.6	2.5
13th	3.6	2.65	4.0	..	2.9	0.05	2.8	2.7	0.8	0.9	0.8	0.7	5.2	0.25	3.1	3.0
14th	5.4	..	5.2	5.1	2.8	0.05	2.7	2.6	0.3	0.8	0.4	..	3.1	0.2	3.0	2.9
15th	5.1	..	4.9	4.8	2.7	0.1	2.6	2.5	0.2	0.9	0.3	..	2.9	0.05	2.8	2.7
16th	3.7	0.7	3.6	3.5	1.6	0.6	1.7	..	1.2	..	1.1	1.0	2.7	0.1	2.6	2.5
17th	3.5	0.5	3.3	3.2	1.6	0.6	1.7	..	1.6	..	1.5	1.4	2.6	0.2	2.4	2.3
18th	3.7	0.7	3.6	3.5	2.8	..	2.6	2.5	0.8	0.9	0.8	0.7	2.6	1.5	2.6	..
19th	2.6	1.6	2.9	..	2.8	..	2.7	2.6	0.7	0.9	0.7	0.6	2.3	1.3	2.4	..
20th	2.6	1.6	2.9	..	1.9	0.4	1.8	1.7	0.5	0.9	0.5	0.4	2.9	..	2.8	2.7
21st	4.0	..	3.8	3.7	1.9	0.4	1.8	1.7	0.3	0.8	0.4	..	2.7	..	2.6	2.5
22nd	4.1	..	4.0	3.9	1.8	0.4	1.7	1.6	0.3	0.8	0.4	..	2.0	0.35	1.9	1.8
23rd	3.8	0.8	3.7	3.6	0.5	0.55	0.6	..	1.0	..	0.9	0.8	1.9	0.4	1.8	1.7
24th	6.2	3.4	6.1	6.0	0.5	0.55	0.6	..	1.2	..	1.2	1.1	1.8	0.4	1.7	1.6
25th	5.6	2.75	5.5	5.4	2.0	..	1.9	1.8	1.1	0.9	1.05	1.0	1.2	0.3	1.1	..
26th	6.9	4.5	7.1	4.0	1.9	..	1.8	1.7	0.7	0.9	0.6	0.6	0.7	0.5	0.6	..
27th	6.0	3.5	5.9	4.0	1.2	0.55	1.1	1.0	0.8	0.9	0.6	0.4	1.9	..	1.8	1.7
28th	6.0	3.5	6.1	4.0	1.2	0.55	1.1	1.0	0.3	0.9	0.4	..	1.9	..	1.8	1.7
29th	9.2	0.4	9.2	4.0	1.2	0.55	1.1	1.0	0.3	0.9	0.4	..	1.3	0.5	1.3	1.2
30th	7.3	..	7.1	4.0	0.2	0.9	0.3	..	0.9	..	0.8	..	1.3	0.5	1.3	1.2
31st	8.2	..	8.1	4.0	..	..	..	..	1.1	..	1.0	0.9	1.3	0.15	1.3	1.2

NOTE.—Figures in italics show water levels below zero of gauge.

Register of daily gauge readings at Cauvery and Vennar regulators—cont.

1909-1910.

Date.	June.				July.				August.				September.			
	Cauvery.		Vennar.		Cauvery.		Vennar.		Cauvery.		Vennar.		Cauvery.		Vennar.	
	Front.	Rear.	Front.	Rear.	Front.	Rear.	Front.	Rear.	Front.	Rear.	Front.	Rear.	Front.	Rear.	Front.	Rear.
1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17
1st ..	1.3	0.95	1.1	1.0	6.2	3.4	6.1	6.0	7.6	4.5	7.7	7.0	5.5	5.0	5.2	5.0
2nd ..	1.2	0.85	1.1	1.0	7.5	4.5	7.2	7.0	7.7	4.5	7.8	7.0	5.5	5.0	5.8	5.8
3rd ..	1.2	0.85	1.1	1.0	7.4	4.5	7.3	7.0	7.7	4.5	7.8	7.0	6.4	5.8	6.8	6.8
4th ..	1.1	0.7	1.0	0.9	7.4	4.5	7.2	7.0	7.9	4.5	8.0	7.0	6.5	5.9	6.9	6.9
5th ..	1.2	0.85	1.1	1.0	7.4	4.5	7.2	7.0	7.8	4.5	8.0	7.0	6.1	5.4	6.3	6.3
6th ..	1.3	0.95	1.2	1.1	7.2	4.0	7.0	6.8	7.9	4.5	8.2	7.0	6.4	5.7	6.7	6.7
7th ..	1.5	1.25	1.5	1.4	7.5	4.4	7.2	7.0	7.7	4.5	7.8	7.0	5.6	5.0	5.9	5.9
8th ..	1.5	1.25	1.5	1.4	7.5	4.5	7.2	7.0	7.6	4.5	7.7	7.0	5.2	4.5	5.5	5.5
9th ..	5.6	5.2	5.9	5.7	7.4	4.3	7.2	7.0	7.7	4.5	7.9	7.0	5.0	4.4	5.3	5.3
10th ..	5.1	4.5	8.3	5.1	7.2	4.1	7.1	7.0	7.6	4.5	7.8	7.0	4.8	4.2	5.1	5.1
11th ..	8.8	4.5	8.7	7.0	7.5	4.5	7.2	7.0	7.6	4.5	7.8	7.0	4.7	4.15	5.0	5.0
12th ..	8.5	4.5	8.4	6.0	7.5	4.5	7.3	7.0	7.6	4.5	7.7	7.0	4.3	3.8	4.6	4.6
13th ..	7.1	4.5	7.1	6.0	7.6	4.5	7.3	7.0	7.5	4.5	7.8	5.0	3.9	3.4	4.2	4.2
14th ..	7.3	4.5	7.3	6.0	7.6	4.5	7.3	7.0	8.5	3.0	8.5	5.0	3.7	3.2	4.1	4.1
15th ..	7.1	4.5	7.1	..	7.8	4.5	7.5	7.0	7.5	2.5	7.4	7.0	4.4	3.85	4.7	4.7
16th ..	6.4	4.5	6.4	..	8.2	4.5	8.0	7.0	7.5	2.5	7.4	7.0	4.4	3.85	4.7	4.7
17th ..	6.3	4.5	6.3	2.0	8.7	4.5	8.5	7.0	7.7	2.5	7.6	7.0	4.2	3.65	4.5	4.5
18th ..	8.4	4.5	8.4	3.0	8.8	4.5	8.5	7.0	7.7	2.5	7.4	7.0	3.8	3.4	4.0	4.0
19th ..	7.9	4.5	7.9	3.0	9.3	4.5	9.2	7.0	8.3	3.75	6.4	6.4	3.5	3.1	3.8	3.8
20th ..	6.4	4.5	6.5	3.0	9.8	4.5	8.7	7.0	7.0	4.15	7.1	7.0	3.2	2.75	3.3	3.3
21st ..	6.3	4.5	6.4	3.0	7.6	4.5	7.4	7.0	6.2	3.55	6.3	6.2	3.1	2.65	3.2	3.2
22nd ..	5.6	2.65	5.4	5.3	7.6	4.5	7.6	7.0	6.4	3.8	6.5	6.5	2.9	2.4	3.0	3.0
23rd ..	5.2	2.15	5.0	4.9	7.5	4.5	7.6	7.0	6.2	3.55	6.2	6.2	2.8	2.4	2.9	2.9
24th ..	4.9	1.7	4.6	4.5	7.5	4.5	7.5	7.0	7.1	2.25	7.1	3.5	2.7	2.4	2.8	2.8
25th ..	2.7	2.5	3.0	2.9	7.6	4.5	7.6	7.0	4.4	4.0	5.0	5.0	2.6	2.25	2.7	2.7
26th ..	2.0	1.6	2.1	2.0	7.6	4.5	7.6	7.0	4.4	4.1	5.0	5.0	2.7	2.25	2.8	2.8
27th ..	2.6	2.0	2.5	2.4	7.5	4.5	7.5	7.0	5.1	4.7	5.7	5.7	2.8	2.4	2.9	2.9
28th ..	1.9	1.25	1.8	1.7	8.1	4.5	8.3	7.0	4.7	4.5	5.3	5.3	2.9	2.5	3.0	3.0
29th ..	2.1	1.45	2.0	1.9	10.4	4.5	10.2	7.0	5.2	4.8	5.7	5.7	3.1	2.75	3.1	3.1
30th ..	3.1	2.5	2.9	2.8	10.3	4.5	10.4	7.0	5.9	5.3	6.3	6.3	4.0	2.65	3.9	3.9
31st ..	..	..	..	..	8.7	4.5	9.0	7.0	5.5	5.0	5.2	5.0	..	..	..	..

Exhibit Ma. 8-A.

Extract from Madras G.O. No. 296 I., dated 18th September 1911.

NOTE ON THE PROPOSAL OF THE MYSORE DURBAR TO CONSTRUCT A STORAGE RESERVOIR ON THE CAUVERY RIVER IN MYSORE TERRITORY BY SIR JOHN BENTON, K.C.I.E., INSPECTOR-GENERAL OF IRRIGATION, DATED 12TH MAY 1911.

I.—ADMINISTRATIVE.

Brief statement of case.—In 1892 an agreement was concluded between the Madras Government and the Mysore Durbar regarding the limitations for construction of works in the latter State on rivers which enter the Madras Presidency. The Cauvery is the most important of all these rivers. The Mysore State works on the Cauvery river comprise,—the hydro-electric works at Sivasamudram for the supply of power to the Kolar Gold Fields,—and works which irrigate about 108,000 acres of land. The Madras Government works on the Cauvery comprise those for a very old system of irrigation which water about 1,100,000 acres annually.

2. The Mysore Durbar propose to construct a reservoir of a present capacity of 11,000 and ultimate capacity of 41,500 million cubic feet on the Cauvery river, the objects in view being as follows:—

- (i) To maintain an unfailing supply of water to the power station at Sivasamudram in connection with the present supply of power to the Kolar Gold Fields.
- (ii) To generate additional electric power for mining and other industrial purposes on a large scale.
- (iii) To provide water for irrigating an extensive tract of country more or less liable to drought.

It is part of the agreement of 1892, referred to above, that the proposals for any such new works should be referred to the Madras Government, and this condition was complied with in this case.

3. On examining the preliminary proposals of the Mysore Government—as intimated in some unofficial correspondence, and as verbally explained by the Chief Engineer, Mysore State—the Madras Government found that the execution of the proposed works would seriously interfere with the irrigation on existing works in Madras Presidency which have a prescriptive right to the water under the terms of the agreement of 1892. Consent to the scheme as sketched in the proceedings above mentioned was therefore withheld. The effect of operating the proposed Mysore reservoir on the following conditions was investigated:—

- (i) The Madras irrigation works to continue to have the supply they now draw off, that is up to 7 feet gauge readings on the Cauvery dam with 10 per cent. extra in certain months as proposed by the Madras Government.
- (ii) The Mysore reservoir to impound water in excess of (i) above.

The result was found to be that the power scheme would fail in three years out of 20. The Mysore Durbar were asked to devise a scheme which would not prejudice existing prescriptive rights in Madras. The fully detailed project, with a copy of the rules for operating the same, was called for.

4. *Agreement of 1892.*—A copy of this agreement is the concluding annexure to the Madras Government's letter No. 428 I., dated 23rd December 1910; the portions of the same which apply to the case under consideration are as follows:—

- (i) In these rules “(1) ‘New Irrigation Reservoirs’ shall mean and include such irrigation reservoirs or tanks as have not before existed, or having once existed have been abandoned and been in disuse for more than 30 years.”
- (ii) “The Mysore Government shall not, without the previous consent of the Madras Government or before a decision under rule IV below, build (a) any ‘New Irrigation Reservoir’ across any part of the fifteen main rivers named in the appended Schedule A or across the following streams of Schedule A lower than the points specified hereunder.

“Across (No. 10) the Cauvery—lower than the Ramaswami anicut.”

- (iii) “When the Mysore Government desires to construct any ‘New Irrigation Reservoir,’ or any new anicut requiring the previous consent of the Madras Government under the last preceding rule, then full information regarding the proposed work shall be forwarded to the Madras Government and the consent of that Government shall be obtained previous to the actual commencement of work. The Madras Government shall be bound not to refuse such consent except for the protection of prescriptive right already acquired and actually existing, the existence, extent and nature of such right and the mode of exercising it being in every case determined in accordance with the law on the subject of prescriptive right to the use of water and in accordance with what is fair and reasonable under all the circumstances of each individual case.”

(iv) “Should there arise a difference of opinion between the Madras and Mysore Governments in any case in which the consent of the former is applied for under the last preceding rule, the same shall be referred to the final decision either of arbitrators appointed by both Governments, or of the Government of India.”

SCHEDULE A.

Main rivers.

Remarks.

10. Cauvery.

5. With reference to the above extracts I may explain as follows:—

(a) The site of the proposed Mysore new reservoir is at Kannambady below Ramaswami anicut, so that the foregoing rules apply.

(b) The full information regarding the design of the proposed Mysore masonry dam sluices, and irrigation scheme, and the rules for operating the same have not been furnished to the Government of Madras up to now, as far as known to the Government of India.

The Madras and Mysore Governments both base their respective cases on the extracts from the rules of 1892 given in the preceding paragraph, so that the case resolves itself into one of applying the conditions of the concluding sentence of rule III.

6. *Action of Madras Government.*—The Government of Madras reported on the proposal to construct a reservoir in Mysore territory in their letter No. 428 I., dated 23rd December 1910, and in their letter No. 78 I., dated 8th

March 1911, they applied for permission to supply the Mysore Durbar with a copy of the Madras Cauvery Project of 1910 which was granted by Government of India. I will explain in the sequel that the proposed Madras Cauvery Project will not affect the Mysore scheme, while it is a most useful source of information regarding the available water-supply. The Mysore Durbar was furnished with full particulars by the Madras Government with regard to the surplus supplies of water available, and it was clearly shown that the proposed Mysore reservoir is too small, and will fail in three years out of 20.

7. *Action of Mysore State.*—The Resident in Mysore forwarded with his letter No. 2053-E.I., dated 3rd April 1911, a copy of a letter No. 869, Political, dated 27th March 1911, from the Diwan of Mysore in which the views of the Durbar are fully expressed. It is only fair to the Diwan to state that when he wrote his letter, he had not the advantage of having seen the data furnished in the Madras Cauvery Project, nor of being in possession of the statistical information which I am now to advance. Most of the subjects dealt with in the Diwan's letter require explanations of existing conditions, and I will reserve his letter for consideration after I have described the Cauvery river as it actually exists.

8. *Proposal to depute officers to report on the case.*—This proposal has been advanced both by the Diwan of Mysore, and by the Resident, but neither of these was aware that most careful detailed enquiries regarding the water-supply of the Cauvery river formed the subject of investigation by the Madras Irrigation officers for over a year before the Madras Storage Irrigation Project was submitted to Government of India, and that full information has been furnished in the three printed volumes relating to that scheme. The information regarding water-supply conditions collected in connection with the Madras Cauvery Project of 1910 is precisely what is required for the Mysore Reservoir Project; it was collected by the Madras Irrigation officers with the sole object in view of arriving at the actual facts of the case, so that they might be able to advance a perfectly reliable project,—and at a time when the project for the Mysore Reservoir was supposed to be abandoned; these circumstances coupled with the fact that all the data had been printed before the resuscitation of the Mysore Reservoir Project in 1909 was first known of to the Madras officers will, I trust, serve to show that the data given in the Madras Cauvery Project of 1910 may be accepted with confidence as a perfectly unprejudiced representation of the conditions regarding water-supply, when there is no Mysore reservoir to intercept supply. In my opinion there is nothing for officers to be deputed to enquire into, the requisite data being all already on record.

9. *Margin of safety.*—The circumstances connected with the preparation of the Madras Cauvery Project—when it was assumed that no Mysore reservoir would exist—promises a better chance of supply not failing than will exist when the Mysore work is executed; it therefore appears necessary to have some margin of safety in accepting the figures of the Madras project as far as they relate to existing irrigation in that Presidency. I will return to this question in the sequel.

10. *Existing irrigation in the Cauvery delta.*—In what follows this is all that is considered,—possible expansion not being dealt with,—since the terms of the agreement of 1892—*vide* paragraph 4 above—do not apply to irrigation which does not exist at present.

11. *Character of the Cauvery river.*—The river drains mountainous tracts—those on the west having a heavy rainfall of over 96 inches; the declivity of the channel is steep, and the floods frequent, rapid, and torrential. The rise and fall of the river at the head of the Madras

delta corresponds to every important shower in the catchment area. In Appendix I to this note I have given the dates of occurrence of the various floods which have occurred in the twenty years ending with 1909-1910. It will be seen that the floods and freshets have been very numerous. The diagrams of the gauge readings are far more serrated than those on almost any other large river in India.

12. *Unsteadiness of supply.*—This has a very important effect on the duty, and on the amount of water required for the Madras delta. Appendix II to this note has been prepared to show how the supply has varied in the Cauvery over the dam Upper Anikat,—which affects most of the irrigation,—and also in the Coleroon which carries off the surplus water. The same month for each year has been given on the same statements for the twenty years ending 1909-1910, and the particulars have been given for half-monthly periods. This appendix has been prepared from Volume III, Parts VI and VII of the Madras Cauvery Project, and it shows as follows:—

Columns 3 and 4.—That unsteadiness of supply in the river characterises the flow throughout the irrigating season 1st June to 31st October. The available supply varies from one-fifth of irrigation full supply to about ten times this amount.

Column 5.—That the average "Irrigation Supply" varies incessantly with the flow in the river,—and I may explain to an extent which is unknown,—as far as I am aware,—on large canal systems elsewhere in India.

Column 6.—That the steady average supplies which would suffice for the area to be irrigated—if a reservoir is provided—are very much less than those which have to be run in order to take advantage of freshets and floods.

Columns 7 to 9.—That the Coleroon river which acts as an escape for carrying off excess supplies is most erratic in its running,—as might be expected under the working conditions which are as follows:—

- Main supply of the river that due to floods.
- Supply up to 7 feet on the gauge on the Cauvery dam passed down the Cauvery for irrigation.
- Excess over 7 feet on gauge passed into the Coleroon river which goes waste to the ocean—except for the small part drawn off at the Lower Anikat further down the river.

The abovementioned conditions of working show that,—in the absence of great storage works to conserve flood waters,—the surpluses in the Coleroon cannot be turned to any useful account. Surplusage at the proposed Mysore reservoir and into the Coleroon would usually occur simultaneously for the same floods, and the surplus waters may be ignored.

13. The conclusions which may be drawn from Appendix II are as follows:—

- In order to take advantage of flood waters, the cultivators must take as much water as they can procure when it is available, since the date of occurrences of the next flood and full supply is uncertain, while the rice crop is not one which will outlive drying up.
- The necessity just mentioned makes it quite impossible to practise the economy in the amount of water used which is possible with an assured supply, since any real attempt to do so would inevitably result in the rice crop being damaged.

14. *Rainfall.*—It might be thought that the rainfall is of sufficient amount to admit of some curtailment of supply without serious detriment to the rice crop. The Madras delta is in Tanjore district, and Appendix III to this note which gives the average rainfall for 23 observation stations for the twenty years ending with 1909-1910 shows as follows:—

- That the annual and monthly rainfall varies greatly, and is liable to wide departures from the average.
- That comparison of the entries under the same month for different years will show that no cultivator would be justified in calculating on the rainfall likely to be received.
- That the rainfall is not such as to afford any means of departing from the practices—paragraph 13 (i) and (ii) above.

15. With a storage reservoir of great capacity the river freshets and floods could be stored, and fairly full advantage could be taken of the generally good but often capricious rainfall; however, the case under consideration is that of using the ever varying river supply as it comes, or allowing it to go waste to the ocean.

16. *Other causes contributing to a low duty for the water.*—In paragraphs 11-15 above, I have explained the principal obstacles to obtaining a high duty for the water; the following additional causes also have effect:—

- Some of the distributaries are large and have wide sandy beds—where there is some undesirable loss of water.
- The distributary system is an inheritance from the past, and is not very efficient; some of the channels have been in use for hundreds of years. Vested rights are substantial, and irrevocable; to embark on any great measure of modernising would result in untold troubles. The source of supply is a flood-ridden river, and for it the large flood-swept distributaries have great advantages.

17. *Special difficulties in abstracting more water from the Cauvery.*—Appendix IV affords a comparison between the Cauvery irrigation and that of the other two great deltaic irrigation systems in Madras. The figures have been taken from the Triennial Irrigation Reports with the exception of (c) and (e) for the Cauvery for which I have adopted the more accurate figures given in the Madras Cauvery Project. This Appendix and Appendix VI show as follows:—

Particulars.	Godāveri.	Kistna.	Cauvery.
Rainfall—Inches	25 to 58	25 to 57	18 to 57
	1,877,000	1,041,000	203,744
River supply—M.C. Feet	to 5,842,000	to 2,803,000	Appendix VI to 700,564
	140,000	98,000	188,000
Supply utilized	to 178,000	121,000	407,000
Percentage of river supply utilised—M.C. Feet.	3 per cent. to 9 per cent.	4 per cent. to 9 per cent.	40 per cent. to 86 per cent.
Irrigation—Acres	912,000	685,000	1,105,000
	154,000	140,000	175,000
Supply of water per acre of irrigation, c. ft.	to 202,000	to 187,000	to 269,000

The Cauvery carries from one-fifth to one-eighth the discharge of the other two rivers, but the percentage of the river supply which is utilized is from 40 per cent. to 86 per cent.,—as compared with a maximum of 9 per cent. on the others. The amount of water required per acre on the Cauvery is from 14 per cent. to 100 per cent. in excess of that on the other two rivers. The large percentage of the Cauvery now utilized greatly adds to the difficulties of meeting proposed expansions,—more especially as it is only certain proportions of floods which can be utilized. The comparatively large supplies per acre irrigated results from the conditions of fluctuating supply explained in paragraphs 11 to 13 above, and which are unavoidable in the absence of great storage works such as proposed for the Madras Cauvery Project. Entire reliance cannot well be placed on the discharge figures of the Triennial Revenue Reports, but none of the inaccuracies in these are likely to call for any modification of the main conclusions advanced above.

18. *Supplies used in the last 20 years according to Revenue Reports.*—The Administration Reports, Irrigation Works, Madras, furnish some particulars regarding the supplies of water used in past years. I have abstracted such information as is procurable from these reports in Appendix V to this note. The Madras Irrigation officers repeatedly stated in the Triennial Revenue Reports,—that special observations were required to obtain correct discharges,—that a special establishment was required for this purpose,—and that they did not rely on the results—which I have given in Appendix V—as accurate enough. The manifest discrepancies exhibited by the results in Appendix V bear out the suspicions of the Irrigation officers. I have given the results afforded by the past Revenue Reports in order to put forward all the information which is available; but I regret to be under the necessity of agreeing with the Irrigation officers that reliance cannot be put on the figures; however, I will show below that it is unnecessary to be guided by these figures.

19. *Supplies of water used in Cauvery Delta.*—This question has been specially investigated in the Madras Cauvery Project, and Appendix VI to this note is an abstract of the principal results. As explained in Volume III of the Madras Cauvery Project, an elaborate series of observations were made. The statement, pages 208 to 212 gives the results and Appendix VI has been abstracted from the same.

Column No. 2.—Shows the supplies passed over the Cauvery dam oint the tract to be irrigated.

Column No. 3.—Shows the amount surplused in the Coleroon river; except for the supply for about 110,000 acres of irrigation on the Lower Anikat, the water is surplused into the ocean.

Column No. 4.—This is the total supply reaching the Upper Anikat.

Column No. 5.—This shows the supply passing Bhavāni bridge about 55 miles up stream of the Upper Anikat. Certain tributaries enter the Cauvery between these works and irrigation on these amounts to 62,500 acres.

Column No. 6.—Shows the supplies in column 2 when limited by the condition that up to 7 feet on the dam gauge the water is required for irrigation. I can recommend the entries, column 6, Appendix VI, for acceptance as a correct representation of the supplies of water actually diverted and required in the last 20 years. Paragraphs 11 to 13 above explain the great variations in the supplies. I have made enquiries of the Chief Engineer regarding surplusage from the delta and in reply to my categorical questions he has informed me,—that very little of the Cauvery and none of the Vennar drain into the Coleroon,—that in years of defective rainfall and short supply the surplus at the Lower Anikat is generally less than at the Upper Anikat,—and that in years of plentiful rainfall the reverse is the case and is chiefly due to floods

which enter the Coleroon from the left bank. With regard to surplusing into the sea, there are no data to show what the quantities passed if any have been, but the depths run have been the least which would admit of satisfactory irrigation more particularly in years of short supply and rainfall. We are chiefly concerned with the six years of short supply and rainfall and in these the surplused waters were nil or negligible. In years of more plentiful rainfall the delta subsoil appears to have acted as a great subsoil storage reservoir receiving excess water during periods of plentiful supply and giving it out in dry periods later on. Doubtless there were surpluses in years of heavy rainfall and abundant supply, but these occurrences do not affect the dry years of short supply which we have to consider.

20. *Comparative statement of supplies.*—Appendix VII has been compiled from Appendices V and VI and column 5 of the same shows the supplies which have to be maintained; it will be seen that the results for the five years ending 1904-1910 agree fairly well with those procured from the Administration Revenue Reports, this being due to greater attention being paid to discharge observations in later years. Although there are considerable differences between the supplies of water as given by the Administration Reports and as got by the special investigations carried out in connection with the Madras Cauvery Project, it will be observed that the results given in columns 4 and 5 both go to show—that large supplies have been used,—that the average head discharges as shown by column 2 have in many years been great, and that considerable remissions had to be made in the dry years, more especially in 1899-1900 when Rs. 6,27,295 were remitted.

21. *Storage works for the delta.*—The successive efforts which have been made for the protection of the rice cultivation in the delta emphasise the shortness of the river supply in dry years for the irrigation which depends on the Cauvery, and the impossibility of reducing it without interfering with existing rights.—The various proposals and schemes have been as follows:—

1834—Sir Arthur Cotton's proposals.

1856—Major Lawford's proposed Neringipet reservoir.

Mr. Frazer's scheme for a reservoir on the Bhavani tributary of the Cauvery.

1869—Captain Smith's scheme for do. do. do.

1880—Major Montgomerie's scheme for a reservoir do. do. do.

1884—Captain Romilly's do. do. do.

1892—Mr. Larminie's do. do. do.

1897—Mr. Hughes' do. do. do.

Colonel Smart's scheme for a Cauvery reservoir.

1904—Mr. Moss's do. do. do.

1909—Colonel Ellis's do. do. do.

Hence in a period of 75 years there have been 11 separate successive efforts to secure protection of existing rice irrigation in the delta; it is true that some of these schemes aimed at some extensions,—notably the last two,—but the leading idea has been protection of existing irrigation in dry years.

22. It appears to me that apart from expansions of irrigation the Madras Government may be held to have a prescriptive right for the extra supply of water which will obviate the heavy recurring losses shown in Appendix VII, column 6, and which they have been endeavouring to secure for the past 75 years. If I am right in this view, then the low supplies shown in column 5 for the years 1894-1895, 1899-1900, 1904-1905, 1905-1906 and 1908-1909 of the appendix just mentioned call for enhancement.

23. *Diwan's letter No. 869-Pol., dated 27th March 1911.*—I wish to offer the following remarks on what has been advanced by the Diwan of Mysore:—

Paragraph 1 of Diwan's letter.—It appears advisable to devise satisfactory arrangements for meeting the objections raised by the Madras Government.

Paragraph 2 of Diwan's letter.—It is understood that the pressing representations of the Kolar Gold Mining Companies were accompanied by threats to procure plant and steam power instead of hydro-electric power for extensions, and if this is the case, the urgency is manifest, since a good market should not be lost.

Paragraph 3 of Diwan's letter.—Rule III of the agreement of 1892 may be complied with as regards supplying the Madras Government with full information relating to the project, if this has not already been done.

Paragraph 4 of Diwan's letter.—The curtailment of the supply for existing Mysore irrigation clearly indicates the need for more power; the proposed works would, according to the Madras Government, have a similar effect on irrigation in that presidency.

Paragraphs 5 and 6 of Diwan's letter.—The figures advanced in different papers are not in entire agreement; this shows the need for complying with rule III of the agreement; since the small dam of 80 feet in height has to be made of the full width for the ultimate height, it is absolutely necessary to first settle what this height is to be.

Paragraph 7 of Diwan's letter.—(i) The rule to run in the Cauvery all the water up to 7 feet on the gauge at the dam is the general present practice, and reduction would mean serious loss of irrigation. A discharge of 26,680 cusecs amounts to about 2,300 million cubic feet per

day. Appendix II, columns 3 and 4, of this note shows how the supplies have fluctuated in this flood-ridden river. The supply of 2,300 million cubic feet is exceptional, low supplies of one-third, one-fourth and one-fifth of this being more common. The maximum is one thing, the average another. Appendix V to this note, column 5, shows many average discharges over 12,000 cusecs; however, in every year when the average was as low as 12,000 cusecs, the maximum was 26,680 when available. I would invite perusal of paragraphs 11 to 13 above.

(ii) In the five driest years we have as follows in million cubic feet:—

Year.	Irrigation supply.	Available for Mysore reservoir.	Unavoidable surpluses of floods.	Total river supply, Aganda Cauvery.
1	2	3	4	5
1890-1891	204,209	45,717	38,270	288,196
1894-1895	207,779	38,467	9,138	255,384
1899-1900	157,199	28,797	17,748	203,744
1905-1906	176,636	37,739	26,969	241,344
1908-1909	194,762	116,638	8,975	320,375

The entries in columns 2 and 5 are taken from Volume III, Part VIII of the Madras Cauvery Project, those in column 3 from the working tables of the Mysore reservoir as furnished to the Durbar, while the entries in column 4 are the unavoidable surplus in floods. The sum of the entries in columns 3 and 4 show past surpluses which will be seen to be a very small part of the 225,000 stated by the Diwan to be surplused every year. In 1899-1900 the whole river supply including the "irrigation supply" of 157,199 was less than the 225,000 mentioned by the Diwan, while the actual surplus was only 28,797 million cubic feet. Column 3 of the above table will serve to show why the Mysore reservoir cannot receive 50,000 million cubic feet in dry years without curtailing the supply of existing irrigation—unless a larger storage reservoir is provided, and this is the course I advise as there is ample water to carry on from years of plentiful supply to supplement that received in dry ones.

(iii) The surplus of 28,797 should apparently be reduced by 15,169 to be surplused from Mysore reservoir.

Paragraph 8 of Diwan's letter.—The remarks made in this paragraph appear to me to call for the following comments.

(i) The Cauvery supplies abundant water—provided that sufficient storage capacity is provided to carry forward the flood supplies to meet the requirements of dry periods in advance; the entries, Appendix VI, column 3, clearly show this. If the Mysore Cauvery reservoir is made of adequate capacity, there will be ample water for all concerned; what is objected to is the proposal to reduce the supply at present required by the cultivators in Madras in order to save the Mysore State the cost of making a reservoir of suitable capacity.

(ii) A Madras Cauvery reservoir of 60,000 million cubic feet would usually suffice for the new irrigation, but 90,020 gross and 80,000 net is provided for the reason just given—vide Project estimate, Volume 1, paragraphs 56, 59 and 64. Similar liberal provision appears essential for the Mysore reservoir.

(iii) It appears to me that the question at issue is not one for decision on consideration of—

- location and relative extent of catchment areas,
- relative yield of catchment area in British and Mysore Territory,
- relative extent of existing irrigation,

since this procedure would be completely subversive of prescriptive rights enjoyed in Madras from time immemorial, and of the reasonable rules already accepted in the agreement of 1892, paragraphs II to IV, vide paragraph 4 above.

Paragraph 9 of Diwan's letter.—(i) The question at issue appears to be whether the Mysore State can be allowed to construct a storage reservoir of inadequate capacity—and to operate the same in a manner which will have a most prejudicial effect on existing irrigation in Madras, vide sub-paragraph (i) above.

(ii) The expenditure on the Madras works and the population to be provided for will be found vastly greater than in Mysore.

(iii) See 8 (i) above.

Paragraph 10 of Diwan's letter.—(i) The width of the 80 feet dam will be that which is required for the ultimate height to which the dam is eventually proposed to be carried; the ultimate height now proposed by the Durbar is inadequate, since the work would fail to meet requirements in 3 out of 20 years. I would advise as follows—

(a) That the Mysore Durbar reconsider the design with reference to what is suggested in sub-paragraph 8 (i) and (ii) above.

(b) That the complete amended project for the dam, and irrigation scheme with the rules for operating of the same may be referred to the Madras Government in accordance with the agreement of 1892, rules II to IV.

(c) That the Madras Government may report on the suitability of the amended proposals to Government of India, and if accepted by the latter, that permission may at once be given for execution of the work.

(ii) The Government of India have already received in the Madras Cauvery Project full particulars regarding the water actually used for irrigation purposes in the past, and the Mysore Durbar has also been supplied with a copy of that project; further data appear unnecessary on the subject of water-supply.

(iii) The third request made applies to the numerous sources of water-supply detailed in Schedules A and B of the agreement of 1892; it would apply to all streams and rivers crossing a border of nearly 500 miles; its adoption would raise a dead wall of obstruction against progress in Madras, such as obtains nowhere else in India. The existing agreement of 1892 appears to be a very reasonable one; and it was concluded between the Madras and Mysore Governments; still without even consulting the Madras Government, the party chiefly concerned—a request is made that Government of India will restrict itself to action which is tantamount to abrogation of the rules which now exist, and which render it possible to do the greatest amount of good to the greatest number. With regard to the case under consideration I wish to remark as follows:—

(i) The agreement is dated 18th February 1892. The average irrigation on the Cauvery system apart from the Coleroon river has been as follows:—

Triennial period.	Average irrigation.
	ACS.
1878—81	1,002,240
1881—84	1,001,693
1884—87	942,067
1887—90	1,008,675
1890—93	1,011,151
1893—96	991,016
1896—99	987,016
1899—1902	980,644
1902—1905	982,586
1905—1908	990,251
1908—1911	Report not received.

This statement shows no increase of irrigation and of prescriptive rights.

(ii) All the arguments advanced by the Madras Government against the present Mysore scheme relate solely to the prejudicial effect of the same on *existing irrigation*.

(iii) In the case of the Madras Cauvery project the abundant amount of storage is such that if the rights of the existing irrigation are not prejudiced,—the supply for the new work will meet requirements to the extent forecasted. The ample but unevenly distributed supply in the river is the explanation of this result.

None of the conditions explained in (i) to (iii) above which are the most relevant circumstances in the case afford any ground for the request advanced by the Mysore Durbar. For the reasons given above I strongly advise that the request may not be complied with, and that the existing agreement continue in force.

Paragraph 11 of Diwan's letter.—The abundant data already collected appear to me to be ample; neither the Durbar nor the Resident have called attention to any subjects on which there is not already to hand ample information for disposal of the case under consideration.

Paragraph 12 of Diwan's letter.—A copy of the project has not been received in Government of India up to date, and it is required.

Paragraph 15 of Diwan's letter.—Reference to paragraph 6 of this note will serve to show that the Madras Government have already fully explained the requirements of the irrigation which has prescriptive rights,—and have invited the Mysore Durbar to advance a scheme for their works which will not reduce the supply of the existing irrigators,—nor infringe the existing agreement,—while meeting their own requirements. A solution of this character appears feasible, and is due from Mysore Durbar who know their own requirements. The action actually taken will be seen from paragraphs 10 and 13 of the Diwan's letter.

24. *Proposed solution of the question.*—The Madras Irrigation Officers represented to the Mysore Durbar,—the requirements of their irrigation which has prescriptive rights,—and they showed that the design for the Mysore reservoir would fail in 3 out of 20 years; they asked that a design might be advanced by the Mysore Durbar which would not disturb existing rights and requirements, while meeting Mysore wants, but instead of doing so, an appeal has been made by the Mysore Durbar to Government of India, and requests made which I have shown above would not be in accordance with the agreement of 1892, rules II to IV, while the effect on existing irrigation in Madras would prove most disastrous. In what follows, I will advance

such a solution as it would be my duty to propose if Mysore territory and all the interests concerned were those of Government of India. For the advancement of a sound scheme and one which would have any chance of acceptance by Government of India, and sanction by the Secretary of State, I would be under the necessity of advising that the scheme should be based on the following:—

(i) That working conditions and rules might be devised which would safeguard existing irrigation.

(ii) That provision might be made against the reservoir becoming inefficient through silting up in the next 100 years.

(iii) That existing irrigation should not be prejudiced, the Mysore reservoir being given such a capacity as would obviate this occurring.

I will now proceed to indicate what appear to me to be the requirements to comply with each of the issues (i) to (iii) above.

25. *Working conditions and rules.*—The conditions and proposed rules, paragraph 3 above, safeguard existing irrigation and appear to me to call for acceptance. It would be necessary for the working of these rules that a Government official should reside at Sivasamudram, or some other convenient location either in British or Mysore territory; that he should be allowed access to all the works on the power scheme or on the canal; that such gauges as may be considered necessary by Government may be recorded by the Mysore officials and copies supplied to the Government official; also that such telegraph lines as may be required for operating of the scheme in Mysore State for distribution in accordance with the rules may be provided by that State; and that the free and unrestricted use of the same by the Government official may be a condition of the proposed works being agreed to. Since the proposed works are for the benefit of Mysore State, these conditions appear reasonable.

26. *Silting up of reservoir.*—This question has not been discussed in any of the papers which have been received, but still it is an important matter which cannot be ignored if works are to escape failure in the near future and condemnation by posterity. We have the following items of information on this subject:—

(i) Perusal of Volume I, paragraph 65, of the Madras Cauvery project will show that the silt swept along is estimated at 200 millions cubic feet per year on the average, so that the deposit would be as follows:—

(a) In 75 years	15,000 millions cubic feet.
(b) In 100 years	20,000

(ii) The actual provision for silt in the Madras Cauvery reservoir is about 10,000 millions cubic feet—this being the difference between 90,020 and 80,000; however, this reservoir can be emptied of water when a certain amount of the silt will be cleared out in its later stages; it is doubtful whether this will be feasible when a high level canal and power scheme depends on the reservoir. It appears probable that 10,000 millions cubic feet will be as useful in this case as 15,000 to 20,000 in the case of the Mysore reservoir. There is a further margin of 20,000 millions cubic feet of storage capacity in the case of the Madras Cauvery reservoir—*vide* Volume I, paragraph 59—so that the total margin is really 90,020 — 60,000 = 30,020 millions cubic feet, and there is no apparent reason why a similar margin should not be required in the case of the Mysore reservoir.

(iii) Since irrigation works are usually designed in a lasting substantial manner—likely as far as we can see to last almost for eternity—it appears to me quite wrong to build a costly reservoir which will have a life of less than 100 years before it begins to be inefficient. In the case of the great Kistna reservoir it has been sought to give the works a life of 150 to 200 years, and great extra expenditure is proposed to be faced to attain this end.

(iv) In the case of small earthen reservoirs a surplus capacity of 10 per cent. for silt over the gross initial capacity is usual—*vide* Mr. W. L. Strange's work on Indian Reservoir, paragraph 42; however, the reservoirs which Mr. Strange appears to have had in view were small ones with earthen banks which can easily be raised, while this is not true of a masonry dam which must be given the full base width for the ultimate height. The 10 per cent. rule connotes in this case an efficient life of about 21 years only, and it appears quite intolerable to advance a work which will only meet requirements for this short period.

The provision for silt may then be put at that for 100 years or 20,000 millions cubic feet.

27. *Capacity of reservoir.*—Appendix VIII to this note has been prepared as follows:—

Column 2 has been extracted from Volume I, Cauvery Project, pages 208—212.

Columns 3 to 8 show particulars as given in the working tables of the Mysore reservoir furnished to the Darbar by the Chief Engineer, Madras.

The italicised figures are shortages and they show the extent to which the reservoir would have failed in the last twenty years if it had then existed; it will be seen that it was short by 13,203 millions cubic feet in 1906–1907, while altogether there were no less than six years when there were lesser shortages. Examination of the figures given at the foot of Appendix VIII will show that the averages of lowest supplies and of the average carried forward were only about

nalf of these for the proposed Madras Cauvery reservoir,—a work which I merely mention to show how much more liberal the scope of its design is than that of the Mysore reservoir as regards provision of ample capacity. The total capacity which appears to me necessary to give the Mysore reservoir is as follows:—

	M. C. FT.
Below R.L. 2,404	4,480
As per Mysore Chief Engineer's note, dated 15th October 1910, paragraph 4, net storage	39,270
Add extra as above for capacity	13,203
Add extra for silt (20,000 — 4,480)	15,520
Total capacity	72,473

The extra capacity which I propose is therefore 30,973 millions cubic feet in excess of the 41,500 proposed by the Darbar; this increase is composed of the following:—

	M. C. FT.
Present shortage	13,203
Allowance for silt and margin of safety	17,770
Total	30,973

28. There are discrepancies between the capacity and height figures given in the Diwan's letter and those deducible from the statement of capacities furnished to the Madras Government; in the absence of the final project figures and plans I am unable to ascertain which of the sets of figures advanced by Mysore is to be relied on as correct. The general effect will be to raise the full supply line of the dam by from 17 to 18 feet, but the complete project must be awaited in order to ascertain the levels which correspond to the requisite capacity.

29. *Design of the work.*—Government is concerned,—in the stability of the design as regards the safety of their delta canal works,—in the rock being of suitable quality for the foundations,—in the surplusing arrangements being suitable,—in the rock being such as will withstand the enormous surplused depths proposed,—in the cushioning,—and in the sluice arrangements. It is trusted that the works will be such as to effectually guard against any possible risk of failure; but as such, if it occurred, would react on the Government works, fully detailed plans are required under the terms of the agreement of 1892 to admit of the officers of Government being in a position to discharge their responsibilities.

30. *Adequacy of supply for Mysore.*—Referring to Appendix VIII to this note the supplies in column 2 show what the Madras Government claim for the irrigation of 1,100,000 acres of existing irrigation,—while these in column 3 show what are left over for the additional area which the Mysore Darbar propose to irrigate and which the Chief Engineer of that State gives as 125,000 acres in his note, dated 15th October 1910, which was supplied to the Madras Government. Then we have as follows:—

$$\frac{125,000}{1,100,000} \times 100 = 12 \text{ per cent.}$$

The entries in column 4 of Appendix VIII in every case exceed 12 per cent., so as far as irrigation is concerned, the Mysore State is to receive in dry years more water acre per acre than the lands in British territory receive under the present system of relying on floods; however stored water giving an assured supply will be used in Mysore State and it will go at least 50 per cent. further which will more than compensate for the small part to be used for power; moreover, the extra storage now recommended will give a large margin of safety.

31. The figures for power which have been advanced are all that I have been circumstanced to consider; I presume that they are liberal and possibly that they may never be exceeded; with regard to untold extensions for extra power beyond the most sanguine dreams of the present, and which might conceivably call for throwing land out of cultivator in Mysore State or in the delta in order to supply extra power, it appears to me that the cultivation of wide tracts producing vast supplies of food-stuff for the people stands on a much higher plane than gold mining which is advanced for the enrichment of companies, and the increase of royalties. Most probably there will be enough water for both purposes for centuries to come, and it is hoped and trusted that this will be the case.

32. *Conclusions.*—The conclusions which I have arrived at are as follows:—

(i) That the existing Madras irrigation requires the supplies of water as actually diverted over the Cauvery Dam for irrigation in the past,—that no curtailment of these supplies is possible without inflicting very serious loss on the cultivators of the delta,—and that no reduction is compatible with the agreement of 1892.

(ii) That the scheme for the proposed Mysore reservoir should be based on the surplus waters left over after operating the Madras Delta irrigation system as in (i) above; this is the proposal of the Madras Government—it appears reasonable,—and the impounding rules which they propose may be accepted.

(iii) That to admit of the proposed Mysore reservoir being successfully operated for both power and Mysore irrigation, it should apparently have the additional capacities (a) and (b) below:—

	M. C. FT.
(a) To meet shortage in dry years	13,203
(b) To provide for the silting up likely to occur, and so that it may remain fully efficient for the sufficient period	17,770
Total extra capacity now proposed	30,973
Add—Gross capacity proposed by Diwan	41,500
Gross capacity	72,473

These figures are subject to correction on receipt of the detailed project since there are apparent discrepancies in the figures hitherto reported in different papers received from Mysore.

(iv) That the surplus supplies of water available for Mysore and as intimated direct by the Madras Government are more than adequate for the additional area proposed to be irrigated in that State, provided that the requisite storage capacity—vide (iii) above—is provided for conserving the flood waters. This result appears to me to leave the Mysore State no apparent grounds for fearing that they will not have the means of protecting tracts which they desire to irrigate,—provided that they are prepared to execute the necessary works.

(v) That the proposed Madras Cauvery project is really a quite separate work from the question now under consideration as will be seen from sub-paragraphs (i) and (ii) above in which I have endeavoured to clearly explain that the Mysore Darbar are to have all the surplus supplies to which they have any claim under the existing agreement placed unconditionally at their disposal. In anticipation of any further enquiries as to how the Madras Government can hope to carry out their large reservoir under the conditions, I may briefly remark that they propose,—to construct an unusually large storage reservoir,—to largely substitute stored water for floods thus increasing the efficiency and duty,—and doubtless also to conserve many of the largest floods which could not be utilized elsewhere by any other means and which would otherwise flow waste to the ocean; in short, they are to follow the identical course which I have now urged for adoption by Mysore Darbar.

J. BENTON,
Inspector-General of Irrigation.

APPENDIX I.

Dates of occurrence of freshets and floods in the Aganda Cauvery river.

Year.	January.	June.	July.	August.	September.	October.	November.	December.
1890	5	7, 25	6, 19, 25	12, 21, 29	7	7, 29	6	11
1891	..	7, 23	10, 26	9	1, 6	2, 5, 7, 11, 14, 17, 19, 22, 29	4, 14	17, 29
1892	..	8, 16, 19	1, 15, 24, 26	4, 15, 24	1, 8, 15, 25	1, 3, 6, 9, 13, 17, 22	1, 11, 27	2, 6, 10, 17, 19
1893	25	10, 14, 21, 30	9, 13, 28	6, 8, 13, 30	3, 8, 17	4, 8, 13, 19, 25, 28	7, 11, 16, 18, 24, 29	..
1894	..	6, 23	3, 16, 18, 23	9, 13, 20, 24, 29	14, 23	21	2, 4, 9	5
1895	..	5, 12, 16, 23	4, 18, 24, 28	4, 12, 24, 31	18, 26, 30	3, 9, 20, 23, 25	6	1, 31
1896	..	6, 17, 25, 27	2, 13, 31	2, 14, 18, 31	4, 8, 25, 29	4, 24	5, 19, 21, 26	2, 9, 21
1897	..	4, 11, 23	2, 15, 24	1, 14, 30	2, 8, 12, 22, 30	2, 16, 18	2, 5, 16	2
1898	..	21	11, 20, 31	10, 19, 30	9, 17, 29	2, 10, 12, 20, 31	13, 15	3, 31
1899	..	21	5, 14	3, 15	7, 9, 20, 23	13, 18, 28	..	6, 10
1900	14	2, 9, 21, 27	3, 6, 19	1, 4, 8, 15	3, 10, 12, 16	4, 18	1, 20, 26	2, 18, 23
1901	14	6, 16, 21	3, 10, 13, 31	9, 19	13, 17, 19, 28	1, 4, 8, 25, 29	11, 20	2
1902	10	4, 19	12, 18	2, 27, 29	5, 13	12, 16, 28	1, 4, 9, 17, 22	8, 13, 19
1903	..	18, 20	5, 19, 30	1, 15, 25	3, 6, 11, 17, 26, 29	2, 4, 24, 28	14	1, 6, 8
1904	2, 23	4, 13, 16, 24	8, 27	10, 14	18, 26	9, 15, 22, 25, 29	18	..
1905	..	8, 25	2, 12, 26	18, 31	3, 12, 21	7, 11, 16, 19	14, 28	..
1906	22	9, 18, 28	16, 28	12, 20, 30	10, 19, 25	9, 13, 17, 21, 26	11, 16	24
1907	2	9, 19, 23	4, 28	11	1, 26, 30	6, 27	8, 11, 21	17, 23
1908	16, 21	1, 14, 25	8, 21, 29	1, 8	4, 12	7, 24, 29	..	7, 18, 24
1909	4	12	1, 21, 29	9	4, 16, 30	8, 18	6	3, 18

APPENDIX II.

Discharges in millions cubic feet.

Year.	Period.	Cauvery river discharges.				Coleroon river discharges when carrying water.		
		In the past			Madras project supply.	Number of days.	Discharges.	
		I—1st to 15th. II—16th to 30th	From	To			From	To
1	2	3	4	5	6	7	8	9

JUNE 1890 TO 1909.

1890	..	..	I	..	..	236	515	348	356	0 out of 15	..	..
			II	..	..	254	1,116	609	356	0 " 15	..	..
1891	..	..	I	..	..	172	803	423	356	0 " 15	..	..
			II	..	..	214	628	409	356	0 " 15	..	..
1892	..	..	I	..	..	370	754	535	356	0 " 15	..	..
			II	..	..	434	1,593	750	356	2 " 15	14	294
1893	..	..	I	..	..	434	1,228	903	356	3 " 15	86	138
			II	..	..	851	3,020	1,893	356	13 " 15	289	1,901
1894	..	..	I	..	..	370	667	453	356	0 " 15	..	..
			II	..	..	594	1,944	1,205	356	9 " 15	86	553
1895	..	..	I	..	..	144	388	224	356	0 " 15	..	..
			II	..	..	144	4,005	1,539	356	10 " 15	345	4,493
1896	..	..	I	..	..	158	374	283	356	0 " 15	..	..
			II	..	..	218	5,324	1,561	356	9 " 15	1,175	6,576
1897	..	..	I	..	..	186	494	374	356	0 " 15	..	..
			II	..	..	386	4,325	1,711	356	11 " 15	79	5,184
1898	..	..	I	..	..	172	322	269	..	0 " 15	..	..
			II	..	..	254	2,342	1,810	356	10 " 15	14	1,296
1899	..	..	I	..	..	254	370	273	356	0 " 15	..	..
			II	..	..	236	3,389	1,388	356	7 " 15	79	3,145
1900	..	..	I	..	..	130	404	265	356	0 " 15	..	..
			II	..	..	114	2,946	1,816	356	7 " 15	239	1,780
1901	..	..	I	..	..	254	472	327	356	0 " 15	..	..
			II	..	..	418	2,658	1,352	356	5 " 15	518	1,678
1902	..	..	I	..	..	98	354	238	356	0 " 15	114	1,521
			II	..	..	114	1,345	563	356	1 " 15	92	92
1903	..	..	I	..	..	254	538	386	356	0 " 15	..	..
			II	..	..	402	1,170	637	356	0 " 15	..	..
1904	..	..	I	..	..	516	1,755	1,013	356	0 " 15	..	..
			II	..	..	730	3,644	1,908	356	14 " 15	806	3,802
1905	..	..	I	..	..	200	402	289	..	0 " 15	..	..
			II	..	..	130	1,818	550	356	0 " 15	..	..
1906	..	..	I	..	..	32	130	46	..	0 " 15	..	..
			II	..	..	50	803	272	..	1 " 15	657	657
1907	..	..	I	..	..	254	418	337	356	0 " 15	..	..
			II	..	..	272	2,070	987	356	0 " 15	..	..
1908	..	..	I	..	..	50	354	159	356	0 " 15	..	..
			II	..	..	172	628	351	356	0 " 15	..	..
1909	..	..	I	..	..	272	3,534	1,245	356	11 " 15	445	3,511
			II	..	..	838	2,160	1,030	356	6 " 15	354	2,978

JULY 1890 TO 1909.

1890	..	..	I	..	..	472	1,404	829	1,727	2 out of 15	14	79
			II	..	..	838	3,884	1,721	1,609	9 " 15	415	3,629
1891	..	..	I	..	..	254	2,831	1,498	1,727	9 " 15	845	1,542
			II	..	..	892	4,842	1,771	1,609	10 " 15	86	5,581
1892	..	..	I	..	..	402	3,536	1,877	1,727	7 " 15	14	3,145
			II	..	..	1,560	6,587	2,172	1,609	16 " 15	79	9,832
1893	..	..	I	..	..	1,060	1,885	1,470	1,727	8 " 15	62	294
			II	..	..	1,060	1,755	1,418	1,609	8 " 15	14	189
1894	..	..	I	..	..	450	1,062	591	1,727	0 " 15	..	..
			II	..	..	1,062	4,842	1,816	1,609	13 " 15	138	5,581
1895	..	..	I	..	..	1,232	3,884	1,833	1,727	10 " 15	62	3,629
			II	..	..	1,430	2,145	1,740	1,609	15 " 15	14	488
1896	..	..	I	..	..	1,430	4,478	2,077	1,727	13 " 15	14	4,688
			II	..	..	1,716	3,867	2,195	1,609	16 " 15	79	13,582
1897	..	..	I	..	..	516	5,227	1,277	1,727	7 " 15	1,175	6,387
			II	..	..	1,430	4,650	1,933	1,609	16 " 15	79	6,377
1898	..	..	I	..	..	402	1,625	935	1,727	4 " 15	62	86
			II	..	..	450	4,564	1,305	1,609	6 " 15	415	5,011
1899	..	..	I	..	..	516	3,488	2,026	1,727	13 " 15	345	2,883
			II	..	..	494	2,145	1,024	1,609	3 " 15	14	345
1900	..	..	I	..	..	3,098	3,488	2,300	(a) 356	3 " 15	2,056	2,833
			II	..	..	2,002	6,498	2,291	(b) 1,727	..	239	7,989
1901	..	..	I	..	..	386	4,791	1,648	1,727	10 out of 15	307	6,214
			II	..	..	1,673	3,410	2,099	1,609	12 " 15	375	2,893
1902	..	..	I	..	..	144	2,620	902	1,727	6 " 15	314	956
			II	..	..	1,645	6,742	2,181	1,609	16 " 15	60	7,375
1903	..	..	I	..	..	322	516	385	1,727	1 " 15	2,415	2,415
			II	..	..	2,460	6,100	2,800	1,609	16 " 15	284	14,148
1904	..	..	I	..	..	2,580	4,938	2,551	1,727	15 " 15	299	3,834
			II	..	..	1,859	2,996	2,301	1,609	5 " 15	278	1,296

With the following exceptions—

(a) For three days.

(b) For 28 days.

DIAGRAM SHOWING AREA CHARGED AS IRRIGATED

THE CAUVERY DELTA

FIG. 1

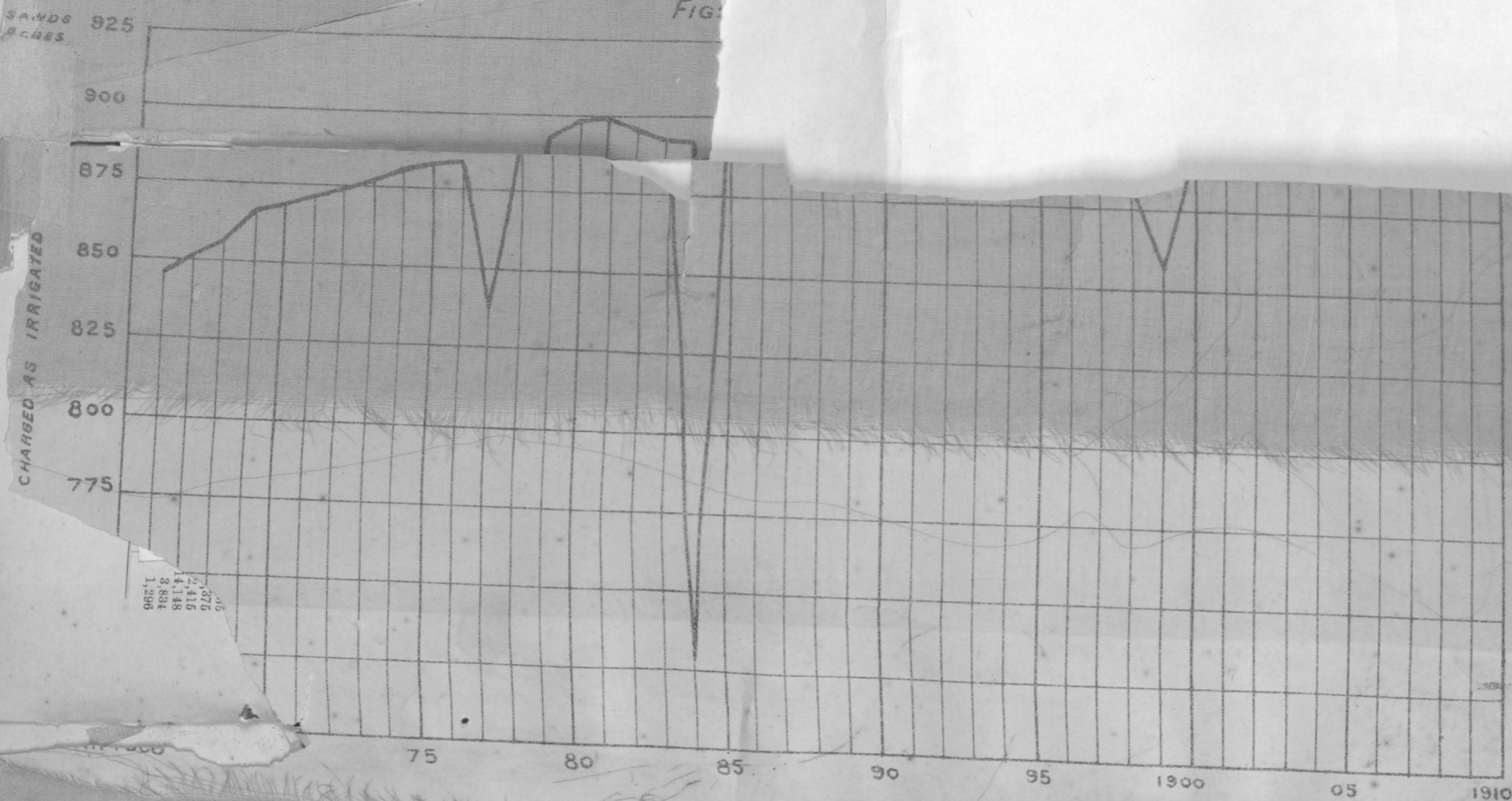


FIG. 2.

LOWER COLEROON

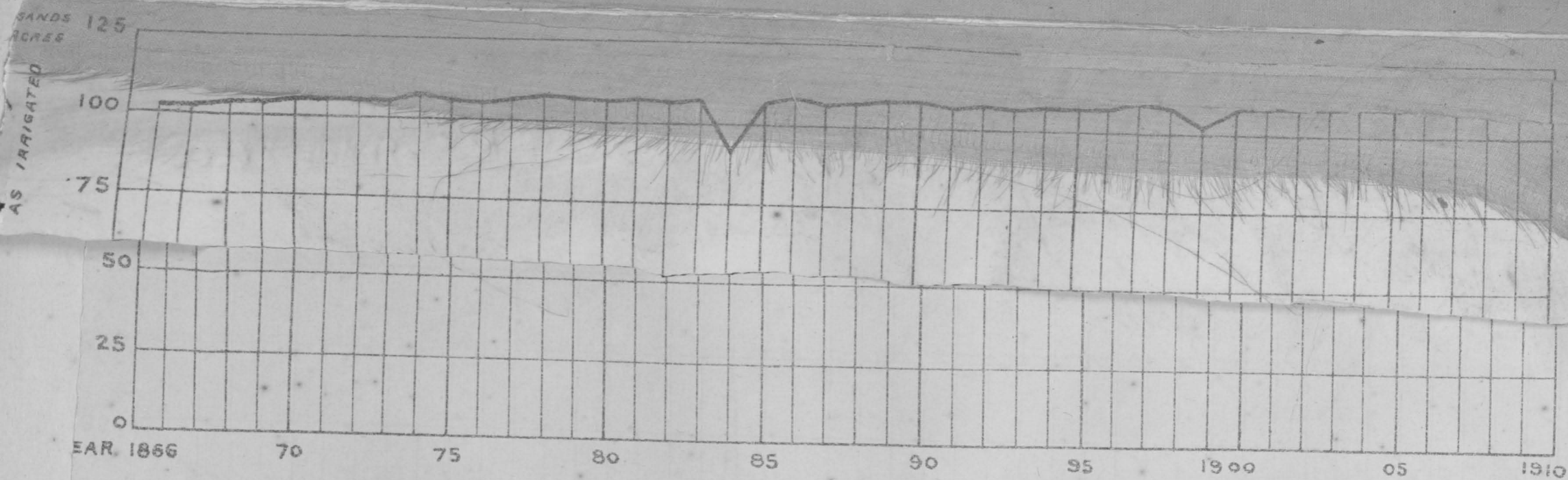
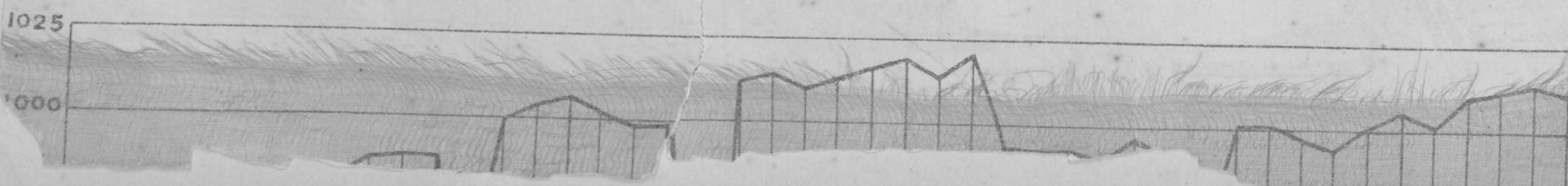


FIG. 3.

TOTAL CAUVERY AND COLEROON



Discharges in millions cubic feet—cont.

Year.	Period. I—1st to 15th. II—16th to 31st.	Cauvery river discharges.				Coleroon river discharges when carrying water.		
		In the past.			Madras project supply.	Number of days.	Discharges.	
		From	To	Irrigation supply.			From	To
1	2	3	4	5	6	7	8	9

JULY 1890 TO 1909—cont.

1905	..	..	I	..	..	1,579	2,624	1,829	(c) 356	5 out of 15	254	1,158	
			II	..	..	472	4,052	1,600	(d) 1,727	11 "	16	511	3,951
			I	..	..	114	4,291	356	(e) 356	4 "	15	1,681	3,467
1906	..	..	II	..	..	2,277	3,890	1,669	(f) 1,727	10 "	16	2,395	4,928
			I	..	..	402	2,779	1,359	1,727	6 "	15	102	2,910
1907	..	..	II	..	..	402	4,085	1,316	1,609	4 "	16	1,860	3,067
			I	..	..	338	2,923	1,493	1,727	6 "	15	491	4,333
1908	..	..	II	..	..	1,120	3,044	2,153	1,609	11 "	10	430	4,104
			I	..	..	1,950	3,566	2,211	1,727	4 "	15	786	4,273
1909	..	..	II	..	..	2,798	5,326	2,319	1,609	14 "	16	174	5,007

AUGUST 1890 TO 1909.

1890	..	..	I	..	..	1,430	3,098	1,987	1,531	15 out of 15	14	2,050	
			II	..	..	1,060	1,885	1,408	1,531	11	15	62	1,296
			I	..	..	1,950	4,052	2,339	1,531	15	15	345	397
1891	..	..	II	..	..	1,166	2,402	1,478	1,531	6	15	14	239
			I	..	..	2,607	3,098	2,305	1,531	15	15	345	2,056
1892	..	..	II	..	..	1,718	2,300	2,054	1,531	15	15	86	689
			I	..	..	1,430	3,020	1,980	1,531	15	15	14	1,901
1893	..	..	II	..	..	730	1,825	1,113	1,531	4	15	62	138
			I	..	..	1,060	2,090	1,545	1,531	9	15	62	453
1894	..	..	II	..	..	1,660	2,650	1,908	1,531	15	15	79	1,296
			I	..	..	1,755	4,392	2,245	1,531	15	15	415	3,802
1895	..	..	II	..	..	1,502	2,300	1,850	1,531	14	15	14	689
			I	..	..	3,408	8,061	2,330	1,531	15	15	1,659	12,839
1896	..	..	II	..	..	1,931	3,078	2,202	1,531	15	15	189	3,975
			I	..	..	1,950	6,786	2,263	1,531	15	15	345	10,005
1897	..	..	II	..	..	2,074	5,227	2,281	1,531	15	15	294	4,320
			I	..	..	1,430	4,052	1,951	1,531	15	15	14	3,975
1898	..	..	II	..	..	594	1,300	941	1,531	0	15		
			I	..	..	200	1,638	460	1,531	1	15	239	239
1899	..	..	II	..	..	386	1,345	658	1,531	1	15	62	62
			I	..	..	3,159	8,932	2,300	1,531	15	15	1,542	12,077
1900	..	..	II	..	..	1,573	8,199	2,067	1,531	15	15	14	14,199
			I	..	..	1,690	3,020	2,017	1,531	15	15	169	2,051
1901	..	..	II	..	..	1,240	3,020	1,786	1,531	10	15	238	2,051
			I	..	..	662	2,699	1,518	1,531	10	15	92	481
1902	..	..	II	..	..	418	1,116	680	1,531	0	15		
			I	..	..	1,845	6,878	3,055	1,531	15	15	11	8,456
1903	..	..	II	..	..	1,625	2,300	1,995	1,531	10	15	281	1,406
			I	..	..	1,232	2,724	1,969	1,531	9	15	622	1,600
1904	..	..	II	..	..	494	2,650	1,408	1,531	2	15	233	635
			I	..	..	538	2,850	1,486	1,531	2	15	48	396
1905	..	..	II	..	..	516	1,345	906	1,531	0	15		
			I	..	..	1,364	2,336	1,993	1,531	8	15	50	2,336
1906	..	..	II	..	..	1,430	4,392	2,024	1,531	15	15	22	6,982
			I	..	..	1,950	5,130	2,267	1,531	15	15	1,418	6,195
1907	..	..	II	..	..	2,915	4,737	2,300	1,531	15	15	688	3,631
			I	..	..	2,370	4,550	2,370	1,531	15	15	1,066	7,413
1908	..	..	II	..	..	981	2,684	1,729	1,531	1	15	314	314
			I	..	..	2,222	3,322	2,295	1,531	14	15	237	3,450
1909	..	..	II	..	..	662	2,299	1,541	1,531	7	15	1,825	3,318

SEPTEMBER 1890 TO 1909.

1890	..	..	..	I	..	..	538	1,560	824	1,371	0 out of 15	..	..
				II	..	..	402	560	505	815	0 " 15	..	..
				I	..	..	814	1,755	1,211	1,371	5 " 15	14	79
1891	..	..	..	II	..	..	450	892	587	815	0 " 15	..	..
				I	..	..	1,625	2,872	2,019	1,371	15 " 15	86	1,659
1892	..	..	..	II	..	..	892	1,560	1,116	815	2 " 15	14	79
				I	..	..	1,300	2,580	1,676	1,371	12 " 15	14	1,175
1893	..	..	..	II	..	..	560	1,950	1,100	815	4 " 15	79	239
				I	..	..	892	1,360	1,109	1,371	0 " 15	..	..
1894	..	..	..	II	..	..	494	1,120	787	815	0 " 15	..	..
				I	..	..	594	1,503	833	1,371	0 " 15	..	..
1895	..	..	..	II	..	..	516	2,070	897	815	3 " 15	239	289
				I	..	..	1,180	2,145	1,754	1,371	13 " 15	14	345
1896	..	..	..	II	..	..	946	2,090	1,234	815	3 " 14	14	483
				I	..	..	1,573	4,579	2,075	1,371	15 " 15	14	2,867
1897	..	..	..	II	..	..	981	4,746	1,855	815	10 " 15	14	5,833
				I	..	..	628	5,280	1,271	3,371	6 " 15	14	1,175
1898	..	..	..	II	..	..	1,400	3,664	1,372	815	15 " 15	14	3,145

With the following exceptions—

(c) For 5 days.

(e) For 25 days.

Discharges in millions cubic feet—cont.

Year.	Period.	Cauvery river discharges.				Coleroon river discharges when carrying water.			
		I—1st to 15th. II—16th to 31st.	In the past.			Madras project supply.	Number of days.	Discharges.	
			From	To	Irrigation supply.			From	To
1	2	3	4	5	6	7	8	9	

SEPTEMBER 1890 TO 1909—cont.

1899	..	..	I	..	518	2,007	1,176	1,371	7 out of 15	79	623
			II	..	594	2,580	1,472	815	7	15	62
			I	..	1,384	2,724	1,754	1,531	10	15	62
1900	..	..	II	..	833	2,798	1,376	815	5	15	14
			I	..	594	1,180	888	1,371	0	15	..
1901	..	..	II	..	784	2,510	1,481	815	5	15	169
			I	..	706	3,176	1,739	1,371	9	15	105
1902	..	..	II	..	838	2,580	1,543	815	7	15	90
			I	..	1,000	2,440	1,418	1,371	12	15	392
1903	..	..	II	..	1,300	2,090	1,557	815	12	15	181
			I	..	854	472	394	1,371	0	15	..
1904	..	..	II	..	370	2,070	988	815	0	15	..
			I	..	784	1,755	1,268	1,531	4	15	168
1905	..	..	II	..	338	1,365	707	815	0	15	..
			I	..	892	2,798	1,914	1,531	6	15	797
1906	..	..	II	..	626	1,425	1,120	975	0	15	..
			I	..	981	2,607	1,901	1,371	3	15	882
1907	..	..	II	..	616	2,090	921	815	1	15	717
			I	..	560	1,950	1,058	1,371	3	15	563
1908	..	..	II	..	322	594	397	815	0	15	..
			I	..	946	2,650	1,638	1,371	15	15	1,790
1909	..	..	II	..	418	1,120	605	815	15	15	1,101

OCTOBER 1890 TO 1909.

1890	..	..	I	..	450	1,287	853	1,009	0 out of 15	..	..
			II	..	886	3,388	833	635	3	15	1,542
			I	..	472	1,755	1,115	1,009	7	15	14
1891	..	..	II	..	1,287	3,020	1,848	635	14	15	14
			I	..	784	1,300	1,102	1,009	0	15	..
1892	..	..	II	..	730	1,690	1,322	635	7	15	62
			I	..	730	4,364	1,840	1,009	10	15	62
1893	..	..	II	..	1,495	2,440	1,952	635	0	15	62
			I	..	854	494	403	1,009	0	15	..
1894	..	..	II	..	657	2,070	1,355	635	10	15	62
			I	..	1,240	2,872	1,887	1,009	11	15	14
1895	..	..	II	..	1,180	1,885	1,493	635	8	15	14
			I	..	1,060	2,650	1,686	1,009	9	15	14
1896	..	..	II	..	623	916	720	635	0	15	..
			I	..	1,502	5,130	2,166	1,009	15	15	14
1897	..	..	II	..	682	3,254	1,450	635	7	15	62
			I	..	2,090	4,052	2,272	1,009	15	15	483
1898	..	..	II	..	1,041	3,408	1,945	635	11	15	79
			I	..	402	682	489	1,009	0	15	..
1899	..	..	II	..	538	730	645	635	0	15	..
			I	..	418	2,580	1,043	815	4	15	62
1900	..	..	II	..	494	3,020	1,278	508	5	15	79
			I	..	1,296	3,254	2,097	1,009	13	15	100
1901	..	..	II	..	516	3,098	1,459	635	7	15	444
			I	..	434	2,872	1,175	1,009	5	15	218
1902	..	..	II	..	518	3,020	1,332	635	6	15	1,079
			I	..	1,300	3,410	1,951	1,009	12	15	91
1903	..	..	II	..	1,430	2,798	2,015	635	10	15	504
			I	..	870	662	444	1,009	0	15	..
1904	..	..	II	..	386	1,287	381	635	0	15	..
			I	..	322	1,462	752	815	5	15	884
1905	..	..	II	..	402	2,133	991	508	1	15	149
			I	..	418	2,650	1,444	815	6	15	355
1906	..	..	II	..	628	3,200	1,093	515	10	15	2,015
			I	..	494	2,580	1,244	1,009	7	15	90
1907	..	..	II	..	370	1,881	727	635	3	15	584
			I	..	354	594	425	1,009	0	15	..
1908	..	..	II	..	338	2,070	774	635	3	15	1,043
			I	..	494	2,513	1,501	1,009	15	15	349
1909	..	..	II	..	594	2,872	1,559	635	8	15	587

APPENDIX III.

AVERAGE rainfall, Tanjore district, in inches.

Year.	June.	July.	August.	September.	October.	November.	December.	January.	Total.
1890-91	3.05	2.20	5.01	6.35	11.74	7.61	0.94	0.21	37.11
1891-92	0.77	0.80	1.87	1.30	14.71	5.99	16.83	0.16	42.43
1892-93	3.59	2.89	8.10	2.08	4.47	2.30	3.10	0.11	27.64
1893-94	1.82	7.56	1.85	2.23	4.81	24.68	3.60	1.84	48.34
1894-95	0.40	0.93	5.64	5.93	4.81	8.94	6.05	0.04	32.66
1895-96	0.37	2.15	8.42	7.01	12.65	10.00	11.24	0.15	51.99
1896-97	1.24	1.28	1.94	3.51	6.62	15.47	14.51	0.04	41.62
1897-98	1.00	0.97	5.46	8.00	3.34	3.04	4.04	1.27	27.21
1898-99	0.95	1.37	5.05	5.83	10.43	18.92	12.35	0.40	55.30
1899-1900	0.51	0.79	1.53	4.53	18.86	5.78	2.51	0.38	34.89
1900-1901	0.82	3.96	1.44	6.75	6.95	11.25	8.52	0.62	42.31
1901-1902	0.51	0.90	3.07	9.33	3.17	12.58	5.54	5.45	40.55
1902-1903	1.84	0.78	4.32	4.18	11.10	12.67	11.98	1.49	48.26
1903-1904	2.20	1.71	5.69	12.49	3.67	7.51	18.03	3.97	55.22
1904-1905	0.68	2.38	2.06	2.86	5.55	2.17	8.26	0.25	24.18
1905-1906	0.81	0.61	4.70	4.03	11.43	8.96	0.49	2.78	38.83
1906-1907	1.56	1.86	7.96	1.32	9.61	19.65	10.03	0.53	52.52
1907-1908	1.02	1.16	2.12	4.79	9.24	14.07	2.50	0.69	35.59
1908-1909	1.86	1.06	1.92	7.00	13.84	1.56	3.68	5.40	36.32
1909-1910	0.35	0.81	8.74	5.21	2.36	2.61	2.12	0.87	23.02
Average for 3 years	1.54	2.15	4.30	4.72	8.05	10.65	7.92	1.04	40.37

APPENDIX IV.

COMPARISON of the Gōdāvari, Kistna and Cauvery Irrigation systems.

Particulars.		1903-1904.	1904-1905.	1905-1906.	1906-1907.	1907-1908.
GODAVARI.						
(a) Average rainfall	Inches	57.80	30.31	24.94	41.07	40.00
(b) Area irrigated	Acres	785,660	869,980	910,317	872,849	911,919
(c) Actual supply	Millions cubic feet	158,942	176,014	141,940	164,286	140,018
(d) Supply per acre	C. ft.	202.216	202.315	155.923	176.762	153.542
(e) Discharge of river	Millions cubic feet	4,089.439	1,877.445	2,244.687	3,092.163	5,842.418
(f) Percentage of $\frac{c}{e} \times 100$	Per cent.	4	9	6	5	3
KISTNA.						
(a) Average rainfall	Inches	57.44	28.37	25.26	34.50	25.70
(b) Area irrigated	Acres	617,042	648,247	657,604	662,959	685,434
(c) Actual supply	Millions cubic feet	107,442	120,955	94,507	92,519	96,898
(d) Supply per acre	C. ft.	174.139	186.659	143.714	139.563	141.367
(e) Discharge of river	Millions cubic feet	2,803.060	1,481.406	1,049.889	1,628.440	2,112.151
(f) Percentage of $\frac{c}{e} \times 100$	Per cent.	4	8	9	5	4
CAUVERY.						
(a) Average rainfall	Inches	53.61	18.04	37.28	56.70	40.83
(b) Area irrigated	Acres	1,039,056	1,055,133	1,103,059	1,094,303	1,105,410
(c) Actual supply	Millions cubic feet	279,614	184,732	207,820	223,509	236,446
(d) Supply per acre	C. ft.	269.114	175.100	188.419	204.304	213.978
(e) Discharge of river	Millions cubic feet	700.564	329.269	241.344	376.091	439.258
(f) Percentage of $\frac{c}{e} \times 100$	Per cent.	40	76	86	65	54

APPENDIX V.

PREPARED from Revenue administration reports.

Year.	Rainfall, 1st June to 31st January.	Crop period in days.		Average discharge at head.		Area charged as irrigated.		Total.	Total supply of Canvery.	Supply for Coleroon.			Total supply.
		First crop.	Second crop.	First crop.	Second crop.	First crop.	Second crop.						
							7			8			
1	2	3	4	5	6	7	8	9	10	11	12	13	
1890-91	37-11	123	181	12,037	81	911,401	101,943	1,013,344	129,178	113,336	14,342	143,420	
1891-92	42-43	123	181	11,246	568	908,616	99,443	1,008,059	128,358	106,669	14,266	142,659	
1892-93	47-64	133	181	12,342	769	912,786	99,324	1,012,049	143,184	111,217	15,909	169,093	
1893-94	48-34	123	181	14,738	1,439	886,485	107,570	996,055	179,123	119,866	19,902	199,025	
1894-95	32-66	123	181	11,252	1,379	886,461	103,430	989,891	126,501	111,666	13,944	139,445	
1895-96	51-99	123	181	13,858	1,076	886,330	190,773	987,103	164,095	111,251	18,233	182,338	
1896-97	44-62	123	181	17,193	2,868	882,536	94,537	977,073	227,560	106,844	25,286	262,845	
1897-98	27-21	123	181	18,074	2,868	886,920	102,888	989,808	205,990	111,267	22,878	228,878	
1898-99	55-30	123	181	13,128	2,174	894,869	109,249	994,118	173,608	117,724	19,267	192,776	
1899-1900	34-89	123	181	10,290	509	894,245	94,855	984,103	117,312	99,301	11,731	129,043	
1900-1901	40-55	123	181	20,735	596	894,414	90,175	993,589	239,671	110,568	25,619	255,190	
1901-1902	48-55	123	181	16,828	2,329	894,072	100,148	994,230	204,624	108,686	22,736	227,360	
1902-1903	48-26	123	181	12,106	2,843	883,451	87,810	971,261	173,109	108,057	19,234	192,340	
1903-1904	55-22	123	181	15,418	3,792	845,235	84,584	929,819	223,146	109,237	24,794	247,943	
1904-1905	24-18	123	181	11,931	1,37	865,004	90,744	945,748	128,933	109,385	14,346	143,248	
1905-1906	33-83	123	181	12,648	2,041	897,892	96,724	993,616	165,265	109,443	18,363	183,628	
1906-1907	52-52	123	181	12,639	3,286	894,245	85,861	993,106	186,701	111,197	20,633	206,834	
1907-1908	36-59	153	121	14,908	3,805	900,972	93,237	994,209	236,777	111,201	26,309	263,086	
1908-1909	23-02	153	121	13,366	..	903,989	92,861	996,950	177,068	114,738	18,563	186,632	
1909-1910	23-02	153	121	19,089	..	904,682	98,967	1,003,649	257,337	113,961	28,036	286,373	

NOTE.—The number of days for first crop are inadequate where 123 are given.

APPENDIX VI.

STATEMENT of annual supplies, Cauvery river, for the 20 years ending 1909-1910 in millions cubic feet. The entries in the second column comprise those in the last one.

Year.	Cauvery dam.	Upper anikat into Coleroon.	Total Agunda Cauvery..	Cauvery-Bhavani Bridge.	"Irrigation supply" limited to 7 feet over Cauvery dam, 28,500 cusecs.
1	2	3	4	5	6
1890-91	225,302	62,894	288,196	212,716	204,209
1891-92	260,013	75,886	335,899	255,247	234,892
1892-93	282,643	100,042	382,685	345,379	246,637
1893-94	326,551	69,201	395,752	316,461	309,513
1894-95	217,923	37,461	255,384	216,998	207,779
1895-96	299,587	89,512	389,099	294,155	278,365
1896-97	422,540	260,333	682,873	551,482	310,678
1897-98	393,379	236,663	630,042	540,487	299,394
1898-99	351,568	109,794	461,362	341,285	215,730
1899-1900	166,457	37,287	203,744	174,434	157,199
1900-1901	391,191	258,582	649,773	523,033	270,560
1901-1902	334,082	116,722	450,804	336,176	303,263
1902-1903	293,629	118,903	412,532	311,700	263,964
1903-1904	407,641	232,928	640,569	519,705	349,395
1904-1905	250,786	78,533	329,319	337,267	216,300
1905-1906	185,994	55,350	241,344	211,321	176,636
1906-1907	243,397	132,694	376,091	318,402	223,131
1907-1908	295,859	143,399	439,258	389,899	241,750
1908-1909	220,127	100,248	320,375	251,529	194,762
1909-1910	313,084	252,932	566,016	401,789	272,464

APPENDIX VII.

COMPARATIVE statement of supplies of water used in Cauvery delta.

Year.	Average discharges at head.		Quantities of water used.		Remission.
	First crop.	Second crop.	Appendix V.	Appendix VI.	
1	2	3	4	5	6
1890-91	12,027	81	143,420	204,209	..
1891-92	11,246	568	142,659	234,892	..
1892-93	12,342	769	159,093	246,637	..
1893-94	14,738	1,439	199,025	309,513	..
1894-95	11,252	379	139,445	207,779	..
1895-96	13,858	1,076	182,238	278,365	..
1896-97	17,193	2,868	252,845	310,678	11,837
1897-98	18,074	890	228,878	299,394	..
1898-99	13,128	2,174	192,776	185,730	..
1899-1900	10,290	509	129,043	157,199	6,27,295
1900-1901	20,735	596	(a) 162,961	270,560	14,823
1901-1902	15,828	2,329	227,360	303,263	8,075
1902-1903	12,106	2,843	314,677	263,964	..
1903-1904	15,418	3,792	192,343	349,395	..
1904-1905	11,931	137	247,940	186,800	67,067
1905-1906	12,648	2,041	143,248	176,636	15,857
1906-1907	12,639	3,286	183,628	223,131	44,969
1907-1908	14,908	3,805	206,334	241,750	6,571
1908-1909	13,366	..	(a) 263,086	194,762	..
1909-1910	19,089	..	(a) 195,632	272,464	35,208
			(a) 174,422	..	25,470
			(a) 280,373	..	..
			(a) 280,381	..	..

(a) These entries are as per volumes used per acre.

APPENDIX VIII.

COMPARATIVE supplies of reservoirs in millions cubic feet.

Year.	Existing irrigation supply, Madras.	Mysore reservoir, gross 41,500 and net 37,100 m. c. ft.				Madras reservoir, gross 90,020 and net 80,060 m. c. ft.	
		Available surplus supply.	Percentage of column 3 on column 2.	Minimum supply in reservoir.	Reservoir supply carried forward.	Minimum supply in reservoir.	Supply in reservoir carried forward.
1	2	3	4	5	6	7	8
1890-91	204,209	45,717	22	5,896	5,869	6,154	27,272
1891-92	231,892	82,206	35	3,900	5,736	16,716	38,692
1892-93	246,637	113,950	46	12,304	12,719	32,281	64,506
1893-94	309,513	44,857	14	4,985	4,985	49,884	80,000
1894-95	207,774	38,467	18	— 8,095	— 8,095	12,925	24,983
1895-96	273,365	71,760	26	— 373	10,683	17,776	15,937
1896-97	310,678	275,405	89	6,436	6,436	50,047	80,000
1897-98	299,394	246,252	83	5,328	25,235	68,599	76,051
1898-99	315,730	77,377	25	24,560	34,545	35,981	80,000
1899-1900	157,199	28,797	18	— 1,126	— 1,126	— 23,487	8,989
1900-1901	270,580	273,270	100	— 3,541	15,594	8,989	66,913
1901-1902	303,253	68,250	22	655	2,332	62,067	80,000
1902-1903	268,964	89,635	34	11,095	13,767	50,769	80,000
1903-1904	349,895	215,987	62	15,804	28,533	48,391	80,000
1904-1905	216,300	100,949	47	4,436	4,436	— 10,780	8,989
1905-1906	176,636	37,739	21	— 7,922	— 7,922	— 17,538	8,989
1906-1907	223,131	89,650	40	13,203	14,608	8,989	67,316
1907-1908	241,750	175,704	72	8,326	9,308	52,084	77,398
1908-1909	194,762	104,565	54	8,015	27,481	15,389	24,776
1909-1910	272,464	116,638	43	22,905	22,905	24,776	60,911
Average	..	..	..	5,000	11,383	25,517	54,581
Percentage on net capacity	..	..	..	3 per cent.	36 per cent.	32 per cent.	68 per cent.

NOTE ON THE PROPOSED MYSORE CAUVERY RESERVOIR BY SIR JOHN BENTON, F.O.B., K.C.I.E., INSPECTOR-GENERAL OF IRRIGATION IN INDIA, DATED 28TH JULY 1911.

Correspondence.—Since the issue of my note of 12th May 1911 copies of the following have been received by the Government of India :—

A. Report on the Mysore Cauvery Reservoir project.

B. The Diwan's letter camp No. 4, Political No. 8, dated 1st July 1911.

C. The Diwan's letter Political No. 27, dated 7th July 1911, with note, dated 8th May 1911, by the Chief Engineer of Mysore.

2. The Madras Government has not yet dealt with any of the above, and it appears essential that the Government of India should procure their opinion on the Mysore proposals. The Mysore Government desires that the Government of India should at once pronounce on the case, and I wish to offer the following comments on the above correspondence.

A.—REPORT ON THE MYSORE CAUVERY RESERVOIR PROJECT.

3. *Preparation of working tables.*—This report does not show very definitely the supply of water proposed to be drawn off in each half month for irrigation and for power, and how it is proposed to operate the reservoir. These data were asked for by the Madras Government months ago and any additional particulars required should be furnished to Madras as soon as possible.

B.—DIWAN'S LETTER NO. 8-4, DATED 1ST JULY 1911.

4. *Provisional remarks.*—Pending receipt of the opinion of the local Government, I can only venture to offer some provisional remarks. The paragraph numbers below are those of the Diwan's letter :—

(i) *Paragraph 1.*—The proposals with regard to the Mysore reservoir have not been shown to meet the requirements of existing irrigation in Madras, and also those of the Mysore State.

(ii) *Paragraph 2.*—It appears to me that the procedure should have been—to adopt as the bases conditions which meet the requirements of pre-existing irrigation in Madras, to have these accepted by the Government of that Presidency, and to then prepare complete working

tables of the reservoir for the last twenty years, on the supposition that the work was then in existence. This was for the Mysore State to carry out, or failing this, that they should furnish the requisite data to the Madras Government.

(iii) *Paragraph 3.*—The Upper anikat crest wall, and also the gauge zero which is at the level of the same were lowered 4 feet in 1899—1902 (*vide* report on the Madras Reservoir Project, volume I, paragraphs 12, 35 and 56, volume III, part I, paragraph 2, part II, paragraphs 11, 13 and 20). The 6 feet gauge referred to by Mr. Larminie was the old one at the high level. The larger the reservoirs, the greater the power for conserving floods. The Madras Government has never advanced any claims for the proposed extensions of irrigation, and their actual procedure is a safer subject for comment than supposed motives which can be refuted by that Government.

(iv) *Paragraph 4.*—The Madras reservoir will only serve the wants of that Presidency; I would suggest that it is for the Mysore Government to construct a reservoir of adequate capacity not to deprive existing Madras irrigation of the supply which it has enjoyed from time immemorial. The omission referred to in sub-paragraph (ii) above appears to me to have caused most of the delay.

(v) *Paragraph 5.*—What is required appears to be—acceptance by the Mysore authorities of principles shown from past working to be necessary to safeguard existing Madras rights, and the preparation of complete working tables for the same—*vide* sub-paragraph (ii) above. Nothing has been detailed which can be settled by verbal discussion; there has already, I understand, been a lengthy verbal discussion in Madras between the Chief Engineers of Madras and Mysore.

C.—DIWAN'S LETTER NO. 27, DATED 7TH JULY 1911.

5. *Provisional remarks.*—The statements made in this letter appear to me to call for the following remarks :—

(i) *Paragraph 2.*—It is essential in my opinion that Government of India should have the opinion of the Madras Government.

(ii) *Paragraph 4.*—The map furnished does not show Ramaswamy anikat. Acceptance of the correction in no way affects the case since the agreement of 1892 requires that the approval of the Madras Government should be procured prior to the construction of any new irrigation reservoir across "any part" of the Cauvery.

(iii) *Paragraph 6.*—Paragraph 3 (iii) above will explain the misconception about the 6 feet gauge reading. The sufficiency of the Cauvery supplies has not been questioned,—provided that adequate storage is provided in the Mysore reservoir for carrying forward the surpluses of floods to meet the shortages of periods of low supplies. The proposed Mysore reservoir should be shown to be large enough to meet this requirement, by preparing fully detailed working tables for the last 20 years, as Colonel Ellis did for the data previously furnished by the Mysore State.

(iv) (a) *Paragraph 7.*—The data now furnished by the Mysore State differs slightly from those for which Colonel Ellis prepared working tables of the Mysore reservoir; shortages of capacity will, I fear, still result when the new data are adopted. In my opinion the procedure should be to prepare *fully detailed revised working tables* for the data now advanced.

(b) The data with regard to silt are not as full as could be desired, but as the dam could not be raised to give greater capacity, and thus compensate for initial shortage by under-estimating of silt deposits, it is apparently essential to make a liberal allowance for silt in the first instance. The experiments of the late Captain Dawes were apparently on a very small scale, and the results—being rather inconsistent with each other—are inconclusive. The proportion of silt to water by volume which he proposed for acceptance was 7.5 grains per gallon. There are 6.2355 gallons in a cubic foot, 5,760 grains in a pound, and we may assume that the weight of silt is 112 lb. per cubic foot. This gives for the volume of silt in one cubic foot of water :—

$$\frac{6.2355 \times 7.5}{5760 \times 112} = \frac{1}{13,794} \text{ of a cubic foot.}$$

It may be observed that this proportion is unprecedentedly small for such a case—the usual proportions being from 1/500 to 1/3000; further no allowance was made for the silt rolled along the bed—which may be as much more,—and which would make the proportion 1/6897. The side valleys are steep, the surface is largely composed of soil liable to erosion, and the conditions do not indicate that the proportion of silt should be unusually small.

(c) The Madras experiments were carried out far more thoroughly, and on a very much larger scale—*vide* volume III, pages 197—203 of the report on the Cauvery reservoir project. The proportion of silt in solution to water by volume was 128.2 to 4812310; hence the following :—

1—3870 for the silt in solution.

1—1685 for the total silt carried, assuming that the quantity rolled along the bed was as much as that held in solution.

Hence the comparative figures are as follows for all the silt carried :—

Mysore experiments 1-6897 for Kannambadi site.
Madras " 1-1685 for Metur site.

(d) The effect of the under-sluices may first be considered. It is asserted that the six sluices of 6' x 12' at 12 feet above bed will scour out the silt, and Bhatgarh reservoir is cited as a parallel case; with regard to these views I would point out as follows :—

I.—RESERVOIR LEVEL BELOW CANAL OFF-TAKE LEVEL AND RIVER SUPPLY USED FOR SCOURING.

If at all feasible,—which appears unlikely,—this could only be carried out at the beginning of the flood season, but with the future supply from the river uncertain, no part of it could be devoted to scouring, and would be necessary to at once store water and hold it up for irrigation and power purposes. If it is considered that any scouring through the under-sluices could be carried out, this expenditure of water should be shown in the working table, and should also find a place in the working rules.

II.—RIVER MAINTAINED AT CANAL OFF-TAKE LEVEL.

The proposed canal off-take is 60 above river bed, and the cross-sectional area at that height is 448,800 sq. ft. The flood discharge at the Kannambadi site is given as follows—*vide* page 9, Mysore project—

	M. C. FT.
Maximum	250,000
Average	220,000

The mean velocity upstream of the dam on the supposition all the water in floods is passed through the sluices, which is far too favourable an assumption, would be—

from 250,000/448,800	= 0.56 of a foot per second
to 220,000/448,800	= 0.49 "

Since a velocity of 2' to 3' would be required for scouring, no removal of silt would be effected under this condition.

III.—WATER LEVEL IN RESERVOIR ABOVE CANAL OFF-TAKE LEVEL AND SCOURING CARRIED OUT IN FLOODS.

No scouring could possibly occur as the velocities would be less than those arrived at in the case II above.

The Mysore reservoir is in no way similarly circumstanced to the one at Bhatgarh, since there is no high level canal taking out at the site of the latter, while the under-sluices are more numerous, and the water-supply so abundant that in the driest years two-thirds of it can be used for scouring. As far as at present informed it appears to me that removal of any silt by scouring through the under-sluices may be regarded as impossible under the conditions of the Mysore work; this result is in accordance with actual experience of works elsewhere which are really similarly circumstanced.

(e) The Mysore reservoir will apparently trap all the silt reaching it; the amount deposited will depend solely on the turbidity, and on the quantity of water passed through. The average discharge is given as 220,000 millions cubic feet. For the reasons given in subparagraphs (b) to (d) the provision required for silt deposits for 100 years may be taken to be as follows :—

	M. C. FT.
In one year $\frac{220,000}{1,685}$ m. c. ft.	= 130.6
In 100 years	= 13,060
Deduct provision for silt in present design	= 4,400
Extra provision for silt for 100 years	= 8,660
To meet shortage in dry years— <i>vide</i> note of 12th May 1911	= 13,203
Total extra capacity	= 21,863
Capacity as per project	= 41,500
Total capacity	= 63,363

The total capacity as given in the Chief Engineer's note of 15th October 1910 was as follows :—

	M. C. FT.
Below R.L. 2404	4,480
Above " 2404	39,270
	43,750

The capacity as given in the report on the Mysore Project estimate is 41,500 or 2,250 millions cubic feet less than the 43,750 detailed above. I am not aware of the cause of this reduction; it is possible that the data on which Colonel Ellis arrived at the shortage of 13,203 millions cubic feet may also be affected, and if so, this would necessitate modification of the 13,203 and also of the 63,363 arrived at above. *Revised working tables are essential to show what extra capacity is required.*

(v) Paragraph 8.—The map furnished does not show the levels about Yedatore, and these are required to complete the case. The figures given under sub-paragraph (iv) (e) above point to about 63,360 millions cubic feet sufficing instead of the 72,473 millions cubic feet arrived at in my note of 12th May 1911 on the incomplete data then available; this reduction of 9,110 millions cubic feet is due to the revised data furnished in the Project estimate received after issue of my note just mentioned. As already stated, revised working tables for the new Mysore data may serve to admit of still further reductions. It is hoped that raising the dam to give the finally amended capacity may not present any insuperable difficulties. The reservoir as now proposed would be one-fourth of a mile from Yedatore. The damage to existing irrigation in the delta from a curtailment of the water-supplies of the past to suit a Mysore reservoir of inadequate capacity would be a far more costly and serious matter than facing compensation and extra cost of construction of a higher dam, while it is due to the existing cultivators that their water-supply should not be reduced. *If the proposed Mysore undertakings were Madras Government works, I would be quite unable to advise Government of India to better the revenues of the former at the expense of the pre-existing rights of irrigators in the delta.*

(vi) Paragraph 9.—(a) The rainfall is too uncertain to admit of any forecasts of it being relied on, more especially as regards rice cultivations—*vide* paragraph 14 of my note, dated 12th May 1911.

(b) A shortage of supply in three years out of twenty years would very seriously prejudice existing rights of the irrigators in the delta, and arrangements must clearly be devised under which this cannot possibly occur.

(c) The provisional proposal to only accept the 7 feet gauge at the upper anikat for six years would in no way meet requirements. Inspection of Appendix VIII of column 5 of my note of 12th May 1911 will show that a shortage of 13,203 occurred only once in 20 years. The six-year period might not include any such dry year, and would not show whether the 7 feet gauge condition could be relaxed. I would advise that the requisite extra capacity may be an essential condition, and that the period for trial may be twenty instead of nine years, my reasons being that a year with a shortage of 13,023 millions cubic feet as in 1906-1907 may occur when the result would be depriving Mysore cultivators of over 52,000 acres of irrigation; this is over one-third of the total 150,000 acres proposed to be irrigated on the new canals, and would give rise to intolerable hardship, not to mention the scandal of favoring the power and mining royalties at the expense of the means of subsistence of the cultivators. The shortage in supply would be the result of inadequate capacity being given to the Mysore reservoir, but the case would appear to those unacquainted with conditions as one of Government of India reducing Mysore irrigation to furnish water to the delta; this position would be unfair to Government of India, since inadequacy of capacity would be the true explanation. The warrantable discontent of the Mysore cultivators promises to be a serious objection and it is obviously a result to carefully avoid.

(vii) Paragraph 11.—The case has been chiefly delayed—

(1) by the reluctance of the Mysore State to accept and act on conditions which are essential for safeguarding the existing rights of the cultivators in the Madras delta,

(2) by their not preparing working tables for these conditions which will clearly show that the arrangements will answer the requirements of both Governments.

(viii) Paragraph 12.—Before the masonry dam can be commenced the ultimate height of it requires to be known since the width at the base depends on the height :—

(a) To proceed with a dam intended to reach 124 feet ultimately, and which may only be carried up to a height of 94 feet for the storage of 11,000 millions cubic feet would involve a waste of Rs. 14½ lakhs—*vide* Mysore Reservoir report, page 5, paragraph 27.

(b) To proceed with a dam intended to be only built up to 124 feet would not admit of the work being raised to provide for the extra storage referred to in paragraph 4 (e) above.

(c) To pronounce on the case without the opinion of the Madras Government,—who are as much interested as Mysore State,—would be to give a decision after hearing only one side of the case, and which promises to be regretted hereafter.

Note by the Chief Engineer, Mysore, dated 8th May 1911.—I wish to suggest as follows with regard to what is stated in this note :—

(i) *Paragraph 9.*—Colonel Ellis' conditions have the recommendations of meeting Madras rights and of being simple; this officer was apparently of opinion that the inflow below Sivasamudram in crucial times would not be a disturbing factor which could not be allowed for, while no statistics have now been, or probably can be, advanced in support of the supposition that this will not be the case. Referring to sub-paragraph (2) of the Chief Engineer's letter the addition of the words "less net increase in the river discharge between Mysore and Upper Anikat" are required to make the condition both fair and definite; and I trust means can be found for giving effect to this modification when there will be no need to make any further departures from the simple rules proposed by the Madras Government. This is a local question which had better be dealt with by the Madras officers in the first instance. The figures advanced in the table are based on averages and normal gauge readings which promise to lead us far away from the Madras requirements. Madras is due and requires a 7-ft. gauge reading at the Upper Anikat when obtainable, and in my opinion any proposal which ignores this fundamental necessity must prejudice existing Madras rights.

(ii) *Paragraph 10.*—As will be seen from my note of 12th May 1911, paragraph 28 (ii), only a moiety of the surpluses quoted were available for the Mysore reservoir,—if that work is given a capacity of only 41,500 millions cubic feet. To make these surpluses available, an enlarged capacity is essential and I have advocated this being given. It is obviously incorrect to assume that flood surpluses which have passed into the ocean months previously,—owing to lack of adequate storage to conserve them,—are available for use either in Mysore or Madras. The proposed Madras reservoir is only given the capacity needed for Madras requirements; as far as Mysore is concerned, this work has no connection whatever with the case now under consideration. This provision of the requisite storage to meet Mysore requirements devolves, I would suggest, on the Government of that State.

(iii) *Paragraph 11.*—It is needless to consider the proposals advanced in this paragraph which pre-suppose that the Madras rights will be met by rules based on the system of average figures referred to in sub-paragraph (i) *supra* which cannot be accepted.

(iv) *Paragraph 12.*—The proposals made in this paragraph are for the consideration of the Madras Government. It appears to me that it is perfectly impossible to clearly see the effect of any such proposal without preparing fully detailed working tables for the last twenty years,—and it is for the Mysore Government to prepare these if they wish to show that their alternative will answer.

(v) (a) The Government of India abandoned the Sutlej-Montgomery project after it had been fully prepared, and chiefly out of deference to the merely prospective requirements and rights of Native States further down that river, while in this case actually established rights protected by special agreement are what have to be safe-guarded; there have been other more or less similar cases of restrictions elsewhere, but it is needless to enter on these matters since the agreement of 1892 has to be complied with. The proposals of the Chief Engineer, Mysore, may prove more troublesome than those advanced by the Madras Government; but neither would be harassing if loyally worked to, since in this case distribution of supply would rest with Mysore as long as the conditions were complied with.

(b) The Cauvery river supply consists of a series of floods as fully explained in my note of 12th May 1911, paragraph 12, and the large size proposed for the Madras reservoir was dictated by this consideration; the size of this reservoir should be no grievance, since it is a question quite apart from that now under consideration, while the enlargement of the proposed Mysore reservoir has been pressed on the Mysore Government in my note just mentioned. For compliance with the existing agreement and safeguarding of existing rights, the Mysore reservoir should either be small enough to not prejudice these rights—which involves restrictions on State proposals—or it should be sufficiently large to fully meet the requirements of existing Madras rights as well as all the proposed new works in Mysore. The relative sizes of proposed Mysore and Madras reservoirs have no bearing on the case at issue except that works of small capacity are quite unsuitable in both cases. I may remark, as already pointed out in my note, dated 12th May 1911, paragraph 23, with regard to the Diwan's letter Political, dated 27th March 1911, paragraph 8, that the ordinary requirements of the Madras reservoir are 60,000 millions cubic feet, while it is to be given a gross capacity of 90,000 millions cubic capacity or 50 per cent. more to provide for dry years, floods and silt. In the case of the Mysore reservoir the ordinary requirements may be presumed to be the project capacity of 41,500 millions cubic capacity; if this is increased to 68,363 millions cubic capacity as advised in paragraph 4 (e) above for precisely the same reasons, the percentage of increase will be 58 per cent. or almost exactly the same as in the case of the Madras work. The conditions as regards uses to which the water is to be put are entirely different, and the closeness of these percentages is admittedly a matter of chance coincidence; however, this will serve to show that the scale of capacity as recommended here is practically the same in both cases.

(vi) *Paragraph 14.*—The suggestion of the Chief Engineer to move the Madras Government to request the necessary permission to proceed with the small reservoir of 11,000 millions cubic feet capacity, is a very practical one which calls for careful consideration. The Chief Engineer does not explain what base width is to be given to the masonry dam, but the difficulties enumerated in paragraph 4 (viii) above present themselves, if the proposal is to make it suitable for a

dam of an ultimate height of 124 feet over bed as proposed in the project. The Chief Engineer of Mysore has not furnished any detailed working table showing that when the Madras conditions—*vide* paragraph 9 of his note with the amendment 6 (i) above—are accepted a work of 11,000 millions cubic feet storage capacity will suit Mysore requirements. Before agreeing to this proposal it appears to me that the following should be ascertained :—

(a) Whether working tables for a Mysore reservoir of about 11,000 millions cubic feet capacity based on the Madras conditions—*vide* paragraph 9 of the Mysore Chief Engineer's note—will meet Mysore requirements.

(b) Whether the Madras Government are prepared to approve of this proposal; it is believed that they will not accept it unless this is agreed on by the Mysore Government to be the ultimate capacity, which would mean that the base width of the dam should only be made of suitable width for a maximum height of 94 feet over river-bed.

(c) Whether the Mysore Government agree to the work being as described in the Mysore Cauvery report, paragraph 27, with a maximum storage capacity of 11,000 millions cubic feet.

6. *Conclusion.*—I would recommend as follows :—

(i) That copies of the papers mentioned in paragraph 1 above along with copies of my note of 12th May 1911 may be sent to the Madras Government for report.

(ii) That the measures necessary for the protection of Madras interests as proposed by that Government may be accepted, or that and amendments of same may be agreed to by Madras—*vide* paragraph 6 (i) above.

(iii) That the working conditions of the proposed Mysore reservoir and irrigation scheme may be clearly laid down and agreed to by the Governments of Madras and Mysore. The proposed working rules were asked from the Mysore Government by the Government of Madras some months ago, but they do not appear to have been furnished in a very definite form up to now.

(iv) That fully detailed working tables for the Mysore reservoir, such as advanced by Colonel Ellis, may be prepared for the conditions (iii) above and for the following two cases :—

(a) For a reservoir of sufficient capacity to comply with the conditions (ii) above while fully meeting Mysore requirements.

(b) For a reservoir restricted to 11,000 millions cubic feet as the ultimate capacity.

The Madras Government will, I trust, be willing to prepare these working tables provided that they are furnished with the requisite additional data which may be found to be necessary—*vide* paragraph 3 above.

Exhibit Ma. 9.

MADRAS CASE.

PART III.—ARGUMENTS—SECOND ISSUE.

Consideration of Madras Rights and Claim s

Immense interests involved.—It is desirable, before commencing to give the details on which the consideration of this case must be judged, to draw attention to the immensity of the vested interests involved in the Madras Presidency.

2. *Area of Madras irrigation under the Cauvery.*—The area of irrigation under the Cauvery below the Upper Anicut is approximately—

In British territory	ACS.
In French territory	1,002,000
	27,000
Total	1,029,000

Above the Upper Anicut in Madras, there are numerous channels taking off from the Cauvery on both sides of the river irrigating approximately—

Below Bhavāni confluence	ACS.
Above Bhavāni confluence	94,000
	1,000
Total	95,000

A considerable portion of this area raises two crops or perennial crops. The total area of wet cultivation is therefore 1,124,000 acres.

A great part of this area is very old irrigation and was cultivated as irrigated land before the country came under the British Government. These lands have been in the enjoyment of the free flow of the Cauvery, reduced only by the draw-off of the existing irrigation channels in Mysore, for a very long period.

3. *Area proposed to be irrigated in Mysore.*—The area irrigated in Mysore under existing Cauvery channels is about 108,000.

The area proposed to be newly irrigated has been variously stated, but appears to be about 150,000 acres.

This statement of areas will give a fair indication of the relative importance of the respective interests of Madras and Mysore involved in this arbitration.

4. *Madras existing interests very large compared with Mysore prospective interests.*—On the one hand, there is an existing prescriptive right of the lands in Madras, over a million acres in area, to receive and enjoy without restriction whatever water they have heretofore been receiving. This water is the life blood of the prosperity of the Madras districts of Tanjore, South Arcot and Trichinopoly: it also materially affects the prosperity of the people of Salem and Coimbatore districts.

The whole of this area has an undoubted right to receive the natural flow of the Cauvery, and any material diminution of this supply must affect the prosperity and material well-being of the holders of these lands as well as the revenues of the Madras Government and the Government of India.

5. *Existing rights to be fully safeguarded.*—The decision come to should, therefore, be such as to involve no risk of any appreciable injury to the Madras irrigated area. It is claimed that in case of doubt which must inevitably crop up in an inquiry into such a complex matter the benefit of the doubt should be given to Madras, whose rights and liabilities are actually existent and must be fully safeguarded. It is urged that the interests involved are too great to justify taking any risk. This matter once decided, a reversal or modification of the decision will be difficult, if not impossible, after new and important interests and liabilities are created in Mysore, and it is submitted that no alienation of water now passed down to Madras is justifiable, if such alienation involves any risk whatever of appreciable loss, by diversion of water from the lands which have been hitherto in enjoyment of it.

6. Only flood water which will, if passed down by Mysore, be surplused into the sea without enjoyment or use by Madras and which will certainly not be required for Madras irrigation should be permitted to be impounded by Mysore, and when, as is frequently the case, it is doubtful whether water will, if passed down, be actually used, it is unjustifiable to expose Madras interests to any risk of loss in order to prevent a possible but uncertain waste of the water. However laudable it may be to utilize such water, this should only be permissible in cases where such utilization does not involve Madras lands in any risk of loss of any of their existing rights in the form of useful supply.

7. *Consideration of Madras prescriptive rights before the remodelling of the Upper and Lower Anicuts.*—The descriptions in Part II of works and irrigation conditions, together with a study of the rules of regulation and record of gauge-readings and discharges at the Upper Anicut, furnish the data for an estimate and measure of the prescriptive rights of Madras.

From the descriptions it will be gathered that as regards quantities of water required to enable the customary supplies to be run on to the Madras irrigated fields there were no very material changes between the construction of the Cauvery Dam about 1845 and the remodelling of works commencing about 1899.

The limit amount of water required in 1899 was materially the same as at any time throughout this period, and the rights existing in the period 1890 to 1899 were similar both in quantity and in system of usage and enjoyment as in the previous decade and the previous one before that. Any minor alterations affecting the limit made during the period 1846 to 1899 were of a nature tending to economy and certainly not tending in any way to increase the limit flow actually enjoyed and used.

8. *Supply for the Cauvery System and for sand clearance.*—The rules of 1882 and 1896 show that 7 feet on the Cauvery Dam was fixed as the ordinary full supply level required for the Cauvery Delta, and this, as supplied under the conditions which existed prior to 1900, is the amount claimed by Madras.

It is, however, to be pointed out that the rules of 1882 permit the use of water for scouring at the Upper Anicut "except in times of scarcity" whenever the water rises above 6.5 feet on the Cauvery Dam gauge, although the rules of 1896 did not permit opening at any time in the absence of special conditions until there was 7 feet on the gauge.

An examination of the water registers for the twelve years 1882 to 1895, omitting the years 1887 and 1888 of which the registers are not available shows that in these years only nine times in the south-west monsoon, and on twenty-six occasions altogether, did the opening

of the under-slucies take place when there was less than 7 feet on the gauge, while the opening of the sluices when the gauge read 7 feet or over occurred on 36 occasions. This proves that, under the rules of 1882, it was more usual than not to wait for a gauge-reading of 7 feet before opening the under-slucies.

9. *Prescriptive right to water for scouring at the Upper Anicut.*—The opening of the sand sluices when water stood below 7 feet on the Cauvery Dam gauge served a double purpose, viz., to scour sand from above the Upper Anicut and to give a supply to the Lower Anicut. Madras has undoubtedly a prescriptive right to the use of water for both these objects. With a gauge-reading of 6.5 feet the discharge of the Aganda Cauvery was—

	M. C. FT.
Over Cauvery Dam	1,950
Over Upper Anicut	366
Through under-slucies fully open	725
Total ..	3,041

In order to obtain 7 feet on the Cauvery Dam with the under-slucies closed, it was necessary to pass one foot of water over the Upper Anicut, the crest of which was only 6 feet above the level of the Cauvery Dam gauge. The total discharge therefore under these conditions was—

	M. C. FT.
Over Cauvery Dam	2,300
Over Upper Anicut	644
Total ..	2,944

In order not to complicate the case by putting forward a different figure the smaller of these two figures is that claimed by Madras as the limit of flow to which she has by prescription a preferential right for the supply of the Cauvery Delta although the larger one might strictly be claimed.

10. *Conditions of supply at the Lower Anicut.*—Considering the conditions at the Lower Anicut both before and after remodelling, it is clear that the system in either condition can only be fully supplied when not infrequent freshes of considerable magnitude are passed down to this weir. This is specially the case during the south-west monsoon, when the yield of the catchment of the Veeranam tank will be materially less than in the north-east monsoon and especially so in the earlier months, June to August, in which the rainfall is small and the ground dry. The capacity of the tank is so small in comparison to the ayacut that it is clear that it is rather by direct flow from the Coleroon than by storage that the crops are raised, the direct flow being assisted and supplemented from impounded water. It has indeed been the practice to speak of "full supply" in the Vadavar when referring to a stage which can only supply by direct flow the whole ayacut under both channel and tank.

It has been shown* that even for this direct flow supply it is necessary to maintain a gauge-reading at the Vadavar head of 9.0 feet.

* Part II, paragraph 41.

Even after remodelling the Lower Anicut the conditions necessary to enable such a supply require a total flow in the Coleroon above the Lower Anicut of 17,750 cusecs. Such a flow from the nature of the case can only be occasional and intermittent. These conditions make storage necessary, and extra flow to provide water for impounding over and above the daily

† Part II, paragraphs 38 to 41.

draw-off is therefore also necessary. The conditions of the Lower Anicut already described† show clearly that it is only when the Veeranam tank stands full that the water of floods surplused over the Upper Anicut do not contribute materially to the irrigation under that tank and that a condition of surplusing at the Lower Anicut is essential to either impounding or passing adequate supplies for the Veeranam tank ayacut. Such being the case and the conditions being as described, it cannot be doubted that the impounding by Mysore of flood waters must, under existing conditions, deprive the Veeranam tank and its ayacut of supplies except at such times as it stands full.

Under such a state of affairs the prescriptive rights of Madras extend to all floods and flood waters during such time as the Veeranam tank is not full.

It is recognised, however, that the conditions of supply of the Veeranam tank are not such as conduce to economy of water and that by enlarging the tank and also the carrying capacity of the supply channel it is possible to obtain a supply without the heavy surplusing over the Lower Anicut which is, under the circumstances described, a necessary condition.

11. *Full legal prescriptive right not claimed by Madras.*—The Madras Government do not in this matter claim the full limit of their prescriptive right, as enunciated above, and have limited their claims to the water required at the Upper Anicut under the conditions existing prior to remodelling for passing over the Cauvery Dam a depth of 7 feet of water with the under-sluiques closed.

12. *Alterations to the Vadavar and the Veeranam tank in progress.*—It is considered here desirable to state that an estimate was sanctioned in 1906 for enlarging both the capacity of the Veeranam tank and its supply channel, the Vadavar, while the scope of the system was to be extended to supplement the supply of the Shatiatope System under the Vellar.

The alterations are—

(a) Raising the full level of the Veeranam tank 2 feet and thus increasing its capacity from 918 million cubic feet to 1,489 million cubic feet.

(b) Enlarging the Vadavar by widening and re-grading to give it a carrying capacity of 1,660 cusecs with water at the level of the top of the anicut shutters when closed in place of the existing capacity of 900 cusecs.

(c) Enlarging an old existing sluice and channel made to feed the Vellar from the tank.

(d) The vent area of the sluice to be increased from 120 square feet to 200 square feet.

These works were designed to allow of passing water from the Veeranam tank into the Vellar and from this to the Shatiatope System.

It was proposed to increase the ayacut area under that system by 5,000 acres from 29,000 acres to 34,000 acres. The works were sanctioned in 1906 and are nearly complete.

What is required to improve the existing conditions of supply of the Veeranam tank ayacut forming part of the Lower Coleroon System is the enlarging of both the tank and its supply channel; and under the sanctioned proposals the cost of works in progress is being shared between the two systems, the Shatiatope System paying for enlarging the sluice and the tank and the Lower Anicut System paying for enlarging the Vadavar.

These works now mentioned are calculated to alter materially the conditions of irrigation of the area under the Veeranam tank and the Vadavar. The actual rights of Madras are, however, not affected. Those rights embrace a claim to all flood water whenever the Veeranam tank is not full up to 918 million cubic feet, the original capacity level.

13. *Remarks on claims to supply made by Madras.*—Although there is thus prescriptive right to floods, the Madras Government are not making a claim to these, but have limited their claim to what water was required in the Aganda Cauvery at the Upper Anicut to enable 7 feet to be passed over the Cauvery Dam under the conditions obtaining for many years prior to 1899.

While the water so claimed would not, under the then existing conditions, have served even for the direct full supply of the Veeranam tank ayacut, under the altered conditions described, the limit water claimed will give sufficient to supply the Veeranam tank and the Lower Anicut System in addition to the Cauvery. The claim made, however, is greatly less than the full prescriptive rights of Madras.

In waiving their strict legal prescriptive rights to all flood water for the supply of the Lower Anicut System so long as the Veeranam tank does not contain 918 million cubic feet of water, the Madras Government claim that a specific supply for this system over and above what has been customarily passed for the Cauvery System is absolutely necessary.

It is only the improvements to the Lower Anicut and the further improvements to the Vadavar in progress which make it possible, without grave injury to the Veeranam tank irrigation, to waive a claim to floods.

The system of supply by floods is admittedly wasteful although it is on this system that the supply of the Veeranam tank has actually depended from time immemorial.

The Government of Madras, however, consider it fair and reasonable, under the altered conditions which render it possible to substitute a less wasteful system, to waive the claim to floods, but they do so only on the express condition of an allowance being given which will, under the altered conditions, fully secure the supply of their irrigation.

14. *Claims of Madras to water at the Upper Anicut include provision for specific supply to the Lower Coleroon System.*—The claim of Madras at the Upper Anicut as formulated leaves available for supply to the Lower Anicut System and for occasional extra water required for the Cauvery System the water which, under the conditions obtaining prior to 1899, used to be passed into the Coleroon through and over the Upper Anicut.

Under the conditions of the revised claim made by Madras (Exhibit Ma.—3, paragraphs 3 and 4-II), the claims for specific supply made in the short statement of the Madras case, [paragraph II (c) and (d)—Exhibit Ma.—1], are waived not because they are not required, but because the revised claim comprises and includes suitable provision for the above purposes. Therefore, should the revised claim made be curtailed on any grounds, these claims for specific supply must be revived.

15. *Claims of Madras for both systems at the Upper Anicut.*—The Madras Government have, on the general grounds stated, decided to confine the claim to the prescriptive rights of Madras, to the limit flow required under the conditions obtaining in and before 1899 to produce over the Cauvery Dam a flow of 7 feet under normal conditions and with the under-sluiques of the Upper Anicut closed. This amounts to a limit flow of 2,944 million cubic feet a day at the Upper Anicut.

The Government claim that, prior to the remodelling of the Upper Anicut, 1899—1902, their prescriptive rights to this limit flow had been fully acquired and that no action taken by them in remodelling their works with a view to effecting economies and securing more efficient use of the water to which their right existed has in any way diminished or impaired such rights and that they remained unimpaired in 1910 just as they existed prior to the remodelling of the Upper and Lower Anicuts, and the Government claim that their rights to water at the Upper Anicut is to all flow up to the limit specified by them.

16. *Proofs on which Madras rely.*—The evidence on which Madras rely to establish their claim are the rules of regulation in force and the water registers showing the actual system of regulation and enjoyment of water for a sufficient period prior to the changes made by remodelling the Upper Anicut.

The rules in force at the Upper Anicut during the period are those of 1882 and 1896 (Appendix I). No copies of rules prior to 1882 have been traced, but the water registers for the years 1880 and 1881 show a similar system. The descriptions already given and the record of the gauge-readings at the Cauvery Dam are evidence of the amount of water which passed day by day over that work, while the rules show clearly what distribution of water was made when supplies were below what was desired and capable of material alterations in distribution by the existing means of regulation.

17. *Limited power of regulation prior to remodelling.*—In this connection it is brought to notice that prior to remodelling of works the power of distribution of water at the Upper Anicut was small in comparison with that since obtained. After remodelling the actual distribution serves as good evidence of what the distribution would have been had it been previously feasible.

The necessities of the Lower Anicut System before and after remodelling have also to be considered and also the use of water for the combined purpose of scour of sand from above the Upper Anicut and the supply of water to the Lower Anicut System.

18. *Rules of regulation indicate the system of use and enjoyment.*—It is submitted that the rules and the actual regulation from 1880 to 1910 clearly indicate the constant use and enjoyment by Madras of water for many years prior to the remodelling of works up to the limit flow claimed, and it is asserted that this use is sufficient to establish a prescriptive right to such a flow whenever available. Any diminution of that limit flow would have had the effect of withholding from Madras lands water which they customarily enjoyed.

The fact that under the then existing conditions of the works certain water passed over the Upper Anicut and that a part of this water was passed into the sea does not, as regards this part, constitute non-enjoyment, as it has been shown that the then existing state of the works made the passing of the water a necessary condition to the required irrigation supplies being delivered on Madras lands. Under such conditions the water passed over the Upper Anicut, including any which eventually passed into the sea, was used by Madras.

The water used for scour of sand at the Upper Anicut comes under the same category of user.

IRRIGATION ABOVE THE UPPER ANICUT.

19. *Use of water above the Upper Anicut.*—In addition to the water required at the Upper Anicut, Madras possesses prescriptive rights to water for the many channels taking off from the Cauvery above this work. The following is an approximate statement of Madras irrigation fed directly by the Cauvery above the Upper Anicut:—

	ACS.
(a) Between Bhavani Bridge and the Upper Anicut	94,000
(b) Above Bhavani Bridge	1,000

Details of the distribution of the irrigated areas are given in Appendix III.

20. The channels fed from the Cauvery below Bhavani take off from the Cauvery at bed level and generally have open heads. When the river is high there is no difficulty in getting adequate supplies. When the river is low the supplies are diverted into the channel by construction of long spurs of stakes and brushwood run out from head of channel into the flowing

water and serving to divert water into the channel. These spurs are known as "koramboos," and a regular establishment is kept up to construct them and land is reserved for the growth of the brushwood and small timber required for their construction.

These channels, unlike those below the Upper Anicut, continue irrigation throughout the hot weather months, and by means of koramboos the natural flow of the river is diverted for the supply of the late crops and perennial crops. Irrigation during the hot weather is carried on to the extent of flow available, which fluctuates much according to the character of the season, and is lowest generally in the month of March. There is no measure available of the quantity of water used in these channels, which are all of great antiquity and have been taking water as described from the natural flow of the river from time immemorial.

The prescriptive rights of Madras include the supply of water in accordance with custom to these channels, and the limit quantities claimed at the Upper Anicut are the quantities passing down after the channels above have drawn off in accordance with usage the supplies required by them.

21. *Prescriptive rights of Madras to hot weather flow.*—For the supply of these channels during the hot weather months, the prescriptive rights of Madras embrace the whole natural flow of the Cauvery less what is drawn off for the supply of the directly supplied channels in the Mysore territory.

22. *Condition for waiving right to hot weather flow.*—With a view of meeting Mysore requirements and recognizing that the water proposed to be continuously passed for power generation by Mysore is to be passed down the river to Madras, the Government of Madras are prepared to waive their prescriptive right to the natural flow of the river in the months of March, April and May and allow the impounding of this by Mysore on the condition that a steady flow of not less than 900 cusecs is passed from Mysore down the river into Madras throughout this period. The estimated steady flow required for power generation by Mysore is 1,000 cusecs, but the amount is reduced to 900 cusecs by Madras to allow a fair working margin.

It is only on condition that this flow is passed on to Madras that the Government of Madras consent to forego their existing prescriptive right to the whole natural flow of the river for the months of March, April and May.

23. *The rights of Madras include water according to custom for the irrigation above the Upper Anicut.*—In stating the claims and limits of flow advanced by Madras the claims at the Upper Anicut only have been formulated in terms of specific gauge-readings and equivalent quantities. The reasons are that the regulation of flow has been impracticable at any point in the Madras territory above the Upper Anicut and the rules of regulation therefore only apply to the water required below that point. Evidence of the system of regulation and statements of gauge-readings and draw-off are not available above this, but the existence of rights to a supply for all the channels is clearly established. Madras claims the whole flow of the river up to the limit quantities specified at the Upper Anicut after the customary draw-off for the channels above has been taken from the river, and the claim includes water for such channels.

24. *Contentions advanced by Mysore regarding limit flow at the Upper Anicut.*—Having described the conditions of irrigation flow and distribution of the Cauvery water to Madras irrigation and stated the claims put forward by Madras, it is now proposed to deal with those contentions put forward by Mysore in their statements and rejoinder which bear on the second of the terms of reference so far as regards the limit flow of water to which Madras is entitled at the Upper Anicut. The gauge-readings advanced by Mysore as suitable half-monthly maximum limits of flow of the Aganda Cauvery over the Cauvery dam which will conserve unimpaired the rights of Madras (Exhibit My. 2, Rule 1) are re-stated in column 2 of the table following.

These figures appear to be generally based on gauge-readings giving flow equivalent to the average of half-monthly supplies actually passed during twenty years 1890 to 1909 over the Cauvery dam limited to a maximum of 2,300 million cubic feet a day.

These figures are given in column 4. The exceptions to this are the months of July, first half of August and second half of September.

To base the limit of maximum flow of a very fluctuating supply on the amount of the average flow actually realized is obviously to reduce the resulting average flow and reduce the supplies which have been enjoyed in the past.

25. Table and statistics showing flow under Mysore proposals—

Half-month.	Maximum limit gauge-reading proposed by Mysore.	Gauge-readings con- noting average supplies of twenty years and a limit of column 2.	Gauge-readings con- noting actual average supply for twenty years limited to maximum of 7-ft. gauge.	Gauge-readings con- noting average supply proposed, Madras Cauvery Project.	Gauge-readings repre- senting average supplies 30 per cent. more than those in column 5.
1	2	3	4	5	6
June—					
First half	3.5	1.4	3.5	2.9	3.5
Second half	5.1	4.5	5.1	2.9	3.5
July—					
First half	6.9	5.6	5.7	6.1	6.8
Second half	6.7	6.2	6.4	6.1	6.8
August—					
First half	6.6	6.3	6.6	5.9	6.6
Second half	6.6	5.9	6.0	5.9	6.6
September—					
First half	6.2	5.5	5.6	5.8	6.5
Second half	5.2	4.8	5.2	4.7	5.1
October—					
First half	5.4	4.9	5.4	5.0	5.5
Second half	5.4	4.9	5.4	4.2	4.7
November—					
First half	5.0	4.4	5.0	3.8	4.3
Second half	4.4	3.6	4.4	3.8	4.3
December—					
First half	3.9	2.8	3.9	3.0	3.6
Second half	3.0	2.3	3.0	1.7	2.0
January—					
First half	2.5	1.9	2.5	2.1	2.5

The table above shows in column 3 gauge-readings which would have been realized half-monthly for the same twenty years with a flow limited by the figures put forward by Mysore. In column 5 are given the gauge-readings put forward in the Madras Cauvery Project as suitable for the steady supply (without fluctuation) of the existing irrigation. It is to be noted that the figures in column 4 represent the water actually passed subject to a limit maximum of 2,300 million cubic feet, and this embraces reductions of flow when less quantities than the limit were purposely passed on account of long continued floods or heavy local rain. The figures in the other columns are not subject to any such deductions and are consequently unduly great in comparison.

It will be seen that the figures in column 3 represent great reductions on the corresponding figures in column 4 in all half-months except the first half of July and the second half of August, and in these periods the reductions are material although not proportionately very large. The figures in column 4 represent actual average supplies passed over the Cauvery dam in twenty years limited to a normal discharge due to a 7 feet gauge-reading. This limit does not embrace the claims or prescriptive rights of Madras as regards occasional extra supply for the Cauvery or the Vennar nor the supplies required for the Veeranam tank and the Lower Coleroon System.

Further, even excluding these considerations, the rights of Madras cannot be limited to any specific quantity based on averages.

The averages include the years of very deficient supply, and the total average quantity is not the limit of Madras rights. Madras rights are as claimed based on the whole natural flow up to a certain limit, and the operations of the rules of regulation clearly define the modes of exercising these rights which have been in enjoyment and use for many years.

Under the conditions experienced very deficient supplies were received in certain years, being the result of deficient or badly distributed natural flow, and the fact of such deficiency cannot be held to restrict or reduce the rights of Madras in a year of more abundant or better distributed natural flow.

While, therefore, the figures in column 4 do not represent the full rights of Madras, a comparison of them with the figures in column 3 shows that they represent a much larger flow than what could be realized under the Mysore proposed limits.

Although Madras claims are based on limit flow and not on total quantities used during a season, it is desirable to give a few figures of actual quantities of water which would have been passed over the Cauvery dam by adopting the Mysore proposals and compare them with the amounts actually passed as shown by the gauge-readings in column 4.

These have been worked out from the total average yearly flow of the twenty years to which column 4 refers from June to January. The total average yearly quantity of water passed from June to January amounts to 253,543 million cubic feet. The quantity under the limits proposed by Mysore (column 2) works out for the same twenty years to 210,920 million cubic feet—a reduction of 42,623 million cubic feet a year or enough to irrigate more than 150,000 acres of land, that is, more than the whole new area proposed to be irrigated by Mysore under their reservoir. Realize further that column 4 does not represent the full extent of Madras prescriptive rights either as regards occasional extra supplies to the Cauvery System or as regards the main source of supply to the Coleroon System, and it will be apparent what disastrous results would necessarily follow the acceptance of the limits proposed by Mysore.

26. *Concerning the admission by Mysore (Exhibit My. 1, paragraph 10).*—In this connection reference is made to the Mysore statement (Exhibit My. 1, paragraph 10) in which the following passage occurs making reference to the uniform depths of flow allowed in the Madras Metur Project: "It is admitted that some allowance should be made on account of the uncertain flow of the river. An addition of about 25 to 30 per cent. of the supplies provided in the Metur Project should be sufficient."

This is an absolutely clear and reasonable admission. Sir John Benton, in noting on the matter (Note dated 12th May 1911), makes a similar remark and says in paragraph 12: "The average irrigation supplies vary incessantly with the flow of the river and, I may explain, to an extent which is unknown as far as I am aware on large canal systems elsewhere in India. The steady average supplies which would suffice for the area to be irrigated if a reservoir is provided are very much less than those which have to be run in order to take advantage of freshets and floods."

The gauge-readings connoting average quantities 30 per cent. in excess of those allowed in the Metur Project are shown in column 6.

When the admission made by Mysore was noted by Madras as reasonable, the Mysore Darbar hastened to explain that they had meant that the 25 to 30 per cent. meant maximum limits and not "supplies" of water. The words used by Mysore do not, however, carry this interpretation. It was stated by them in their rejoinder that, under the rules put forward by Mysore the maximum flow was limited to gauge-readings shown in column 2 of the statement above, and therefore the meaning intended to be conveyed could not be what was understood by Madras. It is, however, pointed out that the rules were drawn out subsequently to putting in the Mysore statement. The gauge-readings equivalent to average supplies under the limit referred to in these rules are given in column 3. It is asked how "such supplies" can be 25 to 30 per cent. in addition to those shown in column 5.

The equivalent gauge-readings to supply 30 per cent. above column 5 are given in column 6.

What Mysore apparently propose is to limit the maximum monthly flow to which Madras has a prior right to the average flow realized monthly for the irrigation supply of the Cauvery System.

27. *Mysore proposals do not conserve unimpaired Madras rights.*—It is brought to notice that the Madras Government have, from the commencement of this controversy, uniformly based their statement of requirements for irrigation of the Cauvery Delta System on a limit flow of 7 feet, and further that in both sets of rules of regulation put forward by Mysore (Exhibit Ma. 1-a) this limit flow is accepted as an equitable basis of settlement throughout the year from June to February.

The Madras Government have felt unable to accede to the principle on which the Mysore rules for regulation were based, and on this ground and on questions relating to losses in transmission, it was found impossible to come to an agreement.

The present proposals of Mysore ignore the admissions made in their previous proposals of the establishment of the 7 feet limit claimed by Madras at the Cauvery Dam.

The limit readings now put forward by Mysore as fully conserving Madras rights are a great reduction on those previously admitted as a suitable basis for agreement. It is believed that these proposals have been shown to be altogether untenable and that they do not suffice to "conserve unimpaired Madras prescriptive rights."

28. *Special allowances for rainfall during the north-east monsoon proposed by Mysore.*—The Mysore Darbar have suggested that special allowance should be made permitting extra impounding in Kannambadi Reservoir on the occasion of heavy falls of rain in the delta (Exhibit My. 1 and Exhibit My. 4, paragraph 9). It, however, admits that it would be difficult to frame rules to make provision for this beforehand. But it is only on the basis of rules made beforehand that extra impounding could be permitted. The contention in this respect advanced by the Madras Government (Exhibit Ma. 3, paragraph 9) is that it is impracticable to frame rules for impounding extra water by Mysore on account of rainfall in the delta which will at the same time fully protect Madras from risk of loss due to such extra impounding.

29. *Considerations governing allowances for rainfall.*—The considerations governing the matter are noted on below.

First, a depth of $\frac{1}{4}$ inch of water per day delivered on the fields is about what will suffice to supply paddy after transplantation is complete.

Thus, a well-distributed precipitation of rain totalling to 4 inches will suffice for half a month's supply. The 4 inches must, to serve such a purpose, be all "useful rainfall."

A fall of 4 inches in a single day would not all be useful; indeed, a great deal of it would be harmful.

The greatest rainfall which can be counted as "useful" is $1\frac{1}{2}$ to 2 inches in one day or a sufficient supply for six to eight days. After any fall in excess of this, ryots are concerned rather in avoiding damage from excess of water and hasten to drain off the rainfall as rapidly as possible.

The excess rain runs off to the sea or stagnates in the eastern swamps and low-lying lands and in no wise assists the supply for irrigation of the bulk of the irrigated valuable lands. If, say, $1\frac{1}{2}$ inches of useful rain falls in one day, this will carry on for six days, a further fall during this period, not exceeding $\frac{1}{4}$ inch the first day, $\frac{1}{4}$ inch the second day up to $1\frac{1}{2}$ inches the seventh day, will be useful, but excess fall over this will not assist supply.

Now consider how such fall of useful rain can be made to serve Mysore for excess impounding.

The collection of rainfall statistics and the despatch of them to executive headquarters will be done by midday on the day after the fall, and action on this would be taken at Kannambadi, say, the evening of the day following the rainfall, i.e., on an average 24 hours after the mean time of the fall for each day.

In the stages of river flow customary during the north-east monsoon, October or November, it will take $3\frac{1}{2}$ to 4 days for flow to reach from Kannambadi to the Upper Anicut, while it will take a further day on an average to reach the irrigated area.

Thus, from the time the rain falls till the reduced supply reaches the fields it will take $5\frac{1}{2}$ to 6 days. Six days is about the limit of time a single fall of rain will supply with the full efficiency.

Further, such rain must be widely distributed over the delta.

Using all reasonable expedition, by the time any reduction of supply made on this rainfall reached the delta, the effect of the rain in the form of useful irrigating supply would have expired, and it is only on the effect of subsequent daily rainfall of a useful character well distributed over this large irrigated tract that material extra impounding could be permitted. It is not denied that on certain occasions it might be possible to make certain concessions to Mysore when the fall of rain in the north-east monsoon was continuous and well distributed over the whole area.

An examination of records of rainfall in the Tanjore district has, however, shown that such occasions did not in the past twenty years arise in any of the years during which such assistance would have been useful to Mysore.

30. *Allowances for rain impracticable.*—The matter is so complicated and the time of transmission so great that the formulation of workable rules regarding allowances for rainfall is not practicable.

The Mysore Government have been unable to formulate any rules which would serve as a guide to regulation on this matter, and the statement made that "it will be easy to frame rules after a term of years" is not supported by any argument whatever and cannot be accepted.

31. *Reference to Madras Project as regards rainfall.*—With regard to the Madras Project, although the Madras Reservoir site is only half as far from the Upper Anicut as Kannambadi, it was found impracticable to formulate any rules for taking advantage of rainfall, although under the much easier conditions of this case the belief was expressed that advantages might occasionally be taken of rainfall to reduce supplies passed down (Madras Cauvery Project, Volume I, paragraph 62).

In such a case any undue reduction of supply could be rectified within four days by issues from the water impounded in the interest and at the call of the area affected.

32. *Conclusions as regards rain-allowances.*—In the case of impounding by Mysore the right of call would not exist, while, even if it did, the distance of that work requires a harmful lapse of time before delivery of compensation water.

The Madras Government adduce the above considerations to support their contention (Exhibit Ma. 3, paragraph 9) that "it is impracticable to frame rules for allowing a reduction in issue at the Mysore Reservoir in consequence of rainfall in the irrigated area."

33. *Specific supplies required for Coleroon System.*—The Government of Mysore have stated that a claim to specific supply for the Coleroon System including the Veeranam tank and ayacut is untenable, because under the present conditions no regulated supply is under ordinary circumstances passed to the Coleroon System (Exhibit My. 1, paragraphs 11 and 12). The sources of supply to the Coleroon System and the Veeranam tank have been already described in considerable detail (paragraphs 35 to 41, Part II).

It is there shown that, under existing conditions, the Vadavar irrigation can only be adequately supplied from the Coleroon when a considerable quantity of water is being passed over the Lower Anicut. This connotes necessity for not infrequent freshes and floods which under existing circumstances are passed down the Coleroon.

The water passed to the Coleroon under existing conditions is not a specific regulated quantity but constitutes all floods and freshes, and until the Veeranam tank is full all such flood water is actually used and enjoyed.

It is only when the Veeranam tank is full that flood water passed by the Lower Anicut is not used and enjoyed.

34. *Discharges of 150-yard calingulah.*—Further, in addition to leakage, percolation and freshes, unregulated and uncontrolled supplies of water pass over the 150-yard calingulah from the Cauvery into the Coleroon, as noted below, whenever the Cauvery Dam passed 5½ feet of water or upwards:—

Gauge, Cauvery dam.	Approximate water passing over 150-yard calingulah.
	CUSECS.
5½ feet	38
6 "	492
6½ "	1,030
7 "	1,584
7½ "	2,215
8 "	2,912
8½ "	3,669
9 "	4,483

Mysore contend that a considerable proportion of the freshes and floods now enjoyed, which now are the main sources of supply of the Veeranam tank and a considerable source of supply to the rest of the Lower Anicut irrigation, may be impounded at Kannambadi and yet no allowance or specific supply should be given in place of these.

Even under existing circumstances the conditions of supply of the Vadavar are unsatisfactory, and if the floods and freshes which are at present in the enjoyment of Madras are impounded, it is absolutely necessary that in their place a specific supply should be given.

It is desired here to correct an error in Madras reply to paragraph 12 (Exhibit Ma.-3): the catchment area 95 square miles should be 256 square miles.

The correction does not affect the argument or inference to be drawn.

35. *Further remarks regarding past correspondence and claims.*—The statement in the Mysore rejoinder (Exhibit My. 4, paragraph 12) that "now the Veeranam tank has been brought in for the first time besides the Coleroon irrigation" is no doubt made by the Mysore Darbar in ignorance of the fact that the Veeranam tank and the irrigation under it forms part of the "Lower Coleroon Anicut System" and the area under the tank is over 46 per cent. of the whole area irrigated by the system.

It has already been pointed out (Exhibit Ma. 3, paragraph 12) that from the first the Mysore Darbar were informed that the 7 feet gauge limit did not include supplies for the Coleroon irrigation and that it would probably be necessary to make further demands for this. As the Veeranam tank ayacut forms a very considerable proportion of the whole "Coleroon irrigation", it is clear that the statement of Mysore that a claim for this is now put forward for the first time is incorrect. The necessity for an allowance for the Lower Coleroon irrigation including the Veeranam tank and its ayacut has been dealt with above, and it is submitted that the Madras rights to water for this are supported by very convincing facts and figures.

It is considered desirable, however, to explain why no specific claim to special extra water for the Lower Coleroon System or occasional extra supplies above the 7 feet limit for the Cauvery Delta System was made, in the tentative rules for working the smaller reservoir (Appendix VII) put forward by the Chief Engineer for Irrigation, Madras, as an enclosure to demi-official letter to the Resident of Mysore of 22nd November 1911, as the prescriptive rights of Madras are the same whatever the size of the Mysore Reservoir be.

The reason is that it was considered that, under the small capacity, 11,030 million cubic feet, and the small area of new irrigation, 25,000 acres, to which Mysore undertook to limit the small scheme, there would be still available at the Upper Anicut in sufficient number and quantity the occasional freshes giving opportunities of passing extra supplies to the Cauvery Delta and for the supply of the Coleroon irrigation including the Veeranam tank.

Under the conditions of the small scheme, it was unnecessary to burden the rules with those extra restrictions and complications for safeguarding Madras supplies which are, however, quite necessary in the case of the large reservoir, which constitutes a formidable danger to the prosperity and rights of Madras irrigation.

36. *Regarding Mysore statement that "the floods of the month of June are mostly allowed to run into the sea."*—This statement (Exhibit My. 1, paragraph 30) is made on the authority of the Revenue Officer's report, Madras Cauvery Project, Volume I, page 87, paragraph 82. What is here said is the "early freshes" are not wholly utilized and probably run to waste or are uselessly absorbed in the channel beds.

Again Mysore quote from Volume I, page 4, paragraph 16: the relevant remarks are quoted at length:—

"15. *Conditions of irrigation water-supply.*—As will be seen from the map, the Cauvery enters the delta at the narrow western corner or neck and its waters are distributed over an ever widening expanse of country on their way to the sea. The volume available in the channel is consequently much reduced as they proceed eastwards, and the porous nature of the soil in the more northerly part of the tract tends to still further diminish the supply by absorbing large quantities of water. This is especially the case when the first freshes come in June after the country and its water-courses have been dry for many weeks. As is only to be expected, therefore, the land towards the west receives a much earlier and abundant supply than that towards the coast. The supply of the latter portion of the delta would indeed be very deficient if it were not for the fact that the porous character of the soil already referred to enables it to store up a considerable quantity of the river supply which afterwards drains out and is partly given back to the channels in the form of spring water for the benefit of the lower land. . . ."

"16. *System of rice cultivation.*— . . . Seed-beds are usually watered either by early freshes in the river or water is obtained for them by baling from wells or spring channels. Any water in the river in excess of what is necessary for seed-beds before the time of transplantation generally runs to waste as the ryots object to using it on their fields or wetting them until just before transplanting. They prefer the ground to remain dry and get thoroughly aerated. . . ."

"17. *Double crop lands.*—In this portion of the delta, it is customary . . . to transplant the first crop (a short one) as soon as possible after the arrival of the early freshes in June so that it may be harvested in September before the break of the north-east monsoon. . . ."

The extensive quotation given indicates that the expression "generally runs to waste", which is quoted by Mysore, does not literally mean that the water serves no useful purpose, but that it is not wholly utilized on the lands if arriving before the ryots have sufficient seedlings ready for transplantation. The water is not under such circumstances run on to fields and it pours down the delta net-work of channels, being absorbed into the bed and adjacent sub-soil and fills up the interstices in the sandy bed and the porous sub-soil. It is absolutely necessary, before water can pass down a porous sandy bed, that the interstices of the sand should be filled up, and this takes enormous quantities of water. In the Madras Project, during the month of June, an allowance of 50 per cent. of the whole supply issued from the reservoir was allowed for wastage by absorption on this account (Volume III, page 43). In one sense this water is wasted, but as such wastage is an essential condition of irrigation, it is as a fact "used" although the benefit is not visible. It is usual to talk of water lost by absorption as wasted, but such wastage is a necessity and water for this purpose is as much one of the rights of user as water run on to the fields.

If the water received in June is not all run on to the fields, it is still used and serves a useful purpose. The above quoted paragraphs, moreover, show the importance of early transplantation of the first crop so that it may be ready to harvest in September and state that "it is customary to transplant as soon as possible after the arrival of early freshes."

The statement of Mysore that the "floods of June" are mostly allowed to run "into the sea" is thus shown to be incorrect.

37. The two places where the freshes coming down the Cauvery in June can be deliberately surplused are at—

(a) The Upper Anicut.

(b) The Grand Anicut.

(a) *The Upper Anicut.*—In the first half of June, it is found that in the twenty years, 1890 to 1909, the Upper Anicut surplused only two years.

In 1893, a small quantity, 362 million cubic feet.

In 1909, a large quantity, the reason for which is stated later.

(b) *The Grand Anicut*.—Water was passed through the Grand Anicut in five years.

38. The following table shows the recorded discharges in the first half of June of the Upper and Grand Anicuts and the Cauvery and the Vennar:—

TABLE of discharges in million cubic feet for the first half of June for the years from 1890 to 1909.

Years.	Discharge at the Cauvery Dam.	Discharge into the Coleroon over the Upper Anicut.	Grand Anicut discharge.	Combined discharges of the Cauvery and the Vennar.
	M. C. FT.	M. C. FT.	M. C. FT.	M. C. FT.
1890	5,224	Nil.	Nil.	2,257
1891	6,345	..	..	3,520
1892	8,032	..	..	4,048
1893	13,541	362	4	11,233
1894	6,807	Nil.	..	..
1895	3,306	..	Nil.	175
1896	4,250	..	..	822
1897	5,662	..	..	2,220
1898	4,030	..	..	..
1899	4,096	..	1,573	129
1900	3,979	..	..	1,694
1901	4,910	..	..	3,272
1902	3,568	..	1,726	288
1903	5,786	..	Nil.	3,441
1904	15,207	..	3,702	7,138
1905	4,336	..	Nil.	2,292
1906	692	..	..	343
1907	5,066	..	2,594	1,138
1908	4,382	..	Nil.	2,817
1909	21,577	20,722	6,619	16,803

* Information not recorded.

The year 1909 was an exceptional one. Work had been going on in April and May on the right abutment of the Grand Anicut which had been found to be in a very dangerous and unstable condition. It was desirable to raise water slowly and not head up water suddenly on the work and this especially in the first freshes. In June, the freshes were abnormally early and abnormally heavy and water was freely passed into the Coleroon over both the Upper and Grand Anicuts and into the Cauvery and the Vennar. Throughout the year there was abnormal regulation in consideration of the state of this work. As a fact the anicut did fail in July, three arches at the right end collapsing.

In 1899, 1902 and 1907 the repair works were backward and water was kept out of the Cauvery and the Vennar till near the middle of June. While such an occurrence is regrettable and points to failure in carrying out repairs expeditiously it in no way affects the prescriptive right of Madras.

In 1904 large quantities of water were passed into the Cauvery and the Vennar, viz., 7,138 million cubic feet. The reasons for not passing down more water are not recorded. However this may be, the omission to occasionally use the entire flow of the first half of June constitutes no valid interruption of the rights of user, and, further the above statistics show that the allegation that the greater part of the flow of the early freshes is wasted as regards the first half of June is incorrect.

39. The conditions of the second half of June may be considered with the help of a similar table.

TABLE of discharges in million cubic feet for the second half of June for the years from 1890 to 1909.

Years.	Discharge at the Cauvery Dam.	Discharge into the Coleroon over the Upper Anicut.	Grand Anicut discharge.	Combined discharges of the Cauvery and the Vennar.
	M. C. FT.	M. C. FT.	M. C. FT.	M. C. FT.
1890	9,133	Nil.	Nil.	7,948
1891	6,130	..	..	3,246
1892	11,258	308	35	6,826
1893	30,406	9,342	698	24,807
1894	18,081	2,020	..	..
1895	28,372	18,316	8,689	19,364
1896	40,094	41,154	19,378	24,799
1897	35,457	27,851	8,435	26,799
1898	24,402	6,080	..	..
1899	24,183	11,880	3,374	15,828
1900	20,903	6,200	96	21,443
1901	20,753	4,791	Nil.	22,652
1902	8,452	92	..	7,174
1903	9,558	Nil.	..	8,161
1904	31,637	27,211	11,403	19,855
1905	8,246	Nil.	Nil.	7,559
1906	4,076	657	..	2,818
1907	14,807	Nil.	1,515	10,410
1908	5,270	..	Nil.	6,704
1909	15,447	8,897	2,852	15,974

* Information not available.

As regards the water passing over the Upper Anicut, this was, except in 1909, most of it involuntary surplus, or effected in accordance with the existing rules of regulation; and under the limiting conditions for impounding by Mysore proposed by Madras the greater part of this, as well as much of the excess involuntarily passed over the Cauvery Dam and discharged at the Grand Anicut into the Coleroon, would have been available for impounding by Mysore. Reference to the daily discharges at Sivasamudram or Bhavani Bridge for the second half of June in the years 1893, 1895, 1896, 1897 and 1904 will clearly demonstrate this. Further, in the case of discharges over the Grand Anicut, it will be seen that, speaking generally, these are only passed when the supplies to the Cauvery and the Vennar have been good.

Out of the nineteen years considered, leaving out the exceptional year 1909 and neglecting amounts under 2,000 million cubic feet in the half month, surpluses have only been passed in months in which the supply passed to the Cauvery has exceeded 19,000 million cubic feet.

The passing of such supplies does not indicate any disposition to waste the early freshes of June into the sea, and it is claimed that the figures produced altogether refute the Mysore suggestion of neglect of use of the early freshes.

40. *Remarks regarding discharges recorded*.—It is to be realized that these figures are extracted from the totals of daily discharges compiled and recorded as a matter of routine. Exception can be taken to the formulæ and assumptions on which many of these computations are made, and the figures cannot be taken to be more than a rough indication of the actual discharges. Recalculating the whole of these discharges would be an undertaking involving immense labour and much time, while the results would be open to the imputation of having been settled and compiled for the purposes of this case. On the whole, it has been thought best to let the figures on record stand with the qualification noted above.

An exception to the above are the discharges extracted from the Madras-Cauvery Project which are the results of carefully conducted gaugings and can be relied on.

41. *Areas irrigated below the Upper Anicut*.—The Mysore Darbar have suggested that the Madras rights are limited by some specific area of land irrigated and which it has been the custom to irrigate. The Madras Government altogether deny that their rights are so limited. It, however, simplifies the consideration of the matters at issue to state that for many years the areas irrigated by the Cauvery in Madras have not materially altered and that only seasonal fluctuations of area have occurred.

A diagram is attached showing the areas charged as irrigated year by year from 1866 in the Cauvery and the Coleroon Delta Systems.

In addition to this, there are channels taking off from the Cauvery between the Cauvery Dam and the Grand Anicut irrigating approximately 6,760 acres.

42. *Sir John Benton's Note of 12th May 1911.*—The Madras prescriptive rights are established by the rules of regulation actually in force from time to time, with corroborative evidence extracted from water registers as regards the actual methods and practices of user. It is on such facts rather than on expert opinion and evidence that Madras base their claims. It is, however, considered desirable to invite attention to and request perusal of Sir John Benton's notes of 12th May and 28th July 1911 on the subject of the matters now under arbitration. This officer was in the position of an impartial expert whose opinion on the matter was sought by the Government of India, while his great eminence as authority on irrigation entitles his opinions to the most careful consideration. These notes with the connected correspondence are printed with the Proceedings of the Madras Government No. 296 I, dated 18th September 1911, and a perusal of the whole will throw much light on the history of the matter prior to reference to arbitration.

43. *Regarding references made by Mysore to the opinions expressed and proposals made in the Madras Metur Project.*—It is to be clearly understood that expressions of opinions and forecasts made in the reports of the Madras Metur project are merely opinions and proposals, and are not facts. The Mysore Darbar have attempted to make capital out of the higher duties of water proposed to be worked to after the construction of the Madras Reservoir. It is, however, on existing conditions and existing modes of use that this case has to be considered. The proposals for the Madras Project relate to very different conditions and it is possible that they may fall short of realization when actually put to the test.

It is, however, believed that the duties allowed will, under the conditions of steady and assured supply, prove adequate, and should the Government of Mysore offer as a compromise the passing to Madras from their impounded supplies water which will assure such a regulated and unfailing supply and give proof of their ability to give effect to such an arrangement, the Government of Madras are prepared to entertain the offer.

44. *Summing up of Madras claim.*—The Madras Government claim that the interests of their ryot population shall receive full protection and, to quote the words of the issue framed, that their prescriptive rights shall be "conserved unimpaired."

Summing up, the Government of Madras advance that the reply to the second issue should be:—

(a) The extent of the prescriptive rights of Madras as against Mysore embraces a title to all the natural flow of the Cauvery under existing conditions at all times when the Veeranam tank is not holding 918 million cubic feet of water.

When the Veeranam tank contains 918 million cubic feet of water, the rights of Madras are to the whole natural flow of the Cauvery which was necessary under the conditions existing prior to remodelling the Upper Anicut in 1899 to secure a flow of depth of 7 feet over the Cauvery Dam with the under-sluices of the Upper Anicut closed.

(b) The Government of Madras claim that, to preserve their rights unimpaired, it is necessary to pass down to them the whole natural flow of the river up to a limit flow which, when measured at the Upper Anicut, amounts to 2,944 million cubic feet per 24 hours.

EXHIBIT Ma.-9 (a).

Information asked for by the Arbitrator.

"Population affected by irrigation below the Upper Anicut."

The population of the villages irrigated by the Cauvery Delta and Lower Anicut Systems is 2,200,000 excluding Karikal, which is French territory.

The figures have been taken from the 1911 Census Report.

25th October 1913.

W. M. ELLIS, Col., R.E.,
Representative of the Govt. of Madras.

EXHIBIT Ma.-10.

THE MADRAS CASE.

PART IV.—ENGINEERING ARGUMENTS—THIRD ISSUE.

1. Under this head have to be considered—

- (a) the principles, and
- (b) the actual rules

under which the discharges at the Kannambadi Reservoir can be best regulated in a way which will ensure to Madras full protection of their prescriptive rights.

2. *Principles of regulation.*—To consider first the principles, that is, the general system of regulation unhampered by figures representing exact quantities. Each party has formulated a system, and in addition a request made by the Assessor for certain investigation of discharges under certain lines foreshadows the possible suggestion by the Arbitrator of a third system.

3. *The Mysore system.*—The system advanced by Mysore is one permitting impounding at Kannambadi on any day of the whole or some portion of the flow, and if it is found by measurement at the Upper Anicut "d" days later that such impounding has deprived Madras of some of the water to which she was entitled, Mysore is then at once to issue this amount as "compensation water" from the Kannambadi Reservoir on receiving by wire such intimation.

It is assumed above that "d" days is the time of transmission or flow of water from Kannambadi to the Upper Anicut in those stages of flow which will suit the general flow conditions under the circumstances described.

4. *Remarks regarding the Mysore system.*—The system proposed by Mysore, although at first sight appearing reasonable, involves computations of a complicated nature and, in addition, does not ensure to Madras full protection of her prescriptive rights. Putting aside for the moment a certain difficult question concerning loss in transmission on compensation water, such a system as indicated has the following disadvantages.

As the time of transmission is "d" days the time which elapses between excess impounding by Mysore and receipt of compensation water is "2d" days.

This connotes the receipt at the Upper Anicut "d" days after date of natural flow, the supply of compensation water in lieu of that of which Madras was deprived. While in time of low natural flow and with a falling river such compensation supply may, and frequently would, prove very useful and under certain and not infrequent circumstances would recoup Madras for the deprivation inflicted "d" days previously, under other also not infrequent circumstances, generally on a rising river, such compensation supply would give an excess over the limit quantity required by Madras and have to be surplused into the sea.

More frequently, the compensation supply, while not being surplused, will cause fluctuations in the incidence of flow at the Upper Anicut materially greater than the natural flow fluctuations.

Already the fluctuating nature of the natural flow at the Upper Anicut is a cause of inconvenience and militates against economy in the use of water.

Material increase in such fluctuations, which is inherent in the system of regulation proposed by Mysore, is most strongly objected to and is an infringement of the rights of Madras.

The loss of compensation water which must be surplused further deprives Madras of water to which she has prescriptive right.

5. *Main objections to the Mysore system.*—On three grounds, therefore, the principles of regulation proposed by Mysore are objected to—

- (a) The system does not secure to Madras the quantities of water to which she is entitled.
- (b) The system alters, in a manner unfavourable to irrigation supply, the natural distribution and fluctuations of flow.
- (c) The system is a complicated one and likely in practice to prove fruitful of disputes and misunderstandings.

An exposition of the practical working of the system, and of the fluctuations of flow to which it gives rise, will be given later when considering the working of the rules advanced by Mysore (Enclosure to Exhibit My. 2.)

The question of loss in transmission on "compensation water" will also be considered later.

6. *The Madras system.*—The system of regulation proposed by Madras is based on the actual frequent measurement of flow of the principal rivers which, combined, make up the flow of the Cauvery in Mysore. Except the Kabbani, all these rivers join the Cauvery above the dam site. The Madras Government propose the actual frequent (or continuous) measurement of the inflow into the reservoir and also of the Kabbani river. The places of measurement must be above the waterspread of the Mysore Reservoir, and the place of measurement of the Kabbani must be such that the flow measured must synchronize with the flow of the other measurements.

7. *Remarks on the Madras system.*—Under such a system of constant actual measurement, the total flow of the Cauvery in Mysore will be known in time to allow Mysore to impound any excess in that flow over what is due to Madras, and to so regulate impounding at the Kannambadi Reservoir as to pass down the river sufficient water, allowing for losses in transmission, to secure to Madras at the Upper Anicut the full flow to which she is entitled.

Subject to a suitable allowance for loss in transmission, such a system can absolutely secure unimpaired Madras rights both as regards quantity and incidence of flow.

If there were no losses or gains in transmission, this system would give to Madras without risk of any failure the water to which she has a right. As, however, losses and gains in transmission occur in an irregular manner which cannot be foreseen or calculated in advance, it is necessary to make such percentage allowances to cover risk of loss as will ensure that Madras shall be fully safeguarded. It is only by comparison of recorded daily and monthly flow, under the varying circumstances which have occurred in a series of years of various characters, that a reasonable estimate of the percentage necessary to secure the rights of Madras can be made. Under the Madras proposals, if C be the percentage allowed for loss in transmission, R the measured inflow into the Mysore Reservoir, K the discharge of the Kabbani, L the limit flow to which Madras is entitled at the Upper Anicut, then Mysore must pass daily for Madras use either the whole inflow into the reservoir (or $\frac{100}{100-C} \times L$) whichever is less. Mysore may thus impound any excess of the combined flow $R + K$ over the quantity represented (by $\frac{100}{100-C} \times L$). Subject to a suitable fixing of C this system is one which would fully secure Madras rights.

8. *The third system of regulation.*—The system foreshadowed in the investigation which the Assessor has asked both parties to consider is the fixing of a proportion (P) which the daily flow of the Cauvery into the Kannambadi Reservoir (R) bears to the daily yield of the river at the Upper Anicut.

If L is the limit flow due to Madras at the Upper Anicut, under this system, Mysore would be allowed to impound on any day the amount by which the inflow at Kannambadi exceeded ($P \times L$).

9. *Remarks on the third system of regulation.*—Such a system has the great merit of simplicity, but the difficulty is to fix such a value for P as will, while fully safeguarding the rights of Madras, not unduly limit impounding by Mysore.

The method is similar to the Madras system, but more simple in that it eliminates the daily measurement of the Kabbani. In other respects it is the same as that system. If the Kabbani and the Cauvery confluence were above the dam site, the system now considered would be precisely the same as that proposed by Madras. Provided that a suitable proportion can be fixed, the difficulties in connection with gains or losses in transmission are eliminated. It is, however, in consideration of these losses that the fixing of P is so difficult a matter. The difficulty in fixing a proportion appears to be materially increased under conditions which leave out the measurement of so important a contributor to the flow as the Kabbani; but the Government of Madras do not desire to oppose such a system of settlement, provided the proportion fixed fully safeguards their existing interests.

10. *Measurements common to all systems of regulation.*—All the three systems require for their working frequent or continuous measurement of the flow into the Kannambadi Reservoir by gauging, at selected stations above the waterspread, the discharges of the rivers Cauvery, Hemavathi and Lakshmanathirtha.

The sum of these measurements will represent what the natural flow of the Cauvery at Kannambadi would have been under conditions existing prior to the construction of the reservoir.

11. *New irrigation above the Mysore Reservoir.*—It is here necessary to bring to notice a matter affecting the natural inflow into the Mysore Reservoir, a measurement of which is the most important factor of every system of regulation mentioned above.

After a good deal of pressing, it is admitted by Mysore that the Darbar have in contemplation, if not in actual execution, a scheme for largely extending "direct flow" irrigation, on the rivers flowing into the reservoir, above the waterspread of that work.

It is well known that in the absence of storage the limits of safe direct flow irrigation in these upper waters of the Cauvery have been reached, and the extension of irrigation in the tracts above the reservoir has been considered and refused because any such extension would prejudicially and materially affect the prosperity of the Mysore cultivation below.

There is no question about there being plenty of water for "direct flow" and water to spare during the months of July, August and September, but after this the flow of the Cauvery dwindles. Even for a single wet crop, water is required up to December, and the measure of the area of secure cultivation under the "direct flow" system is the quantity of dependable flow in the months of November and December. Under existing conditions the limit of the area of the "direct flow" irrigation by Mysore has been already reached, and no material extension is safe except by means of, or by help of, a storage system.

Proposals for such a system are now the subject of consideration by this Arbitration Committee.

It will be clear that, with the assistance of the impounded water in the Mysore Reservoir, it is practicable to give adequate and suitable supplies to all cultivation, whether old or new, lying below the reservoir, subject to the capacity of the reservoir and the water impounded being adequate. In such a state of affairs, Mysore proposes to extend irrigation above the reservoir, supplying such irrigation from the direct flow of the river, which flow prior to the reservoir construction was in the months of small seasonal discharge allocated and required for the supply of the existing irrigated areas below the Kannambadi dam site. The proposals involve the supply of the latter area from the impounded water in the new reservoir. Thus, the area of irrigation above the dam will be limited only by the limit of seasonal flow of river supplying it in those months of the irrigating season when the seasonal flow is low.

In short, subject to suitable conditions of capacity of the Mysore Reservoir, the limit of possible cultivation above the dam is now increased by the area of old cultivation below the dam, and the old cultivation can be secured by the issue from the reservoir of water impounded in the period of more abundant flow.

It will be clear from this that the increase in area of irrigation above the reservoir affords a measure of the area of old irrigation below the reservoir which is under the new conditions made dependent on that work.

12. *How Mysore new irrigation affects Madras.*—It may be asked even if this is so how, provided the rights of Madras are fully protected, this affects Madras.

It affects Madras in this way. All the systems of regulation propounded are based on the measured inflow into the reservoirs of the three rivers Cauvery, Lakshmanathirtha and Hemavathi. The extension of irrigation rendered possible above the reservoir by the construction of this work will have the effect of materially reducing this flow if the off-takes are above the place of measurement. That is, through the instrumentality of the reservoir, the natural flow of the river to the whole of which up to a certain limit Madras has prescriptive right is reduced by draw-off above the place of measurement.

It may be argued that the flow is not reduced as the draw-off above is only substituted for the draw-off for old irrigation below the reservoir, and this is admitted.

Such an argument, however, involves adding to the limit flow to be passed through the Kannambadi dam an allowance for the extent of draw-off required for all new irrigation above the reservoir as well as for any actual new irrigation below the reservoir which is supplied by draw-off direct from the river.

If the total draw-off for such new irrigation is " N " million cubic feet daily, the limit of impounding in Mysore under the third system would thus require to be $PL + N$ in place of PL .

Failing this, it would be from the daily flow legitimately due to Madras that the new irrigation above the Mysore Reservoir would be supplied.

The Mysore Darbar argues that the extension of irrigation suddenly undertaken above the reservoir has no connection or concern with the project under consideration. This is denied. The extensions are only rendered possible by the construction of a storage reservoir as already explained. There will be a considerable area, between 6,000 and 8,000 acres, of wet cultivation now fed by direct flow of the Cauvery submerged by the new reservoir; it is legitimate for Mysore to introduce new irrigation to the same extent as regards area and period of irrigation without being on this ground subjected to any hindrance.

It is, however, claimed by Madras that to the measure of inflow into the Kannambadi Reservoir an allowance should be added for the draw-off of all new irrigation taking off direct from the river in excess of this area.

The above consideration is of material importance in considering Madras rights.

13. *No examination of the third system of regulation now proposed.*—As no definite proposals based on the principle of the third system of regulation have been formulated, no further criticism and examination of this system is here proposed.

14. *Additional daily measurements required for the Madras and Mysore systems.*—As regards the systems or regulation proposed by Mysore and Madras in addition to the measurements of inflow into the reservoir, the following additional measurements are required to be made frequently or continuously:—

On the Mysore system, measurements of the flow of the Agunda Cauvery at the Upper Anicut.

On the Madras system, measurements of the flow of the Kabbani is necessary at a point where this flow will synchronize with the measured flow of the three rivers discharging into the Mysore Reservoir.

Such measurements entail very careful gaugings of the streams and graduation of gauges, but do not connote the possibility of any very material errors or any extreme difficulty.

15. *Definite factors to be fixed in framing rules.*—It is necessary, in framing rules for working the Mysore and Madras proposals, to fix definite figures to fill the place of the quantities d = time of transmission in the Mysore proposals, C = percentage of gain or loss in transmission in the Madras proposals.

Further, a percentage (t) of loss in transmission on compensation water has not been considered in the system proposed by Mysore, and consideration of this loss cannot be eliminated.

16. *Loss or gain in transmission.*—Taking up the consideration of losses or gains in transmission relating to the Madras system, it is admitted that the subject is a difficult one and there must be much uncertainty and doubt regarding several of the points which have to be considered even if all the figures of discharges which are to be used in the presentation of the case are established on a secure basis.

17. *Unreliable basis of Sivasamudram discharge computations.*—The matter is much more complicated from the knowledge, which is only recently acquired, that the figures of daily discharges past Sivasamudram which have been furnished by the Mysore Darbar to Madras are unreliable. These figures, a lately as April last (were officially stated by the Diwan of Mysore, himself a distinguished hydraulic engineer, to be accurate except for high floods, while at the discussion held in Ootacamund at the end of May these discharges were put forward by the Diwan as the basis for examination of the working of a system of regulation proposed by him, and no indication was then given that the discharges were considered inaccurate.

18. *Inspection of Sivasamudram Anicut.*—The Sivasamudram Anicut was visited in June last by Col. Ellis, and from the inspection made it was at once apparent that the discharges on the basis of computation adopted must be inaccurate and excessive for all high stages of flow. The limit of reasonable accuracy appeared to Col. Ellis to terminate with the stage of flow in which the main anicut becomes submerged. It appeared to him probable that this stage would occur somewhere between gauge-readings $2\frac{1}{2}$ to 3 feet, the gauge-reading at the time of his visit being 2.1 feet. This differs very greatly from the estimate furnished by the Chief Engineer, Mysore (the present Diwan), to the Joint Secretary to the Government of Madras in his letter No. 43 of 28th January 1911. In this, he says: "I also understand that over the greater part of the weir the crest is not submerged until the head above the crest rises to a height of not more than 6 feet, and the number of days on which this has occurred is so few that the present discharges may for all practical purposes be taken as correct."

19. As stated above, Col. Ellis considered that the maximum limit of flow which would enable the Mysore computations to be accepted as probably giving quantities with reasonable accuracy was about a gauge-reading of 2.5, which connotes a discharge of about 47,000 cusecs. The reasons on which this opinion was based are contained in a note and set of calculations made by Col. Ellis in June last which are given in Appendix IX.

It was, however, recognized by him that Sivasamudram was clearly unsuitable as a gauging-station, and the river was inspected for some distance above Sivasamudram with a view to seeing if a more suitable site did not exist. The Danakere Anicut, seven miles above Sivasamudram, was also inspected. A report was then submitted to the Government of Madras pointing out that the computed discharges over Dankere Anicut would be more reliable than those at Sivasamudram, and that orders for fixing gauges above and below this anicut and taking daily readings had been given. Further, it was reported that a fair gauging site, so far as could be judged from mere visual inspection, existed below the Danakere Anicut, and suggested that it might be desirable in the future to organize a gauging party to work here and to accurately calibrate the Sivasamudram gauge from observations of velocity and flow so made.

From the results of the calculations made (Appendix IX) the view was taken that below 47,000 cusecs the discharges computed by Mysore might be accepted as a basis on which the gains or losses of water in transmission between Sivasamudram and the Upper Anicut might be computed and form the basis of a settlement of the percentage of allowance on this account required to safeguard the prescriptive rights of Madras.

20. *Assessor's inspection of Sivasamudram Anicut.*—Arrangements were made by the Assessor (Mr. Nethersole) to inspect Sivasamudram after the last sitting of the Arbitration Committee. The stage of flow at the time of inspection (10th August) was practically the same as when inspected by Col. Ellis (gauge-reading main anicut, Sivasamudram, 2.1 feet). Mr. Nethersole took the view that there were resulting from the conditions of flow so many possible sources of error that, even for low stages of flow, the quantities computed by Mysore could not be accepted without confirmatory gaugings taken on a run chosen by him below Danakere Anicut.

21. *Velocity observations taken as directed by the Assessor.*—The views of the Assessor were put on record in his memorandum; dated 13th August 1913, and steps were taken to give effect to his wishes. Float observations for velocity were taken and discharge computations made. There were not facilities for very accurate observations nor did the site chosen prove on further investigation so good as it appeared from visual inspection, but it is nevertheless probable that the computations made from velocity observations more nearly represent the true flow than the calculations of Mysore based on Sivasamudram gauge-readings. A table (Appendix X) is given showing the results of calculations of discharges from float observations and the approximate discharge of Sivasamudram for the same main gauge-reading deduced from the figures of daily discharge furnished by Mysore.

22. *Variations in Mysore computations of Sivasamudram discharges.*—In this connection, it is brought to notice that the calculated discharges at Sivasamudram as given by Mysore differ very materially for the same reading of the upper gauge on the main anicut. This is due to the gauge-readings recorded for Kollegal Anicut being quite uncorroborated with the readings of the main gauge. The reason for this is not understood, but the fact remains. The approximate discharges due to Mysore calculations are obtained by plotting on a diagram a large number of the discharges computed by Mysore for various gauge-readings and from such plotting drawing a representative curve.

The diagram on which this has been done is produced and serves to show the variations existing in Mysore calculations of discharge for the same gauge-reading.

23. *General tendency of results of velocity observations.*—The figures given in Appendix X tend to show that the Mysore calculations give excessive discharges for those stages of flow for which observations have been made.

24. *Tentative figures to be fixed pending accurate calibration, Sivasamudram gauge.*—It is however, submitted that the gaugings made this year do not embrace except in the case of two isolated measurements, the stages which principally affect the question, while they were not carried out under conditions ensuring sufficient accuracy.

Under these conditions, Madras are perforce obliged to agree that the figures of Mysore computations should be accepted as tentative only and consider that immediate arrangements should be made for a joint gauging party to work throughout the next flow season and accurately calibrate the gauge at Sivasamudram. It is agreed that any percentage now fixed for loss in transmission shall be liable to revision in accordance with the result of accurate calibration of the Sivasamudram gauge. Meanwhile, Madras urge that the figures of daily discharges at Sivasamudram furnished by Mysore must be accepted as a basis for tentative settlement as these are the only ones available.

The Madras arguments are based on these figures, and the Government ask that, while the arguments and the system of regulation advanced should be finally adjudicated on, any actual percentage figures awarded on account of loss in transmission based on the computed daily discharges at Sivasamudram shall be tentative and subject to revision as soon as next year's gaugings shall put in our hands an accurate calibration of the Sivasamudram gauge, and accurate computations of the flow of past years, for which gauge-readings are available, can be made.

25. *Data for computing losses in transmission.*—The arguments and statistics which follow as regards a suitable measure of the losses in transmission are based on—

(a) General considerations and data regarding observations of losses in transmission elsewhere and considerations other than actual computed discharges of the Cauvery.

(b) Deductions from the actual computed discharges of the Cauvery and facts relating to the particular river and the case under consideration.

As regards the latter, it is recognized that the discharges at Sivasamudram are unreliable and that any figures arrived at from those discharges are liable to reconsideration. When accurate gaugings of the river have been made, it will be possible to correct, as far as may be necessary, the computed daily discharges which at present are, as regards daily flow of the Cauvery in Mysore, the best and only figures available.

26. *General data regarding evaporation, percolation and absorption in rivers and canals.*—So far as is known, there are no published statements of regular measurement of losses by percolation and absorption in natural rivers, but many experiments on the subject have been made in irrigation canals, and a few statistics on the matter are noted below. They have been extracted from Buckley's "Facts, Figures and Formulae for Irrigation Engineers." The cases taken have been for canals of large discharge from 500 to 3,000 cusecs. Such discharges are no doubt small in comparison with the discharges of the Cauvery, which would amount normally to from five to twenty times as much, but the results are given in a form of percentage loss or loss per million square feet of wetted area, or per inch vertical per 24 hours, and they may be compared fairly with the Cauvery conditions, bearing, however, in mind that losses are apt to be materially less as a percentage of large discharges than for small ones.

(a) Mr. W. L. Strange allows an approximation for "loss in transit" in canals of over 100 cusecs of 0.25 per cent. per mile, that is, 25 per cent. in 100 miles.

(b) Mr. Culchetti gives loss in canals in Italy—

	Discharge.	Approximate rate of loss per 100 miles.
Naviglio Grand	1,851	10 per cent.
Canal Muzza	2,652	15 "

(c) Mr. Kennedy's experiments on the Bari Doab canal give the following losses in transmission by absorption (including evaporation)—

Channel.	Inches, vertical, per 24 hours.	Per mill. sq. ft. of water surface a ft. per second.
Main line, Bari Doab canal (sub-soil sandy)	10.4	10
All other branches	2.3	2.2
On distributaries running steadily constant depths	3.4	3.3
On other distributaries	6.1	5.9

(d) On the Nira canal (head discharge, 455 cusecs) measurement shows losses in 100 miles of 22 per cent.

(e) In the experiments on the Ganges canal in 181 miles of the length the loss varies from 13.2 to 15.6 per cent. (by Mr. J. W. Ivens).

(f) The following table shows losses on some of the great canals of North India:—

Name of canal.	Mileage of canal and branches.	Wetted area.	Loss in channels.	Approximate cusecs per mill. sq. ft. wetted.
		M. SQ. FT.	CUSECS.	
Upper Bari Doab	353	82	830	10
Lower Chenab	426	304	1,332	8
Lower Jhelum	180	78	624	8
Upper Jhelum	136	63	464	8
Upper Chenab	194	146	1,161	7
Lower Bari Doab	196	121	966	8

27. *Allowance for percolation by Sir John Benton.*—The figures of allowances for losses in transmission ordered by Sir John Benton for use in designing new irrigation works in the Madras Presidency (*vide* Chief Engineer's Circular Memorandum No. 1323 of 4th April 1907) are—

	Per million square feet of wetted area.
	CUSECS.
(1) In gravel or decayed rock	10
(2) Alluvial and red soil	8
(3) Black soil	5
(4) Rock-cutting	3
(5) Tunnels	2

Nature of bed of the Cauvery and reasonable allowance for percolation.—It is clear that for the losses by absorption and evaporation in transmission on the Cauvery, a wide and shallow river, very large allowances may be necessary.

In the Cauvery, generally, the proportion of width to depth is much greater than in artificial canals, and this tends to make the area wetted large in comparison to the discharge.

The nature of the river-bed for 180 miles is rock, or rock overlying moderate depths of sand. This reduces losses by percolation and absorption. The rock, however, is fissured and the yield of wells in the vicinity of the margins is good, showing that there is fairly free passages in fissures and through pores of decomposing bands of rock.

Generally, however, percolation will be much lower than in a canal in ordinary loamy and sandy soil in which a loss of about 8 cusecs per million cubic feet of wetted area is a fair allowance. It is considered that a loss of 3 cusecs in the Cauvery may fairly be considered reasonable.

29. *Computation of loss in transmission on the Cauvery.*—The distance from the dam site, Kannambadi, to the Upper Anicut is 257 miles.

The wetted cross section may fairly be taken as 1,500 feet wide on an average for a discharge of between 15,000 and 25,000 cusecs, and the area of wetted river-bed is thus—

$$5,280 \times 257 \times 1,500 = 2,035.23 \text{ million square feet}$$

If the loss in transmission is 3 cusecs per million square feet, the total loss equals 6,105 cusecs. This is roughly about 30 per cent. of the flow.

30. *Losses allowed in the Madras Reservoir Project.*—It may perhaps be suggested that the indeterminate and complex nature of this matter of losses in transmission has caused claims on the Madras side to be unduly inflated.

In order to show that this is not so and that the claims made are in no way inflated, for the purposes of this case, it is important to enquire what allowances were made in the Madras Cauvery Reservoir Project for losses in transmission between Metur, the proposed site, and the Upper Anicut, a distance of 116 miles.

The allowances made are recorded in the Madras Cauvery Reservoir Project paper, Volume III, page 32, column 11 of duty tables and areas under—

	Loss in transmission.
June	50 per cent.
July	20 "
August	20 "
September	20 "
October	20 "
November	20 "
December	30 "
January	40 "

These centages are on the extra water issued from the reservoir to make up deficient natural recorded flow, and thus "inflow" and "draw-off" are already cut out. They are therefore not on the same basis as the centages which may be allowed including "inflow" and "draw-off for irrigation" in the case under consideration.

They serve, however, to show the unbiased opinion of the Madras Engineers regarding losses by evaporation and absorption and the allowances made for such losses in their project.

31. *Flow of the Cauvery in Mysore*—With the exception of the rivers which flow into the Cauvery above Kannambadi, the only river in Mysore which gives a continuous, reliable and considerable supply to the Cauvery in Mysore is the Kabbani.

This river has its sources in the Western Ghats in a very rainy part of the Malabar district and joins the Cauvery about thirty miles above the Sivasamudram anicut.

The only place below the confluence of the Kabbani at which the Government of Mysore have taken daily gauge-readings for a series of years and have made computations of the daily discharges of the Cauvery is at Sivasamudram. No continuous records are forthcoming regarding the flow of the Kabbani, and it is only in the form of the daily discharges past Sivasamudram that there is any measure of the total daily flow of the Cauvery in Mysore.

32. *Flow of the Cauvery in Madras.*—There is only one tributary of the Cauvery between the confluence of the Kabbani and the Upper Anicut which gives a reliable and considerable flow which can be counted on in a bad year. This is the Bhavāni.

The Bhavāni has a considerable hill catchment, 1,082 square miles, which gets rainfall in the south-west monsoon averaging about 30 inches; and although this rain is much less than in the hills in Coorg, Malabar and Mysore in which the upper waters of the Cauvery have their source, still the Bhavāni can be counted on to pass material contributions throughout most of the irrigation season to supplement the flow of the main river.

Below the confluence of the Bhavāni all the Madras channels above the Upper Anicut irrigating some 94,000 acres take off, and in months when the rainfall is below the average the draw-off of these, with the losses by absorption, etc., is greater than the inflow from the Bhavāni and other minor tributaries, and as a consequence the flow at the Upper Anicut, especially during the north-east monsoon.

More frequently, however, there is some gain between the Bhavāni bridge and the Upper Anicut, especially during the north east monsoon.

The gaugings which have been taken show that in the south-west monsoon it is the rule rather than the exception for a material net loss in transmission to be recorded between Sivasamudram and the Bhavāni bridge.

33. *Gain or loss in transmission of great importance.*—The matter of the incidence and amount of gain or loss in transmission is very difficult and one of immense importance. The claim of Madras is that the amount of water issued by Mysore at her reservoir must be such as will not involve Madras in any risk of receiving at the Upper Anicut water less than that which constitutes the natural flow, unless this exceeds the quantity to which a prescriptive right has been established.

34. *Place of measurement of issues of water.*—There has been a certain amount of argument as regards the place at which the supplies required for Madras should be measured. Admitting that several methods may be adopted of computation of flow to be passed under varying conditions, it is obviously only at or near the sluices which control the supply, that is, the sluice at Kannambadi, that the measurement of the supply to be passed through those sluices can be made. This being so, the computation of the quantities to be issued through these sluices must obviously include consideration of the allowance to be made for the gain or loss in transmission to which Sir John Benton alludes in his note of 28th July 1911 (printed on page 63 of G.O. No. 296 I., dated 18th September 1911) under the term "net increase in the river discharge."

35. *"Net increase" of river discharge—a very difficult problem.*—The "net increase," as shown by the recorded discharges, is very fluctuating and is very frequently a "minus" figure.

Under these circumstances, a very complex and important problem is introduced and one of the greatest importance to both parties. Indeed, it is not too much to say that the matter of net gain or loss in transmission, and of dealing with this in a manner which shall fully secure existing interests, is likely to prove the most difficult question which will come before the Arbitrator. It is a matter involving many technical considerations, and it is one involving quantities of water quite sufficient to make the difference between a fair year and a bad one to the immense tract of wet lands which are concerned in Madras; while, on the other hand, it might suffice to make the difference between between the Sivasamudram anicut and the Upper Anicut.

36. *Consideration of the question of gains and losses in transmission.*—The only sources of gains in transmission are the run-off from catchments in the Cauvery Basin between the Sivasamudram anicut and the Upper anicut.

The causes of losses in transmission are evaporation, percolation and absorption. Considerable losses from these causes occur in all natural streams and rivers.

In addition to such natural causes of loss there is additional loss in transmission from "draw-off" for irrigation.

There is some draw-off to areas irrigated by baling either direct from the river or from marginal wells, but there is no statement of areas so irrigated and there is no reason to believe that the draw-off on this account is considerable. In the case of the direct irrigation, however, the amount of draw-off must be very considerable, and in a bad year losses in transmission due to this greatly affect the total flow of the river which reaches the Upper Anicut.

37. *Gain and loss in transmission from discharge records.*—There are daily discharges at Sivasamudram available for nine years, 1901 to 1909. These discharges have been calculated under the direction of Mysore Engineers. They have been made from the ordinary weir discharge formula $D = 3.1 W^{\frac{3}{2}}$, but the circumstances of the site are such as to render the results for the higher discharges (over 3,000 to 4,000 million cubic feet per day) certainly too high, and the percentage excess is likely to become greater the higher the stage of the river.

38. *Discharges at the Bhavāni bridge.*—There are also daily discharges for twenty years, 1890 to 1909, available at the Bhavāni bridge.

These discharges are derived from the readings of a gauge fixed on the bridge which has been read daily throughout this period.

In 1909-10, the river flow was gauged daily throughout the season, June to January, at a suitable site three miles above the bridge and the gauge on the bridge thereby calibrated.

The river-bed both above and below the bridge is rocky and not liable to any material change.

It is unfortunate that no high floods occurred in the year of gauging and that during the highest flood that did occur an accident to the gauging plant resulted in the measurements then made being less reliable than was usually the case.

As a result, only the gaugings up to a level equivalent to a discharge of 7,000 to 8,000 million cubic feet per day are considered thoroughly reliable, while the figures above 9,000 million cubic feet per day are derived from the production of the curve of discharge (Volume III, Madras Cauvery Project Report). They are safe figures of flood quantities for purposes of impounding supply; but they may err rather on the low side, and for flows above 9,000 million cubic feet per day the discharges shown may be somewhat lower than the actuals.

In such cases of doubt, it is submitted that it is necessary to take a safe figure and to be careful that any error is on the side of safety.

This course was pursued in the Madras Cauvery Reservoir Project, and it is submitted that, where figures are doubtful, those which err on the safe side should be taken for the purposes of this arbitration.

39. *Discharge of the Agunda Cauvery at the Upper Anicut.*—There is another gauging-station at the Upper Anicut.

The discharges into the right branch are computed from gauge-reading taken daily throughout the period. The gauge (North gauge, Cauvery Dam) was calibrated from a series of daily float and current meter observations taken in 1909-10 from July to January.

The account of these observations and the curves of discharges, etc., are fully recorded in Part II, Volume III, Madras Cauvery Project Report.

40. The discharges of the left branch of the Cauvery through the Upper Anicut have been calculated by sluice or weir discharges in accordance with the conditions existing daily. The details of the methods of computation are given also in the abovementioned Part II, Volume III.

As in the case of the Bhavāni bridge, the graduation of the Cauvery Dam gauge was hampered by the absence of actual gaugings of high floods; and the high stages of discharge over the Cauvery Dam (in excess of 4,000 million cubic feet per day) are obtained from a produced curve, care being taken that any error is probably on the safe side; that is, the result is rather likely to err by giving a smaller flood discharge than the actual.

41. *Gauging giving a measure of gain or loss in transmission.*—There are thus three sets of gaugings of the river, giving discharges—

- (i) At Sivasamudram, 70 miles below the dam site.
- (ii) At the Bhavāni bridge, 174 miles.
- (iii) At the Upper Anicut, 257 miles.

If these discharges are made the basis of computation, there is at once available a record of discharges which show what, during the nine years under consideration, have been the gains or losses of water in transmission between each station.

42. *Diagram of half-monthly discharges and rainfall.*—There is a difficulty in comparing discharges daily as the velocity of flow varies much with the stage of the river so that the time of transmission of water from Sivasamudram to the Upper Anicut, which in low stages takes about four days, is in high stages reduced to about two days.

For comparing the general conditions of gain or loss in transmission, it has been considered that it is best to compare half-monthly discharges, and a diagram has been prepared showing by half-months the discharges at each of the above stations for the years 1901 to 1909.

It is admitted that this diagram does not show correctly the quantitative aspect of the case. It serves to show the half-months in which there is considerable liability to gain or loss in transmission. The Sivasamudram discharges for high stages of flow are certainly excessive. For discharges up to 4,000 million cubic feet per day, they may be tentatively accepted.

Below this diagram are two others—the first giving the percentage of gain or loss in transmission between Sivasamudram and the Upper Anicut with reference to the former figure and the second similar centages as regards Sivasamudram and the Bhavāni bridge, the first representing the losses including draw-off for irrigation and the second excluding this.

Further diagrams are given below showing (1) rainfall in different catchments and (2) rainfall compounded with area of catchment for these catchments, coloured with a shade of green.

For purposes of this latter, the coloured area represents the product—

(a) for the hill catchment, of the area of catchment and the inches of half-monthly recorded rainfall;

(b) for the plains catchment, of the area of catchment and the number of inches less one of the half-monthly rainfall. The assumption is in this case that there is no run-off in any half-monthly period in which there has not been one inch of rain.

To this diagram, attention is invited.

43. *Losses frequent in the south-west monsoon between Sivasamudram and the Upper Anicut.*—The diagram shows clearly that throughout the south-west monsoon (June to September inclusive) there is constant liability to material loss in transmission and that no half-month is free from such liability. On the other side, gains in transmission also occasionally occur throughout these months.

44. *Discharges of 1901 considered unreliable.*—The rainfall diagrams and catchment area diagrams below clearly indicate the causes of the fluctuating and uncertain conditions. There is a notable exception in the year 1901 in which the uniform gain in transmission throughout the whole period, which is very abnormal, is not supported or explained by record of good rainfall in the catchment in the months of June to August.

Further enquiry has shown that the discharges of 1901 differ vastly from the recorded discharges of all other years for the same gauge-readings.

In this year the Sivasamudram anicut construction works were under execution, and it is admitted by Mysore that owing to this cause the conditions of discharge were constantly varying and the results are therefore of little value.

It is considered that the absence of rainfall in the catchment in this year and the circumstances above recorded justify the flood discharges of the year being regarded with great suspicion.

In all the other cases the comparisons of discharges follow reasonably on what might be expected from the diagrams of rainfall.

45. *Conditions of inflow.*—In considering the problem, attention is directed to the matter of inflow from tributaries. There are three large tributaries to the Cauvery, viz., the Bhavāni, the Noyel and the Amarāvati, and a lesser but still considerable stream, the Tirumanimutar. Were the natural flow of these streams unobstructed and not utilized, it would be reasonable to expect that they would, even in bad years, contribute materially to the flow of the Cauvery and that the inflow would generally be greater than the draw-off for the 94,000 acres of direct flow irrigation from the main river lying between the Bhavāni bridge and the Upper Anicut. The conditions of run-off are, however, altogether altered by the fact that on all these streams there exist highly developed systems of "direct flow" irrigation and that the areas irrigated (see margin) are approximately the maximum areas of irrigation under each river, capable of fairly assured supply.

	Acres
Bhavāni	32,400
Noyel	15,800
Amarāvati	48,600
Tirumanimutar	5,200
Total	102,000

Across the smaller tributary streams, there are also many small anicuts feeding small patches of direct flow irrigation and occasionally diverting water into tanks.

Reference to the catchment area map will make the actual state of affairs clear.

From the above, it results that it is only in times of heavy rainfall that any considerable quantity of water is fed into the main river from the principal tributaries, and until the catchment discharges exceed a certain considerable amount there is no surplus available at the confluence of the rivers with the Cauvery to reinforce the flow of the main river. The Bhavāni is generally an exception to the above statement, as considerable flow is generally running from the middle of June on into November over the Kalingarayan anicut.

In times of heavy rain in the catchment, however, the excess over what can be taken by the irrigation systems is surplused into the Cauvery, and floods at the Upper Anicut largely in excess of what are passed at the Bhavāni bridge result.

The conditions described above are likely to connote great and sudden fluctuations in the water-levels in the Cauvery, much more marked fluctuations than would occur were the river and tributaries unobstructed and the whole natural flow free to run down to the Upper Anicut. It would be an extraordinary thing in nature, if a river of considerable catchment, such as the Amarāvati or the Bhavāni, which was discharging at its confluence with another 20,000 cusecs one day, were two days afterwards only discharging a trickle hardly worth considering; this is, however, what under the existing conditions actually happens as all the normal flow is taken up and diverted to purposes of irrigation.

46. Again, the Cauvery irrigates in Mysore by direct flow some 108,000 acres and in Madras above the Upper Anicut 94,000 acres, while (neglecting small works) the irrigated area on its tributaries in Madras totals 102,000 acres.

The gross total is over 300,000 acres above the Upper Anicut without considering isolated works. Is it surprising that the fluctuations of water-level at this place are very great and the diagrams of gauge-readings are far more serrated than those of almost any other large river in India?—vide Sir John Benton's Note of 12th May 1911, paragraph 11. It is, moreover, to be realized that were it not for the power of regulation of level given by the Upper Anicut, the diagram of gauge-readings would be still more serrated than it is.

Although the information required to actually compute the daily inflow into the Cauvery below Sivasamudram is not available, the foregoing remarks explain the reason for what under natural conditions would be the extraordinary results which are shown by the corresponding gaugings at Sivasamudram and the Upper Anicut when considered together. From what has been stated it will be clear why, while in months of abundant supply the half-monthly flow at Sivasamudram is materially less than that at the Upper Anicut—that is, the inflow from the tributaries is considerably greater than the draw-off and losses by percolation, etc.—in other months (the months of scarcity of rain in the catchment of the river) precisely the reverse is the case. In average months the results show a mean between the two.

47. *The bad years decile the irrigating capacity of a system.*—In the good years the tributaries have normally water to spare. In the bad years they take almost all the flow, except that of an occasional flood, for irrigation of their own systems. It is not to the good years or even the normal years that any Engineer looks in considering the capacity of a river for irrigation, or indeed its capacity for any purpose.

It is to the supply available in bad years to which he looks, and it is the conditions of the bad years and not the good years which are now presented for consideration. Moreover, it is not the total flow of a bad year which is the ruling factor for consideration in the case of the Madras systems, but the distribution of flow over much shorter periods. A good total discharge for a period of eight months constituting an irrigation season will not save a crop which has been totally deprived of water for fifteen days.

The total supply of a bad year is a very important factor in considering the capacity and duty of an irrigation reservoir, but it is the distribution of supply from half-month to half-month which must be considered when one is concerned with the interests and prosperity of irrigation dependent on direct flow as is the case of the Madras irrigation under the Cauvery.

48. *Analysis of the diagram of half-monthly discharges.*—Leaving out the abnormal year 1901, it will be seen from the diagram that there are recorded losses in transmission between Sivasamudram and the Upper Anicut in the eight years considered as noted below in fractional form, the numerator of each figure being the year and denominator the percentage of net loss in transmission recorded in the half-month:—

In June	.. {	1st half ..	{	$\frac{04}{5}$									
		2nd half ..	{	$\frac{02}{20}$	$\frac{05}{45}$	$\frac{06}{44}$	$\frac{07}{23}$	$\frac{03}{40}$					
In July	.. {	1st half ..	{	$\frac{02}{35}$	$\frac{03}{36}$	$\frac{04}{24}$	$\frac{05}{4}$	$\frac{06}{43}$	$\frac{07}{5}$	$\frac{08}{18}$	$\frac{09}{6}$		
		2nd half ..	{	$\frac{02}{18}$	$\frac{03}{5}$	$\frac{05}{26}$	$\frac{06}{37}$	$\frac{07}{15}$	$\frac{08}{9}$	$\frac{09}{1}$			
In August	.. {	1st half ..	{	$\frac{03}{5}$	$\frac{04}{24}$	$\frac{05}{10}$	$\frac{07}{36}$						
		2nd half ..	{	$\frac{02}{22}$	$\frac{04}{20}$	$\frac{05}{44}$							
In September	.. {	1st half ..	{	$\frac{02}{8}$	$\frac{04}{64}$	$\frac{05}{24}$	$\frac{08}{5}$						
		2nd half ..	{	$\frac{04}{38}$	$\frac{05}{11}$	$\frac{06}{16}$	$\frac{07}{28}$	$\frac{08}{16}$					

49. *Great liability to loss in the south-west monsoon.*—From the above it will be clear that the liability to loss in transmission during the south-west monsoon is great and that it is just in the worst years 1904, 1905 and 1908 that the loss is certain and greatest and most continuous. The character of the rainfall, on which depends the whole difference between considerable losses and gains in transmission, is very uncertain and variable in the south-east monsoon, and it is only from the catchments in the hills of the Western Ghâts, Coorg, Malabar and the Wynad to which one can confidently look for an assured supply. In bad half-months, the run-off from these catchments dwindles and becomes smaller as the flow from them passes down the river. In good half-months in which the rainfall in the plains has been abundant the reverse is the case.

The diagram, however, clearly shows that the risk of loss in transmission is great, real and always present in the south-west monsoon, and it is contended that a substantial allowance for this must be made.

Mysore has, in correspondence, put forward a suggestion that, in the event of water being measured in Mysore, allowance should be made for "gain in transmission," and quotes Sir John Benton's Note of 28th July 1911 in support of this. What Sir John Benton said was that allowance might be made for "net gain" in transmission. This is shown in the diagram prepared from the statements of half-monthly discharges drawn up by the Chief Engineer, Mysore, to be frequently a "minus figure."

Madras has an absolute right to be safe-guarded against losses in all cases, and the only way to do this is always to make allowance of a safe percentage of additional water to cover such loss during the season of the year (the south-west monsoon) in which it is shown that the loss is liable to occur and cannot be foreseen.

50. *North-east monsoon loss in transmission infrequent.*—In the north-east monsoon it will be seen that, while loss in transmission is by no means absent, it is infrequent except when the total discharges are so small as to be indubitably all due to Madras. The diagram shows one exception in October 1904 when there was a large loss in transmission although the flow of the river was considerable.

51. *Madras claims allowance for loss in transmission in the south-west monsoon.*—For the reasons stated above, Madras claims allowance for loss in transmission during the south-west monsoon but considers that the occurrence of loss in transmission during the north-east monsoon is too infrequent to justify a claim to cover the risk in that season.

52. *Percentage to be allowed for loss in transmission.*—When the question of the amount of allowance which must be made for loss in transmission is considered, the matter must be admitted to be one not capable of exact computation.

The records of discharge available are admitted to be too great for high floods, and these could not on this ground be taken account of in computing centages. Fortunately they are not required, for the conditions or river-flow will become so altered, if the Mysore Reservoir is made, that the highest discharges passed down during the impounding period will be generally limited to a maximum stage of about 3,000 million cubic feet in 24 hours. In considering losses in transmission, therefore, it is best only to consider discharges within a limit of about between 1,500 and 3,000 million cubic feet.

Below 3,000 million cubic feet discharge observations are not likely to be very inaccurate and while not finally accepted are the best available, while the centage losses between 1,500 and 3,000 million cubic feet stages of the river will fairly represent those likely to be realized if the Mysore Reservoir were constructed. As the river stage of flow increases the inaccuracy of computed discharges also increases, and it is therefore desirable to limit as above the maximum flow stage considered. It has also to be considered that losses by evaporation and absorption are likely to be greater for very low discharges, and it is therefore not desirable to take very low discharges into consideration.

The figure made use of are open to question as to accuracy but are the best available, and as such they form the best basis for argument and indeed they are the only ones from which definite quantities can be stated.

53. With a view, therefore, to getting a fair idea of the losses in transmission actually recorded with the river in stages of discharge which reproduce most nearly the stages during which the losses in transmission are required to be known, a table has been made of losses recorded in the continuous periods in which the river was actually flowing in such stages. The dates of discharges at Sivasamudram and of the corresponding discharges at the Upper Anicut and the figures of daily discharges are given in Appendix XI.

54. *Table showing losses actually recorded.*—The table of totals and centage of loss in transmission is as follows:—

TABLE showing discharges of the Cauvery at Sivasamudram compared with those at the Upper Anicut.

Months.	1901.				1902.				1903.			
	Period.	Discharge at Sivasamudram.	Discharge at the Upper Anicut.	Percentage.	Period.	Discharge at Sivasamudram.	Discharge at the Upper Anicut.	Percentage.	Period.	Discharge at Sivasamudram.	Discharge at the Upper Anicut.	Percentage.
1	2	3	4	5	6	7	8	9	10	11	12	13
		M.C.FT.	M.C.FT.			M.C.FT.	M.C.FT.			M.C.FT.	M.C.FT.	
June	..	..	..	..	15-18	8,412	4,066	55.6	..	..	..	..
July	..	..	..	..	..	..	..	..	..	..	..	..
August	..	..	..	..	..	..	..	..	25-29	10,702	9,260	86.5
September	..	..	..	..	4-6 15-21	7,494 14,180	5,656 13,281	74.1 93.7	1-2	4,674	3,875	82.9

Months.	1904.				1905.				1906.			
	Period.	Discharge at Sivasamudram.	Discharge at the Upper Anicut.	Percentage.	Period.	Discharge at Sivasamudram.	Discharge at the Upper Anicut.	Percentage.	Period.	Discharge at Sivasamudram.	Discharge at the Upper Anicut.	Percentage.
		M.C.FT.	M.C.FT.			M.C.FT.	M.C.FT.			M.C.FT.	M.C.FT.	
June	..	..	..	..	22-24	5,709	3,956	69.3	24-26	5,708	2,745	48.1
July	16-23 26-31	20,078 18,561	18,249 10,780	90.9 79.5	18-14 ..	3,758 ..	2,865 ..	76.2 ..	..	..	..	..
August	1-4 16-26	8,306 23,654	5,896 14,568	71.0 61.6	2-8 23-31	13,669 17,110	9,941 12,301	72.6 71.8	..	..	..	..
September	14-19 23-25	13,667 5,561	7,746 3,306	56.7 57.6	1-4 3-14	7,519 15,258	5,531 11,593	73.5 76.0	14-16 ..	4,985 ..	3,610 ..	72.0 ..

Months.	1907.				1908.				1909.			
	Period.	Discharge at Sivasamudram.	Discharge at the Upper Anicut.	Percentage.	Period.	Discharge at Sivasamudram.	Discharge at the Upper Anicut.	Percentage.	Period.	Discharge at Sivasamudram.	Discharge at the Upper Anicut.	Percentage.
		M.C.FT.	M.C.FT.			M.C.FT.	M.C.FT.			M.C.FT.	M.C.FT.	
June	18-23	11,873	9,292	78.3	..	..	..	..	..	..	..	..
July	..	..	..	..	8-16	18,795	15,612	83.1	2-6	10,596	10,170	96.0
August	..	..	..	..	13-27	29,177	25,370	87.0	13-16	7,160	6,282	87.0
September	23-24	3,07	2,360	76.8	..	..	..	..	..	..	..	..

55. *Allowance for loss in transmission considered reasonable.*—This table shows loss in transmission varying from a maximum of 51.9 per cent. The general view, however, taken from consideration of the figures is that an allowance of 25 per cent. would secure Madras on all but

rare occasions from losses in transmission. This figure is therefore put forward as a reasonable and the lowest safe allowance to be made for loss in transmission from all causes between Sivasamudram and the Upper Anicut. This includes inflow and draw-off for irrigation and is not necessarily a suitable figure to represent losses on account of evaporation and percolation excluding the above.

The general considerations as regards losses elsewhere do not show that this figure is an unlikely one, and, while admittedly based on imperfect data, it is also based on the best data available and is advanced with confidence as a reasonable tentative figure.

56. *Losses shown by velocity observations of 1913.*—The record of the velocity and discharge calculations taken in September of the current year tend to show that the Mysore discharges at Sivasamudram for the stages gauged are overstated. The same gaugings also show a material loss in transmission throughout the period between Danakere, seven miles above Sivasamudram, and the Upper Anicut.

The statement (Appendix X) shows these losses, assuming the gaugings as being accurate, to amount to over 20 per cent. in one week and for the whole period of three weeks taken together to 14.41 per cent. and a loss in transmission occurred in every single day of the period except one. It is submitted that the liability to material loss between Sivasamudram and the Upper Anicut in the south-west monsoon is fully proved and the allowance of 25 per cent. is put forward for tentative acceptance.

The above is the figure which includes allowances for inflow and draw-off between Sivasamudram and the Upper Anicut, but not for "draw-off" above Sivasamudram.

57. *Loss in transmission excluding "inflow" and "draw-off."*—It is further required to consider what the percentage of losses in transmission will be excluding "inflow" and "draw-off", that is, losses due to evaporation, absorption and percolation only. This figure may differ materially from the one previously the subject of enquiry. In this latter case, it will be clear that there must always be some loss in transmission. In the former case, there could be, and is as a fact, a gain on the many occasions when a large inflow was realized. The case under consideration is quite different, for loss is the invariable condition, and it remains to examine how much this loss may be fairly assessed at. It is necessary to assess the loss as it is a necessary item in working under a reasonable and logical basis the system of regulation proposed by Mysore. Unless the loss in transmission by evaporation and absorption is allowed for, the compensation water to be issued to Madras cannot be correctly computed.

For instance, if the flow at the Upper Anicut on any day was less than the Madras allowance for that day by "A" million cubic feet, the amount to be issued by Mysore as compensation would not be A but $\left\{ \frac{100}{100-t} \times A \right\}$ where t = the loss per cent. on the compensation water issued from Kannambadi. It is thus necessary to fix a value for t .

58. It may be noted that for the Madras Cauvery Project the allowance for "t" for a distance of transmission less than half that now considered varies from a maximum of 50 to a minimum of 20 per cent.—vide paragraph 30 above. The conditions in the case were precisely similar to those under consideration now.

While this is no proof of the true value of "t" applicable to the Madras Project, it clearly shows what figures were considered reasonable by Madras officers, who were most anxious to get their project through with the lowest figures they could safely adopt.

59. *Statement of actual measurements of loss in transmission.*—The only approach to actual measurement of the loss in transmission, excluding "inflow" and "draw-off", which is available, is furnished by the statistics of the computed flow of the Cauvery at Sivasamudram and at the Bhavani bridge. The draw-off for irrigation between these points is only for 128 acres. The inflow in periods of small rainfall may be neglected for discharges within the limits of consideration, viz., above 12,000 cusecs, say above 1,000 million cubic feet per day and below about 3,000 million cubic feet per day. Within these limits of flow a statement has been prepared showing losses actually recorded from the discharges at Sivasamudram and the Bhavani bridge.

The statement is similar to that prepared for losses between Sivasamudram and the Upper Anicut.

TABLE showing percentage of discharges of the Cauvery at the Bhavani bridge compared with that at Sivasamudram.

Months.	1901.				1902.				1903.			
	Period.	Discharge at Siva- samudram.	Discharge at the Bhavani bridge.	Percentage.	Period.	Discharge at Siva- samudram.	Discharge at the Bhavani bridge.	Percentage.	Period.	Discharge at Siva- samudram.	Discharge at the Bhavani bridge.	Percentage.
1	2	3	4	5	6	7	8	9	10	11	12	13
June	..	M.C.FT.	M.C.FT.	..	16-19	7,755	6,021	77.64	..	M.C.FT.	M.C.FT.	..
July	..	..	..	..	..	..	..	..	..	..	..	..
August	4-8 10-16 18-30	10,123 13,859 20,746	8,055 10,845 15,538	79.57 78.26 74.90	23-30	9,354	7,783	83.20	8-12 14-21	12,833 16,533	10,598 12,529	82.57 75.78
September ..	..	..	..	..	17-25	14,247	13,428	94.25	8-11 14-23	5,991 18,007	5,673 16,620	94.69 92.30

Months.	1904.				1905.				1906.			
	Period.	Discharge at Siva- samudram.	Discharge at the Bhavani bridge.	Percentage.	Period.	Discharge at Siva- samudram.	Discharge at the Bhavani bridge.	Percentage.	Period.	Discharge at Siva- samudram.	Discharge at the Bhavani bridge.	Percentage.
14	15	16	17	18	19	20	21	22	23	24	25	
June	..	M.C.FT.	M.C.FT.	..	..	M.C.FT.	M.C.FT.	..	..	M.C.FT.	M.C.FT.	..
July	16-22	20,073	15,362	76.53	5-8 13-15 18-20	6,021 5,193 3,992	5,305 4,705 2,892	88.10 90.60 72.44	..	..	..	..
August	16-31	30,116	22,441	74.51	2-31	49,597	36,742	74.08	5-8	6,598	5,772	87.48
September ..	1-2 12-27	2,294 28,277	1,330 22,378	58.00 79.13	1-30	33,955	26,384	77.70	12-24	19,588	15,505	79.15

Months.	1907.				1908.				1909.			
	Period.	Discharge at Siva- samudram.	Discharge at the Bhavani bridge.	Percentage.	Period.	Discharge at Siva- samudram.	Discharge at the Bhavani bridge.	Percentage.	Period.	Discharge at Siva- samudram.	Discharge at the Bhavani bridge.	Percentage.
26	27	28	29	30	31	32	33	34	35	36	37	
June	18-25	14,164	7,615	53.76	21-23	4,121	2,249	54.57	..	M.C.FT.	M.C.FT.	..
July	6-11	8,978	7,174	79.91	8-16	18,795	15,584	82.92	2-10 22-25	19,961 9,736	17,683 8,552	88.58 87.84
August	..	..	..	..	13-31	34,783	27,501	79.06	7-26	38,905	35,457	91.14
September ..	13-24	14,839	10,925	73.63	1-10	14,847	11,457	77.17	16-20 25-28	5,879 4,608	5,092 3,249	86.61 70.64

60. *Results deduced from statement of losses.*—The statement shows losses in transmission between Sivasamudram and the Bhavani bridge (a distance of 114 miles) as varying from a maximum of 46 per cent. (in June). The two greatest centage losses are in the month of June when the river needs filling up, and the figures do not differ very greatly from the 50 per cent. allowed for such losses in June in the Madras Cauvery Project.

A fair computation of the allowances for loss, not taking an extreme view of the results appears to be about 25 per cent. The distance between Kannambadi and the Upper Anicut is 257 miles, about double the distance between Sivasamudram and Bhavani. These figures would give a loss of 50 per cent. for the whole distance. That is, if there were no inflow or draw-off, only half the water passing Kannambadi would be delivered at the Upper Anicut. There is, however, a consideration which modifies this in some respect, viz., that the loss on additional water to flow already in existence will be less than that of the whole flow.

Although actual figures are not available to show this, there can be little doubt that, if a loss in transmission for 20,000 cusecs is 50 per cent., the loss for 40,000 is likely to be materially less and still less for 60,000 and so on.

If it were 40 per cent. for 30,000, then the loss due to the added 10,000 would be only 20 per cent. The 50 per cent. loss on the whole flow for the 257 miles from the reservoir to the Upper Anicut is based on the best figures available. The reduction to be made on the compensation water to be added by Mysore cannot be measured, but, on the consideration stated above, it is thought that half the gross loss, which in this case would be 25 per cent., would be a reasonable figure for stages of river flow between 1,000 million cubic feet and 3,000 million cubic feet per day, and this figure of 25 per cent. is considered and put forward as a suitable and reasonable allowance to be made for loss in transmission.

61. *Centage allowance proposed for loss in transmission on compensation water.*—The figure compares favourably as regards Mysore interests with those allowed for the Madras Cauvery Project, which varied from 20 to 50 per cent. for transmission over about half the distance.

Attention is also here drawn to the allowance for loss made by the late Chief Engineer, Mysore, Mr. McHutchin, an officer who served the greater part of his life in the province. In writing about the capacity required in Kannambadi Reservoir for passing down water for power in the hot season he says "now in the worst year we have ever experienced, 1906, I calculate (allowing 60 per cent. for loss of water in passing it down from the dam to Sivasamudram) we would require 20,000 units. . . . It will be seen that this officer considered it necessary to allow 60 per cent. for losses by evaporation and absorption in a distance of 60 miles in the hot season for the small flow required for power.

62. *Losses shown by velocity observations of 1913.*—In relation to the value of "t", it is in this case also desirable to bring to notice the recorded losses in September of this year on the gaugings at Danakere and the flow at the Bhavani bridge. There is draw-off for only 128 acres of irrigation between these two places. Inflow has not been measured but is certainly more than would irrigate 128 acres. It is quite sure, therefore, that the figures (so far as accepted) cannot show a greater loss than that actually due to absorption and evaporation on any day, or series of days, while they may, through the neglect of inflow, show losses less than actually occur. It will be seen that, on the actual records of discharge for one week, a loss of 19 per cent. has occurred, while for 21 consecutive days the actual loss recorded was 15.21 per cent. in a distance of 120 miles, actual loss in transmission being recorded on each day of the period except one.

The figures are recorded in Appendix X.

63. *The Madras Government's original figure for losses in transmission including "inflow" and "draw-off."*—In reply to the original application made in October, 1910 by Mysore for assent to the construction of their project, the Madras Government asked for further particulars, working rules and tables, and furnished the Mysore Government with full particulars of the assumptions and data on which the Government of Madras had examined the Mysore proposals.

In forwarding their proposals the Mysore Government had not only given no working rules or detail as to what restrictions on impounding they suggested in order to preserve the prescriptive rights of Madras, but had furnished no statement of discharges of the Cauvery in Mysore. They, however, urged that the very earliest possible reply should be given them as the negotiations in progress between Mysore and the mining companies had, it was stated, reached a critical stage, and unless definite assurance of commencing building could be given at a very early date, the companies proposed to put in steam or oil plant to furnish the extra power required. Under these circumstances, the Government of Madras gave instructions to examine the Mysore scheme on the basis of whatever data might be available, and see if it was feasible and promising under the necessary restrictions for the protection of Madras.

One of the questions which had to be considered was what allowances, if any, were necessary for loss in transmission, including "draw-off" for existing Madras irrigation above the Upper Anicut. To make any well-based estimate of this, a statement of the daily discharges of the Cauvery in Mysore was necessary. No such statement was, however, available. The best information available with Madras was the daily discharges of the Cauvery at the Bhavani

bridge. These discharges were therefore worked with as representing the discharges of the Cauvery in Mysore at Sivasamudram. That is, the assumption was made that the inflow balanced the losses between Sivasamudram and the Bhavani bridge.

When the statement of daily discharges at Sivasamudram subsequently furnished by Mysore was compared with the corresponding discharges at the Bhavani bridge, it was clear that the assumption was altogether wide of the facts, and that very considerable losses in transmission between Sivasamudram and Bhavani were frequently experienced in the south-west monsoon, in every month from June to September. On the other hand, during the north-east monsoon, the losses only occurred in years of very deficient flow. Under the original assumption, the comparison of flow between Bhavani and the Upper Anicut showed that losses in transmission were liable to occur in the period from 1st August to 15th November, and to provide for this an extra 10 per cent. on the limit flow claimed at the Upper Anicut was included in the Madras computations to provide for loss in transmission.

When this Arbitration was agreed on, the basis of the claims for losses in transmission was the comparison of discharges at Sivasamudram with those realized at the Upper Anicut. It was found at once that both as regards period and percentage the original allowances were wrong, and that the liability to losses was during the months of June to September, and not as deduced from the erroneous assumptions previously made, while 10 per cent. was a quite inadequate allowance to cover the liabilities to loss computed on the recorded discharges. The above clearly shows the reason for altering the claim on account of losses in transmission and also shows that the erroneous basis of the original claim was due to default by Mysore to furnish necessary information in the first instance.

64. *Time of transmission of water between Kannambadi and the Upper Anicut.*—The distances in miles involved are shown in the table below:—

From	To		
	Sivasa- mudram.	Bhavani bridge.	Upper Anicut.
Kannambadi	60	174	257
Sivasamudram anicut	..	114	197
Bhavani bridge	..	..	83

It is required to consider what will be a reasonable allowance for "d", the number of days time occupied in transmission between Kannambadi and the Upper Anicut, under the condition of flow which would obtain while the Mysore Reservoir is under regulation.

65. *Variations of velocity of flow according to stage.*—The velocity of flow of water varies, other things being equal, as the square root of the hydraulic mean depth.

In the case of a wide river, the bed of which is wholly covered with flowing water from margin to margin, the velocity would vary almost as the square root of mean depth. The velocity of flow thus varies with the stage of flow and is a constantly varying quantity. In the arguments advanced below it is taken that the stage of flow which has to be considered in placing a value upon "d" is a stage between 1,500 and 2,500 million cubic feet in 24 hours—say, the stage of flow is about 25,000 cusecs.

In the Madras Cauvery Project it was assumed, for purposes of computation, that the flow at the Upper Anicut synchronized with the flow at the Bhavani bridge two days earlier. An examination of the tables of daily flow at the Upper Anicut and the flow two days earlier at the Bhavani bridge, which are given for twenty years in the Madras Cauvery Project, Volume III, serve to show that this assumption is generally correct for the lower stages of flow, but is too slow a velocity for stages above about 15,000 cusecs. The following tables give the actual mean velocities of flow of the Cauvery as gauged in 1909 at a place about three miles above the Bhavani bridge and also just below the Cauvery Dam:—

Table of mean velocities three miles above the Bhavani bridge.

Stage of flow.		Mean velocity feet per second. = discharge Area of section.	Number of days and hours to reach the Upper Anicut at this rate of flow.	
Discharge.	Equivalent million cubic feet per day.			
CUSECS.			DAYS.	HOURS.
15,000	1,296	3.1	1	15
20,000	1,728	3.4	1	12
25,000	2,160	3.7	1	9
30,000	2,592	3.9	1	7
40,000	3,456	4.4	1	4
60,000	5,184	5.2	..	23
80,000	6,912	5.7	..	21
100,000	8,640	6.3	..	19
125,000	10,800	7.0	..	17

Table of mean velocities gauged below the Cauvery Dam.

State of flow.		Mean velocity feet per second. Discharge	Number of days and hours from Bhavani at this rate.	
Discharges.	Equivalent million cubic feet per day.			
CUSECS.		Area of section.	DAYS.	HOURS.
15,000	1,296	2.7	1	21
20,000	1,728	2.9	1	18
25,000	2,160	3.2	1	14
30,000	2,592	3.4	1	12
35,000	3,024	3.7	1	9
40,000	3,456	3.8	1	8

66. *General character of the Cauvery between Bhavani and the Upper Anicut.*—The general conditions of the river do not vary very greatly between Bhavani and the Upper Anicut. For the first 12 miles the bed is rocky with shallow sand overlying the rock. Below Erode the rocks gradually disappear, the sand gets deeper and the bed wider, and from the Noyel confluence down to the Upper Anicut the width of the river between margins is from 50 per cent. to 100 per cent. greater than above the Bhavani bridge. The general character of the river and the velocities of flow do not alter greatly, but the tendency is for the velocity to decrease as one goes further down the river. The river has not been gauged between these places.

67. *Representative velocity below Bhavani.*—If the mean of the velocities of the two stations representing a stage of 25,000 cusecs is taken, the result is a velocity $\frac{3.7 + 3.2}{2} = 3.45$ feet per second. This connotes a time of transmission of $35\frac{1}{2}$ hours, say, $1\frac{1}{2}$ days, and this figure is taken as a fair allowance of the time of transmission in the stage of flow under consideration between the Bhavani bridge and the Upper Anicut.

68. *Length of the river between Sivasamudram and Bhavani.*—Again, consider the length of the river between the Bhavani bridge and Sivasamudram. The distance is 114 miles. As regards the character of river flow for the whole length, it is not well known. There are some rapids in which no doubt the river attains a high velocity.

For 30 miles above Bhavani the character of the river is known. For some 6 or 8 miles it is similar to that at Bhavani. Above this the river narrows somewhat and the current becomes more rapid. The river, however, is free from rapids and for 30 to 40 miles above Bhavani up as far as Hogankal falls is largely used for carriage by water in basket boats of green-manure from the forests of North Salem and Coimbatore.

The following table gives mean velocities and corresponding days and hours required to transmit water from Sivasamudram to the Bhavani bridge (114 miles):—

Velocity.						Days and hours of transmission.	
						DAYS.	HOURS.
2 feet per second	..	..	..	..	..	3	12
3 "	..	..	..	..	..	2	8
4 "	..	..	..	..	..	1	18
5 "	..	..	..	..	..	1	9
6 "	..	..	..	..	..	1	4
7 "	..	..	..	..	..	..	21
8 "	..	..	..	..	..	..	18
9 "	..	..	..	..	..	..	17
10 "	..	..	..	..	..	..	

69. *River between Kannambadi and Sivasamudram.*—Again in the length of the river between Sivasamudram and Kannambadi the character of the river alters and the rate of flow is materially slower.

From about a mile above the Sivasamudram anicut for several miles above the Danakere anicut the flow in the stage about 2,500 million cubic feet per day is slower than the flow of the Cauvery between Bhavani and the Upper Anicut.

The actual velocity observations taken below the Danakere anicut show for the same stages of flow very materially smaller mean velocities than those above the Bhavani bridge. Allowing, however, for this length of 60 miles the same mean velocity as that gauged at Bhavani for a stage of 25,000 cusecs, viz., 3.7 feet per second, the time of transmission works out to 24 hours for 60 miles.

70. *Computation of time of transmission.*—Allowing a mean velocity for the Sivasamudram o Bhavani length of river of 7 feet per second, which is probably excessive, the total time of transmission works out—

From Sivasamudram to the Upper Anicut—2 days 12 hours.

From Kannambadi to the Upper Anicut—3 days 12 hours.

The Government of Madras (in paragraph 19, Exhibit Ma.—3) have suggested $3\frac{1}{2}$ days as a reasonable estimate of the allowance to be made for time of transmission, and the above arguments are adduced in support of this estimate.

71. Reference to daily record of discharges and comparison of the gauge-readings and days giving the peaks of floods generally support the above arguments (*vide* Appendix XIV). The discharges show that the maximum limit of a fresh, that is, the peak of the flow, is generally one day later at Bhavani than at Sivasamudram, while between Bhavani and the Upper Anicut the interval is sometimes one day and sometimes two days. The gauge-readings recorded are all taken in the morning. Considerable floods, say, over 5,000 million cubic feet per day, traverse the distance between Sivasamudram and the Upper Anicut in two days. It is a matter of certainty that the lower flow will require considerably more time to traverse the distance, and the estimate of $2\frac{1}{2}$ days is probably below the mark. The matter is one which does not admit of really accurate solution, for a value of "d" which is accurate for one particular stage of flow must be inaccurate for any other.

MYSORE RULES OF REGULATION.

72. *Actual rules of regulation proposed by Mysore.*—The Madras Government take objection to the principles of regulation formulated in the rules proposed by Mysore (Exhibit My.—2) on grounds already generally stated, viz.—

(a) These rules do not provide for delivering the quantities of water to which Madras has rights.

(b) The incidence of flow is altered in a manner unfavourable to Madras irrigation and in a way which infringes prescriptive rights.

(c) The system is complex and would prove unworkable in practice.

The matter of limit quantities has already been dealt with and the inadequacy of the limits proposed by Mysore exposed. It is, however, necessary to adopt a limit in giving examples of the actual working of the Mysore system and two examples are therefore given:—

System "M".—The Mysore system with a limit representing the claim of Madras, viz., 2,944 million cubic feet, at the Upper Anicut (Appendix XIII).

System "N".—The Mysore system with the limit quantities, 2,300 million cubic feet at the Upper Anicut.

Reference to these tables is requested as a proof of the allegations of Madras regarding the defects of the principles of regulation proposed by Mysore.

One alteration has been made in applying Mysore rules in taking the time of transmission from Kannambadi to the Upper Anicut as three instead of two days. It is not open to serious dispute that three days is too short a time. The Madras contention is that $3\frac{1}{2}$ days is a low estimate of the time of transmission, but gauge-readings and discharges at $3\frac{1}{2}$ days' interval are not readily available and for purpose of illustration three days is taken.

The tables are somewhat complicated, and in order to avoid further complication the consideration of the percentage "t" due on compensation water to cover loss by evaporation and absorption has not been included in the computations, and for simplicity further reference to it is omitted in the following remarks regarding the system.

The Mysore system of regulation involves the impounding daily at Kannambadi of the natural flow reaching the reservoir, that is, the inflow, and also involves the issue daily from the reservoir either of the deficit at the Upper Anicut of the flow of that day from the amount of the limit flow to which Madras is entitled or the whole inflow at the Kannambadi Reservoir three days previously, whichever quantity is least.

73. *Remarks on results of practical application of Mysore Rules.*—During a period of steady or slowly fluctuating flow both at impounding station and receiving station, the incidence of flow and the total useful deliveries are not subjected to grave alterations, but in a period of fluctuating flow at either station the reverse is the case, and the fluctuating flow is made to fluctuate to a still greater degree. Further, not infrequently water which is issued to compensate Madras for withdrawals three days previously has to be surplused when received, and in no way compensates for the natural flow impounded by Mysore to the deprivation of Madras. It is obvious that to withdraw a quantity Q from a total natural flow 2 Q and to give it back three days later when the natural flow is 3 Q thus raising the flow to 4 Q does not make up for the previous deprivation even if the conditions are not such as to necessitate surplusing some of the 4 Q.

To take half the natural flow from lands when this flow amounts to half supply, and to give it back three days later when the natural flow is three-fourths the full supply, does not make up in full the loss sustained from the first deprivation, although the total quantity of

water delivered to the fields may be the same. The defect of making the naturally irregular incidence of flow still more irregular is inherent in the Mysore system of regulation, and on this ground alone the Government of Madras strongly oppose such a system as an infringement of their rights.

The rights of Madras not only extend to a total limit of natural flow, but to a natural incidence of flow, and whatever interferes in such a way as to make such incidence more unfavourable is an infringement of the prescriptive rights of Madras.

74. *Working Tables and Diagrams, Mysore Regulation System.*—The tables and diagrams prepared to show the working of the Mysore system (excluding loss by absorption and evaporation) have been prepared for the period from June to October 1905, and these exhibit the inherent defects of the system (*vide* Table, Appendix XIII, and diagrams M and N).

75. Actual quantities appear in the tables and in the remarks column the quantities of compensation water which has to be surplused are shown. As this water is passed by Mysore as repayment for their excessive impounding, the surplusing of this involves deprivation to Madras of water to which they have prescriptive rights.

The diagrams perhaps represent the matter more clearly. The increasingly serrated character of the water level is very marked.

The quantity of compensation water lost by surplus on any day is shown cross-hatched. Horizontal hatching shows decrease of supplies on any day and cross-hatching increase due to the application of the system of regulation under discussion. When the horizontal hatching goes below the zero line or where the tables indicate a *minus* flow, this means that the flow feeding the Madras irrigation above the Upper Anicut has been deprived of water to this extent.

It will be seen that, quite irrespective of the actual quantities proposed, the system of regulation proposed by Mysore has very grave inherent defects, and the Government of Madras most strongly object to a system worked on these principles which will certainly not "ensure to Madras full protection of their prescriptive rights."

MADRAS RULES OF REGULATION.

76. *The Madras system of regulation.*—The principle on which the Madras proposals for regulation are based is the actual measurement of flow in Mysore and entails on Mysore the duty of refraining from impounding unless and until water is passing in Mysore in sufficient quantity to cover the Madras limit flow after adding allowances for losses in transmission. Provided the above allowances are adequate, such a system absolutely secures to Madras without failure the flow to which it is decided there is prescriptive right, both as regards quantity and incidence of flow, and it is submitted it is the only system which can absolutely safeguard the rights of Madras, while at the same time permitting impounding by Mysore to the fullest extent compatible with such a safeguard.

77. *Allowance to be made for irrigation above Sivasamudram.*—From the figures of discharges at Sivasamudram and the Upper Anicut, Madras has advanced a claim to 25 per cent. addition to the limit flow on account of liability to losses between these two places. There is, however, between Sivasamudram and the places of measurement of flow a large area of irrigation fed by "direct flow" from these four rivers measured. This draw-off is not, like that of the channels below Sivasamudram, included in the 25 per cent., and a specific allowance must be made for this.

As a fact the greater part of the irrigation will be fed through the main sluices of the Kannambadi Dam through which the water for Madras will also be passed. What is required to pass through the sluices at Kannambadi is a sufficient supply to feed the Mysore irrigation between the places of measurement and Sivasamudram in addition to the allowance decreed as due to Madras.

The areas of irrigation, for which allowances must be made, cannot be absolutely fixed until the places of measurement of the discharges are fixed. Roughly the areas are outlined below:—

	ACRES.
The Cauvery and tributaries—all irrigation between places of measurement and reservoir	28,000
Mysore Cauvery irrigation between Dam and Sivasamudram	40,000
Madras Cauvery irrigation between Dam and Sivasamudram	760
Mysore irrigation below place of measurement on the Kabbani	12,000
Total	75,760
	or say 76,000

In Madras the usual duty allowance for minor channels taking off direct from the Cauvery is 30 acres per cusec. The same allowance is usual in Mysore (*vide* Report and Notes, Cauvery Reservoir Project, Mysore, Part II, page 10). It is, however, considered that the undernoted allowances will, subject to suitable restrictions, suffice, viz:—

At a duty of 40 acres per cusec for the months of June to August and 60 acres per cusec for the months of October to December, the daily extra requirement is—

	M.C. FT.
June to September	162
October to December	110

No claim is made for losses in transmission between the places of measurement and Sivasamudram, these losses being set off against the run-off from the catchments.

If L be the limit amount of flow due to Madras as fixed under the second term of reference, the claim by Madras is that no impounding shall be allowable in the Mysore Reservoir unless the total flow to the reservoir as measured on the Cauvery, the Hemavathi and the Lakshmanathirtha plus the flow of the Kabbani exceeds a stage of flow noted below and the amount of impounding shall be limited to such excess.

For the months June to September inclusive—

$$\left\{ \left(L \times \frac{100}{100 - 25} \right) + 162 \right\}$$

that is $\left(\frac{4}{3} L + 162 \right)$

For October to December inclusive—

$$(L + 110).$$

For January and February L .

On conditions stated below a concession as regards impounding in February is made which allows Mysore to impound in February the amount of water issued to power from the reservoir on any day or the actual inflow of that day, whichever is least.

For the months of March, April and May, the Government of Madras claim that their rights extend to the full natural flow of the river up to a limit flow of L million cubic feet per day.

The Government are, however, prepared to waive these rights and to permit impounding in the Mysore Reservoir of the whole natural flow during these months on condition of the Mysore Darbar undertaking to pass to Madras through the left branch of the river at Sivasamudram a continuous flow of not less than 900 cusecs throughout the period February to May inclusive and producing proof in the form of rules of regulation and working tables that they will be able to give effect to this undertaking. It is only on this condition that the Madras Government consent to waive their prescriptive right to the full natural flow of the river in the months of February, March, April and May.

78. *Tentative character of award of the Arbitration Committee.*—The Madras Government have strongly pressed for a clear and final pronouncement regarding the matters under arbitration, while "the Mysore Government also earnestly hope that the decision of the "Arbitration Committee may, as far as practicable, have the vital element of finality." (Exhibit My. 4, paragraph 35). On this matter, therefore, both parties are in agreement. In view of the unreliability of the computed discharges of the Cauvery at Sivasamudram, which discharges are necessary for forming a reliable estimate of the percentage of liability to loss or gain in transmission, the Government of Madras must perforce agree that the actual figure of proportion or percentage of flow in Mysore which may form a feature of any system of rules decided on shall be tentative and subject to revision as soon as reliable figures of discharges can be adduced to take the place of the doubtful ones now forming the basis of argument.

The Government of Madras strongly urge that the principles and system on which regulation is to be carried out should now be fixed, and that the only item of a tentative character shall be the actual figures representing percentage or proportion of flow lost in transmission. The principles of regulation and the system and rules are unaffected by whatever figures may be finally fixed for percentage or proportion of allowance for gain or loss, and rules having "the vital element of finality" except in respect to this one point are pressed for. No further flow observations or measurements can give assistance in framing principles upon which to base rules.

79. *Unsatisfactory measurements by Mysore.*—It will be clear that it is only on account of the unreliable character of the statistics of discharges of the Cauvery advanced by Mysore and owing to their extraordinary omission to take the most elementary steps to get verifications of their discharges that the necessity for tentative settlement of these figures arises.

Mysore have claimed to have had this project in view for many years. It is known that in another form it has been under investigation since 1906, and yet that Government come before this Committee with the admission that their discharges at Sivasamudram are quite unreliable and that they have taken no steps to remedy this state of affairs. Had Mysore stated in 1910 or at any time since then that these discharges were unreliable, the Government of Madras would have at once taken steps to rectify this defect.

The steps to be taken were obvious, as also to any one acquainted with the site was the unreliability of the discharges on which Mysore based their data for water available for impounding in their reservoir. Not only did Mysore furnish unreliable discharges, but they

informed the Government of Madras throughout the controversy that they were accurate except for very high floods and it was only before this committee that they repudiated them. The conditions in this case afforded to the Mysore Government quite unusual facilities for computing daily discharges without trouble or material expense.

Just below the dam site at Kannambadi there is an anicut admirably suitable for computing discharge from gauge-readings. Gauge-readings were not taken, and the representation made that the anicut was unsuitable for the purpose will not bear examination.

On the Kabbani and the Lakshmanathirtha there are anicuts where it is possible to take daily gauge-readings from which daily flow could be computed without any great margin of error. Again gauge-readings were not taken.

Seven miles above Sivasamudram there is an anicut much better adapted than the Sivasamudram anicut for the purpose of computing discharges of the main river from gauge-readings. No gauge-readings were taken. Each and all of the places mentioned are far better adapted than the Sivasamudram site for gauging the flow, yet Mysore neglected to take the most obvious and inexpensive observations to get reliable discharges.

80. *Madras should have the benefit of any doubt.*—Under any circumstances, it is claimed by Madras that their right is to be fully safeguarded. Under the special circumstances above stated, it is doubly their due that on any doubtful point Madras should be given the benefit of the doubt. In the tentative settlement it is urged that the Government of Madras should be given allowances for loss in transmission as a tentative figure which will fully protect them.

81. *Finality in award as regards system of settlement asked.*—Further, in view of the finality of principle and system which is desired, it is urged that in fixing the tentative figures the principles and system on which these figures are arrived at should be clearly enunciated, so that on the corrected discharges being available, it will be unnecessary to re-open the whole case and all that will be necessary will be to apply the same method to the new figures of discharge available as was used in arriving at the tentative figures.

W. M. ELLIS, Col., R.E.

THE MADRAS CASE.

PART IV.—ENGINEERING ARGUMENTS—THIRD ISSUE.

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Plans of which blue copies will be produced.

Curve of discharges, Sivasamudram.

Diagram of discharges as per tables M and N.

APPENDIX IX.

Calculations of discharge at Sivasamudram making assumptions for velocity of approach.

The system of computation of discharges at Sivasamudram as discharges over weirs without velocity of approach and with clear overfall is undoubtedly erroneous.

The velocity of approach is, in the case of the Kollegal Branch, the factor which really governs the discharge and in the case of the main anicut left branch has a material effect on it.

In the following pages certain stated assumptions are made as regards velocity of approach and of "afflux" in the case of Kollegal anicut and discharges worked out on the basis of these assumptions serve to confirm the belief that for low discharges the records of discharges advanced are sufficiently near the truth as to allow of acceptance.

Let it be assumed that the velocities of the branches of the river at Sivasamudram are as under for the gauge-readings of main anicut noted:—

Gauge-reading up to	1 foot, 3 feet per second.
"	above 1 and 2 feet, 4 "
"	" 2 " 3 " 5 " "
"	" 3 " 4 " 6 " "
"	" 4 " 6 " 6 " "
"	" 6 feet 8 " per second.

In such cases $h_a = \frac{V^2}{2g}$ and is

Velocity 3 feet per second	.. .. .	$h_a =$
" 4 " "	.. .. .	0.14
" 5 " "	.. .. .	0.25
" 6 " "	.. .. .	0.39
" 7 " "	.. .. .	0.56
" 8 " "	.. .. .	0.76
		1.00

For the main branch an anicut with clear overfall the discharges per foot run

$$D = \left\{ (h + h_a)^{\frac{3}{2}} - h_a^{\frac{3}{2}} \right\}$$

Discharges per foot run on above formula and assumptions as regards velocity of approach are:—

Depth on crest. Ft.	
0.5 discharges per foot run	1.426
1.0 "	3.611
1.5 "	6.790
2.0 "	10.080
2.5 "	14.460
3.0 "	18.600

Table of comparison with results neglecting velocity of approach.

Gauge-reading.	Without velocity of approach discharge.	With velocity of approach as assumed.	Comparative deficiency per cent.
FEET.			
0.5	1.09	1.43	31
1.0	3.10	3.61	17
1.5	5.89	6.79	20
2.0	8.77	10.08	15
2.5	12.26	14.46	18
3.0	16.11	18.60	15

These percentages are excessive as, on account of the "horse shoe" shape in plan of the anicut, a good deal of the effect of the velocity of approach is lost and the discharges are unlikely to be more than half the percentages above in excess of recorded ones, and this is taken for computation which follows:—

Discharges of "Kollegal Extension."

Gauge reading, main anicut.	Depth, Kollegal extension.	Kollegal extension.		Reading, Kollegal anicut gauge.
		Length.	Discharge.	
0.5	0.9	412	1,200	Nil.
1.0	1.4	590	3,080	0.3
1.5	2.0	680	5,600	1.0
2.0	2.55	700	8,750	1.0
2.5	2.75	775	11,180	2.25
3.0	3.0	833	13,760	2.75

The following shows discharge, Kollegal Extension, for recorded lengths for flow at velocity and depth named :—

Main anicut gauge.	Kollegal extension. Area of section.	Velocity foot per second.	Column 2 × column 3, discharge computed.	Recorded discharge.	Percentage excess.
1	2	3	4	5	6
0.5	sq. ft. 369	3	1,107	1,200	8
1.0	826	3	2,478	3,080	25
1.5	1,260	4	5,040	5,600	11
2.0	1,785	4	7,140	8,750	22
2.5	2,139	5	10,695	11,180	5
3.0	2,499	5	12,495	13,760	10

Assumptions for discharge, Kollegal anicut.—The Kollegal anicut is computed as with a clear overfall without velocity of approach, while as a fact it has velocity of approach and is submerged at a very early stage of discharge.

With a gauge-reading on the main anicut gauge of 2 feet it is barely visible and may be considered to have an afflux of 1 foot.

The discharges of the anicut are computed for velocities of approach assumed for the other computations for depths of flow 0.3, 1.0, 2.25 and 2.75 feet corresponding roughly to gauge-readings 1, 1½, 2, 2½, 3 feet on main anicut.

The afflux assumed are—

	FT.
1.8 depth over crest afflux	1.1
2.25 "	0.9
2.75 "	0.25

Gauge-reading.	Depth of flow.	Afflux.	Velocity of approach.	Discharge without velocity of approach.	Discharge with velocity of approach.	Comparative deficiency per cent.
				CUSECS.	CUSECS.	
1.0	0.3	....	3	156	230	47
1.5	1.0	....	3	949	1,105	16
2.0	1.8	1.1	4	2,289	2,982	29
2.5	2.25	0.9	5	3,201	4,162	30
3.0	2.75	0.25	5	4,327	4,171	— 3.6

ABSTRACT showing the discharges of the anicuts and river (excluding sluices) past Sivasamudram on the assumptions made above.

Gauge-reading main anicut.	Recorded discharges.				Discharges on assumptions made above.				Excess percentage.
	Discharge, main anicut.	Kollegal Extension.	Kollegal anicut.	Total.	Discharge, main anicut.	Kollegal Extension.	Kollegal anicut.	Total.	
1	2	3	4	5	6	7	8	9	10
0.5	..	2,474	1,200	..	3,674	2,860	1,107	3,967	8.0
1.0	..	7,037	3,080	156	10,273	7,815	2,478	10,293	0.5
1.5	..	12,916	5,600	949	19,465	14,164	5,040	19,204	4.3
2.0	..	19,908	8,750	2,289	30,947	21,395	7,140	28,535	1.8
2.5	..	19,830	11,180	3,201	42,211	30,327	10,695	41,022	7.0
3.0	..	36,570	13,760	4,327	54,657	39,865	12,495	52,360	2.5

These results tend to confirm the view that the recorded discharge put forward by Mysore may be accepted up to a discharge of 30,000 to 40,000 cusecs and indeed, if these results are accepted, up to a higher total.

W. M. ELLIS, Col., R.E.

APPENDIX X.

The under-noted table shows the discharges by gauging the Cauvery in August and September at Danakere, six miles above Sivasamudram, at the site selected by the Assessor. The gauging is separately reported on, but it may here be stated it was carried out with surface floats and a co-efficient of reduction of 0.82 was used to reduce surface to mean velocities.

The results of daily gaugings for three consecutive weeks, 29th August to 18th September, are tabulated with the discharges of the Cauvery at Bhavani bridge two days later and at the Upper Anicut three days later.

The discharges at the two places named show continuous and daily loss in transmission throughout the whole period.

The loss in transmission between Sivasamudram and the Upper Anicut for the whole period is 14.41 per cent.

As regards the losses between Sivasamudram and Bhavani bridge, it will be seen that here also continuous losses occur. The total loss for the period is 15.21 per cent. and the maximum for one week is 19.05 per cent. The distance between Danakere and Bhavani is 120 miles and from Kannambadi to the Upper Anicut is 257 miles.

Month and date.	Gauged discharge at Danakere.	Cauvery discharge at Bhavani Bridge two days later.		Cauvery discharge at the Upper Anicut three days later.		Reading upper gauge, main anicut, 1913.	* Discharge from Mysore calculations.
		Discharge.	Percentage loss in transmission from Danakere.	Discharge.	Percentage loss in transmission from Danakere.		
	CUSECS.	CUSECS.		CUSECS.			CUSECS.
August 29th	14,204	11,426	— 19.55	12,992	— 8.53	1.40	19,000
" 30th	12,955	10,498	— 18.96	11,600	— 10.46	1.30	17,250
" 31st	14,510	11,925	— 17.81	12,992	— 10.46	1.30	17,250
September 1st	14,442	10,939	— 24.25	11,600	— 19.68	1.30	17,250
" 2nd	11,807	10,498	— 9.55	10,347	— 10.85	1.20	16,500
" 3rd	12,686	14,488	+ 14.20	12,992	+ 2.41	1.30	17,250
" 4th	17,212	15,045	— 12.59	16,538	— 3.92	1.40	19,000
Total, one week	97,616	84,819	— 13.11	89,061	— 8.76	..	122,500
September 5th	17,062	13,943	— 18.28	15,080	— 11.62	1.50	21,000
" 6th	14,433	12,412	— 14.00	12,296	— 14.80	1.40	19,000
" 7th	13,515	11,426	— 15.46	10,974	— 18.80	1.30	17,250
" 8th	11,297	10,939	— 3.17	9,727	— 13.90	1.20	16,500
" 9th	10,548	7,923	— 24.89	7,679	— 27.19	1.10	15,750
" 10th	9,033	7,923	— 12.28	7,285	— 19.35	1.05	12,875
" 11th	8,464	6,670	— 21.19	6,496	— 23.25	1.00	12,000
Total, one week	84,352	71,236	— 15.55	69,537	— 17.56	..	111,375
September 12th	8,081	6,670	— 17.46	5,986	— 25.92	.95	11,150
" 13th	6,966	5,974	— 14.24	5,475	— 21.40	.90	10,300
" 14th	6,348	5,626	— 11.37	5,220	— 17.77	.85	9,525
" 15th	6,037	4,350	— 27.94	4,849	— 19.68	.80	8,750
" 16th	5,598	4,350	— 22.29	4,849	— 13.38	.75	8,050
" 17th	6,325	4,918	— 22.24	4,849	— 23.33	.75	8,050
" 18th	6,557	5,278	— 19.50	5,220	— 20.39	.80	8,750
Total, one week	45,912	37,166	— 19.05	36,448	— 20.61	..	64,575
Grand total, three weeks.	227,880	193,221	— 15.21	195,046	— 14.41	..	298,450

* Note.—These figures are obtained from a curve of discharge drawn on the basis of Mysore calculated discharges.

APPENDIX XI.

EXTRACTS of discharge records at Sivasamudram and upper anicut for stages of discharge between 1,500 and 3,500 mills. c. ft. per day.

Date.	Siva-samudram.	Upper anicut.	Date.	Siva-samudram.	Upper anicut.
1902, June.					
15th	1,814	1,613	13th	2,145	1,625
16th	2,786	1,345	14th	1,613	1,240
17th	2,197	954			
18th	1,615	754			
	8,412	4,666		3,758	2,865
	55.5 per cent.			76.2 per cent.	

1905, June.						1908, July.					
22nd	..	..	..	2,487	1,818	8th	..	..	..	2,660	2,544
23rd	..	..	..	2,106	1,287	9th	..	..	..	2,424	2,028
24th	..	..	..	1,116	851	10th	..	..	..	2,284	1,690
						11th	..	..	..	1,817	1,300
				5,709	3,956	12th	..	..	..	1,605	1,120
				{		13th	..	..	..	1,605	1,120
				69.3 per cent.		14th	..	..	..	1,817	1,560
						15th	..	..	..	2,096	2,160
						16th	..	..	..	2,537	2,090
1906, June.											
24th	..	..	..	2,059	1,314					18,795	15,612
25th	..	..	..	1,961	803					{	
26th	..	..	..	1,683	628					83.1 per cent.	
				5,703	2,745						
				{							
				48.1 per cent.							

1907, June.					
18th	1,611	662	2nd	2,395	2,020
19th	2,291	1,818	3rd	1,937	1,950
20th	2,159	1,818	4th	1,937	2,090
21st	2,291	2,070	5th	2,223	2,090
22nd	1,820	1,579	6th	2,104	2,020
23rd	1,701	1,345			
	11,873	9,292		10,596	10,170
	78.3 per cent.			96.0 per cent.	

1904, July.					
16th	..	..	..	2,872	2,761
17th	..	..	..	2,862	2,697
18th	..	..	..	2,862	2,530
19th	..	..	..	2,929	2,761
20th	..	..	..	2,872	2,607
21st	..	..	..	2,804	2,453
22nd	..	..	..	2,872	2,530
				20,073	18,249
				90.9 per cent.	

1903, August.					
25th	..	..	..	2,282	2,230
26th	..	..	..	2,729	2,090
27th	..	..	..	2,068	1,820
28th	..	..	..	1,891	1,625
29th	..	..	..	1,732	1,495
				10,702	9,260
				86.5 per cent.	

1904, August.					
26th	..	..	..	2,990	2,607
27th	..	..	..	2,812	2,145
28th	..	..	..	2,265	1,859
29th	..	..	..	2,018	1,573
30th	..	..	..	1,748	1,364
31st	..	..	..	1,748	1,232
				13,561	10,780
				79.5 per cent.	

1st	..	..	..	1,748	1,232
2nd	..	..	..	1,748	1,232
3rd	..	..	..	1,998	1,430
4th	..	..	..	2,812	2,002
				8,306	5,896
				71.0 per cent.	

Date.			Siva-samudram.	Upper anicut.	Date.			Siva-samudram.	Upper anicut.
1904, August—cont.					1906, August.				
16th	..	..	2,991	2,090	13th	..	..	1,937	1,859
17th	..	..	2,812	2,145	14th	..	..	1,937	1,502
18th	..	..	2,812	1,931	16th	..	..	1,694	1,298
19th	..	..	2,569	1,645	16th	..	..	1,592	1,573
20th	..	..	2,265	1,430					
21st	..	..	2,018	1,232				7,160	6,232
22nd	..	..	1,831	1,041					
23rd	..	..	1,676	922					
24th	..	..	1,676	803					
25th	..	..	1,502	696					
26th	..	..	1,502	628					
			23,654	14,563	4th	..	..	2,951	2,351
					5th	..	..	2,573	1,801
					6th	..	..	1,970	1,404
								7,494	5,556

Date.	Discharge at Siva- samudram.	Discharge at Bhavani bridge.	Date.	Discharge at Siva- samudram.	Discharge at Bhavani bridge.
1907, July.			1901, August—cont.		
6th	2,291	1,910	18th	2,885	2,356
7th	1,819	1,297	19th	2,676	1,858
8th	1,384	1,212	20th	1,716	1,598
9th	1,288	1,049	21st	1,716	1,391
10th	1,098	905	22nd	1,716	1,297
11th	1,098	811	23rd	1,616	1,202
	8,978	7,174	24th	1,446	1,113
	79.91 per cent.		25th	1,329	943
1908, July.			26th	1,255	868
8th	2,660	2,251	27th	1,209	792
9th	2,424	2,062	28th	1,107	754
10th	2,234	1,832	29th	1,065	683
11th	1,817	1,469	30th	1,010	683
12th	1,605	1,273		20,746	15,538
13th	1,605	1,226		74.90 per cent.	
14th	1,817	1,469	1902, August.		
15th	2,096	1,940	23rd	1,031	611
16th	2,537	2,062	24th	1,265	792
	18,795	15,584	25th	1,148	1,113
	82.92 per cent.		26th	1,247	1,028
1909, July.			27th	1,198	1,028
2nd	2,395	2,093	28th	1,265	1,070
3rd	1,937	1,702	29th	1,198	1,113
4th	1,937	1,754	30th	1,002	1,028
5th	2,223	1,858		9,354	7,783
6th	2,104	1,806		83.20 per cent.	
7th	2,189	1,971	1903, August.		
8th	2,677	2,216	8th	2,788	2,286
9th	2,104	1,858	9th	2,592	2,093
10th	2,395	2,425	10th	2,384	2,216
	19,961	17,683	11th	2,244	2,032
	88.58 per cent.		12th	2,825	1,971
22nd	2,815	2,425		12,833	10,598
23rd	2,395	2,093		82.57 per cent.	
24th	2,263	1,910	14th	2,826	1,858
25th	2,263	2,124	15th	2,237	1,754
	9,736	8,552	16th	2,159	1,650
	87.84 per cent.		17th	1,807	1,547
1901, August.			18th	1,733	1,443
4th	1,595	1,344	19th	1,733	1,495
5th	1,509	1,344	20th	1,756	1,391
6th	1,595	1,344	21st	2,282	1,391
7th	2,887	1,598		16,533	12,529
8th	2,537	2,425		75.78 per cent.	
	10,123	8,055	1904, August.		
	79.57 per cent.		16th	2,991	2,640
10th	2,285	1,650	17th	2,812	2,216
11th	1,904	1,598	18th	2,812	2,032
12th	1,716	1,391	19th	2,569	1,971
13th	1,964	1,297	20th	2,265	1,702
14th	1,805	1,443	21st	2,018	1,547
15th	2,095	1,495	22nd	1,831	1,391
16th	2,090	1,971	23rd	1,676	1,297
	13,859	10,845	24th	1,676	1,113
	78.25 per cent.		25th	1,502	1,070
			26th	1,502	1,070
			27th	1,328	1,070
			28th	1,328	943

Date. Discharge at Siva-samudram. Discharge at Bhavani bridge. Date.

1904, August—cont.

29th	..	..	1,328	868	23rd
30th	..	..	1,239	792	24th
31st	..	..	1,239	719	25th
			30,116	22,441	26th
			74.51 per cent.		27th
					28th
					29th
					30th
					31st

1905, August.

2nd	..	..	2,741	2,565	
3rd	..	..	2,456	2,032	
4th	..	..	2,456	1,858	
5th	..	..	2,247	1,754	
6th	..	..	2,247	1,547	
7th	..	..	1,522	1,249	
8th	..	..	1,341	955	7th
9th	..	..	1,341	905	8th
10th	..	..	1,341	830	9th
11th	..	..	1,173	754	10th
12th	..	..	1,012	719	11th
13th	..	..	1,012	647	12th
14th	..	..	1,084	611	13th
15th	..	..	1,489	792	14th
16th	..	..	1,342	943	15th
17th	..	..	1,149	868	16th
18th	..	..	1,019	754	17th
19th	..	..	1,342	719	18th
20th	..	..	1,342	868	19th
21st	..	..	1,342	1,070	20th
22nd	..	..	1,489	1,344	21st
23rd	..	..	1,642	1,297	22nd
24th	..	..	1,642	1,297	23rd
25th	..	..	1,828	1,249	24th
26th	..	..	1,813	1,391	25th
27th	..	..	1,642	1,249	26th
28th	..	..	2,163	1,391	
29th	..	..	2,063	1,650	
30th	..	..	1,860	1,806	
31st	..	..	2,457	1,598	
			49,597	36,742	
			74.08 per cent.		

1906, August.

5th	..	..	1,816	1,702	
6th	..	..	1,645	1,547	
7th	..	..	1,645	1,368	
8th	..	..	1,492	1,155	
			6,598	5,772	
			87.48 per cent.		

1908, August.

13th	..	..	2,802	2,495	
14th	..	..	2,442	2,356	
15th	..	..	2,318	2,032	
16th	..	..	1,999	1,780	
17th	..	..	1,999	1,572	
18th	..	..	1,999	1,547	
19th	..	..	1,801	1,572	
20th	..	..	1,801	1,443	
21st	..	..	1,604	1,297	
22nd	..	..	1,801	1,397	

1908, August—cont.

..	..	..	1,801	1,297	
..	..	..	1,801	1,368	
..	..	..	1,801	1,320	
..	..	..	1,604	1,226	
..	..	..	1,604	1,070	
..	..	..	1,461	1,028	
..	..	..	1,397	1,028	
..	..	..	1,374	943	
..	..	..	1,374	830	
			34,783	27,501	
			79.06 per cent.		

1909, August.

..	..	..	2,998	3,025	
..	..	..	2,998	2,716	
..	..	..	2,677	2,640	
..	..	..	2,685	2,495	
..	..	..	2,267	1,971	
..	..	..	1,937	1,940	
..	..	..	1,937	1,702	
..	..	..	1,937	1,650	
..	..	..	1,694	1,297	
..	..	..	1,592	1,113	
..	..	..	1,396	1,113	
..	..	..	1,396	985	
..	..	..	1,328	1,202	
..	..	..	1,196	1,249	
..	..	..	1,694	1,249	
..	..	..	1,671	1,650	
..	..	..	1,671	1,547	
..	..	..	1,821	1,971	
..	..	..	1,821	1,910	
..	..	..	2,189	2,032	
			38,905	35,457	
			93.70 per cent.		

1902, September.

..	..	..	2,081	1,971	
..	..	..	1,802	1,858	
..	..	..	1,972	1,910	
..	..	..	1,802	1,754	
..	..	..	1,503	1,391	
..	..	..	1,456	1,249	
..	..	..	1,395	1,155	
..	..	..	1,108	1,070	
..	..	..	1,128	1,070	
			14,247	13,428	
			94.25 per cent.		

1903, September.

..	..	..	1,467	1,391	
..	..	..	1,467	1,344	
..	..	..	1,467	1,443	
..	..	..	1,590	1,495	
			5,991	5,673	
			94.69 per cent.		

Date. Discharge at Siva-samudram. Discharge at Bhavani bridge. Date.

1903, September—cont.

14th	..	..	2,253	2,093	12th
15th	..	..	2,200	1,806	13th
16th	..	..	2,083	1,650	14th
17th	..	..	1,776	1,598	15th
18th	..	..	1,620	1,443	16th
19th	..	..	1,548	1,344	17th
20th	..	..	1,475	1,344	18th
21st	..	..	1,368	1,391	19th
22nd	..	..	1,465	1,858	20th
23rd	..	..	2,219	2,093	21st
			18,007	16,620	22nd
			92.30 per cent.		23rd
					24th

1904, September.

1st	..	..	1,186	683	
2nd	..	..	1,108	647	
			2,294	1,330	
			58.00 per cent.		
12th	..	..	1,122	647	13th
13th	..	..	1,226	830	14th
14th	..	..	1,752	1,155	15th
15th	..	..	2,931	2,565	16th
16th	..	..	2,931	2,286	17th
17th	..	..	2,384	1,858	18th
18th	..	..	2,021	1,547	19th
19th	..	..	1,648	1,344	20th
20th	..	..	1,466	1,070	21st
21st	..	..	1,330	1,070	22nd
22nd	..	..	1,454	1,155	23rd
23rd	..	..	1,648	1,598	24th
24th	..	..	2,018	1,495	
25th	..	..	1,895	1,391	
26th	..	..	1,329	1,297	
27th	..	..	1,122	1,070	
			28,277	22,378	
			79.13 per cent.		

1905, September.

1st	..	..	2,163	1,806	
2nd	..	..	2,003	1,547	
3rd	..	..	1,711	1,344	
4th	..	..	1,642	1,249	
5th	..	..	1,489	1,113	
6th	..	..	1,489	1,028	
7th	..	..	1,342	958	
8th	..	..	1,813	1,344	
9th	..	..	2,457	1,910	
10th	..	..	2,742	2,093	
11th	..	..	2,457	1,858	
12th	..	..	2,163	1,806	
13th	..	..	1,813	1,443	
14th	..	..	1,813	1,391	
15th	..	..	1,489	1,155	
16th	..	..	1,342	943	
17th	..	..	1,149	868	
18th	..	..	1,068	868	
19th	..	..	1,342	868	
20th	..	..	1,068	792	
			33,955	26,384	
			77.70 per cent.		

1906, September.

..	..	..	1,492	1,249	
..	..	..	1,492	1,070	
..	..	..	1,645	1,070	
..	..	..	1,645	1,028	
..	..	..	1,645	1,202	
..	..	..	1,492	1,344	
..	..	..	1,645	1,249	
..	..	..	1,492	1,155	
..	..	..	1,352	1,202	
..	..	..	1,492	1,178	
..	..	..	1,352	1,113	
..	..	..	1,352	1,202	
..	..	..	1,492	1,443	
			19,588	15,505	
			79.15 per cent.		

1907, September.

..	..	..	1,390	1,113	
..	..	..	1,250	1,070	
..	..	..	1,250	985	
..	..	..	1,250	943	
..	..	..	1,092	905	
..	..	..	1,011	868	
..	..	..	1,250	830	
..	..	..	1,092	811	
..	..	..	1,092	773	
..	..	..	1,092	737	
..	..	..	1,535	905	
..	..	..	1,535	985	
			14,839	10,925	
			73.63 per cent.		

1908, September.

..	..	..	1,799	1,391	
..	..	..	1,382	1,495	
..	..	..	1,649	1,297	
..	..	..	2,104	1,495	
..	..	..	1,462	1,155	
..	..	..	1,397	985	
..	..	..	1,374	830	
..	..	..	1,374	1,070	
..	..	..	1,153	754	
..	..	..	1,153	985	
			14,847	11,457	
			77.17 per cent.		

1909, September.

..	..	..	1,391	1,297	
..	..	..	1,219	1,028	
..	..	..	1,219	1,070	
..	..	..	1,026	905	
..	..	..	1,024	792	
			5,879	5,092	
			86.61 per cent.		
..	..	..	1,026	647	
..	..	..	1,277	754	
..	..	..	1,277	905	
..	..	..	1,026	943	
			4,606	3,249	
			70.54 per cent.		

APPENDIX XIII.

TABLE M with limit flow 2,944 millions cubic feet.

Date.	Flow at Kannambadi.	Natural discharge recorded at Aganda Cauvery.	Gross amount which may be impounded 3 days previously at Kannambadi.	Aganda Cauvery less gross amount impounded at Kannambadi, 3 days previously columns (3)-(4).	Compensation water called 2,944—column (5) not exceeding column (2) 3 days previously.	Net impounded Mysore reservoir column (2)—column (6) until reservoir is full.	Draw off Mysore.	Balance Mysore reservoir previous day column (9) + column (7)—column (6).	Natural discharge Aganda Cauvery column (3).	Net impounded Mysore reservoir 3 days previously column (7).	Actual computed flow Aganda Cauvery column (10)—column (11).	Actual recorded flow Aganda Cauvery limited to 2,944.	Mysore reservoir surplus after full supply Madras allowance.	Remarks.
1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
June 1905.														
1st	..	..	402	42	360	..	..	43	11,957	402	42	360	402	..
2nd	..	..	370	21	349	..	..	43	11,914	370	21	349	370	..
3rd	..	..	354	8	346	..	..	43	11,871	354	8	346	354	..
4th	..	..	322	..	322	..	..	43	11,828	322	..	322	322	..
5th	..	..	272	..	272	..	..	43	11,785	272	..	272	272	..
6th	..	..	272	..	272	..	..	43	11,742	272	..	272	272	..
7th	..	..	218	..	218	..	..	43	11,699	218	..	218	218	..
8th	..	1	370	..	370	..	..	43	11,657	370	..	370	370	..
9th	..	1	322	..	322	..	..	43	11,615	322	..	322	322	..
10th	..	1	290	..	290	..	..	43	11,573	290	..	290	290	..
11th	..	1	236	1	235	1	..	43	11,530	236	1	235	236	..
12th	..	95	236	1	235	1	..	43	11,581	236	1	235	236	..
13th	..	641	200	1	199	1	..	43	12,178	200	1	199	200	..
14th	..	151	218	1	217	1	..	43	12,385	218	..	218	218	..
15th	..	33	254	95	159	95	..	43	12,180	254	94	160	254	..
16th	..	132	200	641	441	641	..	152	11,519	200	640	440	200	..
17th	..	132	158	151	7	151	..	152	11,348	158	150	8	158	..
18th	..	138	130	33	97	33	..	152	11,301	130	..	192	130	..
19th	..	160	186	132	54	132	..	152	11,177	186	..	695	186	..
20th	..	1,447	186	132	54	132	1,315	152	12,240	186	19	205	186	..
21st	..	1,263	158	138	20	138	1,125	152	13,313	158	105	58	158	..
22nd	..	210	130	160	30	160	50	152	13,211	130	28	102	130	..
23rd	..	177	594	1,447	853	1,447	1,270	152	11,789	594	1,215	731	594	..
24th	..	144	538	1,263	725	1,263	1,119	152	10,518	538	1,125	587	538	..
25th	..	185	1,818	210	1,608	210	75	152	10,221	1,818	50	1,768	1,818	..
26th	..	328	1,287	177	1,110	177	151	152	10,290	1,287	1,270	2,557	1,287	..
27th	..	328	851	144	707	144	184	152	10,322	851	1,119	1,970	851	..
28th	..	405	662	135	527	135	270	152	10,440	662	75	737	662	..
29th	..	569	594	328	266	328	241	152	10,529	594	151	443	594	..
30th	..	723	754	328	426	328	395	152	10,772	754	184	570	754	..

Table M with limit flow 2,944 millions cubic feet—cont.

Date.	Flow at Kannambadi.	Natural discharge recorded at Aganda Cauvery.	Gross amount which may be impounded 3 days previously at Kannambadi.	Aganda Cauvery less gross amount impounded at Kannambadi, 3 days previously columns (3)-(4).	Compensation water called 2,944—column (5) not exceeding column (2) 3 days previously.	Net impounded Mysore Reservoir column (2)—column (6) until reservoir is full.	Draw off Mysore.	Balance Mysore reservoir previous day column (9) + column (7)—column (6).	Natural discharge Aganda Cauvery column (3).	Net impounded Mysore reservoir 3 days previously column (7).	Actual computed flow Aganda Cauvery column (10)—column (11).	Actual recorded flow Aganda Cauvery limited to 2,944.	Mysore reservoir surplus after full supply Madras allowance.	Remarks.
1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
July 1905.														
1st	..	1,141	1,579	405	1,174	405	786	156	11,852	1,579	270	1,309	1,579	..
2nd	..	1,172	3,697	569	3,128	..	1,172	156	12,368	3,697	241	3,456	2,944	Compensation water surplussed 328
3rd	..	1,044	3,638	723	2,915	29	1,015	156	13,227	3,638	395	3,243	2,944	Do. do. 299
4th	..	855	3,802	1,141	2,661	283	572	156	13,643	3,802	736	3,066	2,944	Do. do. 122
5th	..	676	3,680	1,172	2,508	436	240	156	13,727	3,680	1,172	2,508	2,944	..
6th	..	612	2,834	1,044	1,790	1,044	..	156	13,139	2,834	1,015	1,819	2,834	..
7th	..	584	2,020	855	1,165	855	271	156	12,712	2,020	572	1,448	2,020	..
8th	..	2,714	1,495	676	819	676	2,038	156	14,594	1,495	240	1,255	1,495	..
9th	..	2,804	1,000	612	888	612	2,192	156	16,680	1,000	..	1,432	1,000	..
10th	..	1,991	730	584	146	584	1,407	156	17,881	730	271	1,001	730	..
11th	..	795	730	2,714	1,984	2,714	..	156	15,806	730	2,038	1,308	730	..
12th	..	631	4,077	2,804	1,273	1,671	..	156	14,610	4,077	2,192	1,885	2,944	..
13th	..	654	3,161	1,991	1,170	1,774	..	156	13,854	3,161	1,407	1,754	2,944	..
14th	..	573	2,160	795	1,365	795	..	156	12,956	2,160	1,919	4,079	2,160	Compensation water surplussed 1,135
15th	..	534	1,625	631	994	631	..	156	12,708	1,625	1,040	2,665	1,625	..
16th	..	556	1,240	654	586	654	..	156	12,449	1,240	1,120	2,360	1,240	..
17th	..	556	892	573	319	573	..	156	12,276	892	222	1,114	892	..
18th	..	556	628	534	94	534	22	156	12,142	628	97	725	621	..
19th	..	1,333	538	556	..	556	677	156	12,663	538	28	636	538	..
20th	..	1,802	472	556	..	556	1,246	156	13,758	472	17	489	472	..
21st	..	4,017	516	556	..	556	3,461	156	17,058	516	22	494	516	..
22nd	..	5,924	628	1,233	..	1,233	4,691	156	21,593	628	677	49	628	..
23rd	..	6,695	3,657	1,802	1,855	1,059	5,606	156	27,043	3,657	1,246	2,411	2,944	..
24th	..	6,005	7,516	4,017	8,499	..	6,005	156	32,892	7,516	3,461	4,055	2,944	Compensation water surplussed 556
25th	..	3,606	7,859	5,124	1,935	1,009	2,597	156	35,333	7,859	4,691	3,168	2,944	Do. do. 224
26th	..	2,770	8,003	6,695	1,308	1,636	1,134	156	36,311	8,003	5,606	2,397	2,944	..
27th	..	2,486	6,516	6,005	511	2,433	53	156	36,208	6,516	6,005	511	2,944	..
28th	..	2,173	4,664	3,606	1,058	1,886	287	156	36,339	4,664	2,597	2,067	2,944	..
29th	..	2,029	4,585	2,770	1,315	1,129	900	156	37,083	4,585	1,134	3,451	2,944	Compensation water surplussed 507
30th	..	1,958	4,133	2,486	1,647	1,297	173	156	37,100	4,133	53	4,080	2,944	Do. do. 1,136
31st	..	1,821	4,133	2,173	1,960	984	156	156	37,100	4,133	287	3,846	2,944	Do. do. 902

Table M with limit flow 2,944 millions cubic feet—cont.

Date.	Flow at Kannambadi.	Natural discharge recorded at Aganda Cauvery.	Gross amount which may be impounded 3 days previously at Kannambadi.	Aganda Cauvery less gross amount impounded at Kannambadi 3 days previously columns (3)-(4).	Compensation water called 2,944—column (5) not exceeding column (2) 3 days previously.	Net impounded Mysore reservoir column (2)—column (6) until reservoir is full.	Draw off Mysore.	Balance Mysore reservoir previous day column (9) + column (7)—column (8).	Natural discharge Aganda Cauvery column (3).	Net impounded Mysore reservoir 3 days previously column (7).	Actual computed flow Aganda Cauvery column (10) — column (11).	Actual recorded flow Aganda Cauvery limited to 2,944.	Mysore reservoir surplus after full supply Madras allowance.	Remarks.
1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
August 1905.														
1st	1,382	3,046	2,029	1,017	1,927	545	156	36,399	3,046	900	2,146	2,944	..	Compensation water surplussed 44.
2nd	1,783	2,698	1,958	740	1,958	225	156	36,018	2,698	173	2,525	2,698	..	
3rd	1,676	2,650	1,821	829	1,821	145	156	35,717	2,650	156	2,494	2,650	..	
4th	994	2,440	1,382	1,058	1,382	388	156	35,173	2,440	545	2,985	2,440	..	
5th	549	2,222	1,733	489	1,733	1,184	156	33,833	2,222	225	2,447	2,222	..	
6th	709	2,074	1,676	398	1,676	567	156	32,710	2,074	145	2,219	2,074	..	
7th	666	1,859	994	865	994	328	156	32,226	1,859	..	2,247	1,859	..	
8th	592	1,573	549	1,024	549	..	156	32,113	1,573	1,184	2,757	1,573	..	
9th	595	1,232	709	593	709	114	156	31,843	1,232	967	2,199	1,232	..	
10th	561	981	666	315	666	105	156	31,582	981	328	1,309	981	..	
11th	561	803	592	211	592	31	156	31,395	803	43	760	803	..	
12th	658	662	595	67	595	..	156	31,302	662	114	776	662	..	
13th	545	594	561	33	561	16	156	31,130	594	105	699	594	..	
14th	379	560	561	—1	561	182	156	30,792	560	31	591	560	..	
15th	565	538	658	—120	658	93	156	30,543	538	63	475	538	..	
16th	556	516	545	—29	545	11	156	30,398	516	16	532	516	..	
17th	731	594	379	215	679	352	156	30,594	594	182	776	594	..	
18th	731	784	565	219	565	166	156	30,604	784	93	877	784	..	
19th	731	628	566	72	556	175	156	30,623	628	11	617	628	..	
20th	689	538	731	—193	731	42	156	30,425	538	352	186	538	..	
21st	763	516	731	—215	731	32	156	30,301	516	166	350	516	..	
22nd	1,134	696	731	—35	731	403	156	30,548	696	175	521	696	..	
23rd	1,304	851	689	162	689	415	156	31,007	851	42	893	851	..	
24th	922	1,116	763	353	763	159	156	31,010	1,116	32	1,084	1,116	..	
25th	1,094	1,116	1,134	—18	1,134	40	156	30,814	1,116	403	713	1,116	..	
26th	1,534	1,116	1,304	—188	1,304	230	156	30,888	1,116	616	501	1,116	..	
27th	1,059	1,082	922	140	922	187	156	30,869	1,082	159	903	1,082	..	
28th	985	1,116	1,094	22	1,094	109	156	30,604	1,116	40	1,156	1,116	..	
29th	1,057	1,170	1,534	—364	1,534	477	156	29,971	1,170	230	940	1,170	..	
30th	1,074	1,345	1,059	286	1,059	15	156	29,820	1,345	187	1,208	1,345	..	
31st	981	1,345	985	360	985	4	156	29,670	1,345	109	1,464	1,345	..	

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Table M with limit flow 2,944 millions cubic feet—cont.

Date.	Flow at Kannambadi.	Natural discharge recorded at Aganda Cauvery.	Gross amount which may be impounded 3 days previously at Kannambadi.	Aganda Cauvery less gross amount impounded at Kannambadi 3 days previously columns (3)-(4).	Compensation water called 2,944—column (5) not exceeding column (2) 3 days previously.	Net impounded Mysore reservoir column (2)—column (6) until reservoir is full.	Draw off Mysore.	Balance Mysore reservoir previous day column (9) + column (7)—column (8).	Natural discharge Aganda Cauvery column (3).	Net impounded Mysore reservoir 3 days previously column (7).	Actual computed flow Aganda Cauvery column (10) — column (11).	Actual recorded flow Aganda Cauvery limited to 2,944.	Mysore reservoir surplus after full supply, Madras allowance.	Remarks.
1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
September 1905.														
1st	879	1,696	1,057	639	1,057	178	156	29,336	1,696	477	2,173	1,696	..	
2nd	782	1,696	1,074	622	1,074	292	156	28,888	1,696	16	1,681	1,686	..	
3rd	760	1,755	981	774	981	231	156	28,501	1,755	4	1,759	1,755	..	
4th	847	1,755	879	876	879	32	156	28,313	1,755	178	1,933	1,755	..	
5th	584	1,170	782	383	782	198	156	27,959	1,170	292	1,462	1,170	..	
6th	869	851	759	101	760	119	156	27,922	851	281	1,082	851	..	
7th	1,163	892	847	45	847	316	156	28,082	892	32	924	892	..	
8th	1,392	838	584	254	585	808	156	28,734	838	198	1,036	838	..	
9th	1,503	784	869	—85	869	674	156	29,219	784	119	665	784	..	
10th	1,471	838	1,163	—325	1,163	308	156	29,364	838	316	522	838	..	
11th	1,136	1,536	1,392	144	1,392	256	156	28,952	1,536	808	728	1,536	..	
12th	1,035	2,320	1,503	817	1,503	468	156	28,328	2,320	634	1,686	2,320	..	
13th	997	2,089	1,471	618	1,471	474	156	27,698	2,089	308	1,781	2,089	..	
14th	646	1,798	1,136	657	1,136	490	156	27,052	1,793	256	2,049	1,793	..	
15th	616	1,495	1,035	460	1,035	419	156	26,477	1,495	468	1,963	1,495	..	
16th	457	1,300	997	303	997	546	156	25,781	1,300	474	1,774	1,300	..	
17th	431	1,060	646	414	646	215	156	25,410	1,060	490	1,550	1,060	..	
18th	883	1,365	616	749	616	223	156	25,021	1,365	419	1,784	1,365	..	
19th	374	730	457	273	457	83	156	24,782	730	540	1,270	730	..	
20th	855	662	431	231	431	76	156	24,550	662	215	877	662	..	
21st	300	1,365	383	982	383	83	156	24,311	1,365	233	1,598	1,365	..	
22nd	290	730	374	356	374	84	156	24,071	730	83	813	730	..	
23rd	278	594	355	239	355	77	156	23,838	594	76	670	594	..	
24th	238	494	300	174	300	62	156	23,620	494	83	577	494	..	
25th	238	450	290	160	290	52	156	23,412	450	84	534	450	..	
26th	267	434	278	156	278	11	156	23,245	434	77	511	434	..	
27th	268	386	238	148	238	30	156	23,119	386	62	448	386	..	
28th	217	354	238	116	238	21	156	22,942	354	52	406	354	..	
29th	206	338	267	71	267	61	156	22,725	338	11	349	338	..	
30th	145	338	268	70	268	123	156	22,446	338	30	308	338	..	

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Table M with limit flow 2,944 millions cubic feet—cont.

Date.	Flow at Kannambadi.	Natural discharge recorded at Aganda Cauvery.	Gross amount which may be impounded 3 days previously at Kannambadi.	Aganda Cauvery less gross amount impounded at Kannambadi 3 days previously column (3) — (4).	Compensation water called 2,944—column (5) not exceeding column (2) 3 days previously.	Net impounded Mysore reservoir column (2) — column (6) until reservoir is full.	Draw off Mysore.	Balance Mysore reservoir previous day column (9) + column (7) — column (8).	Natural discharge Aganda Cauvery column (3).	Net impounded Mysore reservoir 3 days previously column (7).	Actual computed flow Aganda Cauvery column (10) — column (11).	Actual recorded flow Aganda Cauvery limited to 2,944.	Mysore reservoir surplus after full supply Madras allowance.	Remarks.
1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
October 1905.														
1st	142	338	217	121	217	75	156	22,315	338	21	359	338	..	
2nd	142	338	206	132	206	64	156	21,995	338	61	399	338	..	
3rd	174	322	145	177	145	29	156	21,568	322	123	445	322	..	
4th	237	322	142	180	142	95	156	21,807	322	75	397	322	..	
5th	201	322	142	180	142	59	156	21,710	322	64	386	322	..	
6th	214	338	174	164	174	40	156	21,594	338	29	309	338	..	
7th	237	1,062	237	825	237	..	156	21,438	1,082	95	967	1,062	..	
8th	196	628	201	427	201	..	5	21,277	628	59	569	628	..	
9th	181	472	214	258	214	..	38	21,088	472	40	432	472	..	
10th	159	851	237	614	237	..	78	20,854	851	..	851	851	..	
11th	258	3,336	196	3,140	..	258	156	20,956	3,336	..	5	3,341	2,944	Compensation water surplussed 301.
12th	595	2,346	181	2,165	779	59	184	20,616	2,346	..	33	2,379	2,346	Do. do. 237.
13th	914	3,140	159	2,981	..	914	156	21,374	3,140	..	78	3,218	2,944	
14th	1,245	2,178	258	1,920	258	987	156	22,205	2,178	258	..	1,920	2,178	
15th	2,761	2,192	595	1,597	595	2,166	156	24,215	2,192	..	184	2,276	2,192	
16th	1,415	4,892	914	3,978	..	1,415	156	25,474	4,892	914	..	3,978	2,944	
17th	912	3,879	1,245	2,634	310	602	156	25,920	3,879	987	..	2,892	2,944	
18th	726	3,870	2,761	1,109	1,835	..	1,109	24,655	3,870	2,166	..	1,704	2,944	
19th	559	4,190	1,415	2,775	169	390	156	24,889	4,190	1,415	..	2,775	2,944	
20th	760	3,001	912	2,089	956	..	95	24,638	3,001	602	..	2,399	2,944	
21st	493	2,305	726	1,579	736	..	233	24,249	2,305	..	1,109	3,414	2,305	Compensation water surplussed 470.
22nd	414	2,353	559	1,794	559	..	145	23,948	2,353	390	..	1,963	2,353	
23rd	348	1,048	760	288	760	..	412	23,380	1,048	..	95	1,143	1,048	
24th	278	1,000	493	507	493	..	215	23,009	1,000	..	233	1,233	1,000	
25th	205	838	414	424	414	..	309	22,644	838	..	145	983	838	
26th	207	662	348	314	343	..	141	22,347	662	..	412	1,074	662	
27th	174	560	278	282	278	..	101	22,090	560	..	215	775	560	
28th	139	516	205	311	205	..	66	21,868	516	..	209	735	516	
29th	139	450	207	243	207	..	68	21,644	450	..	141	591	450	
30th	146	418	174	244	174	..	28	21,480	418	..	101	519	418	
31st	114	402	139	263	139	..	25	21,279	402	..	66	468	402	

TABLE N with limit flow 2,300 millions cubic feet.

Date.	Flow at Kannambadi.	Natural discharge recorded at Aganda Cauvery.	Gross amount which may be impounded, column (2) 3 days previously at Kannambadi.	Aganda Cauvery less gross amount impounded at Kannambadi 3 days previously, column (3) — column (4).	Compensation water called 2,300 — column (5) not exceeding column (2) 3 days previously.	Net impounded Mysore Reservoir column (2) — column (6) until reservoir is full.	Draw off Mysore.	Balance Mysore reservoir previous day column (9) + column (7) — column (8).	Natural discharge Aganda Cauvery, column (3).	Net impounded Mysore reservoir 3 days previously, column (7).	Actual computed flow Aganda Cauvery, column (10) — column (11).	Actual recorded flow Aganda Cauvery limited to 2,300.	Mysore Reservoir surplus after full supply, Madras allowance.	Remarks.
1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
June 1905.														
1st	..	402	42	380	..	..	43	11,957	402	42	260	402	..	
2nd	..	370	21	349	..	..	43	11,914	370	21	349	370	..	
3rd	..	354	8	346	..	..	43	11,871	354	8	346	354	..	
4th	..	322	..	322	..	..	43	11,828	322	..	322	322	..	
5th	..	272	..	272	..	..	43	11,785	272	..	272	272	..	
6th	..	272	..	272	..	..	43	11,742	272	..	272	272	..	
7th	..	218	..	218	..	..	43	11,699	218	..	218	218	..	
8th	1	370	..	370	..	1	43	11,657	370	..	370	370	..	
9th	1	322	..	322	..	1	43	11,615	322	..	322	322	..	
10th	1	290	..	290	..	1	43	11,573	290	..	290	290	..	
11th	..	236	1	235	1	..	43	11,530	236	1	235	236	..	
12th	95	236	1	235	1	94	43	11,581	236	1	235	236	..	
13th	641	200	1	199	1	640	43	12,178	200	1	199	200	..	
14th	151	218	1	217	1	150	43	12,285	218	..	218	218	..	
15th	33	254	95	159	95	..	43	12,180	254	94	160	254	..	
16th	132	200	641	641	..	509	152	11,519	200	640	440	200	..	
17th	132	158	151	7	151	..	152	11,348	158	150	8	158	..	
18th	138	130	33	97	33	105	152	11,301	130	..	62	130	..	
19th	160	186	132	54	132	28	152	11,177	186	..	509	186	..	
20th	1,447	186	152	54	132	1,315	152	12,340	186	..	19	205	186	
21st	1,263	158	138	20	138	1,125	152	13,313	158	105	53	158	..	
22nd	210	130	160	30	160	50	152	13,211	130	28	102	130	..	
23rd	177	594	1,447	853	1,447	..	152	11,789	594	1,815	721	594	..	
24th	144	538	1,263	725	1,263	..	152	10,518	538	1,125	587	538	..	
25th	135	1,818	210	1,608	210	..	152	10,291	1,818	50	1,768	1,818	..	
26th	328	1,287	177	1,110	177	151	152	10,290	1,287	..	1,270	1,287	..	Surplus 257 compensation of water.
27th	328	851	144	707	144	184	152	10,322	851	..	1,119	851	..	
28th	405	662	135	527	135	270	152	10,440	662	..	75	662	..	
29th	569	594	328	266	328	241	152	10,529	594	151	..	594	..	
30th	723	754	328	426	328	395	152	10,772	754	184	..	754	..	

Table N with limit flow 2,300 millions cubic feet—cont.

Date.	Flow at Kannambadi.	Natural discharge recorded at Aganda Cauvery.	Gross amounts which may be impounded, column (2) 3 days previously at Kannambadi.	Aganda Cauvery less gross amount impounded at Kannambadi 3 days previously, column (3) — column (4).	Compensation water called 2,300 — column (5) not exceeding column (2) 3 days previously.	Net impounded Mysore reservoir column (2) — column (6) until reservoir is full.	Draw off Mysore.	Balance Mysore reservoir previous day column (9) + column (7) — column (8).	Natural discharge Aganda Cauvery column (3).	Net impounded Mysore reservoir 3 days previously, column (7).	Actual computed flow Aganda Cauvery, column (10) — column (11).	Actual recorded flow Aganda Cauvery limited to 2,300.	Mysore Reservoir surplus after full supply, Madras allowance.	Remarks.
1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
July 1905.														
1st	1 141	1,579	405	1,174	405	786	156	11,352	1,579	270	1,309	1,579	..	Compensation water surplussed 527.
2nd	1,172	3,697	569	3,128	..	1,172	156	13,368	3,697	241	3,456	2,300	..	Do. do. 266.
3rd	1,044	3,638	723	2,915	..	1,044	156	13,256	3,638	395	3,243	2,300	..	Do. do. 426.
4th	855	3,802	1,141	2,661	..	855	156	13,955	3,802	738	3,066	2,300	..	Do. do. 208.
5th	676	3,680	1,172	2,508	..	676	156	14,475	3,680	1,172	2,508	2,300	..	
6th	612	2,834	1,044	1,790	510	102	156	14,421	2,834	1,044	1,790	2,300	..	
7th	584	2,020	855	1,165	555	..	271	13,994	2,020	855	1,165	2,020	..	
8th	2,714	1,495	676	819	676	2,038	156	15,876	1,495	676	819	1,495	..	
9th	2,804	1,000	612	388	612	2,192	156	17,912	1,000	102	898	1,000	..	
10th	1,991	730	584	146	584	1,407	156	19,163	730	..	271	1,001	730	
11th	795	730	2,714	— 1,984	2,300	..	1,505	17,502	730	2,038	..	1,308	730	
12th	631	4,077	2,804	1,273	1,027	..	396	16,950	4,077	2,192	..	1,885	2,300	
13th	654	3,161	1,991	1,170	1,130	..	476	16,318	3,161	1,407	..	1,754	2,300	
14th	573	2,160	795	1,365	795	..	232	15,940	2,160	..	1,505	3,665	2,160	
15th	534	1,625	631	994	631	..	97	15,687	1,625	..	396	2,021	1,625	
16th	556	1,240	554	586	554	..	98	15,433	1,240	..	476	1,716	1,240	
17th	556	892	573	319	573	..	17	15,260	892	..	222	1,114	892	
18th	556	628	534	94	534	22	..	15,126	628	..	97	725	628	
19th	1,233	538	556	— 18	556	677	..	15,647	538	..	98	636	538	
20th	1,802	472	556	— 84	556	1,246	..	16,737	472	..	17	489	472	
21st	4,017	516	556	— 40	556	3,461	..	20,042	516	22	..	494	516	
22nd	5,924	628	1,233	— 605	1,233	4,691	..	24,577	628	677	..	— 49	628	
23rd	6,695	3,657	1,802	1,855	445	6,250	..	30,671	3,657	1,246	..	2,411	2,300	Compensation water surplussed 111.
24th	6,005	7,516	4,017	3,499	..	6,005	..	36,520	7,516	3,461	..	4,055	2,300	Do. do. 555.
25th	3,806	7,859	5,924	1,935	365	736	..	37,100	7,859	4,691	..	3,168	2,300	Do. do. 868.
26th	2,770	8,003	6,695	1,308	992	156	..	37,100	8,003	6,250	..	1,753	2,300	
27th	2,486	6,516	6,005	511	1,789	156	..	37,100	6,516	6,005	..	511	2,300	
28th	2,173	4,664	3,606	1,058	1,242	156	..	37,100	4,664	736	..	3,928	2,300	Compensation water surplussed 355.
29th	2,029	4,585	2,770	1,815	485	156	..	37,100	4,585	156	..	4,429	2,300	Do. do. 922.
30th	1,958	4,133	2,486	1,647	653	156	..	37,100	4,133	156	..	3,977	2,300	Do. do. 1,677.
31st	1,821	4,133	2,173	1,960	349	156	..	37,100	4,133	156	..	3,977	2,300	Do. do. 1,242.

Table N with limit flow 2,300 millions cubic feet—cont.

Date.	Flow at Kannambadi.	Natural discharge recorded at Aganda Cauvery.	Gross amount which may be impounded, column (2) 3 days previously at Kannambadi.	Aganda Cauvery less gross amount impounded at Kannambadi 3 days previously, column (3) — column (4).	Compensation water called 2,300 — column (5) not exceeding column (2) 3 days previously.	Net impounded Mysore reservoir column (2) — column (6) until reservoir is full.	Draw off Mysore.	Balance Mysore reservoir previous day column (9) + column (7) — column (8).	Natural discharge Aganda Cauvery column (3).	Net impounded Mysore reservoir 3 days previously, column (7).	Actual computed flow Aganda Cauvery column (10) — column (11).	Actual recorded flow Aganda Cauvery limited to 2,300.	Mysore Reservoir surplus after full supply, Madras allowance.	Remarks.
1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
August 1905.														
1st	1,382	3,046	2,029	1,017	1,283	99	156	37,043	3,046	156	..	2,890	2,300	Compensation water surplussed. 485
2nd	1,733	2,698	1,958	740	1,530	173	..	37,060	2,698	156	..	2,542	2,300	Do. do. 242
3rd	1,676	2,650	1,821	829	1,471	196	..	37,100	2,650	156	..	2,494	2,300	Do. do. 194
4th	994	2,440	1,382	1,058	1,242	..	248	36,696	2,440	99	..	2,341	2,300	Do. do. 41
5th	549	2,222	1,733	489	1,733	..	1,184	35,356	2,222	173	..	2,049	2,222	
6th	709	2,074	1,676	398	1,676	..	967	34,233	2,074	196	..	1,878	2,074	
7th	666	1,859	994	865	994	..	328	33,749	1,859	..	248	2,107	1,859	
8th	592	1,573	549	1,024	549	43	..	33,636	1,573	..	1,184	2,757	1,573	
9th	595	1,232	709	523	709	..	114	33,366	1,232	..	967	2,199	1,232	Compensation .. 457
10th	561	981	666	315	666	..	105	33,105	981	..	328	1,309	981	
11th	561	803	592	211	592	..	31	33,918	803	43	..	760	803	
12th	558	662	555	67	595	63	..	32,825	662	..	114	776	662	
13th	545	594	561	33	561	..	16	32,653	594	..	105	699	594	
14th	379	590	561	1	561	..	182	32,315	560	..	31	591	560	
15th	556	538	558	— 120	558	..	93	32,066	538	63	..	475	538	
16th	556	516	545	— 29	545	11	..	31,921	516	..	16	532	516	
17th	731	594	379	215	379	352	..	32,117	594	..	182	776	594	
18th	731	784	565	219	565	166	..	32,127	784	..	93	877	784	
19th	731	628	556	72	556	175	..	32,146	628	11	..	617	628	
20th	689	538	731	193	731	..	42	31,948	538	352	..	166	538	
21st	763	516	31	215	731	82	..	31,824	516	166	..	350	516	
22nd	1,134	696	731	35	731	403	..	32,071	696	175	..	521	696	
23rd	1,304	851	689	162	689	615	..	32,530	851	..	42	893	851	
24th	922	1,116	763	353	763	159	..	32,533	1,116	32	..	1,084	1,116	
25th	1,094	1,116	1,134	— 18	1,134	..	40	32,337	1,116	403	..	713	1,116	
26th	1,534	1,116	1,304	— 188	1,304	230	..	32,411	1,116	6.5	..	501	1,116	
27th	1,059	1,062	922	110	922	137	..	32,392	1,062	159	..	903	1,062	
28th	985	1,116	1,094	22	1,094	..	109	32,127	1,116	..	40	1,156	1,116	
29th	1,057	1,170	1,534	— 364	1,534	..	477	31,494	1,170	30	..	940	1,170	
30th	1,074	1,345	1,059	286	1,059	15	..	31,353	1,345	137	..	1,208	1,345	
31st	981	1,345	985	360	985	..	4	31,193	1,345	..	109	1,454	1,345	

Table N with limit flow 2,300 millions cubic feet—cont.

Date.	Flow at Kannambady.	Natural discharge recorded at Aganda Cauvery.	Gross amount which may be impounded column (2) 3 days previously at Kannambady.	Aganda Cauvery less gross amount impounded at Kannambady 3 days previously column (3) — column (4).	Compensation water called 2,300 — column (5) not exceeding column (2) 3 days previously.	Net impounded Mysore Reservoir column (2) — column (5) until reservoir is full.	Draw off Mysore.	Balance Mysore Reservoir previous day column (8) + column (7) — column (8).	Natural discharge Aganda Cauvery column (3).	Net impounded Mysore Reservoir 3 days previously column (7).	Actual computed flow Aganda Cauvery column (10) — column (11).	Actual recorded flow Aganda Cauvery limited to 2,300.	Mysore Reservoir surplus after full supply, Madras allowance.	Remarks.
1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
September 1905.														
1st	879	1,698	1,057	639	1,057	178	156	30,859	1,696	477	2,173	1,696	..	
2nd	782	1,696	1,074	622	1,074	292	156	30,411	1,696	15	1,681	1,696	..	
3rd	750	1,755	981	774	981	231	156	30,024	1,755	4	1,759	1,755	..	
4th	847	1,755	879	876	879	32	156	29,836	1,755	178	1,933	1,755	..	
5th	584	1,170	782	388	782	198	146	29,482	1,170	292	1,462	1,170	..	
6th	869	851	750	101	750	119	156	29,445	851	251	1,082	851	..	
7th	1,163	892	847	45	847	316	156	29,606	892	32	924	892	..	
8th	1,392	838	584	254	584	808	156	30,257	838	198	1,036	838	..	
9th	1,505	784	869	85	869	634	176	30,735	784	119	665	784	..	
10th	1,471	828	1,163	325	1,163	308	156	30,887	828	316	522	828	..	
11th	1,186	1,536	1,392	144	1,392	256	156	30,475	1,536	808	728	1,536	..	
12th	1,035	2,320	1,503	817	1,433	448	156	29,871	2,320	634	1,686	2,300	..	
13th	997	2,089	1,471	618	1,471	474	156	29,241	2,089	808	1,781	2,089	..	
14th	646	1,793	1,136	657	1,136	490	156	28,595	1,793	256	2,049	1,793	..	
15th	616	1,495	1,035	460	1,035	419	156	28,620	1,495	448	1,943	1,495	..	
16th	457	1,300	997	303	997	510	156	27,324	1,300	474	1,774	1,300	..	
17th	431	1,060	646	414	646	215	156	26,953	1,060	490	1,650	1,060	..	
18th	383	1,365	616	749	616	233	156	26,564	1,365	419	1,784	1,365	..	
19th	374	730	457	273	457	88	156	26,325	730	540	1,370	730	..	
20th	355	662	431	231	431	76	156	26,093	662	215	877	662	..	
21st	300	1,365	383	982	383	38	156	25,854	1,365	233	1,598	1,365	..	
22nd	290	730	374	356	374	84	156	25,614	730	88	813	730	..	
23rd	278	594	355	249	355	77	156	25,381	594	76	670	594	..	
24th	228	494	300	194	300	62	156	25,163	494	83	577	494	..	
25th	228	450	290	160	290	52	156	24,955	450	84	534	450	..	
26th	267	434	278	156	278	11	156	24,788	434	77	511	434	..	
27th	268	386	238	148	238	30	156	24,662	386	62	448	386	..	
28th	217	354	238	116	238	21	156	24,485	354	52	406	354	..	
29th	206	338	257	71	257	61	156	24,268	338	11	349	338	..	
30th	145	338	268	70	268	128	156	23,989	338	30	308	338	..	

Table N with limit flow 2,300 millions cubic feet—cont.

Date.	Flow at Kannambady.	Natural discharge recorded at Aganda Cauvery.	Gross amount which may be impounded column (2) 3 days previously at Kannambady.	Aganda Cauvery less gross amount impounded at Kannambady 3 days previously column (3) — column (4).	Compensation water called 2,300 — column (5) not exceeding column (2) 3 days previously.	Net impounded Mysore Reservoir column (2) — column (5) until reservoir is full.	Draw off Mysore.	Balance Mysore Reservoir previous day column (8) + column (7) — column (8).	Natural discharge Aganda Cauvery column (3).	Net impounded Mysore Reservoir 3 days previously column (7).	Actual computed flow Aganda Cauvery column (10) — column (11).	Actual recorded flow Aganda Cauvery limited to 2,300.	Mysore Reservoir surplus after full supply, Madras allowance.	Remarks.
1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
October 1905.														
1st	142	338	217	121	217	75	156	23,758	338	21	359	338	..	
2nd	142	338	206	132	206	64	156	23,538	338	61	399	338	..	
3rd	174	322	145	177	145	29	156	23,411	322	123	445	322	..	
4th	237	322	142	180	142	95	156	23,350	322	75	397	322	..	
5th	201	324	142	180	142	59	156	23,253	322	64	386	322	..	
6th	214	338	174	164	174	40	156	23,137	338	29	309	338	..	
7th	237	1,062	237	825	237	..	156	22,981	1,062	95	967	1,062	..	
8th	196	628	201	427	201	5	156	22,820	628	59	569	628	..	
9th	181	472	214	258	214	33	156	22,731	472	40	432	472	..	
10th	159	851	237	614	237	78	156	22,397	851	..	851	851	..	
11th	258	3,336	196	3,140	..	258	156	21,499	3,336	..	3,341	2,300	..	Compensation water surplussed 201
12th	595	2,346	181	2,165	135	460	156	22,803	2,346	33	2,379	2,300	..	Do. do. 79
13th	914	3,140	159	2,881	..	914	156	23,551	3,140	78	3,218	2,300	..	Do. do. 237
14th	1,245	2,178	258	1,920	258	987	156	24,392	2,178	258	1,920	2,178	..	
15th	2,761	2,192	595	1,597	595	2,166	156	26,402	2,192	460	1,732	2,192	..	
16th	1,415	4,892	914	3,978	..	1,415	156	27,661	4,892	914	3,978	2,300	..	Compensation water surplussed ..
17th	912	3,879	1,245	2,634	..	912	156	28,417	3,879	987	2,892	2,300	..	Do. do. 258
18th	726	3,870	2,761	1,109	1,191	465	156	27,796	3,870	2,166	1,701	2,300	..	
19th	559	4,190	1,415	2,775	..	559	156	28,199	4,190	1,415	2,775	2,300	..	
20th	760	3,001	912	2,089	211	549	156	28,592	3,001	912	2,689	2,300	..	
21st	493	2,305	726	1,579	721	228	156	28,208	2,305	465	2,770	2,300	..	
22nd	414	2,353	559	1,794	506	92	156	27,960	2,353	559	1,794	2,300	..	
23rd	348	1,048	760	288	760	412	156	27,322	1,048	549	499	1,048	..	
24th	278	1,000	493	507	493	215	156	27,021	1,000	228	1,228	1,000	..	
25th	205	838	414	424	414	209	156	26,656	838	92	930	838	..	
26th	207	662	348	314	348	141	156	26,359	662	412	1,074	662	..	
27th	174	560	278	282	278	104	156	26,099	560	215	775	560	..	
28th	139	516	205	311	205	66	156	25,877	516	209	725	516	..	
29th	139	450	207	243	207	68	156	25,653	450	141	591	450	..	
30th	146	418	174	244	174	28	156	25,469	418	104	522	418	..	
31st	114	402	139	263	139	25	156	25,288	402	66	468	402	..	

APPENDIX XIV.

STATEMENT showing the daily discharges of the Cauvery at Sivasamudram, at Bhavani bridge and at Upper Anicut for the years 1902 and 1903.

Month.	June.			July.			August.			September.		
	Discharge millions cubic feet.			Discharge millions cubic feet.			Discharge millions cubic feet.			Discharge millions cubic feet.		
Date.	Cauvery at Sivasamudram.	Cauvery at Bhavani bridge.	Agenda Cauvery at Upper Anicut.	Cauvery at Sivasamudram.	Cauvery at Bhavani bridge.	Agenda Cauvery at Upper Anicut.	Cauvery at Sivasamudram.	Cauvery at Bhavani bridge.	Agenda Cauvery at Upper Anicut.	Cauvery at Sivasamudram.	Cauvery at Bhavani bridge.	Agenda Cauvery at Upper Anicut.

1902.

1st	47	122	322	90	109	238	2,403	2,942	1,645	921	830	851
2nd	36	117	290	82	99	218	2,152	2,495	3,155	2,080	1,155	706
3rd	22	117	338	81	97	200	1,915	2,032	3,036	2,093	2,093	706
4th	17	109	354	76	92	186	1,906	1,806	2,581	2,952	2,867	1,062
5th	17	107	338	78	..	172	1,657	1,850	2,261	2,574	2,640	2,679
6th	16	107	322	281	..	144	1,469	1,495	1,951	1,071	2,155	2,597
7th	15	102	272	516	127	144	1,334	1,249	1,645	1,353	1,754	2,351
8th	15	102	254	3,233	127	130	1,182	1,202	1,716	1,648	1,547	1,801
9th	14	..	218	3,631	2,716	354	1,087	1,113	1,430	2,260	1,910	1,404
10th	14	..	200	4,443	3,640	516	982	1,028	1,298	3,993	2,867	1,430
11th	13	..	144	4,443	3,640	3,429	973	943	1,166	7,381	5,375	2,499
12th	13	..	144	3,713	3,546	3,575	805	868	838	5,647	5,262	8,071
13th	14	..	144	2,453	2,716	3,474	758	830	838	3,412	4,601	7,886
14th	411	..	130	2,100	2,216	2,867	609	754	690	3,089	3,274	4,375
15th	1,814	102	98	2,817	2,093	2,348	575	575	462	2,708	2,867	3,463
16th	2,786	1,650	114	5,466	5,036	2,684	583	594	2,814	3,565	2,855	..
17th	2,198	1,916	370	15,503	9,924	3,440	542	647	538	2,081	2,216	2,855
18th	1,615	1,391	338	23,919	14,339	13,242	490	575	628	1,802	1,971	2,413
19th	1,158	1,070	1,613	22,117	14,747	13,278	459	545	516	1,973	1,858	2,242
20th	717	375	1,345	19,034	12,416	12,106	490	485	516	1,802	1,910	2,071
21st	482	302	954	12,498	10,511	11,516	518	424	472	1,504	1,754	1,910
22nd	343	302	754	5,309	6,737	10,645	595	455	434	1,457	1,391	1,910
23rd	257	279	594	3,100	4,707	8,807	1,032	611	418	1,395	1,249	1,495
24th	257	279	472	2,076	2,791	6,566	1,266	792	434	1,109	1,155	1,240
25th	206	211	418	2,076	2,356	2,575	1,148	1,118	494	1,128	1,070	1,130
26th	172	173	370	1,726	2,286	2,678	1,248	1,028	954	1,109	1,070	1,000
27th	148	163	354	1,602	1,858	2,474	1,199	1,028	1,116	944	1,155	838
28th	139	138	322	1,511	1,547	2,364	1,266	1,070	900	846	906	1,000
29th	127	133	290	1,377	1,496	2,168	1,199	1,113	1,008	701	830	1,000
30th	98	117	236	1,129	1,344	1,848	1,003	1,028	900	666	792	946
31st	..	..	..	3,259	1,391	1,645	904	906	954	..	..	..

1903.

1st	204	168	338	573	455	888	25,863	14,339	15,344	2,339	1,806	1,495
2nd	189	158	338	482	545	870	22,839	12,416	11,341	2,338	1,971	1,950
3rd	189	158	338	488	611	854	14,540	9,777	10,718	1,866	1,971	2,440
4th	120	138	386	444	611	402	9,651	7,799	9,296	1,733	1,754	2,300
5th	165	122	354	337	400	516	6,541	6,620	9,746	1,729	1,650	1,575
6th	227	143	338	264	302	516	4,910	5,375	8,396	1,524	1,971	2,807
7th	218	184	322	233	279	434	4,127	4,162	8,454	1,468	1,910	2,440
8th	320	279	254	205	234	402	2,788	2,791	4,090	1,468	1,495	2,440
9th	512	375	254	208	211	370	2,593	2,286	3,610	1,468	1,391	1,810
10th	770	455	338	208	211	338	2,335	2,093	2,991	1,468	1,344	1,572
11th	514	516	370	225	234	322	2,244	2,216	3,909	1,590	1,443	2,056
12th	374	611	494	411	455	322	2,826	2,032	3,706	1,524	1,495	1,998
13th	870	611	538	1,379	1,297	870	3,033	1,971	2,156	1,107	1,971	1,998
14th	426	868	538	2,837	2,496	434	2,826	1,910	4,778	2,253	2,093	2,135
15th	404	515	538	4,929	4,922	2,801	2,238	1,858	4,956	2,201	2,093	2,242
16th	902	424	538	11,376	7,088	7,069	2,159	1,754	3,194	2,083	1,806	2,136
17th	1,180	424	538	14,204	8,946	8,543	1,808	1,650	2,623	1,777	1,650	3,503
18th	955	1,155	1,116	14,204	8,274	9,715	1,734	1,547	2,318	1,621	1,598	8,400
19th	720	1,155	657	10,961	6,820	9,902	1,734	1,443	2,089	1,549	1,443	2,727
20th	714	754	1,170	8,914	6,971	9,625	1,756	1,495	1,859	1,475	1,344	1,887
21st	509	683	900	4,728	4,922	8,880	2,232	1,391	1,859	1,348	1,344	1,625
22nd	572	545	706	3,991	3,546	7,288	3,411	1,391	1,788	1,465	1,391	1,560
23rd	531	400	628	3,115	2,867	6,547	4,006	1,754	2,982	2,219	1,853	1,430
24th	431	400	516	4,387	2,565	2,744	3,553	3,025	8,005	2,305	2,093	1,806
25th	572	424	450	5,499	2,565	3,010	2,282	2,495	3,498	2,167	2,716	3,743
26th	471	424	472	5,499	3,640	3,765	2,729	1,754	2,898	2,025	2,942	3,868
27th	373	400	434	5,924	5,149	5,196	2,069	1,598	2,989	1,886	3,940	4,012
28th	333	351	418	11,041	5,828	7,743	1,891	1,443	2,230	1,808	3,940	4,242
29th	290	326	494	17,089	7,205	10,020	1,733	1,297	2,090	2,714	4,815	5,103
30th	423	279	402	22,229	10,950	20,055	1,733	1,155	1,820	2,390	4,493	4,875
31st	..	..	..	25,374	14,339	15,121	2,026	1,344	1,625	..	..	..

STATEMENT showing the daily discharges of the Cauvery at Sivasamudram, at Bhavani bridge and at Upper Anicut for the year 1904 and 1905.

Month.	June.			July.			August.			September.		
	Discharge millions cubic feet.			Discharge millions cubic feet.			Discharge millions cubic feet.			Discharge millions cubic feet.		
Date.	Cauvery at Sivasamudram.	Cauvery at Bhavani bridge.	Agenda Cauvery at Upper Anicut.	Cauvery at Sivasamudram.	Cauvery at Bhavani bridge.	Agenda Cauvery at Upper Anicut.	Cauvery at Sivasamudram.	Cauvery at Bhavani bridge.	Agenda Cauvery at Upper Anicut.	Cauvery at Sivasamudram.	Cauvery at Bhavani bridge.	Agenda Cauvery at Upper Anicut.

1904.

1st	709	1,155	851	2,825	2,867	3,938	1,749	2,356	1,573	1,187	683	472
2nd	1,081	1,344	954	4,366	3,546	3,660	1,749	2,425	1,364	1,109	647	450
3rd	662	1,202	1,223	4,171	3,940	3,334	1,999	2,286	1,232	866	611	450
4th	477	985	1,287	6,510	5,601	4,714	2,812	1,344	1,232	766	576	434
5th	401	1,028	1,170	13,295	9,777	3,631	3,673	2,216	1,430	756	516	418
6th	559	943	851	17,306	11,684	6,196	3,904	2,640	2,002	899	545	402
7th	476	611	696	17,543	11,097	8,813	3,968	2,495	3,176	771	575	386
8th	397	515	560	15,255	10,217	10,663	4,647	9,867	3,172	771	575	370
9th	689	424	516	9,595	8,036	10,135	3,968	3,357	3,751	672	545	386
10th	1,057	376	954	7,527	6,054	9,210	3,964	3,451	4,324	899	516	370
11th	1,057	1,070	677	4,698	6,971	7,214	4,734	3,025	3,801	982	611	354
12th	1,143	985	696	7,534	7,038	5,457	4,943	3,546	3,452	1,123	647	354
13th	1,734	1,202	1,755	5,969	6,167	6,389	4,734	3,546	3,673	1,227	647	354
14th	2,573	1,650	1,345	4,733	4,922	6,389	4,463	3,451	4,076	1,753	830	370
15th	2,984	2,867	1,638	3,537	2,942	5,133	4,112	3,191	3,622	2,931	1,155	370
16th	2,327	2,565	3,112	2,873	2,425	4,292	2,991	2,640	3,285	2,931	2,565	370
17th	1,753	2,032	2,852	2,863	2,286	2,915	2,812	2,216	2,883	2,385	2,286	1,170
18th	1,219	1,443	2,267	2,863	2,216	2,761	2,812	2,032	2,370	2,021	1,858	2,070
19th	1,070	1,070	1,725	2,929	2,155	2,607	2,670	1,971	2,090	1,649	1,547	1,579
20th	1,360	985	1,332	2,873	2,155	2,530	2,265	1,702	2,145	1,467	1,344	1,170
21st	2,982	1,754	1,625	2,805	2,093	2,761	2,019	1,547	1,931	1,331	1,070	954
22nd	5,622	2,425	3,457	2,873	2,032	2,607	1,831	1,391	1,545	1,454	1,070	803
23rd	7,448	7,442	5,026	3,763	2,356	2,453	1,676	1,297	1,430	1,649	1,155	657
24th	4,415	6,280	7,446	2,929	2,356	2,530	1,676	1,113	1,232	2,018	1,598	696
25th	4,440	5,262	6,708	3,592	2,640	3,194	1,502	1,070	1,041	1,896	1,495	954
26th	3,696	4,274	5,661	2,990	3,025	3,198	1,502	1,070	922	1,330	1,391	1,287
27th	3,405	4,061	4,743	2,812	2,716	3,716	1,328	1,070	893	1,123	1,297	1,116
28th	3,222	3,731	5,144	2,265	2,565	3,473	1,328	943	696	932	1,070	803
29th	3,620	3,640	4,453	2,019	2,495	2,607	1,328	868	628	982	868	662
30th	3,460	3,823	3,318	1,749	2,356	2,145	1,239	792	560	900	792	450
31st	...	...	...	1,749	2,356	1,859	1,239	719	494	...	...	...

STATEMENT showing the daily discharges of the Cauvery at Sivasamudram, at Bhavani bridge and at Upper Anicut for the years 1906 and 1907.

Month.	June.			July			August.			September.		
	Discharge millions cubic feet.			Discharge millions cubic feet.			Discharge millions cubic feet.			Discharge millions cubic feet.		
	Cauvery at Sivasamudram.	Cauvery at Bhavani bridge.	Aganda Cauvery at Upper Anicut.	Cauvery at Sivasamudram.	Cauvery at Bhavani bridge.	Aganda Cauvery at Upper Anicut.	Cauvery at Sivasamudram.	Cauvery at Bhavani bridge.	Aganda Cauvery at Upper Anicut.	Cauvery at Sivasamudram.	Cauvery at Bhavani bridge.	Aganda Cauvery at Upper Anicut.

1906.

1st	32	32	374	400	494	3,946	3,781	4,638	3,941	3,828	5,904
2nd	27	32	221	326	402	4,472	3,357	4,898	3,698	3,274	5,430
3rd	27	32	159	168	354	2,571	2,565	3,768	3,057	2,867	4,512
4th	27	32	133	163	238	2,166	1,650	3,081	2,319	2,286	3,903
5th	34	129	138	143	322	1,816	1,702	2,350	2,006	1,910	3,097
6th	33	102	133	138	272	1,645	1,547	2,222	1,345	1,754	2,090
7th	36	44	478	218	182	1,645	1,368	1,931	2,319	1,547	2,090
8th	36	38	1,081	102	172	1,492	1,155	1,645	4,898	2,155	1,885
9th	34	92	130	951	144	1,418	1,368	1,716	2,162	2,032	2,020
10th	26	92	50	1,081	629	1,294	1,547	1,859	1,345	1,754	2,300
11th	22	60	951	701	114	1,345	1,547	1,573	1,645	1,391	2,090
12th	19	88	44	656	516	1,345	2,495	1,364	1,492	1,249	1,690
13th	18	92	38	1,294	594	1,345	1,650	3,517	1,492	1,070	1,365
14th	18	92	38	905	657	1,345	2,356	2,089	1,645	1,070	1,000
15th	15	168	44	931	628	1,345	3,640	3,707	1,645	1,028	892
16th	18	133	50	570	754	2,276	1,764	2,544	1,645	1,202	892
17th	13	98	570	530	706	3,057	3,940	1,650	1,492	1,344	1,000
18th	12	200	1,155	594	455	4,896	6,280	2,761	1,645	1,249	1,180
19th	12	158	2,227	719	538	3,057	6,507	2,997	1,492	1,155	1,430
20th	9	130	3,842	1,971	450	2,006	3,940	9,281	1,352	1,202	1,180
21st	11	98	4,898	4,329	696	1,345	3,548	4,144	1,492	1,178	1,240
22nd	11	66	9,926	6,167	4,430	1,645	2,495	4,762	1,352	1,113	945
23rd	11	44	12,968	8,333	5,107	2,006	2,942	4,099	1,352	1,202	838
24th	2,060	66	17,723	9,430	7,470	1,645	2,216	4,830	1,492	1,443	1,240
25th	1,961	354	15,558	9,777	7,758	2,006	1,650	3,416	1,352	1,391	1,625
26th	1,684	1,391	386	12,144	8,096	3,057	2,216	1,625	1,294	1,391	1,300
27th	967	1,028	338	8,332	6,620	6,061	3,451	3,684	1,099	1,443	1,080
28th	627	754	1,314	6,871	5,818	7,351	10,481	6,854	6,780	1,099	1,249
29th	522	611	803	3,941	2,904	6,109	6,051	8,155	9,950	1,099	1,113
30th	442	515	628	5,052	3,781	4,758	4,896	6,854	10,630	1,099	868
31st	..	..	..	4,436	4,274	4,695	4,896	4,800	8,741	..	..

1907.

1st	124	254	1,597	1,070	402	4,561	6,854	7,244	2,759	2,791	4,072
2nd	124	370	4,087	1,495	662	3,687	3,828	6,178	2,297	2,216	3,847
3rd	124	338	7,032	5,036	1,865	3,687	3,191	3,578	2,099	1,940	3,412
4th	92	306	4,087	4,654	5,889	8,314	4,707	8,608	1,851	1,754	2,607
5th	176	306	4,396	3,451	4,654	12,148	7,799	4,888	1,851	1,884	2,299
6th	269	290	2,291	2,565	4,229	12,877	9,223	8,148	1,851	1,698	2,002
7th	174	338	1,820	1,910	3,163	12,281	8,530	8,199	1,851	1,495	2,002
8th	94	338	1,384	1,297	2,385	13,816	8,392	7,976	1,851	1,443	1,931
9th	94	418	1,289	1,202	1,727	21,045	11,243	8,169	1,851	1,672	1,859
10th	88	418	1,098	1,049	1,365	24,186	12,564	1,0622	1,508	1,297	1,859
11th	88	370	1,098	905	1,240	18,098	11,537	1,2519	1,632	1,202	1,788
12th	70	354	545	811	1,120	13,816	9,223	1,1325	1,390	1,155	1,502
13th	70	338	460	647	946	12,143	8,333	1,0399	1,390	1,113	1,232
14th	49	322	477	754	784	12,878	8,461	8,313	1,251	1,070	1,166
15th	48	306	388	629	560	12,878	8,669	7,564	1,251	985	981
16th	174	370	388	575	560	12,878	8,738	7,564	1,251	943	803
17th	390	370	831	400	516	10,871	7,917	7,818	1,092	905	696
18th	1,611	148	803	831	450	8,314	7,146	7,118	1,012	868	662
19th	2,291	424	1,008	651	402	5,651	5,884	7,187	1,251	830	560
20th	2,159	1,070	662	651	418	4,474	4,761	5,265	1,092	811	560
21st	2,291	1,391	1,818	1,098	494	3,642	4,051	4,943	1,092	773	628
22nd	1,820	1,297	1,818	1,820	472	3,637	3,191	4,860	1,092	737	628
23rd	1,701	1,006	2,070	4,615	1,832	3,637	3,232	4,153	1,536	905	560
24th	1,889	985	1,579	8,314	3,040	3,637	3,687	4,222	1,536	985	516
25th	1,006	849	1,345	12,877	7,799	3,286	2,942	4,726	1,250	1,028	696
26th	460	593	13,814	8,946	6,873	2,948	2,716	4,148	1,536	985	1,495
27th	388	455	696	13,814	9,084	3,136	2,716	3,746	1,536	1,391	1,180
28th	545	351	538	9,292	8,715	3,329	3,451	3,603	1,579	1,297	1,180
29th	1,289	302	434	15,558	9,431	8,216	3,136	2,791	4,025	1,817	1,598
30th	1,597	868	886	10,871	8,096	8,313	3,329	3,108	3,946	1,976	2,807
31st	..	..	..	6,553	6,854	8,563	3,186	3,025	3,856	..	..

STATEMENT showing the daily discharges of the Cauvery at Sivasamudram, at Bhavani bridge and at Upper Anicut for the years 1908 and 1909.

Month.	June.			July.			August.			September.		
	Discharge millions cubic feet.			Discharge millions cubic feet.			Discharge millions cubic feet.			Discharge millions cubic feet.		
	Cauvery at Sivasamudram.	Cauvery at Bhavani bridge.	Aganda Cauvery at Upper Anicut.	Cauvery at Sivasamudram.	Cauvery at Bhavani bridge.	Aganda Cauvery at Upper Anicut.	Cauvery at Sivasamudram.	Cauvery at Bhavani bridge.	Aganda Cauvery at Upper Anicut.	Cauvery at Sivasamudram.	Cauvery at Bhavani bridge.	Aganda Cauvery at Upper Anicut.

1908.

1st	56	272	837	424	338	5,495	5,828	10,511	1,799	754	862
2nd	53	236	1,071	611	402	4,602	3,940	4,932	1,382	1,391	838
3rd	53	200	2,677	647	472	4,602	3,232	4,532	1,649	1,495	1,625
4th	48	172	4,077	2,216	696	6,804	5,147	4,394	2,105	1,297	1,950
5th	48	144	8,218	5,941	1,187	8,223	6,394	4,975	1,462	1,495	1,560
6th	37	130	6,396	6,167	5,232	10,568	7,382	5,729	1,397	1,155	1,560
7th	39	130	3,640	4,492	7,253	9,118	7,799	7,497	1,375	985	1,430
8th	58	66	2,651	3,025	5,340	7,683	6,854	8,699	1,375	830	1,180
9th	58	66	2,425	2,251	3,028	6,223	5,884	7,048	1,154	1,070	1,000
10th	82	50	2,234	2,062	2,526	5,246	4,922	6,316	1,154	754	892
11th	69	66	1,818	1,832	2,544	4,293	4,162	5,890	839	985	1,195
12th	58	50	1,606	1,469	2,028	3,089	3,149	5,149	839	683	1,386
13th	53	44	1,606	1,273	1,690	2,803	2,495	4,767	598	575	1,147
14th	53	402	1,818	1,226	1,300	2,443	2,356	4,407	598	575	662
15th	53	112	2,096	1,469	1,120	2,319	2,032	4,427	795	575	560
16th	53	97	2,537	1,940	1,120	2,000	1,780	2,998	598	611	494
17th	82	236	2,216	2,062	2,000	2,000	1,672	2,530	598	515	594
18th	322	186	2,216	2,001	2,160	2,000	1,547	2,222	598	424	516
19th	322	186	2,885	2,093	2,090	1,801	1,572	2,002	461	424	450
20th	610	178	2,303	2,716	2,230	1,801	1,443	2,002	461	400	418
21st	1,507	153	4,601	3,025	2,800	1,604	1,297	1,931	416	375	402
22nd	1,326	811	6,799	5,149	3,549	1,801	1,297	1,788	416	326	370
23rd	1,289	737	5,997	6,280	5,997	1,801	1,297	1,645	416	302	354
24th	837	701	6,799	6,280	7,358	1,801	1,868	1,573	461	326	354
25th	425	701	6,223	5,771	7,120	1,801	1,320	1,716	461	326	338
26th	333	439	6,223	5,488	6,564	1,604	1,226	1,645	416	302	338
27th	408	338	5,476	6,110	6,170	1,604	1,070	1,573	416	326	322
28th	486	257	7,062	7,205	7,062	1,462	1,028	1,430	461	314	322
29th	589	338	8,476	7,501	7,676	1,897	1,028	1,232	416	338	838
30th	486	387	7,673	6,620	7,552	1,374	943	1,100	416	400	354
31st	..	..	6,803	6,167	7,216	1,374	830	981	..	..	..

1909.

1st	123	138	717	3,142	3,191	6,573	4,297	4,162	6,772	2,646	2,566	5,245
2nd	488	158	717	2,396	2,216	4,242		3,516	4,976	2,383	4,815	4,251
3rd	167	132	717	1,938	2,093	3,510	4,449	3,734	4,604	2,156	4,707	6,510
4th	126	246	717	1,938	1,702	2,510	5,597	3,646	5,057	2,383	3,640	6,539
5th	100	163	322	2,224	1,754	2,020	4,490	4,162	5,193	2,238	4,600	5,822
6th	100	302	322	2,105	1,858	1,950	3,984	3,828	5,008	2,106	3,025	6,222
7th	62	647	838	2,189	1,806	2,090	2,999	3,191	4,884	2,106	2,495	4,955
8th	4,926	868	1,404	2,677	1,971	2,090	2,999	3,025	4,572	2,166	2,356	4,499
9th	8,480	6,054	3,122	2,105	2,216	2,020	2,677	2,716	4,240	2,106	2,286	4,353
10th	7,993	7,205	6,443	2,396	1,858	2,510	2,686	2,640	3,678	1,822	2,032	4,060
11th	6,832	5,941	6,704	4,745	2,425	2,300	2,268	2,495	3,886	1,592	1,598	3,827
12th	4,206	4,218	6,670	6,807	5,601	8,447	1,938	1,971	3,152	1,592	1,495	3,385
13th	3,429	2,983	5,038	8,054	5,828	6,175	1,938	1,940	2,607	1,592	1,754	2,944
14th	2,937	3,025	4,695	8,054	6,507	6,878	1,938	1,702	2,761	1,592	1,910	2,786
15th	2,481	2,460	4,373	8,054	7,205	7,411	1,694	1,650	2,222	1,592	1,650	3,377
16th	2,111	1,910	4,096	8,054	7,205	7,589	1,693	1,297	2,074	1,391	1,495	3,445
17th	1,940	1,754	2,474	11,133	7,799	8,226	1,396	1,113	1,859	1,219	1,297	3,124
18th	1,648	1,521	2,160	10,078	8,274	8,385	1,396	1,113	1,602	1,219	1,028	2,870
19th	1,391	1,070	1,950	8,470	7,680	8,677	1,328	985	1,298	1,027	1,070	2,319
20th	1,158	943	1,625	5,911	6,167	8,477	1,196	1,202	1,573	1,024	905	2,132
21st	889	830	1,300	3,685	4,653	7,544	1,694	1,249	1,232	944	792	2,094
22nd	761	647	1,060	2,815	3,025	5,665	1,671	1,249	1,298	751	719	1,330
23rd	584	575	838	2,396	2,425	3,618	1,671	1,650	1,645	751	665	1,573
24th	583	515	696	2,264	2,093	3,051	1,822	1,647	2,487	751	647	1,577
25th	611	455	628	2,204	1,910	3,833	1,822	1,971	3,150	1,027	647	1,480
26th	677	424	756	4,449	2,124	2,453	2,189	1,910	3,249	1,278	754	1,480
27th	316	515	494	11,133	5,375	2,453	2,063	2,032	3,441	1,278	905	1,598
28th	2,355	754	1,056	17,729	9,777	7,665	2,105	3,884	3,832	1,027	943	1,679
29th	4,794	3,640	1,571	4,449	9,361	10,939	1,938	3,025	5,478	802	792	1,756
30th	4,296	4,051	3,610	8,054	7,620	10,008	2,156	3,191	5,102	802	719	1,778
31st				4,745	5,318	8,930	2,105	3,274	5,202			

Exhibit Ma.-10 (a).

Letter—from M. NETHERSOLE, Esq., Inspector-General of Irrigation, and Assessor, Madras-Mysore Arbitration.

Dated—the 12th August 1913.

I have the honour to forward herewith for necessary action a memorandum explaining the need for early check by independent observation of the discharges computed from the Sivasamudram gauge records which are among the data to be considered by the committee in framing their decision on the matters under arbitration.

2. It will probably save time later on if such discharge observations as can be arranged may be submitted to me with the usual records and calculations for scrutiny and check as soon as they are ready.

ENCLOSURE.

Memorandum by Mr. M. Nethersole, Inspector-General of Irrigation in India, on the gauges and discharge computations at Sivasamudram, dated the 12th August 1913.

After examination of the Sivasamudram anicut, I am of opinion that without further check, the computations of river discharges which have been prepared by the Mysore Engineers on the gauge records at this site are not sufficiently reliable to serve as a basis of settlement of the matters under arbitration.

* Not printed.

The site * plan attached will illustrate the following remarks.

The river divides into two branches at the head of the Heggura island. The left branch is the more important of the two and the gauge which has been recorded and from which discharge of this branch has been computed is fixed on the left bank in the position shown on the plan. The anicut which diverts the water into the power supply channel has a total crest length of 2,270 feet as against a river width at normal supply of about 1,000 feet. The anicut crest is said to be level with the zero of the gauge at R.L. 1994.50. Discharges over the anicut have been computed as though there was equal flow due to the recorded depth over crest for the whole length of the anicut. This can certainly not be true for the two flanks which are more or less parallel to the stream flow and which together make up about two-thirds of the total length; it is, I think, that for these lengths the co-efficient of discharge is probably not more than two-thirds of that of the remaining one-third of the length which is normal to the stream flow.

Again no allowance has been made for velocity of approach which would affect very materially the computed discharge especially that over the middle third normal to the directions of flow, while on the other hand no deduction has been made for submergence which I judge by eye to average about 3 inches at the present stage of the river—i.e., with 2.1 on the left branch gauge—and which must increase very rapidly for higher gauges.

Another element of error likely to materially affect the discharge over this anicut is the difference of levels in water surface on either side of the stream due to the bend the river takes just upstream of the divide. I suspected that there might be an appreciable afflux due to this cause on the right side of the branch and levels taken today to test this show that with the river in its present stage, i.e., 2.1 feet on the left branch gauge, there is a difference of *plus* 10 inches with however may be partly due to local obstructions by high rock on this flank of the anicut. It is obvious from this description that the computation of the discharges over this anicut for various gauges is open to large errors. The computation of discharges in the supply channel and scouring sluices may be accepted as correct.

Error is also inherent in the computations of the volume carried by the right branch. This has been roughly calculated over the sections AB, but inspection shows that with the river in its present stage a very appreciable part of this discharge (possibly as much as one-fourth) finds its way back into the left branch through AC, so that this volume which would increase rapidly for higher gauges is included twice in the computations. It is impossible to say how far these errors which are not all in the same direction may affect the computations, but it is evident that the computations as they stand need verification by independent check before they can be accepted as even approximately reliable. I suggest that this verification or check should be made as soon as possible in order that we may know to what extent we can rely on the Sivasamudram records when the arbitration committee again meets in October. There is a good reach of the river suitable for discharge observations a few chains below the Danakere anicut, about 7 miles above Sivasamudram; and it is possible that a suitable reach may also be found downstream of Sivasamudram. A few observations of the total river discharge

at some such suitable site would be very useful to serve as a check on the Sivasamudram records and I trust that both the Madras and Mysore Governments will co-operate in making necessary arrangements for this to be done. While this check is necessary before any use can be made of the records for arbitration purposes, I may note that Sivasamudram as at present gauged is very unsuitable as a permanent gauging station for measuring water passed on to Madras owing to the many inherent elements of error to which I have referred in this memorandum.

From—the Inspector-General of Irrigation in India, Camp Mysore.

Dated—the 13th August 1913.

I have the honour to forward for information a copy of the memorandum on the discharge computations at Kannambadi dam site, dated the 12th August 1913.

ENCLOSURE.

The discharge computations at Kannambadi dam site should be checked by independent observation of the river channel discharges which may be conveniently taken at the ferry site down-stream of the dam. If the Mysore Government will kindly arrange for these to be taken, it will materially enhance the value of the other computations of the volume passing at Kannambadi.

Davaroy anicut.—This anicut is only $1\frac{1}{2}$ miles below Kannambadi dam site and has a good even crest of dressed masonry.

Its total length is 3,200 feet, the left section—of 1,500 feet length—is about .75 foot higher than the right of 1,700 feet length. I inspected the right flank only. The present gauge is too near the scouring sluice and it would be better to fix a new gauge 10 feet back from the end of the abutment wall of the anicut and with zero at crest level.

Similarly on the left flank a site should be selected which will be unaffected by the left scouring sluices with its zero at crest level.

Both gauges should be referred to M.S.L. so that the readings will indicate any possible difference of level in water surface on either flank.

Gauges should also be fixed downstream of the anicut about 50 feet downstream in order that submergence may be observed that is said to commence with about 4.5 over the right section crest.

This anicut with proper gauges fixed as above indicated will afford valuable facilities for measuring the supplies passing Kannambadi both before and after arbitration and I hope no time will be lost in fixing them.

It is to be regretted that regular observations of gauges at this site have not been taken but such as are available should be tabulated and supplied to Madras. Although simultaneous gauge records of both flanks are not available I think it probable that for all moderate river discharges it will be found that there is very little if any difference in the water levels on both flanks and the single readings which do exist will suffice for both.

For larger floods it is possible that there may be some difference in water level but floods of this magnitude are hardly likely to affect the questions so far as Madras supplies are concerned though they may affect the question of the quantity available for storage in Mysore.

Exhibit Ma.-11.**MADRAS REJOINDER.****PART V.—LEGAL ARGUMENTS.**

Rejoinder to the Memorandum presented by Mysore on the 6th of November 1913.

The Madras Government note with satisfaction that Mysore now admits that the agreement of 1892 was the outcome of the desire of the Government of India that "the matter should be settled, if possible, by some understanding between Madras and Mysore" and not of any "pressure" to which Mysore had to submit, as insinuated in paragraph 25 of the original Mysore case (My. 1). They are also glad to find that the charges of unfairness, etc., originally put forward by Mysore against the agreement itself are no longer persisted in. A perusal of the correspondence (printed in Appendix A) that led up to the agreement will clearly show how unfounded these charges were and how both parties to the agreement were actuated by the sole desire to see the irrigation resources of the tracts in question used to the best advantage of all concerned without detriment to long-established rights or usage. If by the last sentence of paragraph 1

of their memorandum the Mysore Government intend to suggest that in 1889 there was any *change of attitude on the part of the Madras Government* or their officers, this Government must enter their emphatic protest against it. The policy and views of this Government have remained the same from the beginning of the last century as will appear from the correspondence referred to in paragraphs 2 and 3 of Sir K. Seshadri Ayyar's letter to the Resident, dated 10th June 1890 (Appendix A to the Mysore memorandum). Nor can this Government accept the correctness of the statement in paragraph 2 of the memorandum that in the Octacamund Conference of 1890, "the Madras Government assumed an uncompromising attitude, by stating that every irrigation work in Mysore of any consequence required their previous consent." As will clearly appear from the notes of the Conference (printed as Appendix A hereto) the Madras Government then, as ever, merely insisted on the due protection of their prescriptive rights and it is the Mysore Darbar that took up an extreme attitude by denying any prescriptive rights in Madras and putting forward a claim of *unlimited* natural rights to intercept and use the whole rainfall of the plateau within the Mysore territory; and, this is the position also taken up by Sir K. Seshadri Ayyar in his memorandum of 10th June 1890.

2. It is difficult to follow the statement in paragraph 3 of the Mysore reply that Sir K. Seshadri Ayyar's memoranda of 1890 and 1899 present an "exposition of the agreement of 1892." As to the memorandum of 1890, it could not possibly have any bearing on the construction of the agreement of two years later, especially when it is also borne in mind that the agreement did not accept the claims and principles enunciated by Sir K. Seshadri Ayyar in 1890. The note of 1899 cannot be seriously relied on. It was not even communicated, or intended to be communicated, to the Madras Government or to the Government of India, but was meant for the use of his own officers. And, after all, it only contains his *ipso dicit* that the rules of 1892 were "not intended to curtail in any way the rights of the State to utilize the waters within its territorial limits." One cannot help asking, what else were they intended for then? The Mysore Government themselves now admit (see paragraph 10 of the memorandum) that they do not rely on any "unlimited natural right," but Sir K. Seshadri Ayyar stuck to that view even in 1899. As to the weight due to his opinion in the matter of the interpretation of the agreement of 1892, it is only necessary to state (with all respect) that it is no more *relevant* than the opinion of the Madras Government which was the other party to the agreement.

3. The remarks in paragraph 4 of the memorandum are by no means relevant to the questions at issue. It may, however, be pointed out that while verbally disowning the theory of "natural right," the Mysore Darbar practically fall back upon it in a different form in some of their observations in this paragraph. It is put forward as a great grievance that Madras should develop its Cauvery irrigation any further and Mysore therefore desires that steps should be taken immediately to utilize its *natural* advantages to the *fullest extent now possible*. It is forgotten that the Cauvery being an inter-state river, Madras has as much right to its water as Mysore. As pointed out in the Madras memorandum, prescription is not the basis or source of the rights of Madras, but merely a criterion agreed upon for mutual convenience, so that each State may follow its own course of development without detriment to the *existing* rights of the other.

4. It is not stated which portions of the Madras memorandum are considered by the Mysore Darbar to be of "little importance" or "merely of academic value." As to the significance of the expression "fair and reasonable" in rule III of the agreement, the Madras Government certainly do not wish to minimise it, much less to ignore it. Nor did they ever object to what may be called a "fair and reasonable" application of the law. But it is not easy to see how the theory of "fair and reasonable" is to be woven into the law of prescription. On the other hand, it is much more difficult to detect any element either of fairness or reasonableness in the contention of Mysore (in paragraph 16 of the memorandum) that the improvements made in the Upper Anicut in 1899-1902, *with a view to better utilize the water available*, involve the consequence that pre-existing rights to water must be regarded as *abandoned*. The construction of compound clauses by reading the expressions *distributively* is not unknown to the law of interpretation and certainly not unnatural. The Madras Government do not deny that the facts must first be found before the law of prescription can be applied, but that is a matter of evidence as to intention and use and not one to be determined by any external standards of "fairness" or "reasonableness." But whatever may be the effect to be attached to the expression "fair and reasonable" in rule III, it is certainly impossible to put on that rule the construction contended for by Mysore (in the last sentence of paragraph 5) that it is *for the Arbitration Committee to devise* a method by which Mysore can freely exercise its rights.

5. For the reasons already set forth in paragraph 20 of the Madras memorandum, it is immaterial whether the law to be applied is that known as the rule of common law prescription or that contained in sections 26 and 27 of the Limitation Act. But the Madras Government are unable to agree that sections 26 and 27 were present to the minds of the parties to the agreement.

6. But whatever may be the rule of prescription applicable, it is hard to understand the contention in paragraph 11 of the Mysore memorandum. Resting the case on the agreement of 1892, what is there to show that the pre-existing rights of Madras were thereby intended to be or were in fact abandoned? If there was any such abandonment, what then are the rights that were intended to be "secured" to Madras by the agreement and for which the Madras Government so tenaciously fought? Is that to refer merely to rights to be acquired *afresh* in the future by twenty years' enjoyment after 1892? Does it mean that in the year 1895 or 1900, Madras would have had no rights at all to be protected (for twenty years would not have elapsed since 1892) and that the Mysore Government might have done what they pleased? Surely this is not the contention of Mysore. What then were the rights of Madras in 1892? How had they been acquired? Was it not by the user that prevailed long prior to 1892? If so, what has now become of those rights? What has Madras done to abandon them or lose them? To say that Madras has lost them by improving the Upper Anicut, is an argument that merely requires to be stated to be refuted. The Upper Anicut, as already stated, was improved, not for the purpose of surrendering or diminishing the rights of Madras, but to better utilize the water that may be available. And, necessity or no necessity, Madras has admittedly and, as a matter of fact, been ever since claiming and taking the 7 feet water whenever available. When then does the abandonment come in, whether before or after the agreement? Nor has Madras done anything that may be said to imply an abandonment of its right to the quantity of water required for the Lower Coleroon system. A difference in the method of taking it surely cannot be said to imply an abandonment of the right itself. It is a remarkable inconsistency indeed that in one part of the memorandum Mysore should contend that the 7 feet claim must be deemed to have been abandoned after 1899, and in another part argue that that claim has been put forward only since 1896 and that it has therefore not yet ripened into a prescriptive right. On the facts of the present case, *Crossley & Sons v. Lightowler* (I.L.R., 3 Equity 279 at 294) is really an authority against and not in favour of the argument of abandonment.

7. As to the extent of Madras rights, this Government never claimed a right to *all* the water flowing towards the sea. But, as pointed out in the former memorandum, a certain proportion of the water claimed by this Government must inevitably flow into the sea; for that quantity is necessary to raise the level of water so as to make channel irrigation possible. Paragraphs 13, 19 and 22 of the Mysore memorandum do not in any way advance the case. They merely assert that Mysore has no intention to interfere and that what Mysore proposes to do will not substantially interfere with the prescriptive rights of Madras. The question is what are those rights? No reason whatever is assigned for confining the rights of Madras to irrigation for a *particular acreage* (as distinguished from the quantity of water claimed and taken all along). No notice whatever is taken of the numerous authorities on the point cited in the Madras memorandum. Surely they are not all disposed of by the opening sentence in paragraph 11. The American authorities, at any rate, are apposite in this connection, for the irrigation law of America has been developed on the basis of its being an "arid region" where irrigation is of vital importance, and nothing to the contrary has been shown to be the rule applied in, or applicable to, India. Such authority as there is in India supports the contention of Madras.

8. No cases arises here for the application of the maxim *de minimis non curat lex*. Madras complains, not of the inevitable disturbance of the existing conditions of the river flow, but of the necessary interference with its *rights*. If Madras is entitled to the river flow up to 7 feet and to the additions claimed along with it, it cannot be pretended that the Mysore proposals, if carried out, will not *seriously* interfere with those rights.

9. Madras has all along been claiming and all along (whenever there was enough water in the river) been using all the water in the Cauvery up to a limit of 7 feet. The rules of 1896 did not put forward the 7-feet claim for the first time, nor is it then that Madras first used a 7-feet flow. There is, therefore, no force in the contention that twenty years have not yet elapsed since 1896. The facts relating to this aspect of the question have been fully set forth in the Madras memorandum and a few more observations thereon are added *infra*.

10. In paragraph 15 of the Mysore reply, certain arguments are sought to be urged with reference to the law of *easements*. To begin with, it must be pointed out that these arguments are really irrelevant. The agreement was certainly not intended to bring into operation all the numerous rules of the *private law of easements*, which, in the very nature of things, cannot apply to the parties. The rights of Madras are not even described as being *in the nature of*—for strictly they cannot be—"easements." But it can easily be shown that even under the ordinary law of easements the arguments are untenable.

11. One of the sub-paragraphs of paragraph 15 is evidently intended to suggest that the easement could, as a matter of law, have been acquired only in respect of a

definite extent of lands and could not avail for more. This proceeds on a fallacious assumption. Literally applying the definition of an "easement" in section 4, the logical result would be that it could be acquired only for the benefit of a *specific tenement*; but even that will not support the argument of Mysore that the easement must be in respect of a particular *acreage or extent*. They must go the length of contending that the water could be taken only for the specific *plots of land* which have hitherto been cultivated and that the Madras Government cannot take the water for some new plots (not in addition to, but even instead of, the old plots) even though such new plots may adjoin the old and even though the Government may keep within the limits of the pre-existing total acreage. This is certainly both unreasonable and fallacious. The mistake arises from a wrong conception of the "dominant heritage" (as used in sections 21 and 4 of the Easements Act and in *Harris v. Flower & Sons*). In the present case, it is not this particular field or that, but the delta tract as a whole of which the Madras Government is the "dominant owner." The easement has been acquired and used for the benefit of the tract and not of individual fields therein, and so long as it is used for that purpose, the principle of section 21 is not contravened. The memorandum takes no notice of the numerous authorities cited in the Madras memorandum to show that once a right had been acquired to take a certain quantity of water for irrigating one's lands, it is no improper use of the easement to utilize the same quantity of water to irrigate a larger extent of the same owner's lands. This does not make it a right "in gross" or one *independent of land*. The authorities referred to in that memorandum also establish that such a use involves *no change of purpose*—for the purpose *ex hypothesi* remains the same, viz., the irrigation of the dominant owner's lands—nor the imposition of a new burden. Whether as a matter of law or of practical convenience, it is impossible to see how the way in which a lower riparian owner uses the water that he has all along been taking can add to the burden on the upper owner. Once that water passes the upper land, its use by the lower owner cannot affect it in any way, unless the water is swept back on the upper land.

12. It is also suggested that the 7 feet user in the past was in the nature of an "easement of necessity," that the necessity has now ceased and that therefore the right has also ceased to exist. This argument is based on a glaring misapplication of the expression "easement of necessity."

(a) It is used in the Act in a narrow sense as defined by section 13, clauses (a), (c) and (e), from which it will be seen that it is confined to the necessity arising out of partitions or partial transfers or bequests (the transferor retaining another portion for himself). There is nothing of the kind here.

(b) Assuming for the sake of argument that there was anything like a partition or transfer in the present case, the use of the 7 feet of water by Madras did not come about as a *necessity consequent upon such partition or transfer* but had existed long before and certainly had nothing to do with the same.

(c) One has never heard of an easement acquired by prescription being regarded as an easement of necessity. As the very name indicates, the latter expression applies to certain rights which the law presumes by way of an implied grant, on account of the necessity of the situation and which have nothing to do with length of enjoyment (see Halsbury's Laws of England, Vol. II, article 487).

(d) Again, even in the case of a sale or partition, an easement of necessity is presumed by the law only when but for such easement the transferred property could not be enjoyed at all (see per Stirling L.J. in *Union Lighterage Company v. London Graving Dock Company*, L.R. (1902) 2 Ch. at page 573; *Mitra's Limitation*, page 476 of the 4th edition). This cannot be said to be the case here.

(e) Further, the easement is one and indivisible and there is no warrant for introducing any differences of degree into the conception and saying that up to a 6 feet depth it was an ordinary easement and that the seventh foot claim was an easement of "necessity."

(f) If the mere fact of an easement being enjoyed because such use is necessary is sufficient to constitute it an easement of necessity (in the technical sense as used in section 41), every easement known to law will then be an easement of necessity. This certainly is not the sense in which that expression is used in the Easements Act or the Law of Easements.

13. There is no scope here for the application of the doctrine laid down in *National Guaranteed Manure Company v. Donald* (4 H & N 8) that if an easement was granted for a particular purpose, it ceases with the accomplishment of the purpose. Here the purpose of the easement was the irrigation of the delta lands and that purpose still exists. The depth of flow required relates only to the means necessary for the accomplishment of that purpose. The argument proceeds on a confusion of the term "purpose" with the methods adopted for attaining the purpose. Further, the application of the rule must logically lead to the total extinction of the easement and there is no warrant for breaking up a single easement into a 6 feet claim and another extra 1 foot claim.

It is accordingly submitted that the arguments urged and the authorities cited in the Madras memorandum remain unanswered.

APPENDIX A.

I

G.O. No. 323 I., dated 11th June 1890.

READ—the following paper:—

Notes of discussion at a conference held at Ootacamund on Saturday, 10th May 1890, to consider pending irrigation disputes between Madras and Mysore.

The following gentlemen were present:—

- (1) Sir Oliver St. John, K.C.S.I., R.E., Resident in Mysore.
- (2) Hon'ble Mr. H. E. Stokes, C.S.I., Member of Council, Madras.
- (3) Mr. K. Seshadri Ayyar, C.S.I., Diwan of Mysore.
- (4) Colonel Bowen, R.E., Chief Engineer, Mysore.
- (5) Mr. G. T. Walch, Chief Engineer for Irrigation, Madras.

Sir Oliver St. John was requested to preside.

The Diwan proposed to proceed to the consideration of the cases pending, but Mr. Stokes observed that in the correspondence certain pretensions had been put forward on the part of Mysore to the effect that she is entitled to do as she pleases with all water falling in or flowing through her territory; that these pretensions amounted to an absolute negation of all rights on the side of Madras to drainage from Mysore; that if they were maintained there was no basis for discussion; that if, however, it was admitted that Madras has such rights, it might be possible to agree on the principles of a *modus vivendi*, which would on the one hand allow to Mysore reasonable freedom in dealing with her irrigation works, and on the other give to Madras practical security against injury to her interests; and that if such principles were agreed on, the particular disputes which have arisen could be easily settled in accordance therewith.

The Diwan stated that the assertions of Mysore rights alluded to were assumed as the basis of the programme for the restoration of its irrigation works which was inaugurated during the British administration of Mysore and which alone the present Government of Mysore was engaged in carrying out. He read certain passages from Colonel Sankey's papers to the effect that the aim of the operations should be to use up the whole of the rainfall running off the ground, and observed that the scheme in its entirety had been approved at the time by the Government of India. He assumed that this would not have been done if the scheme had trenchoned on British interests, and considered that the Madras Government was bound by that approval and was not at liberty now to dispute anything that might be done in working out Colonel Sankey's scheme.

Mr. Stokes observed that the passages quoted merely affirmed a general *desideratum* in such operations; that it did not appear that the effect of his principles or proposals on Madras works was ever considered or thought of by Colonel Sankey; that the Government of India in approving the scheme probably regarded only Mysore interests for which they were at the time responsible; and that in any case the Madras Government, which had no knowledge of the scheme and was neither heard nor consulted in regard to it, could not in such circumstances be held bound by the decision upon it. He said that one of the objects which Madras has now in view is to secure information of projects undertaken by Mysore which may injuriously affect Madras works in order that objection may be urged in due time.

Mr. Walch pointed out that it was in the interest of Mysore itself that such information should be given, so that objection, if any existed, might be disposed of before money was spent.

Sir Oliver St. John expressed his opinion that the assertion of unlimited right by Mysore was extreme and untenable, and that the approval of the Government of India accorded to the Mysore programme was in no way conclusive of the question as against Madras.

After some argument the Diwan stated his position as follows: Mysore has a natural right to the full use of all the water in its territory, but such natural right is limited by the rights to supply which have been acquired by prescription on behalf of works in Madras. In exercising its natural right, Mysore may do anything which does not injuriously affect the enjoyment of its acquired rights by Madras, or materially diminish the supply to Madras works. The Madras rights extend only to the supply which has been actually turned to account for irrigation. All the rivers flowing from Mysore into Madras pour an unused surplus into the sea. Mysore may intercept and take measures to utilize such surplus, and in view to its interest in it and to preventing the growth or enlargement of the Madras prescriptive rights may as well claim to be informed of and object to new works constructed in Madras for utilizing the river flow as Madras may in regard to what is being done in Mysore.

Mr. Stokes said that he was not concerned to dispute the description of the nature and origin of the rights of Mysore and Madras given by the Diwan; but he demurred to the word "materially" as qualifying diminution of supply to Madras works, holding

that no such diminution is permissible. He refused to admit that the Madras rights to the flow in the rivers was limited to the amount actually turned to account for irrigation, and contended that Madras is entitled by prescription to the whole flow allowed to pass the frontier, at which point Mysore loses all right or interest in it.* All considerations of this sort were, however, abstract, and it was impossible to base practical rules upon them, or to adjust rights with such nicety.

The *Diwan* as an illustration of his meaning as to material diminution took the case (now in dispute) of the tank proposed to impound the head waters of the Chitravati which feeds the Madras tank of Bukkapatnam. The *Diwan* stated that the whole drainage area of the river in Mysore is 581 square miles and in British territory above Bukkapatnam 850 square miles.† The drainage area of the new tank is to be 48 square miles, and he did not consider that interception of this quantity of drainage was a material interference with the supply of the Bukkapatnam tank 50 miles down the river.

Messrs. *Stokes* and *Walch* dissented. Assuming the rainfall throughout the whole area from which the Bukkapatnam tank is supplied is uniform, the diminution on the *Diwan's* showing is $\frac{48}{1430}$ more than 3 per cent. of the whole supply of the tank and more than 8 per cent. of the supply derived from Mysore; and considering that the tank rarely surpluses, such diminution is very material; as a fact, the rainfall at Bukkapatnam may be taken at 17 inches per annum, whereas Colonel *Bowen*, it is stated, calculated it at 24 inches at the site of the new tank.

Asked what was the nature of the restrictions upon Mysore action which the Madras

1. Works which have been disused for twenty years and upwards to be considered to have been abandoned and any restoration of them to be considered as new work.

2. Repairs or restoration of works which have not been abandoned for more than twenty years will not be objected to provided the area to be irrigated does not exceed the highest actual cultivation in previous years.

3. New works to irrigate more than 100 acres within 30 miles of the frontier measured along the stream dealt with from where it, or the river it falls into, crosses the frontier, or if beyond that distance to irrigate more than 200 acres for any individual work or more than 500 acres for any group of works in the same basin, not to be allowed without consent of the Madras Government.

4. No anicuts to be built or reservoirs formed on the rivers named below:—

Tunga.	Arkavati.
Bhadra.	Shimsha.
Tungabhadra.	Hemavatti.
Vedavatti or Hagiri.	Honhalli.
Chitravati.	Oubhani.
Papaghni.	Lechmankirta.
Penner.	Tala Cauvery.
Palar.	Cauvery.
Ponnar.	

representatives would propose, they propounded the rules given in the margin. They said these were put forward mainly as a basis for discussion and as indicating the nature of the securities considered necessary in the interests of Madras. They regarded the restriction on the construction of works to divert or store the waters of the main rivers named as of special importance. As to the 100-acre limit on new works in the frontier zone it might seem low, but it was to be remembered that the Madras works in the neighbourhood were as a rule small and that the abstraction of supply for 100 acres might in some cases mean the complete annihilation of a Madras tank.

Sir Oliver St. John observed that the apparent meaning of the rules was that objection might be taken on the grounds stated to Mysore operations, and that any objection made would have to be discussed and

if necessary settled by arbitration or reference to the Government of India or in some such way.

The *Diwan* said that the list of rivers included all those flowing out of Mysore and most of those in it, and was altogether too extensive. Mr. *Stokes* stated that the list was designedly drawn up to include all the chief rivers and their most important tributaries, especially those of the Cauvery, the supply of which is vital to Madras. He was willing, however, to strike out the Shimsha and the Arkavati streams which, though draining a large area in the central part of Mysore, were comparatively unimportant as feeders of the Cauvery. It was impossible, however, to consent to free use by Mysore of the water of the other tributaries which draw their supply from the Western Ghâts and several of which drain even larger areas than the main river.

The *Diwan* considered the proposed rules as altogether unacceptable and in excess of anything which Mysore could agree to. He was not prepared to advance any alternative proposals.

As it was evident that there was no prospect of agreement in regard to any part of the subject, the conference broke up with an understanding that each side should state its case for the consideration of the Government of India.

OOTACAMUND,
12th May 1890.

H. E. STOKES,
Member of Council, Madras.

G. T. WALCH,
Chief Engineer for Irrigation.

* It might also have been pointed out with regard to the unused surplus which flows to the sea that to claim it, or part in it, Mysore would have to show that it was Mysore water which thus runs to waste; and that in the case of all the rivers the drainage area and run-off within Madras territory is vastly greater than within Mysore limits.

† These figures are the *Diwan's* and are not accepted as correct. The Executive Engineer, Bellary, gives corresponding figures 330 and 250 square miles. Scaled from the atlas sheet 835 and 230 square miles are obtained. The abstraction of 48 square miles of drainage is therefore a much more serious encroachment on the Bukkapatnam supply than the *Diwan's* figures show.

Order—No. 323 I., dated 11th June 1890.

Ordered that the Government of India be addressed.

Here enter No. 324 I., dated 11th June 1890.]

(True Extract.)

G. T. WALCH,
Ag. Secretary to Govt., P.W.D.

To the Chief Engineer for Irrigation, with copy of letter.

II

Letter—from G. T. WALCH, Esq., Acting Secretary to the Government of Madras, Public Works Department.

To—the Secretary to the Government of India, Public Works Department.

Dated—Ootacamund, the 11th June 1890.

No.—324 I.

I am directed to forward, for the consideration and orders of the Government of India, the accompanying copy of the Proceedings of this Government, No. 323 I., dated 11th June 1890, embodying notes of discussion at a conference held at Ootacamund on the 10th May 1890 to consider pending irrigation disputes between this Government and the Mysore Darbar.

2. I am to say that the Governor in Council considers it of very great importance to the interests of Madras irrigation works that some general principles should be arrived at as to the extent to which the Mysore Government may divert to its own purposes water which now flows to Madras territory and feeds works therein. The disputes actually pending are not unimportant, but the injury done to the works concerned is as nothing compared to what might accrue if the Mysore Government, which it is believed is engaged in active prosecution of schemes for the improvement of its irrigation works, were to store or divert the waters of the larger rivers which on almost all sides flow from the Mysore plateau to Madras territory. It will be seen that even with regard to the disputes actually on hand the attitude of the Mysore Darbar is such as to preclude all hope of their yielding due consideration to Madras interests. I am therefore to solicit the interference of the Government of India in bringing such pressure to bear on the Darbar as will secure the interests of Madras.

III

G.O. No. 743 I., dated 12th December 1890.

READ—the following paper:—

Letter—from the Resident in Mysore.

To—the Chief Secretary to the Government of Madras.

Dated—the 21st November 1890.

No.—3868/346-90.

The Mysore Darbar ask for a copy of the Madras Public Works Department's notes of discussions at a conference held on the 10th May 1890 to consider pending irrigation disputes between the Madras Presidency and the Mysore State, and of the covering letter to the Government of India.

2. I presume there is no objection to giving these copies, but I want to make sure before doing so.

3. As I have received only one copy of each of these papers* from the Government of India, I have the honour to request that a few spare copies may, if available, be furnished to this office.

Endorsement thereon in the Political Department, dated 28th November 1890, transferring the above.

Order—No. 743 I., dated 12th December 1890.

Ordered that the Resident be addressed in the Political Department.

(True Extract.)

G. T. WALCH,
Joint Secy. to Govt., P.W.D.
(Irrigation Branch).

To the Political Department, with copy of draft letter to the Resident.
Chief Engineer for Irrigation.

IV

Letter—from the Hon'ble Mr. J. GOSN, I.C.S., Chief Secretary to the Government of Madras, Political Department.
To—the Resident in Mysore.
Dated—Fort St. George, the 16th December 1890.
No.—636.

With reference to your letter No. 3868/346-90, dated 21st November 1890, I am directed to state that there is no objection to copies of the notes of discussion and covering letter to the Government of India being supplied to the Mysore Darbar.

2. I enclose six copies of the papers in question for the use of your office.

ENCLOSURES.

Demi-official—from G. T. WALCH, Esq., Joint Secretary to the Government of Madras, Public Works Department (Irrigation Branch).
To—K. SESHADRI AYYAR, Esq., C.S.I., Diwan of Mysore.
Dated—Madras, the 12th November 1890.

We have just received from the Government of India your Memorandum, 12th June, and its covering letter. Will you kindly tell me if you have received from the Government of India our "Notes of discussion at a conference," dated 12th May 1890, and of its covering letter to the Government of India, and, if so, how you have dealt with them?

It appears to me that our proposed rules 1 to 3 are more favourable to you than your 1 to 4 and that it is only as regards your rule 5 that we are hopelessly at variance.

Demi-official—from K. SESHADRI AYYAR, Esq., C.S.I., Diwan of Mysore.
To—G. T. WALCH, Esq., Joint Secretary to the Government of Madras, Public Works Department (Irrigation Branch).
Dated—Mysore, the 19th November 1890.

Your letter of the 12th July reached me and I have had to write to Bangalore and enquire before replying. Hence the delay. I have never seen your "Notes of discussions at a conference, dated 12th May 1890," nor your covering letter to the Government of India and they have never been forwarded to us. My memorandum of 12th June and its covering letter were written without any definite knowledge of what you were prepared finally to concede. If I can have an opportunity of seeing your definite proposals, I will try and see to what extent mine can be modified so as to effect, if possible, an arrangement satisfactory to both Mysore and Madras ryots. With kind regards.

V

Demi-official—from W. McHUTCHIN, Esq., Chief Engineer, Public Works Department, Mysore.
To—G. T. WALCH, Esq., Joint Secretary to the Government of Madras, Public Works Department (Irrigation Branch).
Dated—the 12th May 1891.

The enclosed is, I think, what we arrived at as a possible basis for future agreement. I have made a few alterations of little consequence in margin.

ENCLOSURE.

Madras Notes of discussion.

Along the whole course of the main streams scheduled below, and on all other streams within 1 mile of the frontier (measured along the streams) works* which have been out of use for twenty years and upwards to be considered to have been abandoned and any restoration of them to be considered as new works, but on streams other than those scheduled at a greater distance than 1 mile from the frontier, restoration of works once in existence but out of use, no matter for what length of time, to be considered simply as Repairs.

* Reservoirs, anicuts to be allowed.
† Note.—Any work to be substituted for existing works but merely to irrigate the same area as those works to be treated as a repair work.

2. Repairs of irrigation works not to be objected to provided the area to be irrigated by them does not exceed that previously irrigated.

* Note.—Consent to be given to those now far advanced, to be specified, with the understanding that if hereafter damage to existing irrigation works in British territory

to have been caused by such works [the damage] be proved a compensation [same] shall be paid.

3. No new works to be constructed on any part of the streams scheduled below or on any streams whatever within 1 mile of the frontier without consent* of Madras Government, but elsewhere to be unrestricted.

4. The schedule referred to above is the same as in No. 4 of Madras rules—leaving out the Arkavati, Shimsha, Honhalli and Tala Cauvery.
† Said not to be in Mysore.

5. The rules to apply, as far as may be, to the Madras Government as regards streams flowing through British territory into Mysore.

VI

Demi-official—from W. McHUTCHIN, Esq., Chief Engineer, Public Works Department, Mysore.
To—G. T. WALCH, Esq., Joint Secretary to the Government of Madras, Public Works Department (Irrigation Branch).
Dated—Bangalore, the 29th June 1891.

I, today, send you three copies of the "Rules" proposed by Mysore, as promised at the conference at Ootacamund in May. An explanatory memorandum and three lists (Schedules A, B and C) are attached to each set of rules. One copy, Ordnance maps of Mysore, is also sent, on which all the streams and catchments entered in schedules A and B are coloured blue. An index map on a small scale is also enclosed, and from this you can see at a glance, from the figures entered on the map, where to look on the larger map for any of the streams or catchments in the schedules.

I am directed to say that the Diwan is most anxious for an early settlement, and in the very exhaustive character of schedule B I hope you will see ample proof of such anxiety.

ENCLOSURES.

Explanatory memorandum to accompany the draft of "Rules defining the limit within which no new irrigation works are to be constructed by the Mysore State without previous reference to the Madras Government."

I. It was mutually agreed at the conference held at Ootacamund on Friday, 22nd May 1891, that the proposal of Mysore to consider each individual stream, or catchment area, separately on its own merits, would be a more suitable method of arriving at an arrangement whereby both Madras and Mysore interests should be protected.

II. With this view the accompanying draft of rules and appended schedules have been prepared after very careful consideration. Special pains have been taken to exclude from Mysore operations all streams and catchment areas which can reasonably be regarded as affecting existing Madras interest to any extent whatsoever.

III. The general principle of the draft rules now proposed is the same as that of the rules recently drawn up in the Madras Public Works Department. The Mysore programme of Public Works will be seriously curtailed by the adoption of even the rules now proposed, but the Darbar are most anxious to have some immediate settlement on the subject in order to be able to revise their programme and to have some projects ready to hand against an adverse season which unfortunately is already threatening. Mysore operations outside the limits of Schedules A and B cannot, it is believed, affect existing Madras works, nor can such works, which depend upon floods in the streams supplying them, be affected by direct irrigation in Mysore from channels drawn from such streams by means of anicuts.

IV. In order to further illustrate the scope of these rules, and the exhaustive character of the list of streams included in Schedule B, the following remarks on each of the main river drainages entered in Schedule A are offered:—

(1) *Tungabhadra drainage*.—On this drainage there are only two streams on which there are any existing Madras works, if the anicuts on the Tungabhadra are left out of account as being almost entirely dependent on floods in the river; these are the—

- (i) The Jiganhalli tank catchment.
- (ii) Antapur tank catchment.

These catchments extend into the Molakalmuru taluk of Mysore, and have been entirely excluded from Mysore operations (items Nos 9 and 10 of Schedule B).

As regards the Madras works on the Tungabhadra itself, the nearest of these to the frontier is, it is believed, the Walvapuri anicut in the Hospet taluk some 87 miles below the frontier measured down the stream, and below this there are several other existing anicuts with their subsidiary works.

These anicuts are entirely dependent on floods in the river, and these floods are caused by the run-off from the Mainad (or Western Ghat) portions of the catchment in the upper reaches of the Tunga and Bhadra rivers above Shimoga and Lakvalli, where the rainfall over large areas is from 150 to 250 inches during the south-west monsoon. The scanty and intermittent supply received by the river (Tungabhadra) from the smaller drainages in the dry tract below Shimoga and Lakvalli does not materially affect the floods; this scanty supply is of no practical benefit to Madras works, as they chiefly occur (if ever) in November or later in the year, but are of incalculable benefit to Mysore in the arid tracts of Chitaldroog.

(2) *Vedavati, or Hagari, drainage.*—Taking the minor drainages of this catchment in order these are—

- (11) Chinna-Hagari.
- (12) Nagalapura tank (Madras) catchment.
- (13) Rangasamudram tank (Madras) catchment.
- (14) Yeradkere tank (Madras) catchment.
- (15) Main stream of Talak drainage
- (16) Main stream of Doderi drainage.
- (17) Virapsamudram and Amrapur tank (Madras) catchments.

Nos. (12), (13), (14) and (17) affect supply to existing Madras tanks and the entire area of these catchments are included in Schedule B. It is believed these are the only catchments on this drainage (Vedavati) flowing out of Mysore Territory on which there are existing tanks below in Madras Territory.

The other three streams in Schedule B, in addition to the main stream in Schedule A, are the main feeders of the river, and Mysore operations up to the points noted in the schedule have been restricted to repair works. In this catchment again the larger proportion of the floods in the river from June to October are due to the heavy rainfall in the upper reaches of the river, and the run-off from the catchments in the dry and arid portions of the catchment near the frontier is of little use in supplying the anicuts on the river (if any such exist) in Madras Territory; floods on these small catchments are generally experienced in the end of October or in November and even then are of comparatively rare occurrence, and of short duration.

(3) *Pennar or North Pinakini drainage.*—Attention may be drawn to Colonel Smalley's remark in paragraph 19 of his No. 674, dated 10th June 1890. There are no existing Madras works on this river for a distance of 200 miles or so from the frontier (as measured down the stream); there are, however, some five tanks near Hindupur which receive a supply from channels with open heads from the river; presumably these tanks would only receive a supply in times of floods in the river.

It will, however, be seen that in addition to the main stream in Schedule A, Mysore has consented to restrict its operations on the whole length of two of the principal feeders as well as on considerable lengths on the Kumadavati and Jayamangali rivers. The whole of such catchment areas in Mysore Territory as directly affect the supply to tanks in Madras have been also excluded from Mysore operations.

(4) *Chitravati River drainage.*—In addition to the main stream, the lower portion of the main feeder (the Kushavati) as well as a large area to the north of the Chelur-Bagenhalli road, have been included in Schedule B. The portion of the catchment to the north of the Chelur-Bagenhalli road being for the greater part very hilly and steep, a large proportion of the flow from the catchment is obtained from this area. The large Gudibanda tank on the main feeder impounds most of the run-off from the area above it.

(5) *Papaghni River drainage.*—The list of streams in Schedule B include the portions of all the principal feeders in Mysore Territory below terminal tanks now in existence on those streams. The streams above these terminal tanks are close to the tops of the watershed, from 5 to 6 miles in all cases; on these upper portions of the catchment there are numerous tanks already in existence, and the surplus supply from these upper streams is very little; the country is nearly all under cultivation, and the run-off from ploughed soil or land when under crops very small.

(6) *Pālār River drainage.*—Schedule B includes all the principal feeders of the river. The other drainages on the eastern and southern frontier are very small and of no importance either to Madras or Mysore.

On this catchment there are, it is believed, no Madras tanks on any of the drainages from Mysore territory; and there are no works in the Pālār river, it is believed, above the Pālār anicut near Arcot, about 85 miles from the frontier of Mysore.

It may also be mentioned that on the main drainage of the Pālār river in Mysore, there are 1,000 tanks, some of them of very large size, on 803 square miles of catchment area, and assuming a supply of 48,000 units (1 unit is equal to 10,000 cubic yards) as available from the catchment, which would be equivalent to a run-off of 7 inches per square mile, we only obtain an average of 48 units as available for each tank now in existence! The surplus water available therefore from such a catchment as this would be of very little use to help the floods in the Pālār river.

(7) *The Pennar or South Pinakini drainage.*—All the principal feeders of the river in Mysore territory are included in Schedule B. There are, it is believed, no Madras works on this river above the Tirukkōyilūr anicut in South Arcot some 140 miles from the Mysore frontier.

On this catchment there are numerous tanks in existence on all the minor streams. The details of the principal tank series on this catchment above terminal tanks are—

- (1) Koppa—47.7 square miles, 76 existing tanks—units available at 60 units.
per square mile is equal to 2,862.
or only 38 units to each tank, many of which are large and important.

	Sq. miles.	Tanks.	Units available.	Units per tank.
1. Budikote series	114.5	160	6,870	43
2. Masti "	45.4	63	2,724	43
3. Malur "	66.5	65	3,990	61
4. Vagata "	31	33	1,860	56
5. Hoskote " including Kadgodu "	524	246	31,440	128
6. Vartur "	106	122	6,360	52
7. Bidarguppe series	88	109	5,280	50
8. Attibele "	38	62	1,596	37

The Budikote stream below the Mysore terminal tank is of considerable length, as also the Koppa stream; but the surplus supply available from above the terminal tanks in these cases would be very little.

The whole of the Masti series has been conceded, as the catchment is hilly, and the run-off perhaps more than here estimated.

The run-off from the terminal tanks in the Vagata and Malur series would be small as the lower tanks are of comparatively large size.

The Hoskote series is perhaps of some importance for supply, and the principal feeder—the Kadgodu branch of this stream—has been conceded.

The run-off from the terminal tanks in the Vartur, Attibele and Bidarguppe series is small, the terminal tanks themselves and those immediately above these being very large and important.

(8) *Cauvery River catchment.*—Here, as in the Tungabhadra, the floods in the river are mainly supplied by the run-off from the catchments in the upper reaches of the several main feeders situated in Manjarabad, Coorg and Heggaddevankote. The run-off from the minor catchments in Chamrajnagar and Malvalli taluks of Mysore, near the frontier, do not materially affect the floods in the river, upon which, it is believed, the Madras irrigation works below almost entirely depend for their supply.

As the Darbar are most anxious for some early definite arrangement, they have included in Schedule B streams and drainages of doubtful benefit to Madras, but of vital importance to Mysore. The foregoing remarks and a glance at the map will show that the arrangement now proposed is more suitable in every way than fixing any particular limit of distance from the frontier all round, without regard to the varying circumstances of particular localities and drainages.

V. *Schedule C* is a list of works now in progress which would be affected by the rules now proposed, but as these works were started before the question of the diminution of the supply to Madras works arose, they are to be allowed to be completed.

VI. A list is under preparation of the more important irrigation works which either had been, or are now, under contemplation by Mysore, and which under the rules now proposed will have to be submitted to the Madras Government for their consent before being undertaken.

VII. The following maps accompany:—

(i) Rolled map of Ordnance Survey sheets, 4 miles to an inch, on which the rivers and streams defined in schedules A and B are coloured blue; the catchment areas in schedule B being also coloured blue; the numbers entered in red ink on the map are the serial numbers as entered in schedule A, and the blue figures serial numbers as entered in schedule B.

(ii) An index map, 16 miles to an inch scale, on which the rivers and streams and catchment areas are also shown.

Draft of rules defining the limits within which no new irrigation works are to be constructed by the Mysore State without previous reference to the Madras Government.

I. In these rules—

(1) "New irrigation reservoirs" shall mean and include such irrigation reservoirs or tanks as have not before existed, or, having once existed, have been abandoned and been in disuse for more than thirty years past.

(2) A "new irrigation reservoir" fed by an anicut newly built across a stream shall be regarded as a "new irrigation reservoir across" that stream.

(3) "Repair of irrigation reservoirs" shall include (a) increase of the level of waste weirs and other improvements of existing irrigation reservoirs or tanks, provided that either the quantity of water to be impounded or the area to be irrigated, is not more than the quantity previously impounded, or the area previously irrigated, by them; and (b) the substitution of a new irrigation reservoir for and in supersession of an existing irrigation reservoir but in a different situation, or for and in supersession of a group of existing irrigation reservoirs, provided that the new work either impounds not more than the total quantity of water previously impounded by the superseded works, or irrigates not more than the total area previously irrigated by the superseded works.

(4) Any increase of capacity other than what falls under "Repair of irrigation reservoirs" as defined above shall be regarded as a "New irrigation reservoir."

11. The Mysore Government shall not, without the previous consent of the Madras Government, or before a decision under rule 4 below, build any "New irrigation reservoirs" across any part of the thirteen main rivers named in the appended schedule A, or across any stream named in schedule B below the point specified in column 5 of the said schedule B, or in any drainage area specified in the said schedule B.

111. When the Mysore Government desires to construct any "new irrigation reservoir" referred to in the last preceding rule, then full information regarding the proposed work shall be forwarded to the Madras Government and the consent of that Government shall be obtained previous to the actual commencement of work. The Madras Government shall be bound not to refuse such consent except for the protection of prescriptive right already acquired and actually existing, the existence, extent and nature of such right and the mode of exercising it so as to control or limit the natural right of the Mysore State being in every case determined in accordance with the law on the subject of prescriptive right to use of water and in accordance with what is fair and reasonable under all the circumstances of each individual case.

IV. Should there arise a difference of opinion between the Madras and Mysore Governments in any case in which the consent of the former is applied for under the last preceding rule, the same shall be referred to the final decision either of arbitrators appointed by both Governments, or of the Government of India.

V. The Mysore Government shall not be bound to obtain the consent of the Madras Government as regards—

(a) any anicut across any river or stream at any point of its course whatsoever, not being an anicut such as is referred to in clause (2) of rule 1, or

(b) any "Repair of irrigation reservoir" as defined in clause (3) of rule 1, wherever the same may be situated, or

(c) any "New irrigation reservoir" other than one falling under rule 2.

VI. The consent of the Madras Government to be given to new irrigation reservoirs specified in the appended schedule C. Should, owing to the omission of the Mysore Government to make or maintain these works in a reasonably adequate standard of safety, irrigation works in Madras, themselves in a condition of reasonably adequate safety, be damaged, the Mysore Government shall pay to the Madras Government reasonable compensation for such damage.

VII. The foregoing rules shall apply, as far as may be, to the Madras Government as regards streams flowing through British territory into Mysore.

SCHEDULE A.

Main rivers.	Remarks.
1. Tungabhadra .. .. .	.....
2. Tunga	Tributary of the Tungabhadra.
3. Bhadra	Do.
4. Hagari or Vedavati	Do.
5. Pennār or Northern Pinakini .. .. .	.....
6. Chitravati	Tributary of the Pennār or Northern Pinakini.
7. Papagani	Do. do.
8. Palār .. .. .	.....
9. Pennār or Southern Pinakini .. .. .	.....
10. Cauvery .. .. .	.....
11. Hemavati	Tributary of the Cauvery.
12. Lakshmantirtha	Do.
13. Kabini	Do.

SCHEDULE B.

A list of the minor streams and catchments in Mysore territory on which no new irrigation reservoirs are to be built within the limits specified without previous reference to the Madras Government.

Serial numbers in Schedule A.	Drainages.	Serial numbers.	Minor branches.	Defined limit on a stream below which, or defined drainage area within which, no new irrigation reservoirs are to be built without previous reference to Madras Government	Distance from frontier as measured up the stream (approximate).	Remarks.
1	2	3	4	5	6	7
I	Tungabhadra ..	1	Sulikere-halla ..	The bund of Sulikere tank.	46 miles ..	The Sulikere tank seldom discharges. This stream joins the Tungabhadra in Mysore territory.
		2	Sagali-halla ..	Up to the boundary line of the Channagiri taluk.	40 do. ..	About this point there are numerous existing tanks, and the run-off from these smaller catchments are of no appreciable importance to floods in the Tungabhadra river.
		3	Sarati-halla ..	As far as the boundary line of the Kakkargola and Avargola villages.	9½ do. ..	A stream of insignificant importance to floods in the Tungabhadra river. This stream joins the Tungabhadra river in Mysore territory.
		4	Branch of Sarati-halla from east.	Up to Kadaji tank bund.	16½ do. ..	Catchment above the Kadaji tank small and insignificant.
		5	North Hagari ..	Up to boundary of Chitaldroog taluk.	12½ do. ..	There are no existing Madras works on this branch of the Tungabhadra.
		6	Branch of do.	Up to Anaji tank bund ..	10 do. ..	
		7	Sokke-halla ..	Up to the Hoskere tank bund.	9 do. ..	No existing Madras works on this stream before it joins the North Hagari. Catchments above Hoskere and Kyasenhalli tanks very small and insignificant.
		8	Branch of Sokke-halla.	Up to the Kyasenhalli tank bund.	9 do. ..	
		9	Jiganhalli tank (Madras) catchment.	The whole of the outlying bit of Mysore territory which drains into this Madras tank.	9 do.	This is an outlying bit of Mysore territory in latitude 14-55'; longitude 76-38'.
		10	Anantapur tank (Madras) catchment.	The whole of the area of the extreme northern portion of the Molakalmuru taluk in Mysore which drains northwards into the Anantapur (Madras) tank catchment.	9 do.	There are existing Madras tanks below, and the whole area which drains into such tanks is included.
IV	Vedavati Hagari.	11	Chinna-Hagari.	Up to the bridge over this stream on the Salem-Bellary road.	8½ do. ..	No existing Madras works affected. This stream joins the main river about 8 miles beyond the frontier.
		12	Sherikola-halla or Nagalapura tank (Madras) catchment.	The whole catchment area in Mysore territory.	8½ do. ..	Affects the supply to Madras tank below.
		13	Rangasamudram tank (Madras) catchment.	The whole area of catchment of the tank in Mysore territory.	8½ do. ..	The stream from this catchment leaves Mysore territory in latitude 14-37'-30" and longitude 76-48'-30".
		14	Yeradhore tank (Madras) catchment.	Do. do.	8½ do. ..	The Yeradhore in Madras is on latitude 14-30'; longitude 76-57'-30".
		15	Main stream of the Talak drainage.	Up to the bridge over this stream on the Salem-Bellary road.	15½ do. ..	The road is a convenient point for a limit. No Madras works affected. This stream joins the Vedavati river within Mysore limits.
		16	Main stream of the Doderi drainage.	Up to the boundary of the Hosahalli village.	17½ do. ..	Latitude 14-21'; longitude 76-49'. No existing Madras works affected. This stream joins the Vedavati river within Mysore territory.

Schedule B—cont.

Serial numbers in Schedule A.	Drainages.	Serial numbers.	Minor branches.	Defined limit on a stream below which, or defined drainage area within which, no new irrigation reservoirs are to be built without previous reference to Madras Government.	Distance from frontier as measured up the stream (approximate).	Remarks.
1	2	3	4	5	6	7
IV	Vedavati or Hagari—cont.	17	Virapsamudram and Amarapur tank (Madras) catchments.	The whole area of catchment of this series in Mysore territory.	17½ miles ..	This area represents a large proportion of the Pavagada taluk of Mysore.
V	Pennar or North ern Pinakini.	18	Mulkalkara tank (Madras) catchment.	Do. do.	Do. ..	This Madras tank is situated in latitude 14-8', longitude 77-26'-20".
		19	Ruddam tank (Madras) catchment.	Do. do.	Do. ..	A considerable area in the north of the Maddagiri taluk of Mysore is on this catchment.
		20	Virapsamudram tank (Mysore) catchment.	Do. do.	Do. ..	This terminal tank is in south-east corner of the Pavagada taluk of Mysore, but there are some Madras tanks above in the Madakasira tahsildari. The catchment excluded from Mysore operations is chiefly in the north of the Maddagiri taluk.
		21	Purghi tank (Madras) catchment.	Do. do.	Do. ..	The catchment excluded from Mysore operations is in the north of the Maddagiri taluk.
		22	Jayamangali river.	Up to its junction with the Garudachala stream.	28 miles ..	The river above this point is of minor importance to Madras.
		23	Savarnamukhi branch of Jayamangali.	Up to site of Rampur anicut.	25 do. ..	Joins the Jayamangali a few miles below this point.
		24	Kumadvati ..	Up to site of anicut feeding the Kodagatur and Gundagal tanks in Mysore.	9½ do. ..	This stream joins the Pennar on the Mysore frontier.
		25	Chaulur tank (Madras) catchment.	The whole direct catchment of this tank in Mysore territory.	Do. ..	This Madras tank is on the west bank of the Pennar just outside Mysore territory.
		26	Western or Thondebhavi branch of the Pennar or N. Pinakini.	Up to its source ..	27 to 30 miles.	....
		27	Central or Varvani branch of the Pennar or N. Pinakini.	Do. ..	25 miles ..	....
		28	Hindapur tank (Madras) catchment.	The whole area of catchment of this series in Mysore territory.	Do. ..	An important and large area of the Goribidnur taluk is here excluded from Mysore operations in a part where water for irrigation is much appreciated.
VI	Chitravati ..	29	Kushavati stream (Bukkapatna tank catchment in Madras).	Up to site of Daparti anicut.	10½ miles ..	The large Gudibanda tank in Mysore and the 20 smaller tanks above impound a very large proportion of the upper catchment already.
		30	Chitravati catchment (Bukkapatna tank (Madras) catchment).	The whole area to the north of the Chelur-Bagenhalli road.	Do. ..	This portion of the Chitravati catchment being more hilly and barren, the run-off is greater than in the more cultivated and level catchment to the south of the Chelur-Bagenhalli road.
VII	Papaghni river.	31	Vandamon-halla.	Up to Naremadipalli tank.	9½ miles ..	No Madras works affected up to the junction of this stream with the Papaghni river.

Schedule B—cont.

Serial numbers in Schedule A.	Drainages.	Serial numbers.	Minor branches.	Defined limit on a stream below which, or defined drainage area within which, no new irrigation reservoirs are to be built without previous reference to Madras Government.	Distance from frontier as measured up the stream (approximate).	Remarks.
1	2	3	4	5	6	7
VII	Papaghni river —cont.	32	Guntipalli tank (Madras) catchment.	The whole area of catchment in Mysore territory.	9½ miles ..	This Madras tank is situated just above the large Vyasasamudram tank.
		33	Sadam tank (Madras) catchment.	The main stream up to its source.	17 to 18 miles.	This Madras tank, the waterspread of which is partly in Mysore territory, drains into the Papaghni river just above the Vyasasamudram tank.
		34	Kotagal branch of the Papaghni.	Up to Kotagal tank ..	Do.	The catchment above Kotagal tank is comparatively small and unimportant with numerous small tanks already on it.
		35	Tippasamudram tank (Madras) catchment.	The Marasanpalli-Digavakote stream up to Digavakote-Patoheruvu tank; and the Marasanpalli-Gundedu stream up to Gundedu tank.	9½ miles ..	These are the only two important streams on this catchment, and above these terminal tanks there are a large number of small tanks on the small drainages.
					13 do. ..	These terminal tanks are only situated from 4 to 5 miles from the watershed of the Palar.
		36	Rangasamudram tank (Madras) catchment.	Adgal stream up to Adgal-Vasankanayikankere tank.	6½ do. ..	The Adgal tank is situated 6 miles from the watershed, and there are numerous tanks in this distance.
				Kurigepalli branch stream up to the Kurigepalli tank.	4½ do. ..	The Kurigepalli tank is only 4 miles from the watershed, and there are some 18 small tanks above it.
VIII	Palar river ..	37	Nangli (Mysore) tank drainage.	Main stream up to its source.	17½ do. ..	There are 12 Mysore tanks situated on this main stream.
		38	Sbettikal (Mysore) tank drainage.	Do. do.	10 do. ..	There are about 5 existing Mysore tanks and 1 breached tank on this main stream.
		39	Malinayakanhalli (Mysore) drainage.	Do. do.	6½ do. ..	There are 4 existing Mysore tanks on this main stream.
		40	Vegmadgu (Mysore) drainage.	Do. do.	7 do. ..	There are 4 existing Mysore tanks on this main stream.
		41	Tailur tank (Mysore) drainage.	Do. do.	23 do. ..	There are 10 Mysore tanks on this important branch of the Palar, the terminal tank being 12½ miles from the frontier.
IX	Pennar or South Pinakini.	42	Verushuvavati river.	Main stream up to Koppa (or Kuppam) tank.	16 do. ..	There are 76 tanks above the Koppa tank which is only some 12 miles from the watershed.
		43	Budikote stream.	Main stream up to Thimmanayakanhalli tank.	21 do. ..	There are 146 tanks above this terminal tank which is only about 12 miles from the watershed.
		44	Masti catchment.	The whole area of catchment in Mysore territory.	21 do. ..	About 45-40 square miles in area in which there are 63 tanks in existence.
		45	Kadgodi drainage.	Main stream up to its source	36 do. ..	There are 10 Mysore tanks on this main stream now in use, most of them of large size.

*Alterations proposed by Madras in the Mysore draft rules received with
Mr. McHutchin's letter of 29th June 1891.*

Remarks and explanatory notes.

Otherwise Mysore might connect existing anicuts with new storage reservoirs

* NOTE.—Though no single anicut could do much harm to Madras interests a series of anicuts on the scheduled streams might do so, and therefore it is necessary not to agree to Mysore having unrestricted power to construct such works, all that the omission implies is that consent shall be obtained.

NOTE.—Subject to this revised rule, we can accept Schedule C. It is noted that in items 28, 30 and 44 in Schedule B the works specified in Schedule C apparently cover the whole drainage area in which Madras interest is admitted.

† See Atlas sheet.

(1) *Rule I, clause (2).*—Strike out “newly built.”

(2) *Rule II.*—After “new irrigation reservoirs” insert “or any new anicuts.”

(3) *Rule III.*—After “new irrigation reservoir,” insert “or anicut.”

Strike out—

“so as to control or limit the natural right of the Mysore State” and also “in accordance with the law on the subject of prescriptive right to use of water and.”

(4) *Rule V, clause (a).*—Strike out altogether.

Clause (c).—Add “or anicuts” after “new irrigation reservoir.”

(5) *Rule VI* to run somewhat thus:—

“The consent of the Madras Government to be given to the new irrigation works specified in Schedule C. Should, however, their construction cause a diminution of the water-supply, or should their destruction or breaching result in damage to Madras irrigation works, the Mysore Government shall pay to the Madras Government reasonable compensation for such diminution of supply, or damage, claims for such compensation shall be settled, in case of difference of opinion, as provided in rule IV.”

(6) *Schedule A.*—Add—

Honhalli (or whatever may be the recognized name of the river which joins the Cauvery from the south near Kollegal) † Suvarnavati—see Index map).

Yegachy or † Yegachy (an affluent of the Hemavati which it joins near Goroor).

(7) *Schedule B.*—Add—

“Choardy river”, affluent of the Tungabhadra as far as “Coomsee” on its main course and as far as “Umblygola” on its western branch.

Alter—

distance from frontier of “No. 11 Chinna Hagiri” or “Janagahalla” from that stated in the schedule, viz., “up to bridge over this stream on the Salem-Bellary road”, to

“up to where it crosses the frontier near Rungyan Droog.” (Note.—This alteration is made on the supposition that where the river appears from the atlas sheet to form the boundary between British territory and Mysore between just north of Chicka-Mallinhally and Rungyan Droog, it lies wholly in British territory—if this is not the case then the alteration to be to “up to 20 miles from where it strikes the frontier a short distance north of Chicka-Mallinhally.”)

8th July 1891.

G. T. WALCH.

VII

Demi-official—from G. T. WALCH, Esq., Joint Secretary to the Government of Madras, Public Works Department (Irrigation Branch).

To—G. McHUTCHIN, Esq., Chief Engineer, Public Works Department, Mysore.

Dated—Ootacamund, the 7th July 1891.

Mr. Stokes and I have been through your proposed rules and I give on a separate sheet the alterations and additions which we consider essential. I think you will see that we have made very considerable concessions in order to meet Mysore on the way to an amicable agreement. The next step will be for the rules proposed by Mysore (with the corrections now asked for by us, or as near an approach to them as may be agreed to) to be sent to us in the regular official way through the Resident who should be informed of what has preceded this official submission of your proposals.

VIII.

Demi-official—from C. C. BOWEN, R.E., Chief Engineer, Public Works Department, Mysore.

To—G. T. WALCH, Esq., Joint Secretary to the Government of Madras, Public Works Department (Irrigation Branch).

Dated—Bangalore, the 20th July 1891.

Your demi-official of 7th to McHutchin regarding the proposed rules for settlement of water disputes he handed over to me, and I took it down to Mysore last week for discussion and orders.

The following is the decision arrived at by the Darbar regarding the modification of draft or fresh proposals now brought forward:—

To strike out the words “newly built” in rule I, clause (2), is agreed to. Mysore cannot agree to insert the words “or any new anicuts” after “new irrigation reservoirs” in rule II, as proposed by you.

Mysore must also dissent from the addition of “or anicut” to rule III. The elimination of the words “so as to control or limit the natural right of the Mysore State” in same rule the Diwan agrees to, but he cannot agree to the elimination of the words “in accordance with the law on the subject of prescriptive right to use of water.”

Further he cannot agree to striking out clause (a) of rule V, nor to the addition of “or anicuts” after “new irrigation reservoir” in clause (c) of same rule. But, if necessary, the whole of this rule can be omitted.

Mysore cannot agree to the modification now proposed in seven last lines of rule VI.

The addition of Honhalli river to schedule A is agreed to, also the addition of Yagachi river, but only up to the Belur bridge.

Modifications now proposed to schedule B are agreed to.

I may remark on the above that to include “or any new anicuts” under rule II would bar Mysore from further utilizing for direct irrigation the ordinary flow of the rivers specified from the months of June to December.

Such ordinary flow is believed to be of little or no use to Madras. By such flow I mean up to average daily level of water in those months.

To eliminate from rule III the words “in accordance with the law on the subject of prescriptive right to use of water” would be to acknowledge that Madras Government, in considering the existence, extent and nature of a prescriptive right to be possibly affected by a proposed Mysore work, could set aside or refuse to be guided by the law on the subject. Nor does it seem reasonable to propose to disregard such law in such cases as may come up for mutual settlement and agreement.

I have said that the whole of rule V may be omitted, if necessary. The clauses, clause (b) perhaps excepted, seem to be redundant, as the points that will be at issue and call for settlement are covered by the rules preceding.

The original wording of rule VI seemed very reasonable, and I understand it was agreed to in substance at last conference at Ootacamund. Madras would have the opportunity of examining the question of the effect on their works of proposed Mysore works, and, having given their consent to the latter, it would be unreasonable for Mysore to be subsequently subjected to claims for compensation for alleged diminution of supply. Such a reading as you propose would admit of, if not encourage, all sorts of claims on the part of Madras ryots. And compensation for loss following on the destruction of any Mysore work is fairly covered by rule VI as drafted and the marginal note regarding a common understanding as to standard of safety. A claim for compensation because of the destruction of a work from an extraordinary convulsion of nature—a storm or cyclone beyond ordinary experience—could not be accepted by Mysore.

The addition of river Yagachi to schedule A is accepted only up to Belur. The river higher up has numerous branches having many anicuts across them, all of which require improvements more or less. Such works indeed would have absolutely no effect on Madras.

I fear all this will delay settlement, but it cannot be helped.

IX

Demi-official—from G. T. WALCH, Esq., Joint Secretary to the Government of Madras, Public Works Department (Irrigation Branch).
To—Col. C. BOWEN, R.E., Chief Engineer, Public Works Department, Mysore.

Dated—Ootacamund, the 27th July 1891.

Yours of 20th. As regards the alterations, in your draft rules, proposed by Madras to which you now object—

(1st) We must adhere to our contention that *prior reference* must be made about construction of anicuts on the *scheduled streams*; you will note that the latter part of rule III and rule IV provide against refusal of permission by Madras on insufficient grounds and, therefore, what we propose would by no means rigidly bar, as you seem to think, the construction of any anicuts on the scheduled streams for direct irrigation, but would only give us the right to object to such as would seriously affect Madras supply.

(2nd) We agree to leaving in your rule III the words "in accordance with the law on the subject of prescriptive right to use of water and."

(3rd) We agree to striking out rule V altogether.

(4th) As regards your remarks about our proposed alteration of rule VI, which, please remember, refers only to schedule C works, and not to any works to which, in future, consent may be given,—neither Mr. Stokes nor myself remember that at the last conference anything was said about giving up all claim on account of *diminution of supply* caused by the works commenced without reference to Madras and to which we have for some time past taken exception; but to which we now propose to agree on certain terms; and most certainly nothing was said about providing Mysore with a clean bill of health as regards those works, the efficiency of the mode of construction of which we have had nothing to do with; to lay down a "standard of safety" about them we consider impracticable. We are not prepared to forego possible claims under the heads of "diminution of supply" and "damage" as regards—

- (a) New Srinivasasagara reservoir,
- (b) New Ramasamudram "
- (c) New Venkatasagara "

but we will let the others go, and even as regards those three works, we will limit the claim for diminution of supply to *one time within ten years of the completion of the work*, any such claim to be adjudicated upon as provided for in rule IV.

(5th) We accept the modification of the scheduled distance up the Yagachi river to "as far as the Belur (?) bridge" as proposed by you.

X

Demi-official—from Col. C. BOWEN, R.E., Chief Engineer, Public Works Department, Mysore.
To—G. T. WALCH, Esq., Joint Secretary to the Government of Madras, Public Works Department (Irrigation Branch).
Dated—Bangalore, the 6th August 1891.

Your further note of 27th ultimo, regarding modifications of propose draft rules for settlement of the water controversy, I duly laid before the Diwan, and, after full consideration of all details, he desires me to communicate to you his views as follows:—

(1) The addition of "new anicuts" to rule II, so far as the streams of schedule B are concerned, is agreed to, also as regards the minor streams of schedule A, viz., Nos. 4 to 9.

(2) As regards the exclusion of "new anicuts" across the major streams of this schedule Nos. 1, 2, 3, 10, 11, 12 and 13, your terms cannot be accepted by Mysore, but a compromise is now proposed.

(3) On each of these streams a point to be fixed, above which Mysore should have an entirely free hand as regards new anicuts for direct irrigation, and below which Mysore will undertake no such new works without previous consent of Madras Government.

(4) The points we suggest as suitable are the existing Ramaswami anicut on the Cauvery, 5 miles above the town of Buhnoor—the road crossing at Honhalli on the Tungabhadra,—and on the Kabani, the present Rampur anicut, 10 miles above the town of Nanjangode. The Ramaswami anicut is some 60 miles above the point, where its river leaves the Mysore frontier, the Rampur anicut about 70 miles, the Honhalli crossing 30 miles.

(5) The Diwan thought at first that it would be advisable for Mysore to propose a distance limit above the highest anicuts on those rivers in Madras territory, but on consideration thinks the above points will suit Mysore requirements in the future.

(6) The confluence of the Tungabhadra, Hemavati and Lakshmanthirtha being above the points named, they need not be specially mentioned here. It is considered that above the points proposed the diversion to direct irrigation of part of the ordinary flow of the streams during the irrigation season, June to December, would but inappreciably affect the supply to anicuts in Madras lower down. I may add that the existing anicuts on the Cauvery and Hemavati above the Ramaswami are so close together that with two exceptions, one on each river, it is not likely that any new anicuts can ever be undertaken and only one seems at all possible (financially) on the Tungabhadra. Besides, you must remember that all water so diverted finds its way back quickly to the rivers *minus* only the proportion absorbed by or evaporated from the rice fields, and the latter proportion must be comparatively insignificant as the Mysore channels never get far away from the river margins, commanding only strips of steep side-lying lands. Your formulated claim on account of "diminution of supply" caused by schedule C works is more difficult of negotiation.

(7) At the conference at Ootacamund, when a basis for mutual concessions and final settlement was under discussion, both the Diwan and McHutchin believe that any compensation on this account was not thought of as a possible factor in the solution.

(8) In your marginal note on the draft rules then discussed, you say:—"Consent to be given to those now far advanced, to be specified, with the understanding that if hereafter damage to existing irrigations (*sic*) (*underlining* is mine) in British territory be proved to have been caused by such works, compensation for same shall be paid." They believed that this was intended to cover damage to Madras works or damage to lands by inundation, that might result from our tanks being breached and the impounded waters suddenly let loose.

(9) It is true (it seems to me) that the wording may be construed truly into meaning, in addition to above damages, damage to existing crops from diminution of supply or to short cropping due to some cause, but this was not understood at the time.

(10) At any rate, to consent to the proposed clause would be for the Diwan to abandon his original and persistent contention that the natural right of Mysore to the utilization of the water-courses can only be restricted when a *material* or *unreasonable* diminution is caused. Therefore he is not prepared to accede to this addition. Besides, such a clause would always hang "in terrorem" over our heads.

(11) If you decline on your side to abandon future claims for loss from diminished supply, then why not submit the question to arbitration at once? Let it be decided *now*, once for all, whether such claims are admissible, and, if admissible, let the compensation equitably due to Madras, covering all contingencies, be finally adjusted. Mysore would consent to such arbitration nominating two arbitrators on their side, Madras Government to name two, and a Judge of Madras High Court or Resident in Mysore to be Umpire. In fact rule IV to be extended at once to this point in dispute.

(12) I have further only to add that in regard of your proposal to limit the claims to "within ten years of the completion of the work," the Diwan thinks that such a limit of time would be of inappreciable benefit to Mysore, while Madras could ordinarily claim relief against a *material* diminution of only such supply as may have been received by their works during the twenty years preceding the completion of the works complained of. The idea of allowing *no diminution whatever* is, we believe, wrong and against the law on the subject

XI

Demi-official—from G. T. WALCH, Esq., Joint Secretary to the Government of Madras, Public Works Department (Irrigation Branch).
To—Col. C. BOWEN, R.E., Chief Engineer, Public Works Department, Mysore.

Dated—Ootacamund, the 11th August 1891.

Your letter without date received yesterday.

(a) We agree to proposals in paragraphs 2 (commencing "the addition of new anicuts") to 7 (ending "as the Mysore channels never get far away from the river margins, commanding only strips of steep side-lying lands").

(b) We agree that it is advisable to get the *admissibility* of claims for "diminution of supply" caused by the three new reservoirs, to which we have persistently and consistently objected, decided as soon as possible, but we think it better that it shall be decided by the Government of India than referred to a somewhat unwieldy court of arbitrators.

(c) We do not see how the *amount* of such claims (*if decided to be admissible*) can be stated and considered till after the works in question have been finished and brought into operation, but we would agree to submit our claims, if any, to the Government of India within a "reasonable" time (to be settled between us) after the completion of the works.

2. I think you will see that we have gone as far as we can to meet you, in our desire to bring the matter to a definite issue, and *that*, we hope, has now been secured.

XII

Demi-official—from G. T. WALCH, Esq., Joint Secretary to the Government of Madras, Public Works Department (Irrigation Branch).

To—Col. C. BOWEN, R.E., Chief Engineer, Public Works Department, Mysore.

Dated—Gödväri, the 25th November 1891.

The Resident is rounding us up about replies to communication about certain tanks which will be affected by whatever may be the outcome of our discussion about irrigation disputes. We of course are awaiting your reply to my demi-official of 11th August, which we hoped would bring the matter to a speedy and satisfactory issue. Please let us know what has been, or is being, done.

XIII

Demi-official—from Col. C. BOWEN, R.E., Chief Engineer, Public Works Department, Mysore.

To—G. T. WALCH, Esq., Joint Secretary to the Government of Madras, Public Works Department (Irrigation Branch).

Dated—Bangalore, the 3rd December 1891.

Yours of 25th ultimo to hand this morning.

On 16th September last I drafted a letter on the subject of our irrigation controversy to the Resident, which draft I only received back from the Diwan two days ago. It was passed, but he wishes to see the rules, and schedules, which have to be altered a little, before they are finally despatched.

This will delay matters a little longer, but I am doing my best to push the question through.

XIV

G.O. No. 162 I., dated 18th February 1892.

Read—the following paper:—

Letter—from General Sir H. N. D. PRENDERGAST, R.E., K.C.B., V.C., Officiating Resident in Mysore.

To—the Chief Secretary to Government.

Dated—Bangalore, the 15th January 1892.

No.—144/346-90.

With reference to correspondence ending with your letter, Political, No. 636, dated the 16th December 1890, I have the honour to forward, for the formal acceptance of the Government of Madras, a copy of the rules and schedules regarding the restoration and construction of irrigation works in Mysore, prepared by the Mysore Durbar, which embody the arrangements which have been come to in an informal manner both by personal discussion and demi-official correspondence between the Chief Engineer, Madras Irrigation Branch, and the Chief Engineer in Mysore.

2. I shall be glad to be informed if the Madras Government agree with the rules proposed.

No. 3-1, dated the 4th January 1892.

3. A copy of Colonel Bowen's letter on the subject is enclosed for information.

ENCLOSURE.

Letter—from Col. C. BOWEN, R.E., Secretary to the Government of Mysore, Public Works Department

To—the Assistant to the Resident in Mysore.

Dated—Bangalore, the 4th January 1892.

No.—3-1

With his letter No. 1 A. of 10th June 1890, the Diwan submitted to the Resident a memorandum on the subject of the restoration and construction of irrigation works

in Mysore, the right to effect which without restriction had been disputed by the Madras Government. In that letter he urged the Resident to represent the matter in full to the Government of India, in view to a settlement of the points at issue.

2. Colonel Sir Oliver St. John informed the Diwan in April last that the Government of India would prefer the matter to be settled, if possible, by some understanding between Madras and Mysore, and, before leaving Ootacamund this year, he arranged for a conference between officers of the two Governments. Under such circumstances the Darbar again made endeavours, in conference with the Madras Government, to arrive at an amicable understanding regarding our future irrigation operations, so that controversy might be obviated in regard of individual works and a sphere of operations declared in which Mysore projects should be absolutely untrammelled. At the same time restrictions to be accepted by the Durbar on certain classes works on certain rivers and in certain valleys which might affect prejudicially Madras works beyond the frontier.

3. The rules and schedules which I now forward embody the arrangements which have been come to in an informal manner by personal discussion or by demi-official communications, and I am desirous to request you will be good enough to move the Resident to now obtain from the Government of Madras their *formal* acceptance of the same. They will then be adopted by Mysore for future guidance of the irrigation officers.

4. Annexed to the final rules and schedule is printed the demi-official correspondence, which led to the modification of the rules after they were first framed and discussed at Ootacamund in May last. These letters will show that the general terms of the settlement have, with one exception, been informally agreed to by both Governments.

5. The exception I allude to is that referred to in the secondary clause to rule V. The decision of the Government of India will be necessary on that point, viz., the existence of a liability on the part of Mysore on account of three large reservoirs now actually under construction, and, if such liability exists, the extent of it; but the definite acceptance by Madras of the rules and schedules as now drawn up is desirable before the controverted cases are specially referred.

No. 112.

Transferred to the Public Works (Irrigation) Department

J. F. PRICE,
Chief Secretary.

21st January 1892.

Order—No. 162 I., dated 18th February 1892.

Ordered that the following letter be sent.

(True Extract).

G. T. WALCH,
Joint Secy. to Govt., P.W.D.
(Irrigation Branch).

To the Chief Engineer for Irrigation,
with copy of draft letter to the Resident.
„ the Political Department, with draft letter to the Resident.
„ the Superintending Engineer, III Circle.
„ other Superintending Engineers.
„ the Revenue Department.

ANNEXURE TO G.O. No. 162 I., DATED 18TH FEBRUARY 1892

Rules defining the limits within which no new irrigation works are to be constructed by the Mysore State without previous reference to the Madras Government.

[Printed as Enclosure to Exhibit Ma.-2.]

XV

Dated—the 11th March 1892.

No.—192, Political.

Letter—from the Chief Secretary to the Government of Madras.

To—the Resident in Mysore.

With reference to your letter No. 144/346-90 dated 15th January 1891, I am directed to say that the rules and schedules in connection with the restoration and construction of irrigation works in Mysore forwarded therewith are accepted by the Madras Government.

Exhibit Ma-12.

MADRAS REJOINDER.

PART VI, FACTS AND ENGINEERING ARGUMENTS--SECOND ISSUE.

PRESCRIPTIVE RIGHTS.

1. Madras deny that their prescriptive rights are limited by any area, but claim that their prescriptive right is the extent of the natural flow of the river up to a specific limit.

Reference Mysore paragraph 23.

The second issue which is that under consideration confines the matter to fixing the limit flow at the Upper Anicut.

AREA OF MADRAS IRRIGATION.

2. As stated above the Madras Government deny that their prescriptive rights can be measured or limited by consideration of area irrigated. It is limited by the methods and quantity of user, and Madras has a right to the benefits immediate or prospective of any economies which by means of remodelling works, constructing new works or otherwise she has been able to effect.

Reference Mysore paragraph 24.

It has frequently happened that improvements to works are financially possible only by reason of the extension of irrigation obtained thereby. The projected Metur reservoir will give sufficient water for the existing irrigated area from a much smaller total area of land is newly brought under irrigation. The Mysore contention is that as soon as the reservoir is completed, the quantity of water to which Madras have a right is at once reduced to the quantity required under the new conditions for the existing area of irrigated land. In other words, Mysore is to have all the benefit of the Madras expenditure. The argument has only to be clearly stated to be rejected. Madras do not claim any more water than is theirs by prescriptive right, but they do claim in the most emphatic terms that they are free to use the water to which they are entitled in the way that seems best to them. The converse of the Mysore argument is that if Madras allowed works to fall out of repair and the quantity of water required for the irrigated area was thereby increased Madras would be entitled to the increased quantity.

3. It is admitted and has all along been stated that as regards the areas irrigated above the Upper anicut and in the tributaries of the Cauvery the figures given in the Metur Project were erroneous.

Reference Mysore paragraph 25.

The figures were of no importance so far as concerned that project and were merely inserted as part of the general description of the Cauvery. A search in the old records of the Cauvery Project office has failed to show from where the figures were abstracted.

4. The first note sent to Mysore on the subject of their application for assent to their project reproduced these erroneous figures from the Metur Project reports, which had just been printed and it was not until this arbitration was under correspondence that any check of the figures was made.

5. The figures in the table given by Mysore are misleading both in respect to the way in which they have been tabulated and in the statements made.

6. Considering the first line "Irrigation under the Cauvery and tributaries."—the figures in column 2 are not what is represented in the Mysore statement; they are the latest figures given to Mysore on 20th October 1913. The figures in column 3 are those from the same statement.

A reference to this statement (Appendix XV) is invited. It shows areas irrigated (compiled from special reports made by Collectors) in the years 1890, 1895, 1900, 1905 and 1910. This information was asked for by Mysore. The remarks specifically show that with regard to the year 1890 information as regards areas is not forthcoming as regards certain channels. For all the other years full information is given.

Mysore has altogether ignored these remarks and represented that the total area irrigated in 1890 was limited to the area for which figures are given. This is denied and is absolutely contrary to fact.

A consideration of the statement of areas will show that the variations in areas which have occurred are of the nature of seasonal variations. All the works are old ones, though minor improvements such as building new supply sluices and improvements in regulation have no doubt been introduced here and there, but the water entering the channel heads has not been increased and any increases in area are of a minor nature due to gradual petty improvements and due to economies thereby effected.

It is denied that, saving such minor and scattered increases due to minor improvements and economies, there has been any increase in the area irrigated above the Upper anicut and further that such increases have caused any increase in the quantities of water used or to the customary user.

Generally the variations in areas are merely seasonal variations.

In comparison with the areas under consideration the variations under all heads are insignificant.

7. *Irrigation under the Cauvery.*—As regards the second line the matter of the original mistake in the Metur Project report from which the figures in column 2 are extracted has been fully dealt with. The area now put forward, 96,500 acres, is a fluctuating one as the quantities of water from year to year and incidence of flow vary greatly. The mode of user remains the same and the prescriptive right is only limited by this and whatever quantities can under such conditions be diverted on to the lands to be irrigated.

8. *Lower anicut irrigation—the third line.*—The variation in areas is due to seasonal fluctuation of which a diagram has already been furnished. The figure in column II, which is from the Metur Project report, is only approximate and is rather below the average. The area, 112,000 acres, in the Madras case is put forward as a fair figure in view of the actual areas. These areas extracted from administration reports are shown in Appendix V to Sir J. Benton's note of May 1911 (Ma.-8a).

9. *Veeranam tank—fourth line.*—The area, 52,000 acres, was reported by the Superintending Engineer of the Seventh Circle. It is the area which appears in the Madras Government order sanctioning the estimate for widening the Vadavar.

In the Government order quoted by Mysore in which the area is stated as 45,000 acres, a reference has been made to the Revenue Department to report on the matter. It is pointed out that so long as the total Coleroon irrigation is not affected, the removal of 6,000 acres from the category of Veeranam tank to that of area altogether dependent on direct flow does not affect the questions under settlement in any material way.

10. The statement of Mysore that 176,334 acres were cultivated by Madras above the Upper anicut prior to 1890 is no doubt true but the inference is not clear.

Reference Mysore paragraph 26.

If the suggestion is that the area either in 1890 or prior to that was limited by this figure this is denied. It is denied that there is an increase of area of 32,000 odd acres. It is denied that any deductions for new irrigation above the Upper anicut should be made from the limit flow at the Upper anicut to which Madras has a prescriptive right and it is denied that the mode and quantity of user above the Upper anicut has been increased by any such extensions of irrigation.

QUANTITY OF WATER REQUIRED.

11. The Madras Government do not put forward a claim for any definite quantity of water but claim the whole natural flow up to a specified limit.

The total quantity will vary according to season, but the limit claimed remains the same.

12. The claim of Madras is for the limit flow at the Upper anicut to which she has a prescriptive right; the question of distribution of that flow is one which is altogether a matter for this Government.

Reference Mysore paragraph 30.

The flow to which Madras has a right will not always be distributed in the same way and the rights are not altered or diminished by such alterations of works as may make a different distribution of flow practicable and desirable. The distribution of the limit flow claimed is not proposed to be allocated by a hard and fast rule to 2,300 mills. cubic feet to the Cauvery delta and 644 mills. cubic feet to the Coleroon system.

The limit of 7 feet passed over the Cauvery dam is frequently intentionally exceeded and extra supplies have been passed into the Cauvery delta in the past and the same practice is proposed in the future.

REQUIREMENTS OF THE CAUVERY DELTA.

13. The Madras claim is to a limit flow which under the conditions prevailing prior to remodelling the Upper anicut was required to produce a flow of 7 feet over the Cauvery dam with undersluices closed, or 6½ feet over the Cauvery dam with undersluices open.

Reference Mysore paragraph 31.

14. It is admitted that the 7 feet limit was only accepted provisionally by Mysore for the smaller scheme to which Madras have assented on certain conditions. The rules required to protect Madras interests under conditions involving the larger reservoir and draw-off for new irrigation six times the area proposed under the smaller scheme obviously require not less onerous obligations as regards Madras interests.

Reference Mysore paragraph 32.

The strict prescriptive rights of Madras are the same under all sizes of work proposed by Mysore.

15. While the tentative nature of the acceptance by Mysore of the 7 feet limit is admitted, it is denied that the Darbar's officers were induced to accept this through

Reference Mysore paragraph 33.

the mistake made by Sir J. Benton as regards the alteration of the gauge at the Cauvery dam.

The fact that this statement was erroneous was explained to the late Chief Engineer, Mysore, by the Hon'ble Mr. H. E. Clerk, when discussing the matter at Ootacamund in the summer of 1911. The mistake was pointed out to Sir J. Benton in demi-official letter No. 441-11 I. of 18th September 1911, and it is there recorded that this had been explained to Mr. Visveswarayya (Appendix XVI).

16. This is further distinctly stated in paragraph 3, page 3, Volume III of the Metur Project report; as pointed out by Mysore in paragraph 35 there is no question about this.

Reference Mysore paragraph 35.

17. The Bhavani Reservoir Project has never been accepted either by the Chief Engineer or by the Madras Government and it has been ordered that it shall lie over.

Reference Mysore paragraph 6.

Any specific facts and records of observations, discharges, etc., have been placed at the disposal of Mysore and the opinions of Mr. Larminie or other officers who have written on the subject are merely of the nature of expert opinions, and it is well known that the most conflicting opinions by professional men of eminence can be produced on every subject. The prescriptive rights of Madras are to be decided on facts, that is, on records of actual gauge readings, and of rules regarding the limits of water to be passed; and the opinions of individual officers who have written from time to time throughout the last 60 years on the subject of the Cauvery delta supplies have not been brought forward or quoted in the Madras case. Reference to old papers, etc., has been confined to descriptions of existing works and statements of fact, and the opinions of various officers with regard to the limits of discharges and useful supplies have not been made any part of the case.

18. It seems futile to rely on the opinion of any officer who wrote in 1900 as to whether the maximum useful limit of depth on the Cauvery dam was 6 feet or less when

Reference Mysore paragraphs 34 and 37 to 39.

the rules of regulation actually in existence at the time, and during all the period from 1896 to the present date, have forbidden the opening or keeping open of any sluices in the Upper anicut with less than 7 feet passing over the dam.

The value of evidence of opinion in such connection may be gauged by imagining what weight would be given to evidence that some officer, however distinguished and reliable, had expressed the opinion that 8 feet should be maintained, or was recognised as the full useful supply of the Cauvery delta, in the face of an actual practice of passing 7 feet which practice was confirmed by rules of regulation.

The expression of opinion as regards 6 feet has precisely the same value and would only be of value in the absence of evidence of actual gauge readings and rules of regulation.

19. The fact that the top level of the new shutters of the Upper anicut when closed were fixed 2 feet higher than the previous crest level of the old anicut, certainly does

Reference Mysore paragraph 39.

not prove that 6 feet was the full useful supply for deltaic irrigation; on the contrary it proves that it was considered desirable to be able to force a depth of water over the Cauvery dam up to a maximum of 8 feet showing that 8 feet was considered the maximum useful supply likely ever to be required.

The cutting down of the crest of the Upper anicut by 4 feet also shows that the 6 feet level was rather fixed and limited by considerations of flood conditions and was not the measure of maximum level of useful supply of water required over the Cauvery dam. Flood conditions prohibited raising the Upper anicut. Raising the anicut by 2 feet or even 1 foot would almost certainly have produced in high floods most disastrous results and the considerations limiting the height to 6 feet is quite apparent. The rules and records of actual regulation clearly show that use was made, for supply of the Cauvery delta and for scouring sand, of the limit quantity of water claimed by Madras whenever it was available except occasionally after heavy rain, generally in the north-east monsoon.

20. The chief evidence of the limit quantity of water which was used and enjoyed by Madras in the Cauvery delta is the record of gauge readings of depths of water actually

Reference Mysore paragraph 40.

passed over the Cauvery dam and the quantity necessary under the conditions prior to remodelling to enable this to be passed.

21. From examination of the record of actual depths passed over the Cauvery dam and the river conditions under which the rules of 1882 were framed shows that there was under the then existing conditions a great probability of any fresh giving a gauge of 6½ feet increasing to a flood of such dimensions as to cause damage in the delta. The Cauvery and Vennar regulators were not in existence, and these floods passed through the open heads of these rivers without restriction.

About 8 feet is the flow which could be passed without inconvenience into the delta rivers and channels and which might be regarded as the maximum flow ever useful.

An examination of the record of gauge readings (Part III, Appendix VI, Ma.-9) shows that between 1882 and 1895, under the operation of these rules, out of 89 occasions on which the Cauvery dam gauge rose as high as 6½ feet the freshes rose to 7 feet or over 67 times and to 8 feet or over 40 times.

22. The rules were framed under considerations which rendered it desirable to steer between the evils of deficient and excess flow—*vide* Part II, page 8, paragraph 30 (Ma.-8)—and the great liability to excess flow is shown from the actuals quoted. This is doubtless the reason why the closing of the under-sluices was, under these rules, at a lower level than that fixed for opening, as the delta could better spare water after receiving a good fresh than before, while water used under such conditions is more efficient for the purpose of scour—*vide* remarks below (paragraphs 26 and 28).

23. Further under the 1882 rules, from 1882 to 1895 the average number of days on which 7 feet or over was actually passed over the Cauvery dam under the operation of these rules averages 34 days a year, with liability to excess supply on frequent occasions.

Under the conditions after remodelling and the rules since then in operation, the average number of days on which 7 feet or over passed the Cauvery dam is 40 yearly but the liability to over-supply is now non-existent except on rare occasions.

24. Under these conditions it is maintained that the rules certainly do not show that the maximum useful supply is below 7 feet limit, having in view the absence of means of control of floods in excess of delta requirements. The happy mean as regards supply, which was aimed at under the circumstances, may best be judged from what regulation was instituted for supply of the same areas as soon as means of efficient control became available. This evidence is afforded by the gauge readings from 1902 and rules of 1902, and 1905 and which aim at generally maintaining a flow of 7 feet over the Cauvery dam whenever possible, some extra supplies being passed occasionally, and especially in August and September.

25. The rules of 1882 define "Scarcity" as a condition in which there has not been a gauge reading of 6 feet for a week. Under such conditions it is laid down that the 7 feet must be passed over the Cauvery dam before any water is used for scouring. This clearly proves that 7 feet is certainly not in excess of the maximum useful supply while in practice the effect of this rule was that the opening of the under-sluices was actually delayed till 7 feet was passing over the Cauvery dam on 36 occasions out of a total of 62 (*vide* Exhibit Ma.-9, paragraph 8).

On the occasions when opening was not delayed an equal quantity of water was used for scour combined with supply, as would be used with a 7 feet gauge without scouring. It is obvious that if scouring was a necessity water must be used to carry it out. That scouring was a necessity is proved by the fact that it was necessary to alter the Upper anicut after construction in order to construct scouring sluices.

26. The effect of a quantity of water used for scour is greater the less the section of approach, that is, the less the water flowing in the river; and therefore delay in opening scouring sluices till a higher gauge was realised would have had the effect of less and not more efficient scour.

Reference Mysore paragraph 41.

The interpretation of the rules suggested is against the reading of the rules.

Thus a flow of 4,000 cusecs with a gauge reading of 6 feet would probably do as much scouring as double that quantity with an 8 feet gauge, while the former condition would occur much more frequently.

27. The statement of Mysore that under-sluices were only opened at 6½ feet because it was wished to maintain 6 feet level is absurd. If this had been the intention, the rule would have been to open the sluices gradually so as to maintain water as near to 6 feet as possible. Under such rules the water surplused over the anicut and *useless for* Scour under the actual rules would have been utilised for scour and been equally useful afterwards for irrigation at the Lower anicut. Had the intention been to maintain 6 feet the rule would obviously have been of the nature it is now when the intention is to maintain 7 feet (*vide* Appendix I, Part III, Rules of 1905). The rule reads "The normal supply for the delta is 7 feet on the Cauvery dam north gauge and this level should be maintained as long as possible by raising or lowering the anicut shutters." This is the obvious form of a rule framed to attain as far as possible a limit gauge reading without exceeding such reading.

The rules were framed with a view of using water for scouring whenever it could be spared. The probable considerations leading to the framing of the rules are described in Ma.-8, Part II, paragraph 30.

28. It is further suggested by Mysore that the rule enjoining no scouring after periods of scarcity until a depth of 7 feet was passed over the Cauvery dam was altogether on account of the requirements of scouring and the increased head obtained for scour with such a depth.

Reference Mysore paragraph 41.

The fact however is that the head (being the difference of level between the head and tail water) was under then existing conditions actually decreased as the gauge reading on the Cauvery dam increased.

The following are the figures of difference in level recorded:—

Gauge Cauvery dam.	Difference in Level.	
	North branch.	South branch.
	FT.	FT.
6 feet	5.60	5.25
6½ „	4.56	4.37
7 „	4.29	3.85

Thus the head is actually decreased as the water rises while the section of approach is increased and scour is much less efficient with 7 feet than with 6½ feet and with 6½ feet than with 6 feet. This has been and probably was a reason for delaying closing the sluices but it certainly was not a reason for delaying opening.

29. The quantity of flow in the Aganda Cauvery required under the conditions existing before remodelling under different conditions of scour and water level is noted. The following are the figures of difference recorded:—

Gauge.	Over Cauvery dam.	Over anicut.	Through under-sluices.	Total.
6 feet	1,625	86	669	2,380
6½ „	1,950	366	725	3,041
7 „	2,300	644	sluices closed.	2,944

It will be seen that even with the 6 feet level and under-sluices open which Mysore represent as the limit flow under the rules of 1892 the amount of water passed is 2,380 mills. cubic feet which is slightly more than will give 7 feet on the Cauvery dam under the conditions subsequent to remodelling. This is under the interpretation given by Mysore to the rules of 1882. Madras, however, altogether deny that the rules of 1882 are limited by 6 feet, and the rules themselves as well as the record of the results of applying them fully bear out this denial.

30. Whatever ambiguity there may be about the limits of the rules of 1882 there is none about those of 1896 or subsequently in which 7 feet is the minimum height of

Reference Mysore paragraph 42.

water at which any sluices may be opened and the direction is to maintain 7 feet or more as long as possible.

The reason suggested for this by Mysore, namely, that more efficient scour is obtainable under these conditions, has been already refuted in paragraphs 26 and 28.

31. It is to be recognised that the necessity for scouring was provided for in these rules and that allocation of water for scour was very necessary and it is a nice matter

Reference Mysore paragraphs 41 and 42.

for consideration at what stage water could be spared for this from irrigation requirements. This is a matter on which the best engineers might well differ, and it is possible that Colonel Smart would not have originally proposed the rules of 1882 even under the then existing conditions (under which the Cauvery-Vennar regulators were non-existent and flood water could not be excluded from the delta).

32. It is, however, submitted that water for irrigation and for scour were both subject to legitimate use and enjoyment, and Madras in no way loses the prescriptive right to the total because at one time the distribution between the two water users, viz., irrigation and scour, was varied. Further the scour water was again used for irrigation of the Lower anicut system.

33. The heading of paragraph 43 of the Mysore reply is not understood. The regulation has been made in accordance with the

Reference Mysore paragraph 43.

consideration, viz., 1882 to 1895. Paragraph 30, Part II, Ma.-8, to which Mysore refer for their instances of “non-operation of rules,” shows an abstract of actuals which resulted from operation of the rules and thus shows that the nature of user under the operation was such as to constantly require the passing of 7 feet over the Cauvery dam before opening the scouring sluices, although this was to the detriment of the scouring service.

34. The “150 yards calingulah” was built at the same time as the Cauvery dam, and its object was to help to relieve the Cauvery floods which were found to be excessive

Reference Mysore paragraph 44.

after the construction of the Upper anicut and before the construction of the Cauvery dam. Its effect was to supplement the surplus power of the Upper anicut and thus to pass down the Coleroon a greater quantity of water than the original construction provided for. The necessity for its construction is a proof that it was flood conditions rather than depths of supply which could be usefully used which was the consideration fixing the maximum level permissible for the Upper anicut. Without the 150 yards calingulah it would have been necessary either to lower the Upper anicut or to build more under-sluices. The former would have been disastrous as regards supply and the latter more expensive than building the calingulah.

The crest level was fixed to agree approximately with that of the Upper anicut.

Writing a descriptive note in 1873 on the delta, Major Oakes says with reference to this—

“At three miles a weir called the 150 yards calingulah provides for the discharge of water when the water level at the Cauvery head is at about 6 feet 3 inches and when 32,130 cubic feet per second are entering at the Cauvery head”.

35. *Grand anicut conditions.*—Mysore states as regards the Cauvery and Vennar:

Reference Mysore paragraphs 45 to 49.

“any limit of flow fixed at the ‘head regulators of these two rivers should therefore represent the full requirements of the whole Delta system.’”

This is a reasonable statement, allowing for sand scour at the Grand anicut, draw-off for irrigation between the Cauvery dam and the Grand anicut, and surplus over the 150 yards calingulah and involuntary losses by percolation. It is necessary therefore to examine what is imposed by the rules of 1892 as the “limit flow” allowed into the Cauvery and Vennar.

36. The only restriction under the rules limiting flow, other than the gauge readings in rear, is that water must not be allowed to head up on the shutters of either work more than 4½ feet above water level in rear.

These restrictions do not operate therefore when there is less than 4½ feet difference of level between the front and rear gauge reading on the Cauvery and Vennar regulators. Apart from such restrictions, the maximum water levels to be admitted to Cauvery and Vennar under the rules of 1892 before surplusing over the Grand anicut are—

To Cauvery up to 7½ feet on rear gauge = cusecs 30,700 (about).

To Vennar up to 8 feet on rear gauge = cusecs 10,450 (about).

It will be seen therefore that under the rules quoted by Mysore, so far from water levels in Cauvery and Vennar being restricted to levels connoting a supply of 11,242 cusecs and 6,104 cusecs, quantities exceeding these by over 100 per cent. were as a matter of rule and regulation ordered to be passed down whenever the flow of the river above was such as to supply this.

37. Reference to the table of gauge readings, Appendix VIII (Ma.-9) will show that in fact, such supplies were passed constantly during times when the 4½ feet restrictions were not in operation. In the face of the executive orders of regulation, it is quite clear that the first rule, which is of the nature of an opinion or preamble, cannot mean that the quantities stated in it are the maximum useful supply to be passed, and the obvious interpretation in view of the very fluctuating character of the river is that the rule expresses views as to the average supply considered sufficient. This is quite obvious in view of the context. Any other interpretation makes the executive directions of the rules conflict with the opinion expressed in rule 1, which as a fact is a reasonable figure of average supply and appears constantly in correspondence as the “theoretic supply.” That the rules regarding full supply were taken in this sense in the Madras Cauvery Project is quite clear from Volume III, table page 36, “Remarks,” in which these figures were taken to mean “average monthly flow” and not limit of daily flow required.

38. Again the fact that rule 2 gives a table showing distribution in proportion of 3 to Cauvery to 2 to Vennar up to a total of 23,140 cusecs as compared with the “full and ample” 17,344 cusecs further clearly shows that this refers not to a daily supply limit but to an average supply.

39. Above these levels denoting a flow of 23,140 cusecs, the proportion is abandoned and extra water is passed into the Cauvery, almost to the exclusion of the Vennar, and this is no doubt due to the exigencies of the regulation of the falling shutters on the anicut. It is impossible from these rules to deduce at what stage of flow in the Cauvery the water passed in exceeds “useful supply.”

As soon as the Grand anicut was remodelled this condition of uncertainty vanishes, for regulation and diversion of the water at will becomes possible without consideration

of conditions imposed by "falling shutters" and it is by examination of the conditions of regulation after 1902 that we can gauge from records of flow in the Cauvery and Vennar what depths were passed down *with intention and without reference to flood conditions*.

By further considering the successive rules for regulation at the Grand anicut and studying the actual flow passed into the Cauvery and Vennar it is possible to understand the rules and to get full information regarding the quantities of water passed for purposes of irrigation use into the Cauvery and Vennar, and it will be realised that such supplies agree within reasonable limits with the supplies passed over the Cauvery dam and claimed as prescriptive right by Madras.

40. Considering the rules of 1902, which are the first rules issued after the fitting of lift shutters on the Grand anicut, it will be seen that the whole year is divided into

Reference Mysore paragraph 50.

two seasons called the flood and non-flood seasons.

The non-flood season refers only to periods when the supply is less than what is called "full supply", viz., $4\frac{1}{2}$ feet Cauvery (13,000 cusecs) and 8 feet Vennar (10,450 cusecs): total, 23,450 cusecs.

So far therefore from this being considered a maximum supply, the rules of regulation provide that when the whole flow is less than 23,450 cusecs, turns must be commenced, dividing the flow between the two rivers on specific days. The rules relating to "flood season" apply to all conditions in which total flow above the Grand anicut exceeds 23,450 cusecs.

The rules in all such times specify that, subject to restrictions named below, before any surplusing through the Grand anicut is allowed, the following amounts of water shall be carried:—

In Cauvery up to 6.2 feet rear gauge = 20,640 cusecs (about).
In Vennar up to 8 feet " = 1,0450 cusecs (about).

Total ... 31,090

When these limits are attained the undersluices of the Grand anicut are to be opened and only after this is done and further rise takes place are the main shutters of the Grand anicut to be lifted to any degree.

From this, it is perfectly clear that useful supply was considered to be not less than 6.2 feet in the Cauvery and 8 feet in the Vennar, a total discharge of 31,090 cusecs. This is equivalent to a normal discharge over the Cauvery dam, allowing for surplus over the 150 yards calingulah, of about $7\frac{1}{2}$ feet, making no allowance for other losses in transmission.

Under the rules of 1902 therefore water up to 31,090 cusecs had to be passed as a matter of rule into the Cauvery delta before any was passed through the Grand anicut.

The so-called "full supply" of 23,510 cusecs was only useful as marking the stage below which "turns" commenced.

41. Again, the rules of 1905 and 1909 alter regulation and start with a standard to be maintained by the subordinate staff in absence of special instructions from the Executive Engineers.

The standard is—

For Cauvery $4\frac{1}{2}$ feet	...	...	...	...	...	...	1,8000
For Vennar 7 feet	...	...	...	...	...	...	7,850
Total	...	...	...	...	...	...	20,650

The rules specially intimate that, subject to certain restrictions as regards floods and as regards head of water on the regulators, Executive Engineers had power to vary the limits at will. The measure of the use and standard of supply passed after 1905, is therefore displayed only by the daily record of rear gauge readings maintained in the Cauvery and Vennar, a table of which is given in Appendix XVII.

42. The restrictions in all the rules—1902, 1905, 1909—as regards floods and head on regulators are similar and provide for restricting water surplused into the Coleroon

Reference to Mysore paragraph 51 and 52.

whenever the front gauge at the Lower anicut exceeds 13 feet.

As regards head on regulators, the rules provide that six feet shall not be exceeded.

These being restrictions, and the power of exclusion of water from the delta being except for these, absolute, it follows that the water passed into the delta is passed in with intention and for use and enjoyment at all times when—

(a) the front gauge at the Lower anicut is less than 13 feet, and

(b) the head on sluice is less than $4\frac{1}{2}$ or 6 feet.

In the table given in Appendix II (Ma.-8), by oversight only restriction (b) was considered and the 6 feet rule was applied to the whole period in place of $4\frac{1}{2}$ feet for 1900 and 1901 and 6 feet subsequently.

A fresh set of tables, Appendix XVIII, shows the state of affairs in an abstract and also shows the number of days on which it was possible, having in view total supplies

in the river, to pass down more than $4\frac{1}{2}$ feet in the Cauvery and 7 feet in the Vennar, and the number of days on which advantage of this was taken *deliberately and not under the obligation of restrictive rules*.

It may be noted here that restriction (a) does not affect the statement in any of these years as there was no gauge reading of 13 feet at the Lower anicut throughout the period.

An abstract of the result shows that the Cauvery carried extra water for 343 days out of a possible 570 and only on 11 days was this necessary from flood conditions.

For Vennar, the figures are 296 out of 592 days and this was never the result of flood conditions.

43. These tables show clearly that it has been customary to take at all periods of the year supplies into the Cauvery and Vennar representing a flow of 7 feet at the Cauvery dam when such a flow is available, and this is done with great frequency especially in July, August and September. It is further pointed out that in these months supplies for irrigation considerably exceeding this limit and diversion up to $7\frac{1}{2}$ feet over the Cauvery dam is sometimes intentionally practised.

The record of regulation shows that supplies in excess of 7 feet are frequently passed intentionally over the Cauvery dam from July to September, and a specific claim based on actual practice and enjoyment on this account was made (Ma.-1, paragraph II-C). This amount is however covered by the extra 644 mills. cubic feet entered in the revised claim (Ma.-3, paragraphs 3 and 4) which will suffice both for this and for specific supply to Lower Anicut system.

It is only in view of this that the claim originally made to a specific supply for this is waived. As regards the rules generally, the fact is emphasised that the rules are only secondary evidence and the *mode and extent of user as displayed by gauge readings are the principal evidence*.

44. It is submitted that, if the mode and extent of user could be shown to be, with intention, materially less than the rules specify, the rules would go by the board.

Similarly when the rules and the extent of user appear to conflict in the other direction it is on the latter on which reliance should be placed. The rules have in some cases been badly drawn and they are ambiguous in places, but the evidence of extent of actual user is clear, and not only serves to interpret the rules but altogether overshadows them as direct evidence of Madras rights. The gauge readings at the Cauvery dam, Appendix VI, Part III (Ma.-9), and at the Cauvery-Vennar regulators, Appendix VIII (Ma.-9), constitute the evidence on which the claims of Madras principally rest as regards supplies and prescriptive rights to water for supply of the Cauvery Delta system.

Reference Mysore paragraph 53.

45. What Major Oakes said in 1873 may be quoted here:—

"With 6 feet of water at the Cauvery dam, the water begins to pass over this weir (the Grand anicut) when 17,600 cubic feet per second are passing down the Cauvery but by means of shutters the water can be retained 2 feet higher when 23,650 cubic feet would pass down the Cauvery."

The 17,600 represented a depth of about $4\frac{1}{2}$ feet in the Cauvery. Yet it is clear that dam stones and shutters had been installed, and were in use in 1874 in order to force 2 feet additional depth (23,650 cusecs) down the Cauvery.

Under the conditions then existing one of the sources of damage and danger to the delta was damage from high floods, there being then no Cauvery-Vennar regulators which now enable as much water as the Coleroon can carry to be diverted into that river. Yet it is seen that even under these conditions devices were installed to force water up to a gauge reading of $6\frac{1}{2}$ feet down the Cauvery and these devices were such as to actually reduce the surplusing capacity in high floods of the Grand Anicut by blocking the water-way with dam stones. Under the conditions then existing the forcing down of extra water to a depth of $6\frac{1}{2}$ feet was the only possible use of the dam stones and shutters and had this not been a requirement of irrigation, neither dam stones nor shutters would have been maintained.

Is it not perfectly clear from this that more than $4\frac{1}{2}$ feet was in constant and intentional use for the Cauvery irrigation supply?

The falling shutters installed in 1886 constituted a method of replacing the stones and planks and serving the same useful purpose without blocking water-way as did the former device. The facts of the case make it clear that, in the stone and plank period, every effort was made to pass water up to 23,650 cusecs down the Cauvery whenever possible and this even at considerable risk and disadvantage during times of high flood. The description of the Grand anicut in 1874 is the strongest evidence that $4\frac{1}{2}$ feet was not the highest useful supply in the Cauvery at that period, and that this supply was not less than that due to $6\frac{1}{2}$ feet, or 23,650 cusecs.

The same holds good to this day and the records of regulation prove this fully.

46. The Cauvery and Vennar are not even now immune from occasional damage from very high floods because the Coleroon

is unable alone to carry all flood water; this danger however is now rare. It was the construction of the Cauvery-Vennar regulators in 1888 and the closing of the old Vennar head in 1894 which gave the present immunity from floods.

The remodelling of the Grand anicut in 1899 did not enable any more water to be diverted into the Coleroon: it, however, greatly facilitated forcing more water down the Cauvery-Vennar, and enabled water to be kept out of the Coleroon which under previous conditions would have passed into it involuntarily. This is the reason why the rules of regulation subsequent to 1899 take into consideration the stage of flow of the Coleroon, whereas those before do not, as there was little power before to regulate the Grand anicut to suit this. Appendix XVIII shows the occasions on which the Cauvery or Vennar were carried at higher levels than the 4½ and 7 feet from 1900 to 1908 and also the occasions on which the extra height was due to flood conditions or to the limit of head.

47. It is denied that Mysore has proved that 6 feet is the maximum limit on the Cauvery dam required for the delta. On the contrary, it is claimed that all the Mysore contentions as regards this have been fully rebutted and it has been conclusively shown that it was and is customary constantly to pass into the delta water corresponding to 7 feet over the Cauvery dam *intentionally and for purposes of supply*, and occasionally to pass additional amounts up to 7½ feet and over.

It is claimed that the requirements of Madras for the Cauvery delta are represented by 2,300 mills. cubic feet per day over the Cauvery dam whenever available, and by occasional additional quantities and that this claim is in accordance both with present requirements and prescriptive right established by long use and enjoyment.

48. The Metur Project does not provide for a uniform supply throughout all the months of the year nor is uniform average half-monthly flow at the Cauvery dam realised under the limit flow conditions claimed by Madras. Indeed allowing 30 per cent. extra for the fluctuating nature of the supply, which has been suggested by Mysore as reasonable, the approximate figures of average quantity actually realised under the limit flow claimed are compared below in form of gauge depths and the divergence is wonderfully little considering the one is a completely controlled supply and the other a fluctuating and uncontrolled one (*vide* Ma.-9, page 7).

	June.		July		August		September.		October.		November.		December.		January.
Average realised in twenty years.	3.5	5.1	5.7	6.4	6.6	6.0	5.6	5.2	5.1	5.4	5.0	4.4	3.9	3.0	2.5
Thirty per cent. above Metur allowances	3.5	3.5	6.8	6.8	6.6	6.6	5.5	5.1	5.5	4.7	4.3	4.3	3.6	2.9	2.5

The above is a proof that the incidence of flow under the Madras claim and limits as represented by actual flow agrees reasonably on an average with the requirements, and in addition these represent the conditions of actual use and enjoyment and are thus within the Madras prescriptive rights. The above tends to prove the suitability of the limit rules of Madras when tested by reference to Metur duties.

It is to be realised that the average river supplies in the north-east monsoon are far less than in the south-west monsoon, although the limit flow is the same. The reason is obviously that the limit flow or flow approaching this occurs much less frequently in the north-east monsoon. Mysore has urged on this ground that it is not required, but the table shows that with this limit only reasonable average supplies are realised. It is moreover the basis of actual enjoyment and use.

49. The Metur Project is only a project and of the nature of unbiassed and independent expert evidence, but so far as it goes the duties and limit flow fully support the Madras contentions and the existing mode of use and enjoyment as being eminently reasonable in view of the existing conditions.

50. Mysore exhibit My-1 states that practically no water is required for irrigation in the first half of June, but they have not advanced any proof of this.

Reference Mysore paragraph 57.

Most of the water passed down in the early part of June is used in filling up the sandy river bed and the loss in transmission at this time is very great. The filling up of the river bed is a necessary antecedent to the full use of the rivers and channels for transport of water and whatever water is used for this purpose is used in the interests of and for the requirements of irrigation although it may never actually run on to the fields. It is true that a high flow is seldom realised in early June, but this is no reason why Madras should be deprived of such flow when it is received and the enjoyment of the natural flow within the limits claimed has been her right from time immemorial.

A great proportion of the first fresh of the season must be absorbed in the river bed and this will be clear if it is remembered that the rivers are wide, shallow and with sandy beds in which the sub-soil water is from 1½ to 4 feet below the bed level.

The interstices in sand may be taken as not less than 33 per cent. of its volume. Thus a portion of river, 1,000 feet wide, 1 mile long, will require over 3½ mills. cubic feet to fill it up, taking the mean depth of sub-soil water to be 2 feet. Water for this has to be supplied by the early freshes which it is now suggested by Mysore are to be impounded if they come early in June because they so seldom come so early.

As a fact these freshes occasionally come in May but it is recognised that in this month the rivers and channels below the Vennar and Cauvery regulators are generally under repairs and that May freshes are not admitted below the regulators.

These May freshes, when they occur, help to fill up the river bed above the Cauvery-Vennar regulators and are useful in replenishing supply to irrigation above the Upper anicut, and Madras has a prescriptive right to them. The Madras Government, however, are prepared to waive the right to the freshes of May under conditions elsewhere stated, but claim their right to the freshes of June up to the limit flow, and altogether deny that these freshes are not utilised when received.

Of the flow in early June, more water is required to fill up the river and channel beds than to give supply to lands and it may be doubted if the allowance of 50 per cent. extra for this purpose made in the Metur Project is sufficient even for the low steady flow there provided for, while absorption in the case of considerable freshes would be much greater in the case of the first few days of fresh.

51. The figures in Appendix D no doubt show considerable surpluses over the

Reference Mysore paragraph 57.

Lower anicut in June and on the assumption that they are dependable and represent water coming from above the Upper anicut, they represent an extraordinary state of affairs which appears inexplicable.

The note of Mysore is: "During the first half of June in fifteen years out of twenty the discharges at the Lower anicut are far in excess of the surpluses at the Upper anicut."

The figures show this and it appears quite impossible that this should be a fact.

First, taking the years in which there was no discharge at the Upper or Grand anicut the discharge at the Lower anicut is considerable. In 1890 the discharge at the Lower anicut is larger than the whole quantity which entered the Cauvery and Vennar. It is quite impossible that this could have come from seepage, leakage or surplus of super-abundant supply.

The figures in 1892, 1897, 1905 display similar impossible discrepancies.

In 1899 the discharge of the Lower anicut is more than the whole flow of the Agunda Cauvery. The figures are so discrepant that no arguments can be based on them. What is advanced by Madras is that the records show that, so far as intention is concerned, the register of regulation shows that it is the custom to pass into the delta for use the freshes of the first half of June. It is against all common sense to argue that the flow off the fields or percolation can at such a time of year give any approach to the figures of discharge recorded at the Lower anicut.

Wherever the water comes from, it cannot possibly be from the Cauvery delta, and the argument that because this water must be involuntary surplus it represents excessive use cannot be maintained.

As regards the second half of June a great deal of the water shown as surplused at the Lower anicut would, under the conditions proposed by Madras be available for impounding in the Mysore reservoir.

The fact that the figures in column 11 exceed those in columns 8 and 9, again points to discrepant and impossible results, having in view the season of the year and the scanty precipitation of rain recorded.

As regards the second half of June the figures are also somewhat discrepant as regards correspondence between the figures in columns 8 and 9 with those in column 11, but are not so in the sense stated by Mysore.

The total of column 8 and column 9 for the second half of June is 221,475 mills. cubic feet and of column 11 is 181,001 mills. cubic feet.

The figures are discrepant in the years 1895 and 1896 and 1909 as displaying a very much smaller discharge at the Lower anicut than should be shown from the figures in columns 8 and 9.

To sum up, the figures show such discrepant and impossible results that they cannot be used as a basis of argument.

52. The whole of the Mysore arguments as regards limit supplies are directed to

Reference Mysore paragraphs 58 to 60.

facts which would be relevant and the arguments reasonable if the "limit flow" were "average flow."

In the case of the Metur Project, the "limit flow" and "average flow" for any fortnight is the same as steady supplies are provided. To compare a limit flow which may be realised once or twice or less in a fortnight with a limit flow which is realised every

day and all day, is altogether inaccurate and misleading and yet this is what is done by Mysore. A comparison of quantities of flow actually realised under the limit of 7 feet throughout the year, and actually enjoyed by Madras during a period of 20 years, with the quantities provided under the Metur scheme given in Ma.-3, paragraph 10, shows the former about 27 per cent. more than the latter, and Mysore admits 27 per cent. is a fair allowance to set off against the fluctuating and uncertain incidence of natural flow.

It is shown in Ma.-9, Part III, paragraph 25, that under the limits proposed by Mysore rules originally put in (My.-1-a) the average supplies for irrigation passed over the Cauvery dam worked out to 42,623 mills. cubic feet less yearly than was actually realised in the past 20 years under Madras existing rules and system of regulation. The limits originally proposed are now reduced by Mysore, and the objection referred to above with regard to the first figures applies with added force to the revised and reduced standard. The statement that these limits allow from 25 to 30 per cent. over the Madras project supplies is altogether denied. What has been raised is the limit of flow which in the Metur Project is a steady flow and in the Mysore proposal a very fluctuating one.

53. The argument used by Mysore with reference to Appendix II of Sir J. Benton's note (page 46, Ma.-8-a) is that because the fluctuations of natural supply are very great

Reference Mysore paragraph 61.

and have in many cases fallen below the supplies allowed in the Metur Project for continuous half months, and also occasionally as much as twice to six times these supplies have been passed in a similar period, that material reduction of the limit flow now utilised can be made.

54. Mysore states that no material loss has resulted from the periods of shorter supplies and this is the basis of their argument. The statement is altogether denied. While remissions on account of total failure of crop from want of water are given, and the remission has amounted in the worst year to over 6 lakhs of rupees representing a loss to the ryots, computed at from 70 to 99 lakhs, it is to be realised that no remission whatever is given for partial failure, that is poor outturn, of crop and in the case of compounded double crop lands no remission is given unless both crops are total failures.

In years of bad supply large areas raise scanty crops and the average outturn per acre is affected.

It is altogether denied that no loss has been experienced in seasons of short supply from this cause, and the statement is altogether unreasonable, and one which could not be accepted without the strongest proof.

Further the Madras rights extend to the quantity and mode of user, and are not restricted to the least quantity on which a cropped area might escape from loss or failure of crop.

55. The necessities for large supplies and large limit flow such as are in customary

Reference Mysore paragraph 62.

use by Madras are based on the fluctuating character of the river. The greater the fluctuations the less the economy of water possible. Yet Mysore actually contend that these fluctuations are a reason for reducing supplies. Mysore draws from Sir J. Benton's Appendix II an absolutely opposite conclusion to that drawn by that officer himself—vide that officer's note, paragraph 13 (Ma.-8a.)

It is only by means of a steady and controlled and secured supply that economy is possible, and the proposals of the Metur Project are based on such a system of supply.

56. In the year 1890 a large area of cultivation coincided with a small river supply but a reference to the statement showing distribution of flow of that year (page 16, Volume I Metur Project) shows the natural distribution of flow approached closely the ideal distribution and in the south-west monsoon was well distributed and in suitable quantity while especially in September and the first half of October (the most critical time) it was ample and well above the average. This accounts for the large area cultivated that year. The precipitation of local rainfall during the year was particularly favourable. There was throughout the season an absence of torrential rainfall and consequent submergence of low lands, but a good and continuous fall of a very exceptionally favourable character (see Metur Project, Volume III, pages 50 to 53, column 17).

The conditions of distribution of both river flow and rainfall were extraordinarily favourable throughout the year and this fully accounts for the large area cropped. The fact that a large area is charged as irrigated and that there are no remissions does not prove absence of loss from deficient supply, but in the case of this year the conditions were such that it appears likely that the outturn of crops was satisfactory. The inference deduced from the results of this very exceptional year cannot be accepted as showing that the greater amount of water ordinarily used is excessive.

57. The figure of area irrigated in 1903-1904 should be 976,174 acres and not as stated by Mysore and this is not the lowest area in the range; Mysore has extracted its figure from Appendix V of Sir J. Benton's note in which this figure is wrongly shown as explained later.

It is not suggested that 349,000 mills. cubic feet is required for the supply of the Cauvery irrigation, and it is not on the incidence of flow in the year of the most continuous and abundant supply that necessities of "limit flow" can be profitably considered.

58. Mysore concludes paragraph 62 with the argument that the yearly supply of 210,920 mills. cubic feet is a suitable supply for the Cauvery Delta system. If this supply were guaranteed yearly and distributed in general accordance with requirements it would suffice.

The figure however is an average and by no means represents the yearly supply. Indeed according to Mysore figures (Appendix G) it would only be realised in six years out of 20 while the distribution of supply frequently leaves much to be desired.

The supplies go as low as 132,123 mills. cubic feet in 1899 as compared with a flow actually enjoyed for the Cauvery delta of 157,199 mills. cubic feet. The latter flow entailed a loss to the delta ryots estimated at about 1 crore of rupees.

It is clear from the above that the limits of Mysore proposals certainly would not conserve unimpaired the prescriptive rights of Madras.

59. No logical argument is advanced in this paragraph. The suggestion that the

Reference Mysore paragraph 63.

worst recorded flow should be a measure of the requirements and enjoyment of Madras is obviously untenable. The fact of occasional surplus involuntary and otherwise is not denied by Madras nor the reasonableness of Mysore's wishes to impound; what Madras ask is to be fully safeguarded with regard to the prescriptive rights of user already acquired.

60. In this paragraph reference is given to Appendix G showing comparative state-

Reference Mysore paragraph 64.

ments for 20 years of the quantities which would have been passed over the Cauvery dam half-monthly—

(a) under the limits proposed by Mysore rules (Appendix E).

(b) under the 6 feet limit which Mysore has advanced as the limit of the prescriptive right of Madras for the Cauvery delta at the Upper anicut.

The Government of Madras do not admit that the 6 feet gauge reading correctly represents the limit of their rights and claim to have proved this.

The table in Appendix G, however, shows conclusively that the limits proposed by Mysore rules (Appendix E) give on every year a resulting flow greatly less than that due to the limit of 6 feet which they themselves advance as the limit flow to which Madras have established a prescriptive right at the Upper anicut.

A comparison of the totals under the columns in Appendix G is invited as a proof of this.

61. Appendix V of Sir J. Benton's note of 12th May 1911 (Ma.-8-a), has, as

Reference Sir J. Benton's Appendix V.

stated therein, been prepared from the Revenue Administration reports of the Madras

Public Works Department, Irrigation Branch.

Every endeavour has been made to trace the figures of "Total supply of the Cauvery"—column 10—to these reports but without success as the figures differ greatly from the discharges shown in the diagrams showing discharges of the Cauvery and Vennar of which a statement is appended (Appendix XVII). It appears that Sir J. Benton got his discharges by multiplying the duty figures given in the irrigation reports by the average daily discharges and the number of days counted as the period of crop.

That is, column 10 = $\{(\text{column 5} \times \text{column 3}) + (\text{column 6} \times \text{column 4})\} \times 0.864$. The accuracy of this figure is dependant on the accuracy of the figures in columns 3, 4, 5, 6 in relation to each other. As regards accuracy, all these figures are open to question and the figures in columns 2 and 4 are specially noted as being unsuitable where 123 days have been taken as the period of first crop.

62. The whole of these figures of crop period are on a wrong basis.

The first crop is the small and short one and not as represented the large one. The large crop is a single crop planted out in July to September and harvested in January to March. The first crop of the area shown under "second crop" is planted in June, harvested in September—October. The same area is replanted at once and harvested in March.

This is the general practice but the crops overlap and it is quite common to see transplantation going on in all the months of the year from June to December.

63. The figures which represent the recorded discharges of the Cauvery and Vennar, given in the Administration reports, are abstracted in Appendix XVII.

These agree with the figures of Sir J. Benton for the years 1907 to 1909. In these years the basis on which the average discharge was computed and that on which the crop periods are calculated must correspond with the average flow basis of computation, whereas this cannot be so in other years.

64. As regards the "areas charged as irrigated"—columns 7 and 8—the figures have been checked against the Revenue Administration reports and are correct except for the years noted below:—

Years.						From column 7, Appendix V.	* From Administration reports.
1902-03	...	...	...	...	...	941,261	982,356
1903-04	...	...	...	...	...	929,819	976,174
1904-05	...	...	...	...	...	945,748	989,226

* Page 44, Triennial Administration Report for three years ending 1904-05.

65. The figures in columns 5 and 6 of Sir J. Benton's statement are abstracted from the Administration reports but there is nothing on record to show how these have been arrived at and every effort to trace the source of the figures has failed.

One thing is however quite clear which is that the discharges shown in column 10 of Sir J. Benton's statement do not even approximately represent the discharges of the Cauvery and Vennar from June to January as computed and shown in the figures of discharges for this period in the Madras Annual river diagrams.

66. As regards the discharge figures appearing in the Administration reports now reproduced in Appendix XVII, the direction of the Assessor as regards making an examination of the basis on which these rest and the methods of computation has been carried out.

It is found that great and altogether unexplained variations in the earlier years (before 1901) appear from year to year in discharges and the discharges recorded for these years are certainly very erroneous.

As regards the later years the basis of the discharges has been traced but it cannot be said that the accuracy of the figures is confirmed although they are by no means so erroneous as the earlier figures.

67. It must be admitted that the Madras discharges are unreliable and it is proposed that, as was done in the case of the Sivasamudram discharges, the evidence on the subject which is forthcoming shall be laid before the Assessor and whatever modifications of the methods of computation or whatever recomputations are required by him be carried out.

The matter is made the subject of a separate note (Exhibit A-4) and it is only here noted that the discharges must be considered unreliable.

68. It is here noted that these figures, although recorded in Madras reports, have never been advanced either for purposes of this arbitration, or in the periodic reports as reliable statements. It was the impossible differences found between the figures of discharges of the Cauvery and Vennar, and of the Cauvery dam, which were compared in 1909, that proved that the discharges recorded by Madras were not such as to give a reliable record of water supplies for purposes of preparing the Madras Cauvery Project, and it was on this ground that the whole work on the project was postponed for a year and an Executive Engineer was specially appointed to gauge the Cauvery at Bhavani bridge and at the Cauvery dam throughout the year 1909. The Metur Project is based on the resulting discharges which are established on a reliable basis.

Sir J. Benton in his remarks, paragraph 18, regarding the table, Appendix V of his note, specially brings to notice the admitted inaccuracy of these Madras discharges.

69. The matter is treated at some length in order to show that the Government of Madras have not put forward as accurate figures of discharges which they now repudiate. These figures do not form part of the Metur Project, or of the Madras case, and have not till now been considered or critically examined in this connection.

70. As the figures on which Mysore relies as shown in Appendix V of Sir J. Benton's note are shown to be erroneous, the inferences drawn by Mysore from these figures are not here further dealt with, but it is denied that these inferences are correct.

It is moreover denied that the question before the Arbitrator is *what supply will adequately safeguard Madras interests*. The issue to be decided is *what limits of flow measured at the Upper anicut is necessary to conserve the prescriptive rights of Madras unimpaired*.

71. Reductions of supply passed to irrigation are not infrequently made after heavy falls of rain in the months of October and November. It is altogether denied that in the north-east monsoon there is "more or less continuous and heavy rainfall." The falls of rain in the north-east monsoon are of a cyclonic nature and the rain is generally torrential but of short duration. It is generally much the heaviest along the coast and rapidly diminishes in intensity as one goes inland.

The limitations under which rainfall is useful, combined with the times of transmission limiting the reduction of supplies on account of rainfall, are described in Ma.-9, Part III, paragraph 29. The useful effect of rainfall depends more on its distribution as regards area and incidence of fall than on quantity of precipitation.

The rules suggested by Mysore, Appendix H, are objected to. It has been pointed out that from the time of fall of rain to delivery of reduced supplies on the fields six days must elapse. At $\frac{1}{4}$ inch per day this will use up $1\frac{1}{2}$ inches. Falls over $1\frac{1}{2}$ inches in one day are redundant as regards supply in that they place on fields in one day more than six days' supply. It is only to further falls in the six-day period following, limited cumulatively as regards useful effect to $\frac{1}{4}$ inch on first day, $\frac{1}{2}$ inch on second day, etc., up to $1\frac{1}{2}$ inches on the sixth day, that credit could, under any circumstances, be given and to allow this, such falls must be widely distributed over the irrigated area, which, it is to be remembered, extends up to Bhavani, that is some 200 miles from the coast.

While, as an act of grace, it might occasionally be possible to allow Mysore to impound quantities in addition to what is allowed by the rules, on account of continuous and well-distributed rainfall, it is impossible to frame rules which will, while fully protecting Madras, enforce enjoyment by Mysore of the rain falling in the irrigated area.

The rules proposed by Mysore are most difficult to work and further assume $2\frac{1}{2}$ inches as the limit of useful rain, which is not admitted. These rules do not afford full protection to the existing rights of Madras, and are in addition extremely difficult of application. It is noted that they do not find place in the third set of provisional rules for the regulation of the Mysore reservoir, put forward as Appendix E.

These rules are already very complicated, and presumably it was found undesirable to include in the already complicated rules the additional provisions required by the system proposed.

The grounds of the suggestion of Mysore that a few years' observation will easily enable rules to be framed are not understood. Rainfall statistics are already available for over 30 years over the whole area affected and a few more years' observation will not assist, but merely postpone a settlement.

REQUIREMENTS OF THE COLEROON SYSTEM.

72. The limit of flow at the Upper anicut claimed by Madras as being the limit of her prescriptive rights at the Upper anicut with reference to the irrigation of the Cauvery delta includes a flow of 644 mills. cubic feet per day when available over and above the discharge due to 7 feet on the Cauvery dam. This quantity is the limit of prescriptive right excluding all consideration of the Coleroon system, and only considering the state of affairs in the Cauvery delta and at the Upper anicut under the conditions existing prior to remodelling that work in 1899—1902.

The Madras Government claim that their action in remodelling has in no way diminished their rights by the improvements made, and they have a title to enjoy and advantage which may accrue from this or any improvements which do not increase the liability of Mysore. The statement that 644 mills. cubic feet is claimed for Coleroon irrigation is thus not quite accurate. If there were no Coleroon irrigation, the claim would still represent the prescriptive right of Madras.

73. In view, however, of the peculiar conditions of supply of the Coleroon system and of the altered conditions of supply to the Cauvery delta and Coleroon anicut system, the Government of Madras are prepared to waive their strict legal prescriptive rights for supply of the Coleroon system subject to the admission undiminished of their claim to limit flow at the Upper anicut. The improvements made by remodelling the Upper, Lower and Grand anicuts will allow of adequate supply being given under the altered conditions to both systems subject to the limit flow claimed by Madras.

74. The supply of the Coleroon has been always dependent on freshes and floods, but the improvements carried out successively by the construction of the Lower anicut and remodelling of the same have diminished the necessity for passing such large floods down the Coleroon in order to give full supply to the system.

Under the conditions of supply already fully described it will be understood that so long as Veeranam tank is not full the supplies to this system are greater or less in accordance with the incidence and magnitude of freshes and that any diminution of a flood entails reduction in the amount of water passed into Veeranam tank.

Under such conditions the flow at the Upper anicut which will preserve, unimpaired the prescriptive right of Madras is only limited by the full natural incidence of flow and flood at all times when the Veeranam tank is not full. The Government of Madras have recognised that such condition of use while covered by existing practice and use is unduly onerous and have restricted their claim as above stated.

75. It is altogether denied that no good purpose would be served by passing into the Coleroon a limit flow of 644 mills. cubic feet when available. It is, however, also denied that Madras have engaged or proposed to set apart or allocate this limit flow to the

Coleroon system. It is also denied that the flow of 644 mills. cubic feet per day when passed over or through the old Upper anicut before remodelling was unavoidably run into the sea.

It is claimed that the whole of this flow was used and required for purposes of irrigation both for the Cauvery delta and also the Lower Coleroon supplies.

76. The irrigation under the Coleroon system varies slightly from year to year. The area is shown in Appendix V, Part III, Ma.-9 and varies from 99,000 acres to 113,000 acres. It has been taken in the Madras arguments as 112,000 acres.

Reference Mysore paragraph 68 (1).

77. It has been shown that the limit of 1,498 mills. cubic feet per day is *utterly* inadequate for the supply of the Cauvery delta and that such limitation is altogether at variance with both existing and past practice. The correctness of the inference based by Mysore on this assumption is therefore denied.

78. The supplies to the Coleroon system are adequate *under existing conditions* when the supplies to the Cauvery are adequate, that is, when there is not less than 2,300 mills. cubic feet per day passing in the Aganda Cauvery at the Upper anicut. Existing conditions entail passing without any impounding all freshes and floods above 2,800 to 2,600 mills. cubic feet in 24 hours into the Coleroon.

79. In view of the detailed examinations of the conditions of supply of the Coleroon system made in connection with this arbitration, Colonel Ellis admits that the provision for supply of this system in the Metur Project made by him was inadequate and unsuitable. Colonel Ellis was altogether in ignorance of the very peculiar conditions of supply of this system when he drew up this project. It is not a fact, however, that no provision was made for the Lower anicut system in the Metur Project (*vide* Ma.-3, paragraph 7, Vol. I).

80. It is, however, again pointed out that any impounding in the Metur reservoir would be held at the call of the requirements of existing irrigation whose prior rights to water over any new area is fully recognised in the Metur Project. Impounding by Mysore implies total loss and alienation of water hitherto enjoyed by Madras.

81. It is claimed that Appendix K proves that excessive quantities of water are thrown into the delta system because in certain months when no water was knowingly passed into the Coleroon there was a flow in that river. The months on which the claim is based are not specified. That there is leakage through and sub-soil percolation under anicuts into the Coleroon to a very considerable amount will be visually clear to any one who has seen the works in times when they are not surplusing.

Reference Mysore paragraph 68 (2).

That there is considerable seepage into the Coleroon from the Cauvery and the fields irrigated under the Cauvery is admitted, although the quantity is unknown. The seepage of water is a necessary incident of irrigation and the existence of a neighbouring stream with a bed at a lower level must always increase such seepage. This makes the necessities of supply greater, but does not show excessive supply; on the contrary it proves additional necessities for the lands adjacent to such a river.

A river which is mainly dependent on occasional heavy freshes for its supply, as is the Coleroon, will, during periods of non-supply, continue to flow from seepage of its own bed, and it is to this that the dry weather flow of all large South Indian rivers is to be attributed.

This cause operates in the Coleroon whenever the shutters of the Upper and Grand anicuts are closed and the 150 yards calingulah is not surplusing. Much of the flow at such times is due to occasional freshes, and the discontinuance of such freshes must very materially reduce the seepage flow of the river which forms a very important part of the supply now passed to the Lower anicut system.

82. Some of the figures in Appendix K are of a nature which throw very considerable doubt on their correctness.

For instance in the first half of June 1899 the total flow of the Aganda Cauvery is only 4,696 mills. cubic feet at the Upper anicut. It is absolutely impossible that the flow at the Lower anicut due to this water could have been 2,605 mills. cubic feet due to leakage, etc.

The leakage would moreover be much more in times of abundant supply after water has been poured into the fields, yet in the second half of July of the same year it is half this amount.

Again in 1905, the figures are for first half of June—

	Millions cubic feet.
Total flow, Aganda Cauvery	4,336
Do. at Lower anicut	4,630
Leakage, etc.	4,619

The figures cannot be explained but they are impossible.

The figures used by Mysore are supplied by Madras from the recorded discharges and are the only ones available but only general inferences can be drawn from them. They are not accurate.

There is a considerable catchment area (about 1,100 square miles) draining into the Coleroon between the Upper and Lower anicuts, but in the earlier months, June to September, the rainfall in the area is not heavy.

The figures on which Appendix K is based are doubtful except as regards column 3 which is likely to be substantially correct, and the deductions made from the figures are therefore also doubtful. Whatever the seepage and leakages may be, however, they are unavoidable.

83. The capacity alluded to as "full supply capacity" is the requirements of "direct supply" from day to day of all the channels and even this allows only 935 cusecs, a deficient supply for the Vadavar and Veeranam tank.

Reference Mysore paragraph 68 (3).

If, however, an average supply of this amount was made available from day to day this would nearly suffice for the irrigation, the duty figure being a little over 50 acres per cusec.

The supplies are proposed, however, to be given on limit flow and the representation that the limit flow required should be the bare supply which is required each day is obviously fallacious.

84. The conditions of supply as fully explained in the descriptions of the Lower anicut are not such as to enable all flow received being passed into the channels. These conditions have to be studied and fully considered before any opinion can be formed of what flow is necessary to secure to Madras unimpaired the protection of her existing rights.

Mysore have ignored all these conditions and have suggested moreover that flow should be limited to the average daily requirement, although no provision for ensuring the daily supply of this is suggested.

85. Mysore have not fully stated the limit of Madras claims in their quotation from Madras case, Part III, paragraph 13 (Ma.-9). What is there stated is "the limit water claimed will give sufficient to supply the Veeranam tank and the Lower anicut system in addition to the Cauvery. The claim made however is greatly less than the full prescriptive rights of Madras."

86. It is not a fact that Madras have admitted that the 644 mills. cubic feet per diem when passed at the Upper anicut did not help in replenishing the Veeranam tank. The facts, and also the statements of Madras, lead precisely to the opposite conclusion.

87. It is not a fact that Madras have admitted that the old conditions at the Upper anicut had grown so bad that they necessitated remodelling. Remodelling, however, has been a great improvement and it is claimed by Madras that the enjoyment of the advantage derived from such remodelling is their right and that they should not be deprived of any right previously existing on the grounds of the improvements carried out, which improvements have in no way adversely affected Mysore. The extra 644 mills. cubic feet referred to will be used by Madras for supply of the Lower Coleroon system, and for occasional extra supplies to the Cauvery system. The statement that it is not to be used for the same purpose (supply of Lower Coleroon system) as prior to the remodelling of the Upper anicut is denied.

88. It is admitted by Mysore that in bad years the surplus allowed into the Coleroon is not much under existing conditions. Under the conditions contemplated as regards impounding in Mysore reservoir, these small quantities will all or nearly all be impounded, and no freshes will be passed down the Coleroon.

Madras have not admitted that the flood discharge of the Aganda Cauvery is "quite underestimated." What has been stated is that the produced curve of discharges showing high floods probably errs somewhat on the side of safety, that is on the low side. The discharges are not deliberately underestimated, but a caution which Mysore has neglected to display in preparing its project, was exercised in estimating flood discharges in the Madras Cauvery Project.

89. The matter does not appear to be very material to the point at issue, as Madras have waived their prescriptive right to high floods at the Upper anicut.

90. The capacity of Metur reservoir has no bearing whatever on the case now under consideration, which is, what flow at the Upper anicut is required to maintain Madras rights unimpaired. It is, however, obvious that water impounded for the protection of a system, even if wrongly impounded, is still available as a protection. Madras deny the inference drawn by Mysore that no specific supply is needed for the Coleroon system.

Under a condition which interferes with the natural discharge of floods hitherto enjoyed, Madras only consent to waive their undoubted prescriptive right to floods for the supply of Veeranam tank in return for an adequate limit supply being accorded sufficient to protect this system and the Cauvery delta system.

Reference Mysore paragraph 71.

92. The average rainfall at Srimushnam

Reference Mysore paragraph 72.

average 9.33 inches, in September, October and November of 22.37 inches, and in December and January of 4.74 inches. The good rainfall is in the months of September, October, November and the catchment is dependent mostly on the north-east monsoon. The irrigating allowance of Madras for tanks in this zone of rainfall is about 50 to 60 acres per square mile of catchment for small catchments. This however diminishes with the size of the catchment.

The tanks in this area are north-east monsoon tanks and generally commence cultivation in October. The Veeranam tank, having enjoyed from time immemorial an early supply from the Vadavar, commences cultivation in July and derives benefit from the supplies of both monsoons.

The supplies of June to August are mostly river supplies coming from the Western Ghats, and the supplies from September are largely from the local catchment but also from the Coleroon to a quite considerable extent. The capacity allowed for north-east monsoon tanks is generally about .15 mill. cubic feet per acre irrigated. That would be about 8.25 mills. cubic feet per square mile of catchment. The capacity of Veeranam tank is 918 mills. cubic feet or 3.55 mills. cubic feet per square mile of catchment. Thus the tank if it had an adequate capacity might irrigate $60 \times 256 = 15,360$ acres commencing about October. Owing to its inadequate capacity, it could not irrigate more than about 10,000 acres if dependant altogether on its own catchment and cultivation would commence in October. As a fact it irrigates 52,000 acres commencing in July, a time when the tank is generally without supply from its own catchment. Under the circumstances it is submitted that the Mysore contentions in paragraph 72 are altogether fallacious.

The reference to rainfed paddy crops refers either to conditions of well-distributed rain over 5 to 6 months and in quantities exceeding 70 inches or to inferior qualities of paddy raised as a short crop. The conditions under Veeranam tank ayakat as regards water required is the same as throughout the Cauvery delta and the rights to river water are even older. The Lower anicut was primarily constructed for the protection of the Veeranam tank irrigation and the Madras rights are to the customary supplies and methods of enjoyment.

93. The assumed duty of 70 is purely arbitrary, while the rainfall on which it is said to be based is only heavy between September and November and is of a very fluctuating

Reference Mysore paragraph 73.

nature and of a cyclonic character. During this time river supplies are usually low and but seldom give limit supplies. The occasional river supplies are of a great value in supplementing local rainfall and to these supplies the system has from time immemorial a prescriptive right. The point to be decided by the Arbitrator with respect to the Coleroon system as well as with respect to the Cauvery delta is not what is the minimum supply of water on which it is just possible to raise wet crops without widespread failure, and irrespective of yield per acre, but what is the limit supply of water to which prescriptive right exists in accordance with established method of user.

94. The rules in force at the Lower anicut prior to remodelling direct the opening of undersluices at a level of $1\frac{1}{2}$ feet over north branch; that is, at level + 52.92.

Reference Mysore paragraph 74.

The undersluices consist of 16 vents of 6 feet span only in a length of 2,000 feet of anicut with a discharge of 6,318 cusecs. With $1\frac{1}{2}$ feet over the crest the discharge over anicut is about 9,000 cusecs.

The level at which full supply for the direct irrigation of the area under Veeranam tank and the Vadavar could be raised prior to remodelling was 2.56 feet above the south branch crest that is + 53.56. This is distinctly recorded as a fact in the report of Mr. T. Lobb, Executive Engineer, Coleroon Project Division, in 1886.

95. It is convenient here to restate levels and zeros of gauges from (Ma.-8, Part II, paragraphs 35 and 39):—

Crest levels, old anicut—

North branch 51.42

South branch 51.00

Crest level new lift shutters when fully lowered 53.42

Zero of Vadavar gauge 45.02

(This was altered in 1905 before the gaugings of 1906 were taken).

Reading of the Vadavar gauge corresponding with water just topping the shutters 8.40

It is necessary generally to keep water about .2 below the top of the shutters as waves spilling over the shutters injure the apron below and no water is allowed to spill over the shutters.

The discharge flowing down the Vadavar with the shutters fully lowered and the water as high as these will hold is that due to 8.2 gauge or 935 cusecs (*vide* Ma.-8, Part II, paragraph 41).

With a height of 2.56 above the level of the crest of the old south branch (+ 51.0) the water level was 53.56 which connotes a gauge reading Vadavar gauge of (53.56 — 45.02) = 8.54 and a discharge of 1,030 mills. cubic feet. It is probable in the time of Mr. Lobb in 1886, that the Vadavar, which has been steadily silting up, gave a greater discharge than the gaugings of 1906 record. It is considered probable that when the rules in force prior to remodelling were first framed, the level for opening undersluices + 52.92 gave a discharge of over 1,000 cusecs down the Vadavar.

The flow required at a duty of 50 for the direct supply of the area under the Vadavar 62,000 acres is 1,240 cusecs and thus with the shutters fully down the maximum discharge of the Vadavar is insufficient for the direct supply of the area under it.

If the flow of water could be continuously maintained at this level the deficit would not be large, but this is not the state of the case. Even under existing circumstances with the enjoyment of the whole of the freshes, and floods of the river and with the resulting seepage in the intervals between freshes, it is common in bad years for water to fall below the top of the shutters. Under the conditions of a reservoir on the Upper Cauvery impounding as it would almost all freshes in a bad year, it will be quite impossible to maintain anything approaching to present supplies to the Vadavar. It is clear that under conditions put forward by Mysore, Veeranam tank will hardly ever receive river water for impounding in a bad year while the direct supply water will be available for less frequently than at present. The present conditions of supply of the tank and system prior to 1899 have been greatly improved at very great cost by the Government of Madras but this Government do not wish to make a claim for floods which would under the conditions existing prior to 1899—1902 have been necessary, and to which, in strict law, their prescriptive right extends. They insist, however, that the fullest recognition and consideration should be given to the changes, and to the concessions made, as well as to the changes which the altered conditions of supply to the Coleroon will entail on the incidence of flow and supply, and further that the concessions made as regards floods should not be taken to indicate that floods under present conditions would be useless and their withdrawal would not very materially diminish useful supply.

96. The capacity of the Veeranam tank is small and its ayacut large. The tank holds about twelve days' full supply for its whole ayacut. It is of the nature of a "balancing reservoir" as correctly stated by Mysore.

Reference Mysore paragraph 75.

As a "balancing reservoir" its rôle is to impound when there is water available in excess of daily requirements and to give out from the impounded supply when the reverse is the case, to make up any deficit.

As deficit in supply is of very frequent occurrence the Veeranam tank is a work of the greatest value—indeed, one without which the irrigation under the Vadavar would fail with great frequency.

The statement is made by Mysore that in certain years—for instance 1893-94, 1894-95, 1906-1907 and 1907-1908—the irrigation under the tank did not suffer. The fact that the area paying assessment under a work is not reduced is no proof whatever of absence of loss. The loss on an eight-anna yield as compared with one of sixteen annas is surely very great; but on an eight-anna or even four-anna yield no remissions are given. To entitle to remission, total loss of crop is necessary.

It is denied therefore that there was no loss in the years cited by Mysore.

Again the fact that a tank does not fill is no proof that it has not fulfilled a very important rôle. A tank ceases to be useful only when it is empty; Marikanave reservoir in Mysore has never yet filled, but this does not mean it is in any way useless. A tank may be balancing supplies all the time although it never actually surpluses and this indeed empty in the first week of September. In the year 1893 the tank was empty in the third week of August. In 1906 the tank got no water till the 15th July, after which date it was never empty. In 1907 the tank got no water till the middle of July. After that it was never empty. None of these cases connote absence of useful work by the tank.

In any case, the fact of a tank-supply has been very unsatisfactory in certain years, is not a reason for reducing those supplies it is an irrefutable fact that Madras has

a right to all useful supplies for this tank which she has hitherto enjoyed. The fact that in certain years supplies were not received is no reason for reduction of facilities for supply for the future.

It is denied that Mysore have shown that in certain years the crops under Veeranam tank did not suffer. It is denied that in any year the tank did not fulfil a useful rôle, and it is further denied that even if this were so, there is any reason for reducing the supplies and rights to supplies such as have passed into the tank in the past.

97. Mysore has misunderstood the statement in Madras Part II, paragraph 38 (Ma.-8), which refers to the conditions prior to remodelling and also to conditions on the supposition that no supplies or assistance is received from the tank catchment, and it may be added from the Coleroon catchment (about 1,100 square miles) between the Upper and Lower anicuts. The instances cited are years after remodelling when the conditions were altogether different. It is not denied that the tank receives from its catchment very material supplies, but it is affirmed and claimed that such supplies require supplementing and especially in June to August. In addition to taking years which are not applicable to the Madras statement, Mysore have drawn a wrong inference from the table which is that Madras have stated that it required 107 days to fill Veeranam tank in addition to supplying the ayacut with any flow at the Upper anicut *exceeding 7.6 feet*.

This is not so. It was with a flow *not exceeding 7.6 feet* which was alluded to and under the conditions which existed prior to the remodelling of the Upper and Lower anicuts and prior to the construction of the Cauvery-Vennar regulators.

The inferences drawn by Mysore assume a wrong basis, assume years which are inapplicable and draw unjustifiable inferences from these faulty assumptions.

98. In the second remodelling of the Lower anicut the cills were lowered to facilitate the passing of floods and to reduce risk from floods to the Lower anicut which is a work that has breached badly twice and gives great cause for anxiety in high floods. This change has no doubt to a very slight degree reduced the percentage of flood water which can be passed into the Veeranam tank. The reduction is small, while the condition of the work as regards utilization of floods as well as ordinary flow and minor freshes is improved very greatly by the remodelling of 1899—1900. The conditions of supply of the Veeranam tank under existing circumstances with the cills as remodelled is, on the whole, satisfactory, although in a bad year inadequate supplies are received. In years of high flood the supplies are usually ample. It is in the years of low and infrequent fresh, that deficiency is experienced.

Under existing circumstances all floods in excess of 30,000 cusecs are passed down to the Lower anicut and feed the Vadavar and no "special allowance" is necessary for feeding the Vadavar other than those provided in existing rules.

Under conditions greatly limiting, and in bad years almost entirely stopping, floods and freshes passed to the Lower anicut, it is obviously necessary to give specific and special allowance to replace these.

In alternative the strict legal right of Madras to floods hitherto enjoyed must be pressed for.

99. *Use of hot weather flow.*—It is denied that there is no hot weather irrigation in the Madras portion of the Cauvery at present. There is a large area of perennial and late irrigation under the Cauvery channels between Bhavani bridge and the Upper anicut and water under these channels is needed all the year round. Special establishments are tained for making of "Korambus" for diverting the river water into the channel heads. All the natural flow of the river during the hot weather is utilized for irrigation above the Upper anicut.

Madras do not claim 900 cusecs as prescriptive right in the month of February to May. The Government of Madras prescriptive right in these months, extends to the whole natural flow of the river under the conditions existing prior to the installation of power and this right is now admitted by Mysore.

The Madras Government have not waived their claim to the hot weather flow without reservation. They waived it on the understanding that the water which under the working conditions set out in the Mysore Project is required for power, viz., a continuous flow of 1,000 cusecs, will be passed down to Madras. They were prepared to allow a small working margin and accept a minimum of 900 cusecs. It is understood that the Darbar admits that the Madras Government are entitled to the whole of the natural flow of the river in the months of February to May subject to the customary draw-off for Mysore existing irrigation. Should Mysore, after reasonable notice, discontinue the supply of 900 cusecs the Madras existing rights to the whole natural flow must be recognised as unimpaired.

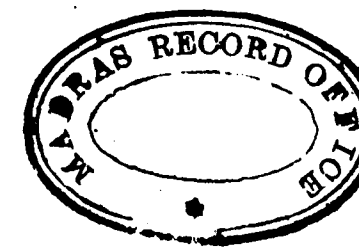
APPENDIX XV.

STATEMENT showing the area of irrigation under the Cauvery and its tributaries above the Upper Anicut for each period of five years commencing from 1890.

Main river.	Tributary.	Area irrigated in acres.					Remarks.
		1890.	1895.	1900.	1905.	1910.	
Tirumanimuttar ..		* 3,011	6,069	6,324	5,244	6,506	The area under the Palar has been included under the Shurmuganadi.
Omalar river or Sarabanganadhi.	....	† 3,801	5,467	5,113	3,453	6,164	
Thoppiyar river ..	....	1	1	-1	3	3	
Sanathkomaranadhi.	....	233	240	229	232	243	
	Total ..	7,046	11,777	11,667	8,932	12,916	
Bhavani ..	Thadapalli channel including Ananthasagaram tank, Arakankottai and Kalingarayan channels.	29,264	29,446	30,087	30,412	31,085	
Do. ..	....	1,922	2,115	2,362	2,376	2,605	
	Total ..	31,186	31,561	32,449	32,788	33,690	
Noyil river (total) ..	....	15,515	14,554	15,733	15,437	15,883	
Amaravati river ..	22 channels ..	† 17,091	26,068	26,066	25,889	26,441	The area under the Palar has been included under the Shurmuganadi.
Do. ..	4 channels ..	2,777	2,521	2,528	2,528	2,568	
Do. ..	Nanganjiyar ..	604	669	922	682	1,035	
Do. ..	Shurmuganadi ..	5,064	5,064	6,099	5,926	6,177	
Do. ..	Porsihalar ..	971	940	967	981	970	
Do. ..	Pachiyar ..	1,689	1,674	1,385	1,446	1,609	
Do. ..	Nallatangayar ..	254	269	263	258	270	
Do. ..	Varattar ..	2,161	2,064	1,686	1,524	2,157	
Do. ..	Odai flowing into Varattar ..	106	131	111	91	122	
Do. ..	Varattar flowing into Kodavanar.	14	14	87	39	149	
Do. ..	Santhanavardhani ..	228	255	376	305	571	Figures are not available for these channels for 1890.
Do. ..	Odai flowing into Kodavanar.	28	103	122	127	139	
Do. ..	Odai flowing into Santhanavardhani.	275	277	341	442	395	
Do. ..	Kodavanar ..	2,210	2,696	2,708	2,751	2,949	
Do. ..	Sirumalai odai flowing into Santhanavardhani.	38	39	90	51	87	
Do. ..	Sittar ..	76	101	122	110	116	
Do. ..	Karumalai odai ..	19	41	20	16	15	
Do. ..	Kuthirayar ..	787	788	799	790	799	
	Total ..	84,385	43,724	44,690	43,954	46,569	
Cauvery river ..	Pogalur channel ..	..	2,250	2,226	2,285	2,317	Figures are not available for these channels for 1890.
Do. ..	Vangal channel ..	..	1,048	1,046	1,046	1,035	
Do. ..	Nerur channel ..	1,651	1,722	1,651	1,683	1,613	
Do. ..	Krishnarayapuram channel ..	1,462	1,385	1,549	1,663	1,646	
Do. ..	Mahadanapuram channel.	718	635	640	643	646	
Do. ..	Marudur Nattu voikal ..	5,742	5,833	5,795	5,928	5,928	
Do. ..	Nangam voikal ..	2,222	2,132	2,191	2,174	2,220	
Do. ..	Raja channel ..	2,965	2,975	2,963	2,924	2,920	
Do. ..	Mohanur channel ..	1,282	1,272	1,281	1,336	1,535	
Do. ..	Komarapalayam channel.	1,005	1,004	1,006	1,000	991	
Do. ..	Ayilur channel ..	633	588	587	1,491	1,491	Figures are not available for these channels for 1890.
Do. ..	Siplaputhur channel ..	633	588	587	1,491	1,491	
Do. ..	Tottiyam Chinna channel.	2,124	2,996	3,183	3,308	3,428	
Do. ..	Tottiyam Periya channel.	1,792	2,795	2,938	2,978	3,085	
Do. ..	Srinivasanallur channel ..	827	1,269	1,496	1,485	1,587	
Do. ..	Musiri voikal ..	2,477	2,644	2,547	2,554	2,652	
Do. ..	Amur voikal ..	839	841	511	819	830	
Do. ..	Konesalem voikal ..	737	738	624	621	625	
Do. ..	Uyyakondan channel ..	23,948	24,745	25,000	25,112	25,458	
Do. ..	Ramarathalai channel ..	1,328	1,379	1,392	1,386	1,475	
Do. ..	Peruvai channel ..	14,654	14,973	15,086	15,250	15,357	Figures are not available for these channels for 1890.
Do. ..	Panguni channel ..	6,648	6,673	6,629	6,524	6,489	
Do. ..	Ayyan channel ..	14,495	14,464	14,738	14,756	14,714	
Do. ..	Baling.. ..	20	31	28	25	32	
	Total ..	88,202	94,978	95,994	98,477	99,565	

* Information is not available for certain channels. The area under Ponnayar has been included under Tirumanimuttar.

† Figures not available for certain channels.



ABSTRACT.

STATEMENT showing the area of irrigation under the tributaries of the Cauvery down to Upper Aniout.

Name of rivers.	Tributary.	Area irrigated in 1890.	Area irrigated in 1895.	Area irrigated in 1900.	Area irrigated in 1905.	Area irrigated in 1910.
		ACS.	ACS.	ACS.	ACS.	ACS.
Tirumanimattar and minor streams.	..	7,046	11,777	11,667	8,932	12,916
Bhavani	..	31,186	31,561	32,449	32,788	33,690
Noyil	..	15,515	14,554	15,733	15,437	15,883
Amaravati	..	34,385	43,724	44,690	43,954	46,569
Cauvery	..	88,202	94,978	95,994	98,477	99,565
Grand Total ..		176,334	196,594	200,533	199,588	208,633

APPENDIX XVI.

Demi-official—from the Hon'ble Mr. H. E. CLERK, Joint Secretary to the Government of Madras, Public Works Department, Irrigation Branch.
To—Sir J. BENTON, K.C.I.E., Inspector-General of Irrigation.
Dated—the 18th September 1911.
No.—441. 1/11.

With regard to the Mysore Cauvery Reservoir Project and Mr. Gordon's letter No. 9751, dated 28th August 1911, this Government have now written to Mysore suggesting a reservoir of limited size for power alone and have sent a copy to the Government of India which no doubt will be sent to you.

I write now to point out that there is one slight inaccuracy in your note dated 28th July 1911.

While dealing with Mr. Larminie's statement that 6 feet was the recognized gauge at the Upper Aniout, you in paragraph 4 (iii) of your note state that both the ancient crest and gauge referred to by Mr. Larminie have been lowered 4 feet.

The ancient crest has been lowered, but the gauge to which Mr. Larminie referred was the Cauvery dam gauge which, I believe, has never been altered.

I have looked up the original papers and find that Mr. Larminie was dealing with the relative advantages of reservoirs on the Bhavani and Cauvery, and when he spoke of the recognized level, he was considering the level required at the accepted duties with continuous supply. His argument tended to prove that it would be unsafe to reduce the water level below 6 feet. The question of the necessity of keeping it above that level with an unsteady supply was not considered by him.

I explained this to Mr. Visvesvarayya when he was with me.

The question is not a very important one and I have not alluded to it in the letter to Mysore or the Government of India, but I write this in case you may wish to modify your note.

APPENDIX XVII.

COMPARATIVE statement of annual discharges of the Cauvery and Vennar in millions of cubic feet—June to January.

Years.	From Administration reports, Madras.	From Sir J. Benton's note of 12th May 1911, Appendix V, column 10 (Ma. 8-a.)
	CUBIC FEET.	CUBIC FEET.
1890-91	173,924	129,078
1891-92	173,099	128,398
1892-93	191,351	143,184
1893-94	248,099*	179,123
1894-95	177,753	125,501
1895-96	227,533	164,095
1896-97	294,062	227,560
1897-98	287,470	205,990
1898-99	229,441	173,508
1899-00	121,452	117,312
1900-01	326,624	229,671
1901-02	268,428	204,624
1902-03	213,002	173,109
1903-04	276,179	223,146
1904-05	184,046	128,933
1905-06	185,635	165,265
1906-07	200,006	185,701
1907-08	234,830	236,777
1908-09	204,330	177,068†
1909-10	294,434	252,337†

* From discharges recorded in water registers.

† This figure omits second crop period—vide Sir J. Benton's Appendix V.

APPENDIX XVIII.

TABLE showing occasions of carrying water in Cauvery and Vennar at depth exceeding full supply stated in the rules of regulation in force.

The Cauvery.

Year and month.	Total number of days, when passing over 4.6 was practicable.	Number of days readings realised within limits.					Total number of days extra water carried on account of flood conditions.	Number of days extra water carried for irrigation only, columns 7—8.
		4.6 to 4.9.	5.0 to 5.4.	5.5 to 5.9.	6 feet and over.	Total over 4.6.		
1	2	3	4	5	6	7	8	9
1900.								
June	4	..	2	1	1	4	..	4
July	31	2	10	4	15	31	1	30
August	28	3	..	2	19	24	3	21
September	14	3	6	3	2	14	..	14
October	..	..	3	..	3	6	..	6
November	..	..	..	..	..	..	..	..
December	..	..	..	..	..	..	..	..
Total ..	83	8	21	10	40	79	4	75
1901.								
June	3	1	1	..	1	3	..	3
July	20	1	11	2	3	17	1	16
August	13	2	9	..	..	11	..	11
September	4	..	..	1	1	2	..	2
October	19	1	1	3	2	7	..	7
November	10	..	..	..	..	..	..	..
December	..	..	..	..	..	..	..	..
Total ..	69	5	22	6	7	40	1	39

Note.—One day noted in column 8 for July 1900 is the 13th.
Three days noted in column 8 for August 1900 are—7th, 14th and 15th.
One day noted in column 8 for July 1901 is the 14th.

Table showing occasions of carrying water in Cauvery and Vennar at depth exceeding full supply stated in the rules of regulation in force—*cont.**The Vennar.*

Year and month.	Total number of days, when passing over 7 feet was practicable.	Number of days carried.							Total over 7 feet.	Total number of days extra water carried on account of flood conditions.	Number of days extra water carried for irrigation only, columns 10 — 11.
		7-1 to 7-2.	7-3 to 7-4.	7-5 to 7-6.	7-7 to 7-8.	7-9 to 8-0.	8-1 to 8-4.	8-5 and over.			
1	2	3	4	5	6	7	8	9	10	11	12
1900.											
June ..	7	..	..	2	..	5	..	..	7	..	7
July ..	31	..	..	1	..	16	4	11	31	..	31
August ..	31	..	..	1	..	1	3	26	31	..	31
September ..	20	1	1	1	2	8	3	..	16	..	16
October ..	13	2	2	1	1	7	..	..	13	..	13
November ..	1	..	..	..	..	1	..	..	1	..	1
December ..	..	..	..	..	..	..	..	..	..	..	..
Total ..	103	3	3	5	3	38	10	37	99	..	99
1901.											
June ..	7	..	1	1	..	5	..	..	7	..	7
July ..	22	..	1	..	..	15	3	3	22	..	22
August ..	26	2	1	1	..	22	..	..	26	..	26
September ..	4	1	..	..	2	..	..	..	3	..	3
October ..	21	..	1	1	..	5	2	..	9	..	9
November ..	12	..	..	..	..	..	..	..	..	..	..
December ..	..	..	..	..	..	..	..	..	..	..	..
Total ..	92	3	4	3	2	47	5	3	67	..	67

The Cauvery.

Year and month.	Total number of days, when passing over 4-5 was practicable.	Number of days readings realised within limits.					Total number of days extra water carried on account of flood conditions.	Number of days extra water carried for irrigation only, columns 7 — 8.
		4-6 to 4-9.	5-0 to 5-4.	5-5 to 5-9.	6 feet and over.	Total over 4-5.		
1	2	3	4	5	6	7	8	9
1902.								
June ..	..	..	..	..	..	..	..	..
July ..	17	1	2	4	6	13	2	11
August ..	2	1	1	..	2	2	..	2
September ..	18	2	4	4	2	12	..	12
October ..	14	..	..	1	2	3	..	3
November ..	11	..	..	..	..	..	..	..
December ..	14	..	..	..	..	..	..	..
Total ..	76	4	7	9	10	30	2	28
1903.								
June ..	..	..	..	..	..	..	..	..
July ..	16	..	..	1	15	16	..	16
August ..	30	..	9	2	7	18	2	16
September ..	24	..	..	..	..	..	..	..
October ..	24	2	10	2	..	14	..	14
November ..	15	1	5	1	2	9	2	7
December ..	12	..	..	..	..	..	..	..
Total ..	121	3	24	6	24	57	4	53

Note.—Two days noted in column 8 for July 1902 are 18th and 19th.
Two days noted in column 8 for August 1903 are 3rd and 4th.
Two days noted in column 8 for November 1903 are 14th and 16th.

Table showing occasions of carrying water in Cauvery and Vennar at depth exceeding full supply stated in the rules of regulation in force—*cont.**The Vennar.*

Year and month.	Total number of days, when passing over 7 feet practicable.	Number of days carried.							Total over 7 feet.	Total number of days extra water carried on account of flood conditions.	Number of days extra water carried for irrigation only, columns 10 — 11.
		7-1 to 7-2.	7-3 to 7-4.	7-5 to 7-6.	7-7 to 7-8.	7-9 to 8-0.	8-1 to 8-4.	8-5 and over.			
1	2	3	4	5	6	7	8	9	10	11	12
1902.											
June ..	1	..	..	..	..	1	..	..	1	..	1
July ..	21	1	1	1	1	12	4	..	20	..	20
August ..	7	1	1	..	1	4	..	..	7	..	7
September ..	17	..	..	1	2	5	1	..	25	..	25
October ..	10	1	1	1	..	..	..	..	3	..	3
November ..	1	..	..	..	..	..	..	..	..	..	..
December ..	9	..	..	..	..	..	..	..	..	..	..
Total ..	66	3	3	3	4	22	5	..	40	..	40
1903.											
June ..	..	..	..	..	..	..	..	..	..	..	Nil.
July ..	16	..	1	..	..	4	7	4	16	Nil.	16
August ..	16	..	4	..	..	1	1	2	8	..	8
September ..	8	..	..	..	..	..	..	..	..	..	Nil.
October ..	14	..	..	..	..	..	..	..	..	..	..
November ..	12	..	1	..	..	..	..	..	1	..	1
December ..	12	..	..	..	..	..	..	..	..	..	..
Total ..	78	..	6	..	..	5	8	6	25	..	25

The Cauvery.

Year and month.	Total number of days, when passing over 4-5 was practicable.	Number of days readings realised within limits.					Total number of days extra water carried on account of flood conditions.	Number of days extra water carried for irrigation only, columns 7 — 8.
		4-6 to 4-9.	5-0 to 5-4.	5-5 to 5-9.	6 feet and over.	Total over 4-5.		
1	2	3	4	5	6	7	8	9
1904.								
June ..	12	2	4	..	..	6	..	6
July ..	29	3	7	8	6	24	..	24
August ..	14	2	2	3	..	7	..	7
September ..	5	..	4	1	..	5	..	5
October ..	4	2	1	..	..	3	..	3
November ..	..	..	..	..	..	..	..	..
December ..	..	..	..	..	..	..	..	..
Total ..	64	9	18	12	6	45	..	45
1905.								
June ..	1	1	..	..	..	1	..	1
July ..	18	..	5	1	1	7	..	7
August ..	7	..	6	..	1	7	..	7
September ..	6	1	..	..	..	1	..	1
October ..	9	..	..	..	..	..	..	..
November ..	..	..	..	..	..	..	..	..
December ..	..	..	..	..	..	..	..	..
Total ..	41	2	11	1	2	16	..	16

Table showing occasions of carrying water in Cauvery and Vennar at depth exceeding full supply stated in the rules of regulation in force—cont.

The Vennar.

Year and month.	Total number of days, when passing over 7 feet practicable.	Number of days carried.							Total number of days extra water carried on account of flood conditions.	Number of days extra water carried for irrigation only, columns 10 - 11.
		7-1 to 7-2.	7-3 to 7-4.	7-5 to 7-6.	7-7 to 7-8.	7-9 to 8-0.	8-1 to 8-4.	8-5 and over.		
1	2	3	4	5	6	7	8	9	10	11
1904.										
June ..	13	1	2	..	..	..	..	..	3	3
July ..	23	..	4	3	1	..	..	..	8	8
August ..	14	..	1	..	..	6	..	..	8	8
September ..	2	..	1	1	..	..	..	..	2	2
October ..	1	..	..	..	..	..	..	..	..	..
November ..	..	..	..	..	..	..	..	..	..	..
December ..	..	..	..	..	..	..	..	..	..	..
Total ..	53	1	8	4	1	5	..	..	19	19
1905.										
June ..	..	..	..	..	..	..	..	..	..	..
July ..	17	..	1	..	..	..	..	..	1	1
August ..	4	..	..	..	1	1	..	..	2	2
September ..	9	..	..	..	..	..	..	..	..	..
October ..	8	..	..	..	..	..	..	..	..	..
November ..	..	..	..	..	..	..	..	..	..	..
December ..	..	..	..	..	..	..	..	..	..	..
Total ..	38	..	1	..	1	1	..	..	3	3

The Cauvery.

Year and month.	Total number of days, when passing over 4-5 practicable.	Number of days readings realised within limits.					Total number of days extra water carried on account of flood conditions.	Number of days extra water carried for irrigation only, columns 7 - 8.
		4-6 to 4-9.	5-0 to 5-4.	5-5 to 5-9.	6 feet and over.	Total over 4-5.		
1	2	3	4	5	6	7	8	9
1906.								
June ..	..	..	..	..	..	4	..	4
July ..	8	4	..	..	..	3	..	3
August ..	17	1	2	..	..	..	..	..
September ..	6	..	3	2	..	7	..	7
October ..	10	2	..	..	..	..	..	..
November ..	2	..	..	..	..	..	..	..
December ..	..	..	..	..	..	..	..	..
Total ..	43	7	5	2	..	14	..	14
1907.								
June ..	1	..	..	..	..	..	..	..
July ..	5	..	3	1	1	5	..	5
August ..	5	..	2	4	20	26	..	26
September ..	6	..	..	..	..	..	..	..
October ..	9	..	..	..	..	..	..	..
November ..	2	..	..	..	..	..	..	..
December ..	..	..	..	..	..	..	..	..
Total ..	28	..	5	5	21	31	..	31

Table showing occasions of carrying water in Cauvery and Vennar at depth exceeding full supply stated in the rule of regulation in force—cont.

The Vennar.

Year and month.	Total number of days, when passing over 7 feet was practicable.	Number of days carried.							Total number of days extra water carried on account of flood conditions.	Number of days extra water carried for irrigation only, columns 10 - 11.
		7-1 to 7-2.	7-3 to 7-4.	7-5 to 7-6.	7-7 to 7-8.	7-9 to 8-0.	8-1 to 8-4.	8-5 and over.		
1	2	3	4	5	6	7	8	9	10	11
1906.										
June ..	..	..	..	..	..	..	..	..	..	..
July ..	10	..	1	5	1	..	..	..	7	7
August ..	24	..	1	1	..	4	..	..	6	6
September ..	5	..	..	..	..	..	..	..	..	..
October ..	14	..	..	..	..	..	..	..	..	..
November ..	5	..	..	..	..	..	..	..	..	..
December ..	2	..	..	..	..	..	..	..	..	..
Total ..	60	..	2	6	1	4	..	..	13	13
1907.										
June ..	3	..	..	..	..	..	..	..	..	..
July ..	10	..	..	1	..	1	..	2	4	4
August ..	81	..	..	1	1	12	..	12	26	26
September ..	7	..	..	..	..	..	..	..	..	..
October ..	9	..	..	..	..	..	..	..	..	..
November ..	6	..	..	..	..	..	..	..	..	..
December ..	..	..	..	..	..	..	..	..	..	..
Total ..	66	..	..	2	1	13	..	14	30	30

The Cauvery.

Year and month.	Total number of days, when passing over 4-5 practicable.	Number of days readings realised within limits.					Total number of days extra water carried on account of flood condition.	Number of days extra water carried for irrigation only, columns 7 - 8.
		4-6 to 4-9.	5-0 to 5-4.	5-5 to 5-9.	6 feet and over.	Total over 4-5.		
1	2	3	4	5	6	7	8	9
1906.								
June ..	..	..	..	..	..	..	..	..
July ..	19	5	9	..	..	14	..	14
August ..	17	4	13	..	..	17	..	17
September ..	6	..	..	..	..	..	..	..
October ..	8	..	..	..	..	..	..	..
November ..	..	..	..	..	..	..	..	..
December ..	..	..	..	..	..	..	..	..
Total ..	45	9	22	..	..	31	..	31

The Vennar.

Year and month.	Total number of days when passing over 7 feet practicable.	Number of days carried.							Total over 7 feet.	Total number of days extra water carried on account of flood conditions.	Number of days extra water carried for irrigation only, column 10 - 11.
		7-1 to 7-2.	7-3 to 7-4.	7-5 to 7-6.	7-7 to 7-8.	7-9 to 8-0.	8-1 to 8-4.	8-5 and over.			
1	2	3	4	5	6	7	8	9	10	11	12
1908.											
June	..	..	..	..	..	..	..	..	..	..	..
July	16	..	..	..	..	..	..	..	..	..	..
August	16	..	..	..	..	..	..	..	..	..	..
September	..	..	..	..	..	..	..	..	..	..	..
October	2	..	..	..	..	..	..	..	..	..	..
November	3	..	..	..	..	..	..	..	..	..	..
December	..	..	..	..	..	..	..	..	..	..	..
Total	38	..	..	..	..	..	..	..	..	..	..

Exhibit Ma.-13.

REJOINDER OF MADRAS.

PART VII, FACTS AND ENGINEERING ARGUMENTS—THIRD ISSUE.

1. The three alternatives suggested during this arbitration as systems of measurement did not, until now, mention measurement at Sivasamudram. A system of measurement of the inflow into Kannambadi Reservoir and of estimating the quantity of water due to Madras on a system of proportions of this flow to the whole flow at the Upper Anicut has however been mentioned. This system is briefly described in Part IV, paragraph 8 (Ma.-10) under the designation of "the third system." This is not mentioned among the systems considered in Mysore paragraph 80.

Reference Mysore paragraph 81.

2. It is agreed that a system of measurement at Sivasamudram need not be further considered.

3. The Madras system involves measurement of the inflow into the reservoir and in addition, the measurement of the flow of the Kabbani which is the only really consistently reliable tributary of the Cauvery, except the Bhavani, between Kannambadi and the Upper Anicut.

Reference Mysore paragraph 82.

A percentage must be applied to the limit flow due to Madras to cover any proved liability to loss in transmission and this percentage to be fixed tentatively pending accurate calibration of the gauge above the main anicut at Sivasamudram. This system has been fully described and it is advanced as the one which will best, subject to fixing a suitable percentage, ensure to Madras full protection of their existing rights as regards both quantity, and incidence of flow, while allowing Mysore to impound to the extent, but only to the extent which is consistent with such a condition.

4. The matter of gain and loss in transmission between Sivasamudram and the Upper Anicut should not be treated as a matter of conjecture. Had Mysore discharges at Sivasamudram been reliable, a statement showing discharges at each end of the transmission line would now be available and a figure suitable to cover liability to such losses could be fixed.

Reference Mysore paragraph 83.

As the discharges are unreliable a tentative figure based on the best available data can be fixed to cover it pending the accurate calibration of Sivasamudram gauge, when a permanent percentage can be settled. The recent observations at Danakere anicut fully confirmed the contention that there is liability to continuous losses in transmission for considerable continuous periods. Appendix X (Ma.-10) gives details of these losses and shows that they were continuous and material throughout a period of three weeks and totalled to a loss of 14.4 per cent. for the whole three weeks.

5. The contribution of flow of the Cauvery tributaries excepting the Bhavani during periods of deficient rainfall is so small as not nearly to cover losses in transmission between Sivasamudram and the Upper Anicut.

Reference Mysore paragraph 84.

In a similar season the inflow of the Bhavani is insufficient to supply the draw-off of the Cauvery channels above the Upper Anicut. The net result is that during bad seasons, or parts of a season, it is quite common for the flow at the Upper Anicut to be less than the flow at Sivasamudram for days together, and the gaugings taken this year at Danakere establish this on fairly conclusive evidence.

It is not suggested that there is not very frequently a gain in transmission and any such representation would be absurd, but it is advanced that Madras irrigation must be protected from abstraction of water to which there exists prescriptive right during the periods in which loss in transmission occurs. The admission made by Madras as regards the north-east monsoon contribution of the Madras catchment is with reference to good years only—(vide Ma.-8 Part II, paragraph 5).

6. The Mysore system of measurement is objected to by Madras on the grounds that it does not provide for the maintenance unimpaired of the flow of water to which Madras has rights,

either as regards quantity, or incidence of flow, while the system is complicated and difficult of practical application (vide Part IV, paragraphs 72 to 74 Ma.-10).

7. The occasional independent check of the discharges at the Cauvery dam is probably desirable. The gauging of discharges at the Cauvery and Vennar is fully as complicated a matter as at the Cauvery dam, the Vennar regulator is generally discharging with shutters lifted clear or with a very small afflux, and the liability to error of results calculated from sluice discharge formulæ would be large.

Reference Mysore paragraph 86.

Reference Mysore paragraph 88.

8. Madras views on the subject of tentative findings have been given in Part IV, paragraph 78 (Ma.-10).

9. What is required to be known under the system of regulation put forward by Madras is the loss in transmission from all causes including inflow and draw-off for irrigation as well as absorption.

Reference Mysore paragraph 89.

What is required in the case of the system advanced by Mysore is the loss in transmission due to evaporation and absorption only. Both aspects of the matter have been considered separately in the Madras case and definite, although tentative, percentages advanced. The loss in transmission including all inflow, draw-off, evaporation and absorption is treated of in Part IV, paragraphs 43 to 56 (Ma.-10). Losses in transmission by evaporation and absorption only are dealt with in paragraphs 57 to 62.

There has been no mixing up of the two different cases as stated by Mysore in paragraph 89.

10. The observations at Danakere fully prove liability to losses in transmission under both headings for continuous periods of days and even weeks. Further observations will be valuable and are called for, but unless they prove gross error in the already observed discharges, they cannot possibly disprove the above.

11. There is no suggestion that on an average of long periods there is a net loss in transmission, but a gain at one period cannot compensate Madras for deprivation at another, and it is necessary that Madras rights as regards limit flow shall be fully safeguarded and remain unimpaired.

12. As regards time of transmission, it has been pointed out in the Madras case that there is no such thing as exact time of transmission.

The statement of Mysore that all that is required is accurate discharges plotted on diagrams to give an easy determination of this is not concurred in.

Madras has however, no objection to time of transmission being made the subject of further examination and fixed only tentatively if this factor becomes relevant.

13. Subject to the definite fixing of the system of regulation and the methods on which the final figures are to be arrived at when accurate calibration of the Cauvery at Sivasamudram gauge is made and the results of necessary observations are available, the Government of Madras agree that the undernoted items may be fixed tentatively, the method of computing permanent figures when accepted discharges are available being indicated in the findings of the Arbitrator.

Reference Mysore paragraphs 90 and 91.

The items are—

(a) The "proportion factor" to be applied to the inflow at Kannambadi Reservoir in the south-west and north-east monsoon, respectively.

As regards this, the "proportion" referred to does not indicate the relation the total flow at Kannambadi bears to that at the Cauvery Dam in these seasons, but refers to the proportion factor to be fixed for insertion in the rules with a view to safeguarding Madras rights.

(b) The percentage, if any, to be allowed for transmission losses.

(c) The interval of time necessary to allow as the time of transmission or flow from Kannambadi to the Cuavery Dam.

14. The reference to items (d) and (e) of paragraph 91 of the Mysore reply (My. 8) is not understood since no figures representing these find place in any system of rules or measurement suggested.

The items are included in the results of the figures representing items (a) and (b).

It is noted that Mysore agree that the system of measurement and the rules themselves should now be finally fixed and with them the methods of applying the corrected record of discharges when available in the matter of revision of the tentative figures.

15. The Mysore revision of "Madras Table N", which showed the result of working the system of measurement as then put forward by Mysore, is claimed by Mysore to show that most of the admitted defects of the Mysore system can be eliminated.

Reference Mysore paragraph 92.

The resulting figures in Mysore "Madras Table N improved" show the same defects as those to which Madras made objections but in a less aggravated form.

It is stated that this alteration in results is due to the omission of consideration in the Madras tables of loss in transmission. The examination of the Mysore "Improved Table N" reveals that another material alteration has been made in preparing these "improved tables." That is, that in computing compensation water due to Madras (column 6) an omission has been made in excluding from consideration all minus figures in column 5.

The result is the deprivation of return to Madras of water due to the amount of these figures. This at once explains why the figures of this "Improved Table N" show results more favourable to Mysore and appear to show results also more favourable to Madras.

In addition to the figures shown in the tables further compensation water was due to Madras totalling to 3,194 mills. cubic feet which represents additional water wrongfully impounded by Mysore to the detriment of Madras.

It is under these conditions that the "Improved Table N" shows more favourable results than the original Madras table.

The table is incorrectly worked out and the inferences drawn from the erroneous results are also erroneous. As however Mysore have abandoned the rules and materially modified the system of working on which this table was drawn, no useful purpose will be served by drawing up a corrected table or by further examination of rules which by their abandonment are presumably admitted even by Mysore to display the defects to which objection was taken by Madras.

16. The rights and also the necessities of the Madras demand that all natural flow of the river up to the limit flow to which they are entitled to shall not be reduced on any day on

Reference Mysore paragraphs 93 and 94.

which, under existing conditions, that flow would have been available. Under these conditions allowances to cover liabilities of loss in transmission are absolutely necessary to protect and safeguard such rights.

The fact that there is frequently a gain in transmission does not safeguard Madras from loss on the days on which the reverse happens. It may be added that the losses occur most frequently in the bad years or bad months when water is specially required, and deprivation entails losses much greater than is represented by the actual amount of water withheld considered on the basis of average value of water. Allowance for gains as a "set off" against losses in transmission involves taking water away when it is specially scarce and valuable, because at times when it is plentiful more than is required can be given. Any such "set off" is surely a gross deprivation and infringement of Madras rights and cannot be said, to quote the words of the second term of reference, to "conserve these rights unimpaired." The Madras system, subject to a suitable percentage, or in alternative the third system, subject also to a fixing of a suitable proportion factor, provides for conservation unimpaired of Madras rights.

17. It is shown below that the system of measurement at the Upper Anicut altogether fails to effect this and such a system cannot fully safeguard Madras prescriptive rights.

18. Mysore have admitted the intention to extend direct irrigation above the Kannambadi

Reference Mysore paragraphs 95 and 96.

Reservoir by about 20,000 acres and as explained in the Madras case this extension above the limit of area of wet lands to be submerged by the reservoir as well as any further extensions can only be made with the help of the reservoir by feeding from the reservoir existing wet lands lying below that work with water drawn from the impounded store, while supplying the new area above with the "direct flow" which previously was required to supply the existing irrigation below. This is a feasible and ingenious way of extension and the idea is altogether due to Mysore, not to Madras, and the description of the same has been derived from official Mysore letters and reports.

It is from these reports that it is ascertained that all suggestions for extension of irrigation under the upper channels were negatived, because of the necessities of existing Mysore areas below.

The Mysore reports and correspondence on the subject of the proposed extensions show that the proposed extensions have been refused sanction on the ground of deficient natural direct flow and are now only sanctioned because the existing areas under the lower channels can be adequately supplied from the reservoir.

The irrigation period referred to by Madras is from October to January and does not embrace the period of year in which the requirements of power entail restricted issue of water to irrigation and the suggestion that the extensions have been postponed only on account of power is denied; but even if this were so it is immaterial and does not affect the main considerations, viz., that the extensions are only possible by means of the reservoir and will, unless taken into account, result in reducing Madras supplies.

Up to the middle of January the discharge of Kabbani alone is generally sufficient for power and the special restrictions to conserve water for power have only been necessary after the 15th January and only affect perennial and late crop irrigation. The extensions proposed are extensions of areas irrigated during the main irrigation season—June to December.

19. In this connection an article, extracted from the *Madras Mail*, of 19th May 1913, is reprinted as Appendix XX. Enquiries have elicited that the writer of this article had no knowledge whatever of the matter treated of other than that extracted from the official reports, letters, and written statements of the Mysore Government or its officers and that the whole of the matter forming the article is derived from such sources.

It has further transpired that the official documents on which the article is based were through oversight, or otherwise unintentionally, placed at the disposal of the press and have since the publication of the article been withdrawn.

It appears however quite certain that the Government of Mysore have declined, previous to the sanction of the reservoir scheme, to carry out the extensions of irrigation on these channels, but that they now propose to do so in view of the protection which the reservoir will afford to the supplies of the existing lower channels.

20. The article states: "The Government also point out that although these projects have been ready for some years and their construction has been repeatedly urged by the Representative Assembly they could not be sanctioned as the water-supply was uncertain. The Cauvery Reservoir will now however protect all the irrigated area below it and the extension of the upper channels can therefore be carried out without risk of detriment to the irrigation in the lower reaches."

It is perfectly clear that this information is extracted from official reports either of the Darbar or some of its officers. Madras claim that such extensions of irrigation as are contemplated above the reservoir in excess of the wet area to be submerged are and should be treated as new irrigation dependent on the reservoir.

It is submitted that the reports, estimates and all other documents referring to the proposed extensions and to the scheme for re-establishing on the land the cultivators displaced by the submergence caused by the new reservoir may be produced for the perusal of the Arbitration Committee.

The Government of Madras claim that any extensions of irrigation on the Cauvery or its tributaries above the reservoir in excess of the area of existing irrigation submerged by the reservoir shall, in considering the water due to Madras, be treated in the same way as extensions of irrigation below the reservoir.

21. The contention put forward by Mysore amounts to claiming a right for the purpose of extending their irrigation to all water falling in the Cauvery basin above the Upper Anicut in excess of that producing the "limit flow" at the Upper Anicut and at once places an obstacle on all further extensions by Madras in the valley of the Cauvery. While Madras do not deny the justice of the contention on the assumption that the full limit of the Madras prescriptive right according to the strictest interpretation of the law is conceded, the claim is objected to on the grounds that Madras are not claiming their full legal prescriptive right in view that under the circumstances this would be unduly onerous on Mysore.

The claim of Mysore now put forward is only reasonable on the assumption that the strict legal rights of Madras are considered and provided for, not only at the Upper Anicut, but on all the main tributaries of the Cauvery separately considered.

The strict legal rights of Madras at the Upper Anicut as stated by Madras with reference to the Upper Anicut (Part III, paragraph 44 Ma-9) extend to all natural flow and floods in the Cauvery at all times when the Veeranam tank does not contain 918 mills. cubic feet and to a limit flow of 2,944 mills. cubic feet per day at all other times.

22. The Government of Madras have proposed to relinquish their right to floods, although required to fully secure their existing rights and contributing greatly to the supplies of the

Coleroon system, but in view of the onerous nature of the claim now made by Mysore to limit all extensions by deducting water for these from the limit flow allowed as Madras prescriptive rights, the Government of Madras formally withdraw this proposal and ask for the recognition of their full legal right to floods. The concession made in not claiming floods subject to certain allowances must be withdrawn in the face of this new claim of Mysore, which is only reasonable if the full legal rights of Madras to the water at the Upper Anicut and on each tributary stream is recognised. If such rights are made the subject of investigation the recorded adjudication thereon will involve a great extension of the scope of the whole enquiry while computation of the effect of extensions of irrigation which may be carried out in the future in Madras would be so complicated as to defy any solution on the basis of reasonably exact computation.

23. For instance, let it be considered how a reservoir on the Bhavani or the Noyel would affect the working of the complicated Mysore system of measurement at the Upper Anicut, and it will be realised at once that one is faced by a problem so complicated as to be incapable of solution by any process of computation not open to question. This claim introduces another and very grave objection to the system of measurement at the Upper Anicut which is put forward by Mysore, as under this system nothing in the shape of a final settlement can be contemplated. The systems proposed by Madras, or "the third system," is open only in a very minor degree to these objections, while the effects of alteration of the existing conditions can be computed without great difficulty. The Mysore system is one which promises to involve constant differences between the two interested States and a constant condition of suspicion and unrest.

The Madras system, or any system of measurement in Mysore, contains the element of finality which is so desirable and also leaves both States as far as is practicable free to develop their own resources.

Mode of measurement proposed by Mysore.

24. This paragraph does not quite correctly interpret Colonel Ellis' note which showed that the proportion 0.6 suggested for trial by the Assessor in application to the third system of regulation did not suffice to safeguard Madras interests.

Reference Mysore paragraph 99.

Colonel Ellis suggested that trial of a proportion of 0.3 in the south-west monsoon and 0.5 in the north-east monsoon might be made the subject of computation, but did not propose or suggest adoption of these. The trials and computations were not originated by Madras, but were made under the directions of the Assessor as arranged by the Arbitration Committee.

25. The issue to be decided is: "what principles and rules can best be formulated which will ensure to Madras full protection of their prescriptive rights." The first consideration is the full protection of the existing and immense interests of Madras. If those interests are in any way adversely affected by the Mysore project, then Madras is justified in refusing assent to the project. It is not a case for compromise. The case is not one where both Governments are proposing new projects and where a settlement on the basis of give and take might therefore be reasonable. The interests of Madras involve an existing and huge liability both to the cultivators and a directly dependent population of over two million people, and also to an independent Sovereign State (France). The interests of Mysore are relatively small and are only prospective. They must clearly be subordinated to the much larger and existing interests of Madras and the French possessions. The terms of the third issue clearly recognise this.

26. There is no possible system of regulation which can prevent loss of water into the sea, and this has been emphasised in Sir J. Benton's notes (Ma-8-a, G.O. No. 296 I. of 18th September 1911). The Government of Madras consider that the system proposed by them is the most suitable, but do not object to the third system subject to the fixing of proportions which will fully protect them.

Reference Mysore paragraphs 101 and 102.

Table I drawn by Mysore is erroneous in omitting consideration of minus figures of column 6, but even with this, it clearly shows that a proportion of 0.6 will not in the south-west monsoon protect Madras rights.

This has already been shown in Colonel Ellis' tables.

In the Mysore new system referred to below, 0.625 has been taken as the factor for the south-west monsoon in their new rules of regulation. It is believed that the proportion 0.8 and 0.5 suggested by Colonel Ellis might suffice to protect Madras as regards both quantity and incidence of flow. It is such protection which is the essence of Madras claims and the primary consideration to be held in view in deciding on a system of regulation.

27. The Government of Madras accept and agree with the statement of Mysore that the Mysore proposals are subject to the condition of not interfering with Madras prescriptive rights in any way and subject to this have never denied to Mysore the right of impounding. No system of regulation advanced by Mysore has, however, satisfied this condition. It is not clear in what respect table II is material to the case as it only displays results derived from an

examination of a system and conditions of regulation which is not advanced by Mysore for acceptance or consideration. No remarks are therefore made on table II except that it does not display conditions of working which either as regards quantity or incidence of flow protect Madras rights, even assuming that the limit quantities useful at the Cauvery dam put forward by Mysore were correct.

28. In these paragraphs, Mysore refer to a revised system of regulation now for the first time advanced and which, although not altogether clearly described, can be understood from a study of tables III with the help of the explanations—pages 69 and 70 (Appendix P.)

The system is a compound of the original "Mysore system" of measurement at the Upper anicut and of issue of compensation water from their reservoir and the "third system" of forecasting the flow at the Upper anicut by applying a proportion factor to the measured inflow into the Kannambadi reservoir.

29. In applying this system Mysore recognises that the proportions—

0.625 for the south-west monsoon,
0.33 for the north-east monsoon,

which are proposed in the new rules now put forward, will not fully safeguard the rights of Madras and proposes to retain the system of issue of compensation water to make up the deficiency of flow passed down whenever such deficiency occurs.

30. The working of the system is examined by Mysore in tables III for the year 1905-06 and for part of the current year 1913.

Tables III display the same omission as is shown in "Improved table N" in the matter of the minus figures in column 5.

Such omission constitutes, obviously depriving Madras of water to which she has prescriptive right, and the rectification of the omission displays the Mysore system in a materially worse aspect as regards its effect on both quantity and incidence of flow, than the Mysore tables (or the diagrams representing them) display.

Revised tables III-A (Appendix XIX) have been drawn showing the results given by applying the necessary corrections to the figures in Mysore tables III for the years 1905-06 and 1913. Similar tables have been drawn for the early months of the years 1899 and 1902.

31. The results obtained are shown in tables III-A (Appendix XIX), and also displayed in diagrams which are produced. For the purpose of comparison with Mysore tables all these tables have been made on the same basis, viz., on the basis of the maximum useful supplies allowed under Mysore rules, but this is only done to enable comparison to be made on some basis which cannot be disputed by the other side and which admit of comparison and is not to be taken as implying any admission.

Analysing the results of the tables, it will be seen—

In 1905-06.—The incidence of useful flow produced under the impounding shows a diagram much more serrated, that is, a much more fluctuating supply, than the natural flow afforded.

That the quantities of irrigation supplies are deficient to the following extent (column 9 of the tables):—

									M.C. FT.
June	...	...	...	...	...	...	...	...	2,619
July	...	...	...	...	...	...	...	...	2,334
August	...	...	...	...	...	...	...	...	876
September	...	...	...	...	...	...	...	...	577
Total deficient supply									5,456

This is a much larger amount than made out by Mysore and represents water enough to irrigate some 28,000 acres.

Even on Mysore figures, which are wrong, a deficient supply of 3,477 mills. cubic feet is admitted and this represents an area of over 17,000 acres. Their diagram also shows a materially more fluctuating incidence of discharge than the natural flow.

The Madras figures show the same results but the deficiency and the fluctuations produced by the application of the system are in these tables greater.

It is submitted that Madras tables are correct computations.

Both sets of tables display conditions which do not bear out the Mysore claims that the system leaves Madras protected both as regards quantity and incidence of flow, but distinctly shows that full protection is not given as regards either of these.

Again consider the year 1899, the worst of which we have full records.

As regards quantities deficient irrigation supplies are passed as under—

Such a deprivation in such a year would have meant great disaster, as it was the year which was one of very great deficiency. The deficiency connotes a supply sufficient for irrigating about 37,000 acres.

In the year 1902.—The incidence of flow is much more irregular than natural flow and the fluctuations are to the detriment of Madras in the third week in June, the second week in July and the third week in July. The latter two cases would have been very unfavourable to Madras irrigation.

The deficient supplies of this year are—

and represents some 25,000 acres.

32. As regards the tables and the diagram for 1918 the infringement on Madras rights displayed in this year is smaller than in any of the others examined, but it cannot be said

even for this year that either as regards incidence or quantity of flow, it shows unimpaired preservation of the rights of Madras.

34. For the reasons given and on the evidence of tables and diagrams, it is altogether denied that the claim made by Mysore is in any way substantiated so far as regards Madras; that claim is that the system leaves "both quantity and incidence of flow undisturbed."

The tables and diagrams clearly prove that the application of the rules gives a precisely different result and affects Madras interests prejudicially both as regards quantity, and incidence, of flow.

34. The system is no doubt an improvement on the first proposals in that it partially incorporates the system of measurement in Mysore which has always been advocated by Madras as essential. Just in so far as this principle is brought in, the system promises success and just so far as the practice of passing compensation water is necessary, the system fails in working.

With "proportion factors" increased so as to reduce the amount of compensation water the interference with incidence of flow and the surplusing of compensation water would be reduced. That is, the nearer the system approaches one based only on measurement in Mysore, the more fully will it be likely to prove efficient as well as simple in application.

35. In conclusion, it is advanced that the revised rules advanced by Mysore as Appendix E, Part II (My-7) are rather of the nature of explanation of tables III to which they freely refer.

The rules Nos. 8 and 9 involve operations having no object or effect when taken in connection with the rest of the rules.

In no case can Madras assent to the impounding by Mysore of the whole flow of the Canvery during the month of February as provided for in these rules, and as regards impounding the whole flow from March to May only on certain conditions elsewhere specified.

APPENDIX XIX—TABLE III-A.

Approximations for quantities to be impounded on dates named.										Conditions at the Cauvery dam three days later.										Conditions at the Kannambadi dam on dates named.											
1		2		3		4		5		6		7		8		9		10		11		12		13		14		15		16	
Y = Flow at Kannambadi in m. l. on the feet.	N = Probable flow at Cauvery dam; N = 1 from June to September; N = 3 in October to January.	NY - Z = Probable excess over the limit at Cauvery dam; Z = limit in column 16.	NY - Z = Value of column 2 (a) at Kannambadi dam; 2 (a) of column 2 (a).	Quantity to be impounded at Kannambadi dam, column 2 (d) or 2 (e) whichever is less.	Flow at the Cauvery dam in m. l. on the feet, three days later.	Value of column 2 (a) at Cauvery dam; 2 (a) of column 2 (a).	Net flow at Cauvery dam, column 5 - column 4 + 2 (a) of column 2 (a) at Kannambadi, if any.	Compensation water, column 3 if less than Z or Z - column 6; Z = limit in column 16.	Resulting flow at Cauvery dam, column 5 + column 6, three days previous.	Quantity running to waste at Cauvery dam above limit.	Quantity running to waste out of compensation water.	Gross storage in the reservoir, column 3 (a) + previous day's balance in column 16.	Compensation water converted to Kannambadi reservoir, 2 (a) of column 6.	Draw-off for irrigation, etc.	Surplus when the reservoir is full.	Total of columns 11, 12 and 13.	Balance in the reservoir.	Limit of flow allowed at Cauvery dam (Z).													
16th	3,182	4,081	5,375	3,182	5,103	2,387	2,716	2,304	1,744	89	16,458	117	152	43	289	43	16,589	450													
17th	3,420	4,572	6,096	3,420	6,042	2,640	3,402	2,582	3,825	1,180	20,109	1,673	152	43	1,725	43	18,384	450													
18th	3,442	4,607	6,407	3,442	6,534	2,932	3,802	5,475	4,415	1,973	22,426	2,631	152	43	2,783	43	19,643	450													
19th	3,405	3,992	3,909	2,495	5,198	1,871	3,327	3,377	2,267	152	22,138	152	152	43	152	43	21,936	450													
20th	1,350	1,100	1,467	1,350	3,439	1,013	2,426	2,426	1,366	152	23,336	152	152	43	152	43	23,184	450													
21st	936	21st	584	584	2,296	438	1,857	1,857	797	152	23,768	152	152	43	152	43	23,616	450													
22nd	513	438	..	..	1,639	..	1,639	1,639	579	152	23,616	152	152	43	152	43	..	450													
23rd	378	..	..	..	1,180	..	1,180	1,180	120	152	..	152	152	43	152	43	..	450													
24th	341	..	..	..	730	..	730	730	..	152	..	152	152	43	152	43	..	450													
25th	341	..	..	..	662	..	662	662	..	152	..	152	152	43	152	43	..	450													
26th	421	..	..	..	540	..	540	540	..	152	..	152	152	43	152	43	..	450													
27th	642	..	..	..	608	..	608	608	..	152	..	152	152	43	152	43	..	450													
28th	1,080	..	..	..	891	..	891	891	..	152	..	152	152	43	152	43	..	450													
29th	1,486	..	..	..	538	..	538	538	..	152	..	152	152	43	152	43	..	450													
30th	2,192	..	..	..	2,573	..	2,573	2,573	..	152	..	152	152	43	152	43	..	450													
Total	..	..	..	19,742	..	..	..	..	14,810	3,241	..	..	4,321	..	..	..	..	..													
Grand total	..	..	..	24,063	..	..	..	..	14,810	3,241	..	..	4,321	..	..	..	..	..													

APPENDIX XIX—TABLE III-A—cont.

1 Month and date.	Approximations for quantities to be impounded on dates named.					Conditions at the Cauvery dam three days later.					Conditions at the Kannambadi dam on dates named.					
	2					3					10					
	a	b	c	d	e	3	4	5	6	7	8	9	10	11	12	13
Y = Flow at Kannambadi in milla, cubic feet.	NY = Probable flow at Cauvery dam; N = $\frac{1}{2}$ from June to September; N = $\frac{3}{4}$ in October to January.	NY - Z = Probable excess over the limit at Cauvery dam; Z = limit in column 16.	NY - Z = Value of column 2 (c) at Kannambadi dam, $\frac{1}{2}$ of column 2 (c).	Quantity to be impounded at Kannambadi dam, column 2 (c) or 2 (e) whichever is less.	Flow at the Cauvery dam in milla, cubic feet, three days later.	Value of column 2 (c) at Cauvery dam = $\frac{1}{2}$ of column 2 (c).	Net flow at Cauvery dam, column 3 - column 4 + $\frac{1}{2}$ of surplus at Kannambadi, if any.	Compensation water, column 3 if less than Z or Z - column 6; Z = limit in column 16.	Resulting flow at Cauvery dam, column 6 + column 6, three days previous.	Quantity running to waste at Cauvery dam above limit.	Quantity running to waste out of compensation water.	Gross storage in the reservoir, column 2 (c) + previous day's balance in column 16.	Compensation water converted to Kannambadi reservoir, $\frac{1}{2}$ of column 6.	Draw-off for irrigation, etc.	Surplus when the reservoir is full.	Total of columns 11, 12 and 13.
																15
																16 Limit of flow allowed at Cauvery dam Z.
July 1899.																
1st	2,798	4,477	2,852	3,803	2,798	5,388	2,099	3,289	3,967	2,332	668	29,616	891	156	1,047	28,568
2nd	3,008	4,810	3,185	4,247	3,006	6,321	2,255	4,086	5,181	3,556	1,115	31,574	1,487	156	1,643	29,931
3rd	2,702	4,323	2,698	3,597	2,702	5,855	2,027	3,828	4,524	2,899	696	32,633	928	156	1,084	31,549
4th	2,482	3,971	2,346	3,128	2,182	5,621	1,862	3,759	3,759	2,134	..	34,031	..	156	..	83,875
5th	2,269	3,630	2,005	2,673	2,265	4,921	1,699	3,222	3,222	1,597	..	36,140	..	156	..	35,984
6th	2,025	3,240	1,615	2,153	2,025	3,946	1,519	3,007	3,007	1,382	..	38,009	..	156	773	37,080
7th	1,435	2,296	671	895	895	3,182	671	3,065	3,065	1,440	..	37,975	..	156	739	37,080
8th	1,099	1,758	133	177	177	2,573	133	2,456	2,456	831	..	37,257	..	156	21	37,050
9th	1,311	2,098	473	631	631	2,295	473	2,178	2,178	553	..	37,711	..	156	475	37,080
10th	2,094	3,350	1,725	2,300	2,094	2,853	1,571	2,736	2,736	1,111	..	39,174	..	156	1,938	37,080
11th	2,156	3,450	1,825	2,433	2,156	2,564	1,617	3,447	3,447	1,822	..	39,236	..	156	2,000	37,080
12th	1,547	2,475	850	1,133	1,133	2,853	850	2,736	2,736	1,111	..	38,213	..	156	977	37,080
13th	1,172	1,875	250	333	333	2,496	250	2,373	2,373	748	..	37,413	..	156	177	37,080
14th	995	..	..	..	..	1,997	..	1,997	1,997	372	..	37,080	..	156	..	36,924
15th	754	..	..	..	..	1,587	..	1,587	1,587	..	..	36,924	..	156	..	36,768
Half-monthly total.	..	..	..	..	22,697	..	..	..	..	21,888	2,479	..	3,306	..	7,100	..
16th	715	..	..	..	..	1,430	..	1,430	1,430	..	..	36,768	..	156	..	..
17th	427	..	..	..	..	1,232	..	1,232	1,232	..	..	..	..	156	..	..
18th	428	..	..	..	..	1,166	..	1,166	1,166	..	..	..	..	156	..	..
19th	561	..	..	..	..	1,100	..	1,100	1,100	..	..	..	..	156	..	..
20th	494	..	..	..	..	1,041	..	1,041	1,041	..	..	..	..	156	..	..
21st	560	..	..	..	..	862	..	862	862	..	..	..	..	156	..	..
22nd	441	..	..	..	..	696	..	696	696	..	..	..	..	156	..	..
23rd	388	..	..	..	..	594	..	594	594	..	..	..	..	156	..	..
24th	354	..	..	..	..	560	..	560	560	..	..	..	..	156	..	..
25th	354	..	..	..	..	538	..	538	538	..	..	..	..	156	..	..
26th	354	..	..	..	..	538	..	538	538	..	..	..	..	156	..	..
27th	296	..	..	..	..	494	..	494	494	..	..	..	..	156	..	..
28th	279	..	..	..	..	472	..	472	472	..	..	..	..	156	..	..
29th	280	..	..	..	..	494	..	494	494	..	..	..	..	156	..	..
30th	270	..	..	..	..	628	..	628	628	..	..	..	..	156	..	..
31st	268	..	..	..	..	..	..	..	..	..	..	..	..	156	..	..
Total	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..

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APPENDIX XIX—TABLE III-A—cont.

1 Month and date.	Approximations for quantities to be impounded on dates named.					Conditions at the Cauvery dam three days later.					Conditions at the Kannambadi dam on dates named.					
	2					3					10					
	a	b	c	d	e	3	4	5	6	7	8	9	10	11	12	13
Y = Flow at Kannambadi in milla, cubic feet.	NY = Probable flow at Cauvery dam; N = $\frac{1}{2}$ from June to September; N = $\frac{3}{4}$ in October to January.	NY - Z = Probable excess over the limit at Cauvery dam; Z = limit in column 16.	NY - Z = Value of column 2 (c) at Kannambadi dam, $\frac{1}{2}$ of column 2 (c).	Quantity to be impounded at Kannambadi dam, column 2 (c) or 2 (e) whichever is less.	Flow at the Cauvery dam in milla, cubic feet, three days later.	Value of column 2 (c) at Cauvery dam = $\frac{1}{2}$ of column 2 (c).	Net flow at Cauvery dam, column 3 - column 4 + $\frac{1}{2}$ of surplus at Kannambadi, if any.	Compensation water, column 3 if less than Z or Z - column 6; Z = limit in column 16.	Resulting flow at Cauvery dam, column 6 + column 6, three days previous.	Quantity running to waste at Cauvery dam above limit.	Quantity running to waste out of compensation water.	Gross storage in the reservoir, column 2 (c) + previous day's balance in column 16.	Compensation water converted to Kannambadi reservoir, $\frac{1}{2}$ of column 6.	Draw-off for irrigation, etc.	Surplus when the reservoir is full.	Total of columns 11, 12 and 13.
																15
																16 Limit of flow allowed at Cauvery dam = Z.
August 1899.																
1st	208	..	..	..	..	494	..	494	494	..	..	34,272	..	156	..	..
2nd	208	..	..	..	..	434	..	434	434	..	..	..	..	156	..	..
3rd	185	..	..	..	..	418	..	418	418	..	..	..	..	156	..	..
4th	180	..	..	..	..	386	..	386	386	..	..	..	..	156	..	..
5th	183	..	..	..	..	370	..	370	370	..	..	..	..	156	..	..
6th	145	..	..	..	..	338	..	338	338	..	..	..	..	156	..	..
7th	105	..	..	..	..	322	..	322	322	..	..	..	..	156	..	..
8th	93	..	..	..	..	290	..	290	290	..	..	..	..	156	..	..
9th	650	..	..	..	..	218	..	218	218	..	..	..	..	156	..	..
10th	1,887	3,019	1,394	1,859	1,859	1,394	..	1,394	1,394	..	..	..	..	156	..	..
11th	1,673	2,677	1,052	1,403	1,403	1,052	..	1,052	1,052	..	..	34,727	..	156	..	..
12th	1,262	2,019	394	525	525	1,877	..	1,877	1,877	..	..	35,974	..	156	..	..
13th	776	..	..	..	..	1,407	..	1,407	1,407	..	..	36,343	..	156	..	..
14th	619	..	..	..	..	1,116	..	1,116	1,116	..	..	36,187	..	156	..	..
15th	447	..	..	..	..	1,008	..	1,008	1,008	..	..	34,172	1,859	156	..	..
Half-monthly total.	..	..	..	..	3,787	..	..	..	2,588	..	1,719	1,719	..	3,451	..	..
16th	457	..	..	..	..	851	..	851	851	..	..	32,268	..	156	..	..
17th	457	..	..	..	..	706	..	706	706	..	..	..	..	156	..	..
18th	362	..	..	..	..	696	..	696	696	..	..	..	..	156	..	..
19th	319	..	..	..	..	628	..	628	628	..	..	..	..	156	..	..
20th	299	..	..	..	..	560	..	560	560	..	..	..	..	156	..	..
21st	261	..	..	..	..	516	..	516	516	..	..	..	..	156	..	..
22nd	238	..	..	..	..	494	..	494	494	..	..	..	..	156	..	..
23rd	240	..	..	..	..	472	..	472	472	..	..	..	..	156	..	..
24th	361	..	..	..	..	418	..	418	418	..	..	..	..	156	..	..
25th	424	..	..	..	..	418	..	418	418	..	..	..	..	156	..	..
26th	545	..	..	..	..	418	..	418	418	..	..	..	..	156	..	..
27th	505	..	..	..	..	386	..	386	386	..	..	..	..	156	..	..
28th	488	..	..	..	..	494	..	494	494	..	..	..	..	156	..	..
29th	517	..	..	..	..	538	..	538	538	..	..	..	..	156	..	..
30th	517	..	..	..	..	538	..	538	538	..	..	..	..	156	..	..
31st	433	..	..	..	..	516	..	516	516	..	..	..	..	156	..	..
Total	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	29,772
Grand total	..	..	..	..	3,787	..	..	..	2,588	..	1,719	1,719	..	3,451	..	..

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APPENDIX XIX—TABLE III-A—cont.

Month and date.	Approximations for quantities to be impounded on dates named.					Conditions at the Cauvery dam 3 days later.					Conditions at the Kannambadi dam on dates named.					Limit of flow allowed at Cauvery dam Z.			
	Y = flow at Kannambadi m. o. ft.	N.Y = Probable flow at Cauvery dam N = 3 from June to Sept. N = 8 in Oct. to Jan.	N.Y. - Z = Probable excess over the limit at Cauvery dam. Z = limit in col. 16.	N.Y. - Z = value of col. 2c at Kannambadi dam, 1/2 of col. 2c.	Quantity to be impounded at Kannambadi dam, col. 2d or 2a, whichever is less.	Flow at the Cauvery dam in m. o. ft. 3 days later.	Value of col. 2c at Cauvery dam = 1/2 of col. 2a.	Net flow at Cauvery dam col. 3 - col. 4 + 1/2 of surplus at Kannambadi, if any.	Compensation water, col. 3 if less than Z or Z - col. 5. Z = limit in col. 16.	Resulting flow at Cauvery dam: -col. 5 + col. 6 three days previous.	Quantity running to waste at Cauvery dam above limit.	Quantity running to waste out of compensation water.	Gross storage in the reservoir col. 2c + previous day's balance in col. 15.	Compensation water converted to Kannambadi reservoir 1/2 of col. 6.	Draw off for irrigation, etc.		Surplus when the reservoir is full.	Total of cols. 11, 12 and 13.	Balance in the reservoir.
1	2a	2b	2c	2d	2e	3	4	5	6	7	8	9	10	11	12	13	14	15	16
June 1902.																			
1st June 1902	18	..	..	..	..	354	..	354	..	354	..	..	10,000	..	43	..	..	..	..
2nd "	18	..	..	..	..	338	..	338	..	338	..	..	..	..	43	..	..	..	..
3rd "	18	..	..	..	..	322	..	322	..	322	..	..	..	..	43	..	..	..	..
4th "	18	..	..	..	..	272	..	272	..	272	..	..	..	..	43	..	..	..	..
5th "	18	..	..	..	..	254	..	254	..	254	..	..	..	..	43	..	..	..	..
6th "	18	..	..	..	..	218	..	218	..	218	..	..	..	..	43	..	..	..	..
7th "	18	..	..	..	..	200	..	200	..	200	..	..	..	..	43	..	..	..	..
8th "	18	..	..	..	..	144	..	144	..	144	..	..	..	..	43	..	..	..	..
9th "	18	..	..	..	..	144	..	144	..	144	..	..	..	..	43	..	..	..	..
10th "	..	..	..	..	..	130	..	130	..	130	..	..	..	..	43	..	..	9,527	..
11th "	432	691	241	..	821	98	241	143	241	143	..	..	9,848	..	43	..	43	9,805	..
12th "	863	1,381	931	1,241	863	114	847	533	647	533	..	..	10,668	..	43	..	43	10,625	..
13th "	1,434	2,294	1,844	2,459	1,434	370	1,076	706	1,076	706	..	..	12,059	..	43	..	43	12,016	..
14th "	909	1,454	1,004	1,359	909	338	682	344	682	108	..	..	12,925	321	43	..	364	12,561	..
Total	..	..	..	..	3,527	..	..	..	2,616	..	..	..	..	321	..	..	..	..	..
16th June 1902	1,872	2,995	1,935	2,580	1,872	1,613	1,404	209	851	856	..	..	14,438	863	152	..	1,015	13,418	..
17th "	1,519	2,430	1,370	1,827	1,519	1,345	1,139	206	854	1,282	222	222	14,987	1,434	152	..	1,566	13,351	..
18th "	972	1,555	495	660	972	954	495	459	495	1,141	81	81	14,011	909	152	..	1,061	12,950	..
19th "	741	1,186	126	148	741	754	126	628	126	1,479	419	419	13,118	1,185	152	..	1,287	11,831	..
20th "	668	1,069	9	12	668	694	9	685	9	1,439	379	379	11,843	1,139	152	..	1,291	10,552	..
21st "	547	..	..	..	547	472	..	472	..	967	..	..	10,552	660	152	..	812	9,740	..
22nd "	480	..	..	..	480	418	..	418	..	844	..	..	9,740	168	152	..	320	9,420	..
23rd "	438	..	..	..	438	370	..	370	..	379	..	..	9,420	12	152	..	164	9,256	..
24th "	340	..	..	..	340	354	..	354	..	354	..	..	9,256	..	152	..	..	..	..
25th "	..	..	..	..	..	322	..	322	..	322	..	..	..	..	152	..	..	..	..
26th "	..	..	..	..	..	290	..	290	..	290	..	..	..	..	152	..	..	..	..
27th "	170	..	..	..	170	236	..	236	..	236	..	..	..	..	152	..	..	..	..
28th "	218	..	..	..	218	236	..	236	..	236	..	..	..	..	152	..	..	..	..
29th "	213	..	..	..	213	218	..	218	..	218	..	..	..	..	152	..	..	..	..
30th "	176	..	..	..	176	200	..	200	..	200	..	..	..	..	152	..	..	8,112	..
Total	..	..	..	..	4,221	..	..	..	2,335	..	1,101	1,101	..	6,320	..	..	..	..	..
Grand total	..	..	..	..	7,756	..	..	..	4,981	..	1,101	1,101	..	6,641	..	..	..	..	..

APPENDIX XIX—TABLE III-A—cont.

Month and date.	Approximations for quantities to be impounded on dates named.					Conditions at the Cauvery dam three days later.					Conditions at the Kannambadi dam on dates named.					Limit of flow allowed at Cauvery dam Z.			
	Y = Flow at Kannambadi in m.o.ft.	N.Y. = Probable flow at Cauvery dam; N = 3 from June to Sept.; N = 8 in Oct. to Jan.	N.Y. - Z. = Probable excess over the limit at Cauvery dam; Z = limit in col. 16.	$\frac{N.Y. - Z}{O}$ = Value of col. 2a at Kannambadi dam $\frac{1}{2}$ of col. 2 (c).	Quantity to be impounded at Kannambadi dam, col. 2 (c) or 2 (a) whichever is less.	Flow at the Cauvery dam in m.o.ft. three days later.	Value of col. 2 (c) at Cauvery dam = $\frac{1}{2}$ of col. 2 (a).	Net flow at Cauvery dam, col. 3 - col. 4 + $\frac{1}{2}$ of surplus at Kannambadi, if any.	Compensation water, col. 3 if less than Z or Z - col. 5; Z = limit in col. 16.	Resulting flow at Cauvery dam: col. 5 + col. 6 three days previous.	Quantity running to waste at Cauvery dam above limit.	Quantity running to waste out of compensation water.	Gross storage in the reservoir, col. 2 (c) + previous day's balance in col. 15.	Compensation water converted to Kannambadi reservoir $\frac{1}{2}$ of col. 6.	Draw off for irrigation, etc.		Surplus when the reservoir is full.	Total of cols. 11, 12 and 13.	Balance in the reservoir.
1	2a	2b	2c	2d	2e	3	4	5	6	7	8	9	10	11	12	13	14	15	16
July 1902.																			
1st July 1902	145	..	..	..	..	186	..	186	..	186	..	..	8,192	..	156	..	..	..	..
2nd "	175	..	..	..	..	172	..	172	..	172	..	..	..	..	156	..	..	..	..
3rd "	237	..	..	..	..	144	..	144	..	144	..	..	..	..	156	..	..	..	..
4th "	376	..	..	..	..	144	..	144	..	144	..	..	..	..	156	..	..	..	..
5th "	489	..	..	..	..	130	..	130	..	130	..	..	..	..	156	..	..	..	..
6th "	1,280	2,048	428	564	564	354	23	69	423	1,188	..	..	7,976	..	156	..	156	7,412	..
7th "	2,272	3,635	2,010	2,680	2,272	516	1,704	1,188	1,704	1,188	..	..	10,092	..	156	..	156	7,820	..
8th "	2,473	3,957	2,332	3,109	2,473	3,429	1,855	1,574	51	1,574	..	..	12,409	..	156	..	156	9,936	..
9th "	1,289	2,062	437	583	583	3,575	437	3,138	..	3,561	1,936	423	12,836	564	156	..	156	12,253	..
10th "	1,134	1,814	189	352	352	3,474	189	3,285	..	4,989	3,364	1,704	12,568	2,272	156	..	2,428	9,940	..
11th "	2,321	3,718	2,093	2,791	2,321	2,867	1,741	1,126	499	1,177	..	..	12,261	68	156	..	224	12,037	..
12th "	3,082	4,931	3,306	4,408	3,082	2,348	2,312	36	1,589	36	..	..	15,119	..	156	..	156	14,963	..
13th "	3,630	5,808	4,183	5,577	3,630	2,684	2,723	39	1,664	39	..	..	18,593	..	156	..	156	18,437	..
14th "	5,179	8,286	6,661	8,881	5,179	3,440	3,884	444	2,069	..	..	..	23,616	665	156	..	821	22,795	..
15th "	7,339	11,742	10,117	13,489	7,339	13,292	6,504	7,788	..	9,877	7,752	1,689	30,134	2,119	156	..	2,275	27,859	..
Total	..	..	..	..	27,695	..	..	..	7,999	..	13,052	3,716	..	5,688	..	..	..	..	..
16th July 1902	9,641	15,426	13,801	18,401	9,641	13,278	7,231	6,047	..	7,711	6,086	1,664	37,500	2,219	156	..	2,875	35,125	..
17th "	12,025	19,240	17,615	23,487	12,025	12,106	9,019	6,973	..	9,873	8,248	2,069	47,150	2,759	156	7,155	10,070	37,080	..
18th "	10,486	16,778	15,153	20,204	10,486	11,516	7,865	11,399	..	11,399	9,774	..	47,566	..	156	10,330	10,486	37,080	..
19th "	7,786	12,478	10,833	14,444	7,786	10,645	5,840	10,528	..	10,528	8,903	..	44,866	..	156	7,630	7,786	37,080	..
20th "	4,878	7,325	5,700	7,600	4,878	8,507	3,434	8,690	..	8,690	7,065	..	41,658	..	156	4,422	4,578	37,080	..
21st "	2,666	4,266	2,641	3,521	2,666	6,566	2,000	6,449	..	6,449	4,824	..	39,746	..	156	2,510	2,666	37,080	..
22nd "	1,890	3,024	1,396	1,865	1,865	2,576	1,399	2,458	..	2,458	833	..	38,945	..	156	1,709	1,865	37,080	..
23rd "	1,709	2,734	1,109	1,479	1,479	2,678	1,109	2,581	..	2,581	936	..	38,559	..	156	1,323	1,479	37,080	..
24th "	1,709	2,734	1,109	1,479	1,479	2,474	1,109	2,357	..	2,357	732	..	38,559	..	156	1,323	1,479	37,080	..
25th "	1,503	2,406	780	1,040	1,040	2,361	780	2,247	..	2,247	622	..	38,120	..	156	884	1,040	37,080	..
26th "	1,380	2,208	583	777	777	2,158	583	2,041	..	2,041	416	..	37,857	..	156	621	777	37,080	..
27th "	1,308	2,093	468	624	624	1,848	468	1,731	..	1,731	106	..	37,704	..	156	468	624	37,080	..
28th "	1,055	1,688	63	84	84	1,645	63	1,582	43	1,582	..	..	37,164	..	156	..	156	37,080	..
29th "	1,436	2,293	673	897	897	1,645	673	1,474	151	1,474	..	..	37,905	..	156	669	825	37,080	..
30th "	1,869	2,990	1,365	1,820	1,820	1,645	1,365	3,048	..	3,048	1,423	..	38,900	..	156	1,664	1,820	37,080	..
31st "	1,497	2,395	770	1,027	1,027	3,036	770	2,877	..	2,010	1,285	43	38,107	57	156	814	1,027	37,080	..
Total	..	..	..	..	58,274	..	..	..	194	..	51,253	3,776	..	5,035	..	41,522	..	..	..

APPENDIX XIX—TABLE III-A—*cont.*

1	Approximations for quantities to be impounded on dates named.					Conditions at the Cauvery dam three days later.									Conditions at Kannambadi dam on dates named.						
	2					3	4	5	6	7	8	9	10	11	12	13	14	15	16		
	a	b	c	d	e																
Month and date.	Y = Flow at Kannambadi in miles cubic feet.	NY = Probable flow at Cauvery dam; N = $\frac{1}{2}$ from June to September; N = 3 from October to January.	NY - Z = Probable excess over the limit at Cauvery dam; Z = column 16.	NY - Z ⁰ = Value of column 2c at Kannambadi dam, $\frac{1}{2}$ of column 2e.	Quantity to be impounded at Kannambadi dam column 2d or 2e whichever is less.	Flow at the Cauvery dam in mills. cubic feet three days later.	Value of column 2 (e) at Cauvery dam = $\frac{1}{2}$ of column 2e.	Net flow at Cauvery dam Column 3 - column 4 + $\frac{1}{2}$ of surplus at Kannambadi, if any.	Compensation water column 3 if less than 2 or Z - column 5; Z = limit in column 16.	Resulting flow at Cauvery dam, column 5 + column 6, three days previous.	Quantity running to waste at Cauvery dam above limit.	Quantity running to waste out of compensation water.	Gross storage in the reservoir, column 2 (e) + previous day's balance in column 16.	Compensation water converted to Kannambadi reservoir, $\frac{1}{2}$ of column 6.	Draw-off for irrigation, etc.	Surplus when the reservoir is full.	Total of columns 11, 12 and 13.	Balance in the reservoir.	Limit of flow allowed at Cauvery dam (Z).		
June 1905.																					
1st	..	..	..	..	..	322	..	322	..	322	..	..	10,000	..	..	..	43	..	5,957		
2nd	..	..	..	..	..	272	..	272	..	272	..	..	9,957	..	..	..	43	..	9,914		
3rd	..	..	..	..	..	272	..	272	..	272	..	..	9,914	..	..	..	43	..	..		
4th	..	..	..	..	..	218	..	218	..	218	..	..	..	..	..	..	..	..	..		
5th	..	..	..	..	..	370	..	370	..	370	..	..	..	..	..	..	..	..	..		
6th	..	..	..	..	..	322	..	322	..	322	..	..	..	..	..	..	..	..	..		
7th	..	..	..	..	..	290	..	290	..	290	..	..	..	..	..	..	..	..	..		
8th	..	1	..	..	..	236	..	236	..	236	..	..	..	..	..	..	..	..	..		
9th	..	1	..	..	..	236	..	236	..	236	..	..	..	..	..	..	..	..	..		
10th	..	1	..	..	..	200	..	200	..	200	..	..	..	..	..	..	..	..	..		
11th	..	1	..	..	..	218	..	218	..	218	..	..	..	..	..	..	..	43	9,527		
12th	..	95	..	..	..	254	..	254	..	254	..	..	9,527	..	..	..	43	43	9,484		
13th	..	641	1,026	576	768	300	480	280	480	280	..	..	10,125	..	..	..	43	43	10,082		
14th	..	151	..	..	..	158	..	158	..	158	..	..	10,082	..	..	..	43	43	10,039		
15th	..	33	..	..	..	130	..	130	..	130	..	..	10,039	..	..	..	43	43	9,996		
Half-monthly total ..	824	..	..	..	641	3,698	..	..	480	..	..	..	..	..	..	..	..	..	..		
16th	..	132	..	..	..	186	..	186	..	186	..	..	9,996	611	152	..	798	..	9,208		
17th	..	132	..	..	..	186	..	186	..	186	..	..	9,208	..	152	..	152	..	9,051		
18th	..	138	..	..	..	158	..	158	..	158	..	..	9,051	..	152	..	152	..	8,899		
19th	..	1,170	1,556	796	1,061	130	796	666	796	491	..	..	9,960	..	152	..	152	..	9,808		
20th	..	1,447	2,315	1,255	1,673	594	1,085	491	1,085	491	..	..	11,355	..	152	..	152	..	11,103		
21st	..	1,263	2,021	961	1,263	538	947	499	947	..	..	..	12,366	..	152	..	152	..	12,214		
22nd	..	210	..	..	..	1,818	..	1,818	..	2,614	1,554	796	12,214	1,061	152	..	1,218	..	11,001		
23rd	..	177	..	..	..	1,287	..	1,287	..	3,372	1,812	1,085	11,001	1,447	152	..	1,599	..	9,402		
24th	..	144	..	..	..	851	..	851	..	1,798	738	738	9,402	1,358	152	..	1,415	..	7,987		
25th	..	135	..	..	..	662	..	662	..	662	..	..	7,987	..	152	..	152	..	7,885		
26th	..	328	..	..	..	594	..	594	..	594	..	..	7,835	..	152	..	152	..	7,531		
27th	..	348	..	..	..	754	..	754	..	754	..	..	7,531	..	152	..	152	..	7,379		
28th	..	405	..	..	..	1,579	..	1,579	..	1,579	..	..	7,379	..	152	..	152	..	7,227		
29th	..	569	..	..	..	3,697	..	3,697	..	3,697	2,073	..	7,356	..	152	..	152	..	7,204		
30th	..	723	1,157	97	139	3,638	97	3,541	..	3,541	1,916	..	..	..	152	..	..	..	..		
Half-monthly total ..	7,291	..	..	..	3,900	16,672	..	..	2,828	..	7,592	2,619	..	4,412	..	..	..	..	..		
Monthly total ..	6,215	..	..	..	6,541	20,270	..	..	3,406	..	7,592	2,619	..	4,412	..	..	..	..	..		

APPENDIX XIX--TABLE III-A--cont.

1	Approximations for quantities to be impounded on dates named.					Conditions at the Cauvery dam three days later.									Conditions at Kannambadi dam on dates named.						
	2																				
	a	b	c	d	e	3	4	5	6	7	8	9	10	11	12	13	14	15	16		
Month and date.	Y = Flow at Kannambadi in mlla. cubic feet.	NY = Probable flow at Cauvery dam; N = $\frac{1}{2}$ from June to September; N = 3 from October to January	NY - Z = Probable excess over the limit at Cauvery dam; Z = column 16.	NY - Z = Value of column 2 (c) at Kannambadi dam, $\frac{1}{2}$ of column 2 (c).	Quantity to be impounded at Kannambadi dam, column 2 (d) or 2 (e) whichever is less.	Flow at the Cauvery dam in mlla. cubic feet, three days later.	Value of column 2 (c) at Cauvery dam = $\frac{1}{2}$ of column 2 (c).	Net flow at Cauvery dam column 3 - column 4 + $\frac{1}{2}$ of surplus at Kannambadi, if any.	Compensation water, column 3 if less than Z or Z - column 5; Z = limit in column 16.	Resulting flow at Cauvery dam, column 6 + column 9, three days previous.	Quantity running to waste at Cauvery dam above limit.	Quantity running to waste out of compensation water.	Gross storage in the reservoir, column 2 (c) + previous day's balance in column 15.	Compensation water converted to Kannambadi reservoir, $\frac{1}{2}$ of column 6.	Draw-off for irrigation, etc.	Surplus when the reservoir is full.	Total of columns 11, 12 and 13.	Balance in the reservoir.	Limit of flow allowed at Cauvery dam = Z.		
July 1905.																					
1st	1,141	1,826	201	268	268	3,802	201	3,601		3,601	1,976		7,472		156		156	7,316			
2nd	1,172	1,875	250	333	333	3,680	250	3,430		3,430	1,805		7,649		156		156	7,493			
3rd	1,044	1,670	45	60	60	2,834	45	2,789		2,789	1,164		7,553		156		156	7,397			
4th	865					2,020		2,020		2,020	395		7,397		156		156	7,241			
5th	676					1,495		1,495		1,495			7,241		156		156	7,085			
6th	612					1,000		1,000		1,000			7,085		156		156	6,929			
7th	584					730		730		730			6,929		156		156	6,773			
8th	2,714	4,342	2,717	3,823	2,714	730	2,036	- 1,306	2,036	- 1,306			9,487		156		156	9,331			
9th	2,804	4,486	2,861	3,815	2,804	4,077	2,103	1,974		1,974	349		12,136		156		156	11,979	1,62		
10th	1,991	3,186	1,561	2,081	1,991	3,161	1,493	1,668		1,668	43		13,970		156		156	13,814			
11th	795					2,160		2,160		4,196		2,036	13,614	2,714	156		2,870	10,944			
12th	631					1,625		1,625		1,625			10,944		156		156	10,788			
13th	654					1,240		1,240		1,240			10,788		156		156	10,632			
14th	673					892		892		892			10,632		156		156	10,476			
15th	584					628		628		628			10,476		156		156	10,320			
Half-monthly total					8,170	30,074			2,036		8,303	2,036		2,714							
16th	556					538		538		538					156						
17th	556					472		472		472					156						
18th	556					516		516		516					156						
19th	1,232	1,973	348	464	464	628	348	280	348	280			10,316		156		156	9,852			
20th	1,802	2,882	1,258	1,677	1,677	3,657	1,258	2,399		2,399	774		11,837		156		156	10,160			
21st	4,017	6,427	4,802	6,403	4,017	7,516	3,013	4,503		4,503	2,878		15,898		156		156	11,681			
22nd	5,924	9,478	7,853	10,471	5,924	7,859	4,443	3,416		3,784	2,139	348	21,466	464	156		620	20,846			
23rd	6,695	10,712	9,087	12,116	6,695	8,003	5,021	2,982		2,982	1,357		27,541		156		156	27,385			
24th	6,005	9,608	7,983	10,644	6,005	6,516	4,504	2,012		2,012	387		33,390		156		156	33,234			
25th	3,606	5,770	4,145	5,627	3,606	4,634	2,705	1,959		1,959	334		36,800		156		156	36,684			
26th	2,770	4,432	2,807	3,743	2,770	4,585	2,078	4,171		4,171	2,546		39,454		156	2,218	2,374	37,080			
27th	2,486	3,978	2,353	3,137	2,436	4,133	1,865	4,016		4,016	2,391		39,566		156	2,330	2,486	37,080			
28th	2,173	3,477	1,852	2,469	2,173	4,133	1,630	4,016		4,016	2,391		39,263		156	2,017	2,173	37,080			
29th	2,029	3,246	1,621	2,161	2,029	3,046	1,522	2,929		2,929	1,304		39,109		156	1,873	2,029	37,080			
30th	1,958	3,183	1,508	2,011	1,958	2,698	1,468	2,682		2,582	957		39,038		156	1,802	1,958	37,080			
31st	1,821	2,914	1,289	1,719	1,719	2,650	1,289	2,634		2,534	909		38,799		156	1,563	1,719	37,080			
Half-monthly total					41,523	61,614			348		18,367	348		464		11,803					
Monthly total					49,693	91,688			2,384		20,670	2,384		8,178		11,803					

APPENDIX XIX—TABLE III-A—cont.

		Approximations for quantities to be impounded on dates named.					Conditions at the Cauvery dam three days later.							Conditions at Kannambadi dam on dates named.						
		2																		
1		a	b	c	d	e	3	4	5	6	7	8	9	10	11	12	13	14	15	16
Month and date.		Y = Flow at Kannambadi in mlla. cubic feet.	NY = Probable flow at Cauvery dam; N = $\frac{1}{2}$ from June to September; N = $\frac{3}{4}$ from October to January.	NY - Z = Probable excess over the limit at Cauvery dam; $\frac{1}{2}$ = column 16.	NY - Z = Value of column 2 (c) at Kannambadi dam, $\frac{1}{2}$ of column 2 (c).	Quantity to be impounded at Kannambadi dam, column 2 (d) or 2 (e) whichever is less.	Flow at the Cauvery dam in mlla. cubic feet, three days later.	Value of column 2 (c) at Cauvery dam = $\frac{1}{2}$ of column 2 (c).	Net flow at Cauvery dam, column 3 - column 4 + $\frac{1}{2}$ of surplus at Kannambadi, if any.	Compensation water, column 3 if less than Z or Z - column 6; Z = limit in column 16.	Resulting flow at Cauvery dam, column 5 + column 6, three days previous.	Quantity running to waste at Cauvery dam above limit.	Quantity running to waste out of compensation water.	Gross storage in the reservoir, column 2 (c) + previous day's balance in column 15.	Compensation water converted to Kannambadi reservoir, $\frac{1}{2}$ of column 6.	Draw-off for irrigation, etc.	Surplus when the reservoir is full.	Total of column 11, 12 and 13.	Balance in the reservoir.	Limit of flow allowed at Cauvery dam = Z.
August 1905.																				
1st	..	1,382	2,211	586	781	781	2,440	586	2,323	..	2,323	628	..	37,861	..	156	625	731	37,080	1,625
2nd	..	1,733	2,773	1,148	1,541	1,581	2,222	1,148	2,105	..	2,105	480	..	38,611	..	156	1,375	1,531	37,080	
3rd	..	1,676	2,682	1,057	1,409	1,409	2,074	1,057	1,957	..	1,957	332	..	38,489	..	156	1,253	1,409	37,080	
4th	..	994	..	..	..	..	1,859	..	1,859	..	1,859	234	..	37,080	..	156	..	..	..	
5th	..	549	..	..	..	..	1,573	..	1,573	..	1,573	..	..	..	..	..	..	..	..	
6th	..	709	..	..	..	..	1,232	..	1,232	..	1,232	..	..	..	..	..	..	..	..	
7th	..	666	..	..	..	..	981	..	981	..	981	..	..	..	..	..	..	..	..	
8th	..	592	..	..	..	..	803	..	803	..	803	..	..	..	..	..	..	..	..	
9th	..	595	..	..	..	..	662	..	662	..	662	..	..	..	..	..	..	..	..	
10th	..	561	..	..	..	..	594	..	594	..	594	..	..	..	..	..	..	..	..	
11th	..	561	..	..	..	..	560	..	560	..	560	..	..	..	..	..	..	..	..	
12th	..	658	..	..	..	..	538	..	538	..	538	..	..	..	..	..	..	..	..	
13th	..	545	..	..	..	..	516	..	516	..	516	..	..	..	..	..	..	..	..	
14th	..	379	..	..	..	..	594	..	594	..	594	..	..	..	..	..	..	..	..	
15th	..	565	..	..	..	..	784	..	784	..	784	..	..	..	..	..	..	..	..	
Half-monthly total	..	..	..	..	..	3,721	..	..	..	..	..	1,744	..	..	..	..	3,253	..	..	
16th	..	556	..	..	..	..	628	..	628	..	628	..	..	..	..	156	..	..	..	1,625
17th	..	731	..	..	..	..	538	..	538	..	538	..	..	..	..	156	..	..	..	
18th	..	731	..	..	..	..	516	..	516	..	516	..	..	..	..	156	..	..	..	
19th	..	721	..	..	..	..	696	..	696	..	696	..	..	..	..	156	..	..	..	
20th	..	689	..	..	..	..	851	..	851	..	851	..	..	..	..	156	..	..	..	
21st	..	763	..	..	..	..	1,116	..	1,116	..	1,116	..	..	34,428	..	156	..	..	34,272	
22nd	..	1,134	1,814	189	252	252	1,116	189	927	..	927	..	..	34,524	..	156	..	156	34,368	
23rd	..	1,304	2,086	461	615	615	1,116	461	655	..	655	..	..	34,983	..	156	..	156	34,827	
24th	..	922	..	..	..	..	1,062	..	1,062	..	1,062	..	..	34,827	..	156	..	156	34,671	
25th	..	1,094	1,750	125	167	167	1,116	125	991	..	1,180	..	..	34,838	..	156	..	408	34,430	
26th	..	1,534	2,454	829	1,105	1,105	1,170	829	341	..	802	..	..	35,535	615	156	..	771	34,764	
27th	..	1,059	1,694	69	92	92	1,345	69	1,276	..	1,276	..	..	34,856	..	156	..	156	34,700	
28th	..	985	..	..	..	..	1,345	..	1,345	..	1,470	..	..	34,700	167	156	..	323	34,377	
29th	..	1,057	1,691	66	88	88	1,696	66	1,630	..	2,459	834	829	34,466	1,105	156	..	1,261	33,204	
30th	..	1,074	1,718	93	124	124	1,696	93	1,603	..	1,672	47	47	33,328	92	156	..	248	33,080	
31st	..	981	..	..	..	..	1,755	..	1,755	..	1,755	130	..	33,080	..	156	..	156	32,924	
Half-monthly total	..	..	..	..	..	2,443	..	..	1,695	..	1,011	376	..	..	2,231	..	..	..	..	
Monthly total	..	..	..	..	..	6,164	..	..	1,695	..	2,755	876	..	..	2,231	..	8,253	..	..	

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APPENDIX XIX—TABLE III-A—cont.

Month and date.	Approximations for quantities to be impounded on dates named.					Conditions at the Cauvery dam three days later.							Conditions at the Kannambadi dam on dates named.						
	2					3	4	5	6	7	8	9	10	11	12	13	14	15	16
	a	b	c	d	e														
Y = Flow at Kannambadi in milla. cubic feet.	NY = Probable flow at Cauvery dam; N = $\frac{1}{2}$ from June to September; N = $\frac{3}{4}$ from October to January.	NY - Z = Probable excess over the limit at Cauvery dam; Z = limit in column 16.	NY - Z = Value of column 2 (c) at Kannambadi dam, $\frac{1}{2}$ of column 2 (c).	Quantity to be impounded at Kannambadi dam, column 2 (d) or 2 (e) whichever is less.	Flow at the Cauvery dam in milla. cubic feet, three days later.	Value of column 2 (c) at Cauvery dam = $\frac{1}{2}$ of column 2 (c).	Net flow at Cauvery dam, column 3 - column 4 + $\frac{1}{2}$ of surplus at Kannambadi, if any.	Compensation water, column 3 if less than Z or Z - column 6; Z = limit in column 16.	Resulting flow at Cauvery dam, column 5 + column 6, three days previous.	Quantity running to waste at Cauvery dam above limit.	Quantity running to waste out of compensation water.	Gross storage in the reservoir, column 2 (c) + previous day's balance in column 15.	Compensation water converted to Kannambadi reservoir, $\frac{1}{2}$ of column 6.	Draw-off for irrigation, etc.	Surplus when the reservoir is full.	Total of columns 11, 12 & 13.	Balance in the reservoir.	Limit of flow allowed at Cauvery dam = Z.	
September 1905.																			
1st	879	..	..	..	..	1,755	..	1,755	..	1,755	..	..	32,924	..	156	..	156	32,768	1,625
2nd	782	..	..	..	..	1,170	..	1,170	..	1,170	..	..	32,768	..	156	..	156	32,533	
3rd	750	..	..	..	..	851	..	851	..	851	..	..	32,583	..	156	..	156	32,427	
4th	847	..	..	..	..	892	..	892	..	892	..	..	32,427	..	156	..	156	32,271	
5th	584	..	..	..	..	838	..	838	..	838	..	..	32,271	..	156	..	156	32,115	
6th	869	..	..	..	..	784	..	784	..	784	..	..	32,115	..	156	..	156	31,959	
7th	1,168	1,861	236	315	315	838	236	602	236	602	..	..	32,274	..	156	..	156	32,118	
8th	1,392	2,227	602	803	803	1,536	602	934	602	934	..	..	32,921	..	156	..	156	32,765	
9th	1,503	2,405	780	1,040	1,040	2,320	780	1,540	85	1,540	..	..	33,805	..	156	..	156	33,649	
10th	1,471	2,364	729	972	972	2,089	729	1,360	265	1,596	..	..	34,621	815	156	..	471	34,150	
11th	1,136	1,818	193	257	257	1,793	193	1,600	25	2,202	577	577	34,407	803	156	..	959	33,448	
12th	1,035	1,656	31	41	41	1,495	31	1,464	31	1,549	..	..	33,489	113	156	..	289	33,220	
13th	997	..	..	..	..	1,300	..	1,300	..	1,565	..	..	33,220	353	156	..	509	32,711	
14th	646	..	..	..	..	1,060	..	1,060	..	1,085	..	..	32,711	33	156	..	189	32,522	
15th	616	..	..	..	..	1,365	..	1,365	..	1,396	..	..	32,522	41	156	..	197	32,325	
Half-monthly total.	..	..	..	..	3,428	..	..	..	1,244	..	577	577	..	1,687	..	..	..	..	
16th	457	..	..	..	..	730	..	730	..	730	..	..	32,325	..	156	..	156	..	1,120
17th	431	..	..	..	..	662	..	662	..	662	..	..	..	..	156	..	156	..	
18th	383	..	..	..	..	1,365	..	1,365	..	1,365	..	..	..	..	156	..	156	..	
19th	374	..	..	..	..	730	..	730	..	730	..	..	..	..	156	..	156	..	
20th	355	..	..	..	..	594	..	594	..	594	..	..	..	..	156	..	156	..	
21st	300	..	..	..	..	494	..	494	..	494	..	..	..	..	156	..	156	..	
22nd	290	..	..	..	..	450	..	450	..	450	..	..	..	..	156	..	156	..	
23rd	278	..	..	..	..	434	..	434	..	434	..	..	..	..	156	..	156	..	
24th	238	..	..	..	..	386	..	386	..	386	..	..	..	..	156	..	156	..	
25th	238	..	..	..	..	354	..	354	..	354	..	..	..	..	156	..	156	..	
26th	267	..	..	..	..	338	..	338	..	338	..	..	..	..	156	..	156	..	
27th	268	..	..	..	..	338	..	338	..	338	..	..	..	..	156	..	156	..	
28th	217	..	..	..	..	338	..	338	..	338	..	..	..	..	156	..	156	..	
29th	206	..	..	..	..	338	..	338	..	338	..	..	..	..	156	..	156	..	
30th	145	..	..	..	..	322	..	322	..	322	..	..	..	..	156	..	156	29,985	
Half-monthly total.	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	
Monthly total	..	..	..	..	3,428	..	..	..	1,244	..	577	577	..	1,687	..	..	..	..	

APPENDIX XIX—TABLE III-A—cont.

		Approximations for quantities to be impounded on dates named.					Conditions at the Cauvery dam three days later.							Conditions at the Kannambadi dam on dates named.							
1		2					3	4	5	6	7	8	9	10	11	12	13	14	15	16	
Month and date.		Y = Flow at Kannambadi in mls. cubic feet.	NY = Probable flow at Cauvery dam; N = $\frac{1}{2}$ from June to September; N = 3 from October to January.	NY - Z = Probable excess over the limit at Cauvery dam; Z = limit in column 16.	NY - Z = Value of column 2 (c) at Kannambadi dam, $\frac{1}{2}$ of column 2 (c).	Quantity to be impounded at Kannambadi dam, column 2 (d) or 2 (e) whichever is less.	Flow at the Cauvery dam in mls. cubic feet, three days later.	Value of column 2 (c) at Cauvery dam = $\frac{1}{2}$ of column 2 (c).	Net flow at Cauvery dam, column 3 - column 4 + $\frac{1}{2}$ of surplus at Kannambadi, if any.	Compensation water, column 8 if less than Z or Z - column 6; Z = limit in column 16.	Resulting flow at Cauvery dam, column 6 + column 9, three days previous.	Quantity running to waste at Cauvery dam above limit.	Quantity running to waste out of compensation water.	Gross storage in the reservoir, column 2 (c) + previous days' balance in column 15.	Compensation water converted to Kannambadi reservoir, $\frac{1}{2}$ of column 6.	Draw-off for irrigation, etc.	Surplus when the reservoir is full.	Total of columns 11, 12 & 13.	Balance in the reservoir.	Limit of flow allowed at Cauvery dam = Z.	
October 1905.																					
1st	..	142	..	..	..	322	..	322	..	322	..	..	..	29,985	..	156	..	156	..	1,240	
2nd	..	142	..	..	..	322	..	322	..	322	..	..	..	..	..	156	..	156	..		
3rd	..	174	..	..	..	338	..	338	..	338	..	..	..	..	..	156	..	156	..		
4th	..	237	..	..	..	1,062	..	1,062	..	1,062	..	..	..	..	..	156	..	156	..		
5th	..	201	..	..	..	628	..	628	..	628	..	..	..	..	..	156	..	156	..		
6th	..	214	..	..	..	472	..	472	..	472	..	..	..	..	..	156	..	156	..		
7th	..	237	..	..	..	851	..	851	..	851	..	..	..	..	..	156	..	156	..		
8th	..	196	..	..	..	3,336	..	8,336	..	3,336	2,096	..	..	..	..	156	..	156	..		
9th	..	181	..	..	..	2,346	..	2,346	..	2,346	1,106	..	..	..	..	156	..	156	..		
10th	..	169	..	..	..	3,140	..	3,140	..	3,140	1,900	..	..	..	..	156	..	156	..		
11th	..	258	..	..	..	2,178	..	2,178	..	2,178	938	..	..	..	..	156	..	156	..		
12th	..	595	1,785	545	727	595	..	1,746	..	1,746	506	..	..	28,854	..	156	..	156	28,269		
13th	..	914	2,742	1,502	2,003	914	..	4,206	..	4,206	2,966	..	..	29,622	..	156	..	156	28,708		
14th	..	1,245	3,735	2,435	3,327	1,245	..	2,945	..	2,945	1,705	..	..	30,711	..	156	..	156	29,466		
15th	..	2,761	8,238	7,043	9,391	2,761	..	1,799	..	1,799	559	..	..	33,316	..	156	..	156	30,555		
Half-monthly total	..	..	..	..	5,515	..	..	..	..	..	11,776	..	..	..	..	..	..	..	..		
16th	..	1,415	4,245	3,005	4,007	1,415	..	3,129	..	3,129	1,889	..	..	34,675	..	156	..	156	34,419		
17th	..	912	2,736	1,496	1,995	912	..	2,317	..	2,317	1,077	..	..	35,331	..	156	..	156	35,175		
18th	..	726	2,178	938	1,261	726	..	1,760	..	1,760	520	..	..	36,901	..	156	..	156	35,745		
19th	..	559	1,677	437	583	559	..	1,934	..	1,934	694	..	..	36,304	..	156	..	156	36,148		
20th	..	760	2,280	1,040	1,387	760	..	478	570	478	..	..	..	36,908	..	156	..	156	36,752		
21st	..	493	1,479	239	319	493	..	761	239	761	..	..	..	37,071	..	156	..	156	36,916		
22nd	..	414	1,242	2	3	414	..	836	2	836	..	..	..	36,918	..	156	..	156	36,962		
23rd	..	348	..	..	..	662	..	662	..	1,232	..	..	..	36,762	760	156	..	916	35,546		
24th	..	278	..	..	..	560	..	560	..	799	..	..	..	35,846	319	156	..	475	35,371		
25th	..	205	..	..	..	516	..	516	..	518	..	..	..	35,371	3	156	..	159	35,212		
26th	..	207	..	..	..	450	..	450	..	450	..	..	..	35,212	..	156	..	156	..		
27th	..	174	..	..	..	418	..	418	..	418	..	..	..	..	..	156	..	156	..		
28th	..	139	..	..	..	402	..	402	..	402	..	..	..	..	..	156	..	156	..		
29th	..	139	..	..	..	370	..	370	..	370	..	..	..	..	..	156	..	156	..		
30th	..	146	..	..	..	354	..	354	..	354	..	..	..	..	..	156	..	156	..		
31st	..	114	..	..	..	338	..	338	..	338	..	..	..	..	..	156	..	156	34,276		
Half-monthly total	..	..	..	..	4,694	..	..	..	811	..	4,180	..	..	..	1,082	..	..	..	..		
Monthly total	..	..	..	..	10,209	..	..	..	811	..	15,956	..	..	..	1,082	..	..	..	..		

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APPENDIX XIX—TABLE III-A—cont.

1	Approximations for quantities to be impounded on dates named.					Conditions at the Cauvery dam three days later.					Conditions at the Kannambadi dam on dates named.								
	a	b	c	d	e	2	4	5	6	7	8	9	10	11	12	13	14	15	16
Month and date.	Y = Flow at Kannambadi in mls. cubic feet.	NY = Probable flow at Cauvery dam; N = $\frac{1}{2}$ from June to September; N = 3 from October to January.	NY - Z = Probable excess over the limit at Cauvery dam; Z = limit in column 16.	NY - Z = Value of column 2 (c) at Kannambadi dam, $\frac{1}{2}$ of column 2 (c).	Quantity to be impounded at Kannambadi dam, column 2 (d) or 2 (e) whichever is less.	Flow at the Cauvery dam in mls. cubic feet, three days later.	Value of column 2 (c) at Cauvery dam = $\frac{1}{2}$ of column 2 (c).	Net flow at Cauvery dam, column 8 - column 4 + $\frac{1}{2}$ of surplus at Kannambadi, if any.	Compensation water, column 3 if less than Z or Z - column 6; Z = limit in column 16.	Resulting flow at Cauvery dam, column 6 + column 9, three days previous.	Quantity running to waste at Cauvery dam above limit.	Quantity running to waste out of compensation water.	Gross storage in the reservoir, column 2 (c) + previous day's balance in column 16.	Compensation water converted to Kannambadi reservoir, $\frac{1}{2}$ of column 6.	Draw-off for irrigation, etc.	Surplus when the reservoir is full.	Total of columns 11, 12 & 13.	Balance in the reservoir.	Limit of flow allowed at Cauvery dam = Z.
November 1905.																			
1st	112					322		322		322			34,276		156		156		1,000
2nd	112					306		306		306					156		156		
3rd	93					218		218		218					156		156		
4th	93					272		272		272					156		156		
5th	97					236		236		236					156		156		
6th	97					236		236		236					156		156		
7th	97					236		236		236					156		156		
8th	126					236		236		236					156		156		
9th	117					236		236		236					156		156		
10th	89					254		254		254					156		156		
11th	89					402		402		402					156		156		
12th	89					322		322		322					156		156		
13th	76					306		306		306					156		156		
14th	76					306		306		306					156		156		
15th	64					272		272		272					156		156	31,936	
Half-monthly total																			
16th	66					254		254		254					156		156		696
17th	71					290		290		290					156		156		
18th	71					370		370		370					156		156		
19th	71					338		338		338					156		156		
20th	71					322		322		322					156		156		
21st	71					322		322		322					156		156		
22nd	69					322		322		322					156		156		
23rd	69					322		322		322					156		156		
24th	69					338		338		338					156		156		
25th	69					560		560		560					156		156		
26th	84					434		434		434					156		156		
27th	145					386		386		386					156		156		
28th	190					354		354		354					156		156		
29th	177					338		338		338					156		156		
30th	93					322		322		322					156		156	29,596	
Half monthly total																			
Monthly total																			

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		Approximations for quantities to be impounded on dates named.				Conditions at the Cauvery dam three days later.							Conditions at Kannambadi dam on dates named.							
		2				3	4	5	6	7	8	9	10	11	12	13	14	15	16	
		a	b	c	d															e
Month and date.		Y = Flow at Kannambadi in mlla. cubic feet.	NY = Probable flow at Cauvery dam; N = $\frac{1}{2}$ from June to September; N = $\frac{3}{4}$ from October to January.	NY - Z = Probable excess over the limit at Cauvery dam; Z = column 16.	NY - Z = Value of column 2 (c) at Kannambadi dam, $\frac{1}{2}$ of column 2 (c).	Quantity to be impounded at Kannambadi dam, column 2 (d) or 2 (a) whichever is less.	Flow at the Cauvery dam in mlla. cubic feet, three days later.	Value of column 2 (a) at Cauvery dam = $\frac{1}{2}$ of column 2 (c).	Net flow at Cauvery dam, column 3 - column 4 + $\frac{1}{2}$ of surplus at Kannambadi, if any.	Compensation water, column 3 if less than Z or Z - column 5; Z = limit in column 16.	Resulting flow at Cauvery dam, column 5 + column 6, three days previous.	Quantity running to waste at Cauvery dam above limit.	Quantity running to waste out of compensation water.	Gross storage in the reservoir, column 2 (a) + previous day's balance in column 16.	Compensation water converted to Kannambadi reservoir, $\frac{1}{2}$ of column 6.	Draw-off for irrigation, etc.	Surplus when the reservoir is full.	Total of columns 11, 12 & 13.	Balance in the reservoir.	Limit of flow allowed at Cauvery dam = Z.
1st	..	128	..	..	..	..	338	..	338	..	338	..	..	29,596	..	..	..	156	..	638
2nd	..	71	..	..	..	..	354	..	354	..	354	..	..	..	..	..	156	156	..	..
3rd	..	71	..	..	..	..	338	..	338	..	338	..	..	..	..	..	156	156	..	..
4th	..	70	..	..	..	..	322	..	322	..	322	..	..	..	..	..	156	156	..	..
5th	..	76	..	..	..	..	322	..	322	..	322	..	..	..	..	..	156	156	..	..
6th	..	83	..	..	..	..	290	..	290	..	290	..	..	..	..	..	156	156	..	..
7th	..	67	..	..	..	..	272	..	272	..	272	..	..	..	..	..	156	156	..	..
8th	..	61	..	..	..	..	254	..	254	..	254	..	..	..	..	..	156	156	..	..
9th	..	61	..	..	..	..	236	..	236	..	236	..	..	..	..	..	156	156	..	..
10th	..	58	..	..	..	..	218	..	218	..	218	..	..	..	..	..	156	156	..	..
11th	..	58	..	..	..	..	218	..	218	..	218	..	..	..	..	..	156	156	..	..
12th	..	58	..	..	..	..	200	..	200	..	200	..	..	..	..	..	156	156	..	..
13th	..	58	..	..	..	..	186	..	186	..	186	..	..	..	..	..	156	156	..	..
14th	..	58	..	..	..	..	186	..	186	..	186	..	..	..	..	..	156	156	..	..
15th	..	58	..	..	..	..	186	..	186	..	186	..	..	..	..	..	156	156	27,256	..
Half-monthly total	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
16th	..	56	..	..	..	..	186	..	186	..	186	..	..	27,266	..	..	156	156	..	..
17th	..	60	..	..	..	..	172	..	172	..	172	..	..	..	..	..	156	156	..	..
18th	..	12	..	..	..	..	158	..	158	..	158	..	..	..	..	..	156	156	..	..
19th	..	12	..	..	..	..	158	..	158	..	158	..	..	..	..	..	156	156	26,832	..
20th	..	265	795	425	567	265	144	199	199	199	199	..	..	26,897	..	..	156	156	26,741	..
21st	..	265	795	425	567	265	144	199	199	199	199	..	..	27,006	..	..	156	156	26,850	..
22nd	..	265	795	425	567	265	98	199	199	199	199	..	..	27,115	..	..	156	156	26,939	..
23rd	..	0	..	..	..	..	82	..	82	..	82	..	..	26,939	265	..	156	156	26,538	..
24th	..	0	..	..	..	..	50	..	50	..	50	..	..	26,538	265	..	156	156	26,117	..
25th	..	0	..	..	..	..	66	..	66	..	66	..	..	26,117	265	..	156	156	25,696	..
26th	..	0	..	..	..	..	44	..	44	..	44	..	..	..	..	..	156	156	..	..
27th	..	16	..	..	..	..	32	..	32	..	32	..	..	..	..	..	156	156	..	..
28th	..	16	..	..	..	..	32	..	32	..	32	..	..	..	..	..	156	156	..	..
29th	..	16	..	..	..	..	32	..	32	..	32	..	..	..	..	..	156	156	..	..
30th	..	16	..	..	..	..	32	..	32	..	32	..	..	..	..	..	156	156	..	..
31st	..	23	..	..	..	..	26	..	26	..	26	..	..	..	..	..	156	156	24,760	..
Half-monthly total	..	..	..	..	..	..	..	..	..	597	..	..	..	..	795	..	..	..	..	..
Monthly total	..	..	..	..	..	..	..	..	..	597	..	..	..	..	795	..	..	..	..	..

1		on dates named.				conditions at the Cauvery dam three days later.								Conditions at the Kannambadi dam on dates named.						
		2				3	4	5	6	7	8	9	10	11	12	13	14	15	16	
		a	b	c	d															e
Month and date.		Y = Flow at Kannambadi in mlla. cubic feet.	NY = Probable flow at Cauvery dam; N = $\frac{1}{2}$ from June to September; N = $\frac{3}{4}$ from October to January.	NY - Z = Probable excess over the limit at Cauvery dam; Z = column 16.	NY - Z = Value of column 2 (c) at Kannambadi dam; $\frac{1}{2}$ of column 2 (c).	Quantity to be impounded at Kannambadi dam, column 2 (d) or 2 (a) whichever is less.	Flow at the Cauvery dam in mlla. cubic feet, three days later.	Value of column 2 (a) at Cauvery dam = $\frac{1}{2}$ of column 2 (c).	Net flow at Cauvery dam, column 3 - column 4 + $\frac{1}{2}$ of surplus at Kannambadi, if any.	Compensation water column, column 5 if less than Z or Z - column 6; Z = limit in column 16.	Resulting flow at Cauvery dam, column 5 + column 6, three days previous.	Quantity running to waste at Cauvery dam above limit.	Quantity running to waste out of compensation water.	Gross storage in the reservoir, column 2 (a) + previous day's balance in column 16.	Compensation water converted to Kannambadi reservoir, $\frac{1}{2}$ of column 6.	Draw-off for irrigation, etc.	Surplus when the reservoir is full.	Total of columns 11, 12 & 13.	Balance in the reservoir.	Limit of flow allowed at Cauvery dam = Z.
1st	..	157	..	..	..	..	539	..	539	..	539	89	..	10,000	..	43	..	..	..	450
2nd	..	110	..	..	..	..	618	..	618	..	618	168	..	..	..	43	..	..	..	..
3rd	..	124	..	..	..	..	286	..	286	..	286	..	..	..	..	43	..	..	..	..
4th	..	118	..	..	..	..	172	..	172	..	172	..	..	..	..	43	..	..	..	..
5th	..	132	..	..	..	..	617	..	617	..	617	67	..	..	..	43	..	..	..	..
6th	..	146	..	..	..	..	786	..	786	..	786	836	..	..	..	43	..	..	..	..
7th	..	120	..	..	..	..	561	..	561	..	561	111	..	..	..	43	..	..	..	..
8th	..	97	..	..	..	..	539	..	539	..	539	39	..	..	..	43	..	..	..	..
9th	..	286	458	8	11	11	435	..	427	..	427	..	..	9,667	..	43	..	43	9,666	..
10th	..	720	1,162	702	936	720	371	..	169	..	169	..	..	10,344	..	43	..	43	10,301	..
11th	..	702	1,123	673	897	702	419	..	108	..	108	..	..	11,003	..	43	..	43	10,960	..
12th	..	688	1,101	651	868	688	1,123	..	607	..	615	165	..	11,648	..	43	..	43	11,594	..
13th	..	1,163	1,861	1,411	1,881	1,163	1,629	..	757	..	1,297	237	..	12,767	..	43	..	763	11,994	..
14th	..	1,438	2,301	1,851	2,468	1,438	3,338	..	2,354	..	2,781	1,721	..	13,432	..	43	..	745	12,687	..
15th	..	1,100	1,760	1,310	1,747	1,100	3,459	..	2,634	..	2,634	1,574	..	13,787	..	43	..	43	13,744	..
Half-monthly total	..	..	..	..	..	5,822	..	..	..	1,075	..	4,567	772	..	1,433	..	..	..	..	..
16th	..	712	1,139	79	105	105	2,791	..	2,712	..	2,712	1,652	..	13,849	..	152	..	152	13,697	..
17th	..	578	..	..	..	..	1,973	..	1,973	..	1,973	913	..	..	..	152	..	..	..	..
18th	..	471	..	..	..	..	786	..	786	..	786	..	..	..	..	152	..	..	..	..
19th	..	330	..	..	..	..	698	..	698	..	698	..	..	..	..	152	..	..	..	..
20th	..	315	..	..	..	..	595	..	595	..	595	..	..	..	..	152	..	..	..	..
21st	..	262	..	..	..	..	495	..	495	..	495	..	..	..	..	152	..	..	..	..
22nd	..	214	..	..	..	..	435	..	435	..	435	..	..	..	..	152	..	..	..	..
23rd	..	132	..	..	..	..	387	..	387	..	387	..	..	..	..	152	..	..	..	..
24th	..	100	..	..	..	..	355	..	355	..	355	..	..	..	..	152	..	..	..	..
25th	..	128	..	..	..	..	323	..	323	..	323	..	..	..	..	152	..	..	..	..
26th	..	303	..	..	..	..	307	..	307	..	307	..	..	..	..	152	..	..	..	..
27th	..	248	..	..	..	..	307	..	307	..	307	..	..	..	..	152	..	..	..	..
28th	..	472	1,594	534	712	712	273	..	273	..	273	..	..	..	..	152	..	152	11,873	..
29th	..	996	..	..	..	..	355	..	355	..	355	..	..	12,585	..	152	..	152	12,433	..
30th	..	569	..	..	..	..	817	..	355	..	355	..	..	12,433	..	152	..	152	12,281	..
Half-monthly total	..	..	..	..	..	6,639	..	..	..	534	..	2,565	772	..	Nil.	..	..	..	..	..
Monthly total	..	..	..	..	..	..	..	..	..	1,609	..	7,122	..	..	1,433	..	..	..	..	..

Approximations for quantities to be impounded on dates named.										Conditions at the Cauvery dam three days later.										Conditions at the Kannambadi dam on dates named.											
1		2		3		4		5		6		7		8		9		10		11		12		13		14		15		16	
a	b	c	d	e	f	g	h	i	j	k	l	m	n	o	p	q	r	s	t	u	v	w	x	y	z	aa	ab	ac	ad	ae	
Y = Flow at Kannambadi in mlla. cubic feet.	NY = Probable flow at Cauvery dam; N = 3 from June to September; N = 2 from October to January.	NY - Z = Probable excess over the limit at Cauvery dam; Z = column 16.	$\frac{Y - Z}{2}$ = Value of column 2 (e).	Quantity to be impounded at Kannambadi dam, column 2 (d) or 2 (e) whichever is less.	Flow at the Cauvery dam in mlla. cubic feet, three days later.	Value of column 2 (e) at Cauvery dam = $\frac{1}{2}$ of column 3 (e).	Net flow at Cauvery dam, column 3 - column 4 + $\frac{1}{2}$ of surplus at Kannambadi, if any.	Compensation water, column 8 if less than Z or Z - column 16.	Resending flow at Cauvery dam, column 5 + column 6, three days previous.	Quantity running to waste at Cauvery dam above limit.	Quantity running to waste out of compensation water.	Gross storage in the reservoir, column 7 (e) + previous day's balance in column 16.	Compensation water converted to Kannambadi reservoir, $\frac{1}{2}$ of column 6.	Draw-off for irrigation, etc.	Surplus when the reservoir is full.	Total of columns 11, 12 & 13.	Balance in the reservoir.	Limit of flow allowed at Cauvery dam = Z.													
1st	491	..	..	..	1,243	..	..	1,243	..	..	..	..	..	..	..	..	..	..	12,281	..	..	..	..	..	..	..	..	..	..	12,126	
2nd	387	..	..	..	1,629	..	..	1,629	..	..	..	..	..	..	..	..	..	..	12,126	..	..	..	..	..	..	..	..	..	..	11,257	
3rd	444	..	..	..	1,563	..	..	..	..	..	..	..	..	..	..	..	..	..	11,257	..	..	..	..	..	..	..	..	..	..	..	
4th	425	..	..	..	1,732	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	
5th	501	..	..	..	732	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	
6th	757	..	..	..	840	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	
7th	627	..	..	..	948	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	
8th	576	..	..	..	780	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	
9th	498	..	..	..	698	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	
10th	530	..	..	..	663	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	
11th	636	..	..	..	840	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	
12th	674	..	..	..	732	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	
13th	583	..	..	..	698	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	
14th	584	..	..	..	948	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	
15th	541	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	
Half-monthly total	..	..	..	..	..	..	..	..	..	..	534	..	..	..	..	..	..	..	10,510	..	..	..	..	..	..	..	..	..	..	..	10,384
6th	1,616	..	..	..	4,824	..	..	..	3,863	..	..	..	..	..	..	..	..	..	15,631	..	..	..	..	..	..	..	..	..	..	..	15,455
7th	6,267	..	..	..	14,027	..	..	..	10,077	..	..	..	..	..	..	..	..	..	23,727	..	..	..	..	..	..	..	..	..	..	..	23,571
8th	8,262	..	..	..	12,038	..	..	..	6,842	..	..	..	..	..	..	..	..	..	31,916	..	..	..	..	..	..	..	..	..	..	..	31,760
9th	8,346	..	..	..	11,568	..	..	..	5,023	..	..	..	..	..	..	..	..	..	39,383	..	..	..	..	..	..	..	..	..	..	..	39,227
10th	7,823	..	..	..	13,352	..	..	..	6,267	..	..	..	..	..	..	..	..	..	42,762	..	..	..	..	..	..	..	..	..	..	..	42,606
11th	6,812	..	..	..	7,009	..	..	..	6,892	..	..	..	..	..	..	..	..	..	40,216	..	..	..	..	..	..	..	..	..	..	..	40,060
12th	8,166	..	..	..	3,166	..	..	..	4,362	..	..	..	..	..	..	..	..	..	49,034	..	..	..	..	..	..	..	..	..	..	..	48,878
13th	3,166	..	..	..	1,944	..	..	..	3,617	..	..	..	..	..	..	..	..	..	38,906	..	..	..	..	..	..	..	..	..	..	..	38,750
14th	1,944	..	..	..	3,794	..	..	..	2,898	..	..	..	..	..	..	..	..	..	37,833	..	..	..	..	..	..	..	..	..	..	..	37,677
15th	1,590	..	..	..	2,010	..	..	..	3,048	..	..	..	..	..	..	..	..	..	37,833	..	..	..	..	..	..	..	..	..	..	..	37,680
16th	1,275	..	..	..	2,165	..	..	..	2,048	..	..	..	..	..	..	..	..	..	37,833	..	..	..	..	..	..	..	..	..	..	..	37,680
17th	1,372	..	..	..	2,165	..	..	..	1,772	..	..	..	..	..	..	..	..	..	38,043	..	..	..	..	..	..	..	..	..	..	..	37,883
18th	1,467	..	..	..	2,095	..	..	..	1,978	..	..	..	..	..	..	..	..	..	38,013	..	..	..	..	..	..	..	..	..	..	..	37,880
19th	1,463	..	..	..	2,235	..	..	..	1,978	..	..	..	..	..	..	..	..	..	38,359	..	..	..	..	..	..	..	..	..	..	..	38,203
20th	1,616	..	..	..	1,279	..	..	..	2,118	..	..	..	..	..	..	..	..	..	40,306	..	..	..	..	..	..	..	..	..	..	..	40,150
21st	3,225	..	..	..	3,225	..	..	..	6,016	..	..	..	..	..	..	..	..	..	41,476	..	..	..	..	..	..	..	..	..	..	..	41,320
22nd	5,160	..	..	..	6,132	..	..	..	7,060	..	..	..	..	..	..	..	..	..	41,476	..	..	..	..	..	..	..	..	..	..	..	41,320
23rd	7,034	..	..	..	7,167	..	..	..	3,297	..	..	..	..	..	..	..	..	..	46,296	..	..	..	..	..	..	..	..	..	..	..	46,140
24th	3,409	..	..	..	5,409	..	..	..	..	..	..	..	..	..	..	..	..	..	46,296	..	..	..	..	..	..	..	..	..	..	..	46,140
25th	5,409	..	..	..	54,894	..	..	..	..	..	..	..	..	..	..	..	..	..	54,894	..	..	..	..	..	..	..	..	..	..	..	54,738
26th	7,034	..	..	..	54,894	..	..	..	..	..	..	..	..	..	..	..	..	..	54,894	..	..	..	..	..	..	..	..	..	..	..	54,738
27th	3,409	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
28th	5,409	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
29th	7,034	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
30th	3,409	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
31st	4,396	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
Half-monthly total	..	..	..	..	..	..	..	..	..	..	534	..	..	..	..	..	..	..	534	..	..	..	..	..	..	..	..	..	..	..	..
Monthly total	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..

Approximations for quantities to be impounded on dates named.										Conditions at the Cauvery dam three days later.										Conditions at the Kannabadi dam on dates named.									
		3		4		5		6		7		8		9		10		11		12		13		14		15		16	
Month and date.		X = Flow at Kannabadi in mlls. cubic feet.	NY = Probable flow at Cauvery dam; N = $\frac{1}{2}$ from June to September; N = 8 from October to January.	NY - Z = Probable excess over the limit at Cauvery dam; Z = column 16.	NY - Z = Value of column 2(a) at Kannabadi dam, $\frac{1}{2}$ of column 2(c).	Quantity to be impounded at Kannabadi dam, column 2(d) or 2(e) whichever is less.	Flow at the Cauvery dam in mlls. cubic feet, three days later.	Value of column 2(a) at Cauvery dam = $\frac{1}{2}$ of column 2(c).	Net flow at Cauvery dam, column 8 -- column 4 + $\frac{1}{2}$ of surplus at Kannabadi, if any.	'Compensation water, column 8 if less than Z or Z -- column 16.	Identifying flow at Cauvery dam, column 6 + column 6, three days previous.	Quantity running to waste at Cauvery dam above limit.	Quantity running to waste out of compensation to water.	Gross storage in the reservoir, column 2(a) + previous day's balance in column 16.	Compensation water converted to Kannabadi reservoir, $\frac{1}{2}$ of column 6.	Draw-off for irrigation, etc.	Surplus when the reservoir is full.	Total of columns 11, 12 & 13.	Balance in the reservoir.	Limit of flow allowed at Cauvery dam = Z.									
1st	..	4,786	7,658	6,033	8,044	4,786	7,287	3,639	7,171	5,516	7,271	..	..	41,866	..	..	4,630	4,786	37,080	..									
2nd	..	4,981	7,970	6,345	8,460	4,981	7,167	3,736	7,060	5,425	7,060	..	..	42,071	..	..	4,825	4,981	37,080	..									
3rd	..	5,125	8,200	6,575	8,767	5,125	6,868	3,844	6,946	5,546	6,946	..	..	42,265	..	..	4,969	5,125	37,080	..									
4th	..	4,472	7,155	6,630	7,773	4,472	6,868	3,834	5,765	4,141	5,765	..	..	41,564	..	..	4,316	4,472	37,080	..									
5th	..	4,235	6,976	6,161	7,373	4,235	6,874	3,776	4,760	3,135	4,760	..	..	41,315	..	..	4,079	4,235	37,080	..									
6th	..	3,106	4,970	3,445	4,160	3,106	4,834	2,329	3,768	2,143	3,768	..	..	40,156	..	..	2,950	3,106	37,080	..									
7th	..	2,817	4,507	2,882	3,843	2,817	4,012	2,113	3,895	2,270	3,895	..	..	39,837	..	..	1,661	2,817	37,080	..									
8th	..	2,057	3,301	1,666	2,221	2,057	3,526	1,643	3,009	1,784	3,009	..	..	39,137	..	..	1,901	2,057	37,080	..									
9th	..	1,997	3,195	1,570	2,093	1,997	2,636	1,498	2,539	1,914	2,539	..	..	39,077	..	..	1,841	1,997	37,080	..									
10th	..	1,691	2,706	1,081	1,441	1,691	2,375	1,081	2,268	1,784	2,268	..	..	38,591	..	..	1,285	1,691	37,080	1,625									
11th	..	1,331	2,130	505	673	1,331	1,841	606	1,978	1,285	1,978	..	..	37,784	..	..	617	1,331	37,080	..									
12th	..	1,212	1,939	314	419	1,212	1,629	314	1,707	82	1,707	..	..	37,499	..	..	263	1,212	37,080	..									
13th	..	1,036	1,658	33	44	1,036	1,429	33	1,596	..	1,596	..	..	36,968	..	..	..	156	36,968	..									
14th	..	814	1	..	..	..	1,243	..	1,243	..	1,243	..	..	36,812	..	..	..	156	36,812	..									
15th	..	744	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	156	36,566	..									
Half-monthly total	..	..	..	..	..	36,153	..	..	..	30,347	..	..	..	..	..	..	31,237	..	..	..									
16th	..	704	..	..	..	..	1,183	..	1,183	..	1,212	..	..	36,656	..	39	..	195	36,461	..									
17th	..	613	..	..	..	..	1,123	..	1,123	..	1,123	..	..	..	..	..	..	156	..	..									
18th	..	599	..	..	..	..	1,002	..	1,002	..	1,002	..	..	..	..	..	..	156	..	..									
19th	..	674	..	..	..	..	894	..	894	..	894	..	..	..	..	..	..	156	..	..									
20th	..	618	..	..	..	..	894	..	894	..	894	..	..	..	..	..	..	156	..	..									
21st	..	675	..	..	..	..	840	..	840	..	840	..	..	..	..	..	..	156	..	..									
22nd	..	670	..	..	..	..	1,002	..	1,002	..	1,002	..	..	..	..	..	..	156	..	..									
23rd	..	952	..	..	..	..	1,063	..	1,063	..	1,063	..	..	..	..	..	..	156	..	..									
24th	..	1,216	1,946	321	428	428	1,563	321	1,242	..	1,242	..	..	35,787	..	..	..	156	35,309	1,625									
25th	..	1,183	1,813	188	251	251	1,563	188	1,375	..	1,375	..	..	35,892	..	..	..	156	35,641	..									
26th	..	1,307	2,091	466	251	621	1,826	166	1,376	..	1,376	..	..	36,387	..	..	..	156	35,736	..									
27th	..	1,140	1,854	199	265	265	1,629	199	1,376	..	1,376	..	..	36,387	..	..	..	156	36,201	..									
28th	..	892	..	..	..	..	1,429	199	1,429	195	1,751	126	126	35,882	..	..	..	156	35,882	..									
29th	..	802	..	..	..	..	1,123	..	1,123	..	1,123	..	..	35,882	..	..	..	156	35,882	..									
30th	..	934	..	..	..	..	1,002	..	1,002	..	1,002	..	..	35,475	..	..	..	156	35,475	..									
31st	..	809	..	..	..	..	1,123	..	1,123	..	1,123	..	..	34,688	..	..	..	156	34,688	..									
Half-monthly total	..	..	..	..	..	1,565	..	..	..	1,170	..	126	126	..	..	..	Nil.	..	..	..									
Monthly total	..	..	..	..	..	37,718	..	..	..	1,199	..	30,473	126	..	1,599	..	34,237	..	..	..									

		Approximations for quantities to be impounded on dates named.					Conditions at the Cauvery dam three days later.					Conditions at the Kannambadi dam on dates named.								
1	Month and date.	2					3	4	5	6	7	8	9	10	11	12	13	14	15	16
		a	b	c	d	e														
		Y = Flow at Kannambadi in mlla. cubic feet.	N Y = Probable flow at Cauvery dam. N = $\frac{1}{2}$ from June to September; N = 8 from October to January.	N Y - Z = Probable excess over the limit at Cauvery dam: Z = limit in column 16.	$\frac{N Y - Z}{2}$ = Value of column 2 (a) at Kannambadi dam, $\frac{1}{2}$ of column 2 (c).	Quantity to be impounded at Kannambadi dam, column 2 (d) or 2 (e) whichever is less.	Flow at the Cauvery dam in mlla. cubic feet, three days later.	Value of column 2 (a) at (Cauvery dam) = $\frac{1}{2}$ of column 2 (c).	Net flow at Cauvery dam, column 8 - column 4 + $\frac{1}{2}$ of surplus at Kannambadi, if any.	Compensation water, column 8 if less than Z or Z - column 6; Z = limit in column 16.	Resulting flow at Cauvery dam, column 5 + column 6, three days previous.	Quantity running to waste at Cauvery dam above limit.	Quantity running to waste out of compensation water.	Gross storage in the reservoir, column 2 (a) + previous day's balance in column 16.	Compensation water converted to Kannambadi reservoir, $\frac{1}{2}$ of column 6.	Draw-off for irrigation, etc.	Surplus when the reservoir is full.	Total of columns 11, 12 & 13.	Balance in the reservoir.	Limit of flow allowed at Cauvery dam = Z.
1st	..	758	..	..	..	..	1,002	..	1,002	..	1,002	..	..	34,126	..	..	..	..	..	1,626
2nd	..	874	..	..	..	..	894	..	894	..	894	..	..	..	..	..	..	..	..	..
3rd	..	946	..	..	..	..	1,123	..	1,123	..	1,123	..	..	..	..	..	..	..	..	..
4th	..	910	..	..	..	..	1,429	..	1,429	..	1,429	..	..	..	..	..	..	..	..	..
5th	..	863	..	..	..	..	1,303	..	1,303	..	1,303	..	..	..	..	..	..	..	..	..
6th	..	785	..	..	..	..	1,063	..	1,063	..	1,063	..	..	..	..	..	..	..	..	..
7th	..	697	..	..	..	..	948	..	948	..	948	..	..	..	..	..	..	..	..	..
8th	..	671	..	..	..	..	840	..	840	..	840	..	..	..	..	..	..	..	..	..
9th	..	500	..	..	..	..	664	..	664	..	664	..	..	..	..	..	..	..	..	..
10th	..	448	..	..	..	..	629	..	629	..	629	..	..	..	..	..	..	..	..	..
11th	..	394	..	..	..	..	562	..	562	..	562	..	..	..	..	..	..	..	..	..
12th	..	357	..	..	..	..	518	..	518	..	518	..	..	..	..	..	..	..	..	..
13th	..	393	..	..	..	..	473	..	473	..	473	..	..	..	..	..	..	..	..	..
14th	..	223	..	..	..	..	451	..	451	..	451	..	..	..	..	..	..	..	..	..
15th	..	296	..	..	..	..	419	..	419	..	419	..	..	..	..	..	..	..	..	..
Half-monthly total	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	31,786	..
16th	..	288	..	..	..	..	419	..	419	..	419	..	..	..	..	..	..	..	..	..
17th	..	263	..	..	..	..	419	..	419	..	419	..	..	..	..	..	..	..	..	..
18th	..	266	..	..	..	..	451	..	451	..	451	..	..	..	..	..	..	..	..	..
19th	..	266	..	..	..	..	451	..	451	..	451	..	..	..	..	..	..	..	..	..
20th	..	287	..	..	..	..	1,498	..	1,498	..	1,498	..	378	..	..	..	..	..	..	..
21st	..	320	..	..	..	..	1,183	..	1,183	..	1,183	..	63	..	..	..	..	..	..	..
22nd	..	316	..	..	..	..	732	..	732	..	732	..	..	..	..	..	..	..	..	..
23rd	..	318	..	..	..	..	1,063	..	1,063	..	1,063	..	..	..	..	..	..	..	..	..
24th	..	284	..	..	..	..	1,243	..	1,243	..	1,243	..	173	..	..	..	..	..	..	..
25th	..	446	..	..	..	..	1,325	..	1,325	..	1,325	..	305	..	..	..	..	..	..	..
26th	..	415	..	..	..	..	1,296	..	1,296	..	1,296	..	2,676	..	..	..	..	..	..	..
27th	..	517	..	..	..	..	4,796	..	4,796	..	4,796	..	1,639	..	..	..	..	..	..	..
28th	..	361	..	..	..	..	2,759	..	2,759	..	2,759	..	..	..	..	..	..	..	..	..
29th	..	609	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
30th	..	675	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	29,446	..
Half-monthly total	..	..	..	..	..	..	..	..	..	..	..	6,084	..	..	..	..	..	..	168	..
Monthly total	..	..	..	..	..	..	..	..	..	..	..	6,084	..	..	..	..	..	..	..	..

Approximations for quantities to be impounded on dates n. need.										Conditions at the Cauvery dam three days later.					Conditions at the Kannambadi dam on dates named.					
1		2	3	4	5	6	7	8	9	10	11	12	13	14	15	16				
Month and date.		Y = flow at Kannambadi in millie. cubic feet.	NY = Probable flow at Cauvery dam; N = $\frac{1}{2}$ from June to September; N = 3 from October to January.	NY - Z = Probable excess over the limit at Cauvery dam; Z = limit in column 16.	NY - Z = Value of column 2 (a) at Kannambadi dam, $\frac{1}{2}$ of column 2 (a).	Quantity to be impounded at Kannambadi dam, column 2 (a) or 2 (a) whichever is less.	Flow at the Cauvery dam in millie. cubic feet, three days later.	Value of column 2 (a) at Cauvery dam = $\frac{1}{2}$ of column 2 (a).	Net flow at Cauvery dam, column 3 - column 4 + $\frac{1}{2}$ of surplus at Kannambadi, if any.	Compensation water, column 3 if less than Z or Z - column 16.	Resulting flow at Cauvery dam, column 5 + column 6, three days previous.	Quantity running to waste at Cauvery dam above limit.	Quantity running to waste out of compensation water.	Gross storage in the reservoir, column 2 (a) + previous day's balance in column 16.	Compensation water converted, $\frac{1}{2}$ of column 6.	Draw-off for irrigation, etc.	Surplus when the reservoir is full.	Total of columns 11, 12 & 13.	Balance in the reservoir.	Limit of flow allowed at Cauvery dam = Z.
October 1913.																				
1st	..	626	1,914	674	899	678	2,504	478	2,426	..	2,426	1,186	..	30,084	..	166	..	156	29,928	1,940
2nd	..	673	2,019	779	1,039	673	2,923	505	2,418	..	2,418	1,178	..	30,501	..	166	..	156	30,445	..
3rd	..	624	1,902	662	888	634	2,901	476	2,436	..	2,436	1,186	..	31,079	..	166	..	156	30,928	..
4th	..	714	2,142	902	1,203	714	3,432	535	2,897	..	2,897	1,657	..	31,637	..	166	..	156	31,481	..
5th	..	704	2,112	872	1,163	704	3,368	528	2,840	..	2,840	1,600	..	32,186	..	166	..	156	32,029	..
6th	..	632	1,896	656	875	682	2,868	474	2,009	..	2,009	1,600	..	32,661	..	166	..	156	32,502	..
7th	..	845	2,655	1,295	1,727	845	3,463	634	1,671	..	1,671	1,431	..	33,156	..	156	..	156	33,004	..
8th	..	979	2,937	1,697	2,063	979	3,746	734	2,012	..	2,012	1,448	..	34,178	..	156	..	156	34,017	..
9th	..	804	2,412	1,172	1,663	804	2,746	603	1,562	..	1,562	1,448	..	34,321	..	156	..	156	34,165	..
10th	..	692	2,076	886	1,115	692	2,165	519	1,448	..	1,448	1,448	..	34,321	..	156	..	156	34,165	..
11th	..	503	1,509	299	369	369	1,967	269	1,034	206	1,034	208	..	35,560	..	156	..	156	35,201	..
12th	..	629	1,597	347	463	463	1,903	269	1,034	..	1,034	..	..	35,560	..	156	..	156	35,404	..
13th	..	1,107	3,321	2,031	2,776	1,107	4,193	830	3,363	..	3,363	2,123	..	36,818	..	156	..	156	36,711	..
14th	..	3,220	9,660	6,820	11,227	3,220	6,396	2,415	6,286	..	6,286	5,045	206	39,982	..	156	2,371	2,802	37,080	..
15th	..	3,373	10,119	6,877	11,639	3,373	6,616	2,530	6,498	..	6,498	4,268	..	40,453	..	156	3,217	3,373	37,080	..
half-monthly total ..		..	..	..	..	15,837	..	..	..	206	..	20,777	206	..	275	..	5,568	..	..	..
16th	..	2,301	6,903	5,663	7,551	2,301	4,535	1,726	4,418	..	4,418	3,178	..	39,381	..	156	2,145	2,301	37,080	..
17th	..	1,299	3,897	2,667	3,648	1,199	3,332	974	3,215	..	3,215	1,975	..	38,379	..	156	1,142	1,299	37,080	..
18th	..	1,005	3,015	1,715	2,367	1,005	2,085	754	1,978	..	1,978	738	..	38,185	..	156	846	1,005	37,080	..
19th	..	775	2,325	1,086	1,447	775	1,954	685	1,572	..	1,572	332	..	37,875	..	156	619	775	37,080	..
20th	..	620	1,860	620	837	620	1,429	466	1,312	..	1,312	72	..	37,700	..	156	494	620	37,080	..
half-monthly total ..		..	..	..	..	6,000	..	..	..	..	..	6,295	..	..	..	..	5,226	..	..	..
Monthly total ..	..	..	..	..	..	21,837	..	..	..	206	..	27,072	206	..	275	..	10,808	..	..	..

APPENDIX XX.

Extract from the "Madras Mail," dated 19th May 1918.

THE CAUVERY RESERVOIR.

The ambitious project of the Mysore Government for damming the Cauvery river at Kannambadi, 8 miles above the island of Seringapatam, thereby creating a huge reservoir, the water of which will be used for irrigation purposes and for the supply of power for the generation of electricity, reached a practical stage some considerable time ago, and has now been taken a step further by the completion of a scheme, which has been published by the Mysore Government, for carrying out the difficult and delicate negotiations connected with the acquisition of the land which will eventually form the projected reservoir. The construction of this Cauvery reservoir involves the submersion of about 5,000 acres of wet land and 4,656 acres of dry land, situated in forty-eight villages, of which eight villages will be more or less completely submerged, and will also render necessary the displacement of a population of about 5,000 souls. The task of acquiring these lands by the payment of compensation and of resettling the population displaced has proved a problem which the Mysore Government have finally solved, after long and anxious consideration. The magnitude of the work has given rise to peculiar difficulties and His Highness the Maharaja's Government are to be congratulated on the scheme they have devised, which, while it safeguards the interest of the local agriculturists, will enable the authorities to acquire the necessary land at the minimum financial outlay.

The mere acquisition proceedings do not present any extraordinary difficulties, for competent machinery already exists for this work, but should they be carried out in the customary way, and monetary compensation be handed over to the owners of the area acquired, the displaced population would be unable, if left to themselves, to obtain other land for cultivation and would not, on account of their numbers, have any opportunity of resettling as agriculturists in the same neighbourhood. The authorities wish to avoid the hardships that have been caused to the people in similar operations in other parts of the country, where it has been found that, if the Government content themselves with paying compensation in money to the owners of land and neglect to ensure their resettlement, the result is, almost invariably, finally to reduce them to the condition of day labourers. To prevent this, the aim of the present project is to provide the displaced ryots with lands in exchange for those taken from them, supplemented, where necessary, by monetary compensation. In most cases it would be necessary to provide this land from the area which will eventually be irrigated by the new reservoir, but the Mysore Government have, luckily, in the immediate neighbourhood, facilities for carrying out three channel extension projects, which will be taken advantage of for the present project, and which will, it is estimated, provide irrigation for an area large enough for the purpose required.

These projects are the Alalkatte, Hemagiri and Mandagiri channel schemes, which were prepared some years ago and which are estimated to cost about Rs. 25 lakhs. It will be a substantial addition to the cost of the acquisition if they are to be carried out as well, but the compensating advantages are so great that the Government have decided that they shall be undertaken. The estimated cost of acquiring the Cauvery reservoir area was put down in the sanctioned estimate at Rs. 10 lakhs, a sum which will probably be largely exceeded. If land compensation is attempted, it is estimated that the Government may have to spend about Rs. 13 lakhs more, but this additional Rs. 13 lakhs will enable the Government to carry out three important channel extensions and will be a remunerative outlay in itself. The Government also point out that, although these projects have been ready for some years, and their construction has been repeatedly urged by the Representative Assembly, they could not be sanctioned, as the water-supply was uncertain. The Cauvery reservoir will now, however, protect all the irrigated area below it, and the extension of the upper channels can therefore be carried out without risk of detriment to irrigation in the lower reaches. After the most careful consideration, the Government have come to the conclusion that, if worked with proper safeguards, the proposal to give land in exchange for that to be acquired will prove more economical than monetary compensation from the point of view of the Mysore State, and by adopting it they will be consulting the permanent interests of the displaced population. They have accordingly adopted the scheme.

Exhibit Ma. 14.

MADRAS REJOINDER TO MYSORE—PARTS I AND II, My.-9.

PART VIII.—LEGAL ARGUMENTS.

Instead of replying to the Mysore memoranda paragraph by paragraph, it will be convenient at this stage to review briefly the course of their argument on the question of the extent of the prescriptive rights of Madras so as to indicate certain changes in the same from time to time and bring out prominently such of the arguments as now remain to be considered.

2. Some general arguments originally advanced or suggested, evidently on the basis of the *a priori* right of the Mysore State to use up all waters within the limits of the State, are no longer maintained and need no further notice—*vide* Mysore case, Appendix Q, paragraphs 1 and 2.

3. Again, the question of the particular kind of prescription that the authors of the agreement had in view deserves no further discussion, as it is of little practical significance in the present circumstances and it is common ground that the principles both of the law of prescription and of the law of easements can apply here not in their entirety but only by way of analogy so far as there is reasonable ground for such analogy.

4. It is also common ground that the rights of Madras are to be determined, as in the year 1910, on the basis of the agreement of 1892. But Mysore are obviously wrong in trying to deduce from this that the authorities cited in the Madras case (Ma.-7, paragraphs 32 to 35) on the question of fixing the extent of prescriptive rights are irrelevant under the terms of the agreement (Mysore reply, paragraph 4). The agreement only says that the extent of the prescriptive rights of Madras is to be determined "in accordance with the law on the subject of prescriptive right to the use of water, etc." What then, is the meaning of saying that the agreement discards the use of legal authorities on that very question? It requires no stretch of imagination to see why Mysore attempt to get rid of the authorities on the point in this summary way. These authorities are utterly inconsistent with the Mysore contention that the prescriptive right covers only a particular acreage of land that has been irrigated during the last twenty years. The only answer that Mysore give is that they "doubtless show that once a right has been acquired, a change in the mode and the object of exercising it is justifiable to a certain extent, but they are not useful for the purpose in view inasmuch as they throw no light at all on the question enunciated by Madras itself, namely, how is the extent of the user to be measured?" (paragraph 13 of Appendix Q, Mysore case). That this reading by Mysore of the authorities is not correct and that the answer at best amounts to little more than a suggestion of distinction without any difference is shown *infra* when dealing more fully with this point.

5. The claims of Madras in respect of water at and below the Upper Anicut are set forth and fully explained in Part III, paragraphs 7 to 15 and paragraph 44 of Ma.-9.

The claim may be divided into—

- (i) the flow required during the period March to May, and
- (ii) that required during the period June to February.

Claim (i) depends upon the understanding between Madras and Mysore in connection with the Sivasamudram supply (as to which see paragraph 78, My.-7, and paragraph 99, Madras, Part VI, Ma.-12).

The question of prescription arises chiefly in connection with claim (ii), *i.e.*, the flow during June to February.

6. The Mysore Durbar at first admitted (though only provisionally) the fairness of the Madras claim to seven feet at the Upper Anicut, and the difference between Madras and Mysore related to the rules for regulation and questions connected with losses in transmission.

7. When submitting their case to the Committee of Arbitration, the Durbar contended—

- (a) that consequent on the remodelling of the Upper Anicut the seven feet claim was under present circumstances not justifiable (paragraph 7 of My.-1), and
- (b) that, in any event, there was no justification for a claim for seven feet in five months out of nine (paragraphs 6, 8 and 9 of My.-1).

8. The Durbar went on to suggest that an addition of about 25 to 30 per cent. of the supplies provided in the Metur project should be sufficient as against the uniform depth of seven feet claimed (paragraph 10 of My.-1); but when the Madras Government expressed their willingness to consider this basis (*vide* paragraph 10 of Ma.-3), the Durbar hastened substantially to withdraw the suggestion by putting forward an interpretation (*vide* My.-4), which, to say the least, is not the natural meaning of the words used.

9. To follow the Mysore argument on point (a) above, namely, the seven feet claim at the Upper Anicut, one has to bear in mind certain assumptions made by the Durbar and certain statements of fact they put forward. They distinguish between the depth of flow at the Upper Anicut and the flow over the Cauvery dam. They postulate that "the Upper Anicut existed and still exists for the purpose of securing the irrigation supply required for the delta; but this supply is measured off at the Cauvery dam. The Upper Anicut has no direct connection with the extent of the prescriptive right which has to be determined only by the conditions that have prevailed at the Cauvery dam." They argue that "in order to secure a seven feet flow at the Cauvery dam, it used to be necessary before the remodelling, but not afterwards, to waste one foot of water over the Upper

Anicut, and this one foot was not prescriptively used for irrigation in the delta " and they themselves add that " it is on this question of fact that all the arguments of Mysore regarding the claim to one foot are entirely based " (paragraph 10 of the Mysore reply, My.-9). The several assumptions and statements of facts made or implied in the above are not admitted by Madras. But to weigh the legal force of the argument, we have to analyse the Mysore position a bit more closely.

10. Madras submit that the Upper Anicut has all along been the starting point for the distribution by the Madras authorities of the water to which they are entitled, that it is with reference to the customary flow claimed and taken at that point that the extent of Madras rights should be fixed, that their right is a single entire right to the whole flow of the Agunda Cauvery corresponding to a gauge reading of seven feet at the Cauvery dam before the Upper Anicut was remodelled and that it does not in any way concern or affect Mysore how the Madras authorities distribute that limit of supply along the several branches of the Agunda Cauvery. It is only in the event of this argument not being accepted that it would be necessary to consider separately the *several heads* of claim comprised in the general claim or as stated in paragraph II of the Madras Brief Statement (Ma.-1), viz., the supply at the Cauvery dam (as distinguished from the Upper Anicut), the supply for the Lower Coleroon system and the Veeranam tank, etc.

11. It is proved beyond doubt that prior to 1899 a flow of one foot over the Upper Anicut was necessary to give the required flow over the Cauvery dam. It is urged by Mysore that the one foot flow over the Upper Anicut could not be regarded as even then used for irrigation, but only the flow over the Cauvery dam. This is an artificial distinction with no basis in principle. If the flow at the anicut was necessary to give the required water for delta irrigation, the said limit flow is certainly required for and used for delta irrigation; for without it the delta irrigation could not be carried on in the accustomed manner. It is difficult to see what meaning Mysore would give to the expression " used for irrigation." Certainly it cannot be confined to the quantity of water that is actually put on the fields. It must cover every step which is necessary to make that last step in the process of irrigation possible. This argument of Mysore is merely an attempt to obscure the fact that their claim practically amounts to denying to us any benefits out of the remodelling works; that is, that by remodelling the Upper Anicut we have gained nothing, but have lost the right to have any longer the quantity of water that we were *ex hypothesi* entitled to before. It is said that after the remodelling the seven feet at the anicut is not necessary for the *delta irrigation*. Here comes the thin end of the wedge. Why confine the irrigation to the delta tract alone served by the Cauvery? The water flowing over the Upper Anicut was used before and according to the Madras case is still required for the purpose of irrigation under the Lower Coleroon system. But whether the water is used there or elsewhere, there is no reason why in examining the conditions of irrigation, the investigation should be confined to the usual irrigated area in the delta tract alone, served by the right branch, that is, the Cauvery. This seems to be the whole basis for the Mysore assumption that the Upper anicut is a mere regulator and that the extent of the prescriptive right does not depend upon the flow as calculated at the Upper anicut. The legal ground on which the reduction of the Madras right by one foot over the Upper anicut is based is the doctrine of abandonment, or in a somewhat different form, the principle of the cessation of easements of necessity. This will be dealt with below.

12. Another form in which the same argument is advanced is that stated in paragraph 20 of the Mysore reply (My.-9), i.e., that the quantity of water respectively used in the past for the delta irrigation and the Lower anicut irrigation " being separate and flowing in two distinct channels and also being separately measured, they cannot now be added together or redistributed in any different manner as now proposed by Madras. For the prescriptive right has, as already stated, to be considered with reference to the flow required for meeting the actual irrigational requirements of particular areas and not merely to the flow in general. Although a flow of seven feet on the Cauvery dam might have also meant a flow of 644 mills. cubic feet over the Upper anicut under old conditions, this latter flow could not have been used for the delta irrigation. It is, therefore, not permissible to divert it for use now for the delta irrigation either partly or wholly, as such a diversion would make the burden on Mysore more onerous and would further be opposed to the law of prescription." This argument involves more fallacies than one. The Durbar, for the purpose of their own argument, find it convenient to leave the Upper anicut alone and deal separately with the delta irrigation and the Lower anicut irrigation; and then on this supposed division they proceed to build the further argument that the two should not be mixed up and redistributed between the two different channels. This itself is the best proof that the limit flow in the Agunda Cauvery and not the flow over the Cauvery dam is the proper measure of the prescriptive right of Madras. The Durbar might as well urge that each channel in the delta tract should be separately dealt with and Madras should not redistribute the water-supply differently between them, but they evidently consider this too absurd to put forward. The Cauvery up to the Upper anicut is the Agunda Cauvery (all one river), and the Upper anicut is the starting point for all distribution lower down of the supply to which Madras claim to be entitled. It is no concern

of Mysore how Madras utilise or distribute this quantity within its own limits, so long as it is used for purposes connected with irrigation. The argument that such a redistribution would make the burden on Mysore more onerous has certainly no substance, for the Durbar admit (see paragraph 8 of their reply My.-9) that the user of water which has passed their boundaries does not affect them in any way. The only question is, will such redistribution be in *excess* of the prescriptive rights of Madras? The authorities cited in paragraphs 32 to 35 and 44 and 45 of Ma.-7 show that it is not. The real basis of this contention of Mysore is their general argument that our prescriptive rights extend only to the water that may now be found necessary to irrigate the old irrigated area and to no more. This contention is dealt with *infra*.

13. It now remains to discuss in some detail the two points reserved for fuller consideration, namely, (1) that the one foot claim at the Upper anicut has been abandoned or has ceased with the cessation of the necessity for it, and (2) that the extent of prescriptive rights of Madras is confined to water required for the particular acreage which has been cultivated during the last twenty years.

14. The two questions to some extent overlap each other and they may be conveniently dealt with together. The broad proposition put forward by Mysore is that the right of Madras is confined to what can be shown to have been uninterruptedly done for twenty years since 1890. This in the very nature of things is untenable, for the limit, whether judged by the quantity of water used or the acreage of irrigation, must necessarily vary from year to year from causes often beyond the control of man. This aspect is noticed in the passage cited from Doss on Riparian Rights (in paragraph 32 of Ma.-7). The author says: " A difficulty may however arise if the user has been varying in extent. It has been held that in such cases the court is not bound to found its judgment solely on the actual user proved, but may also take into consideration the surrounding circumstances." Among " surrounding circumstances " will certainly come the steps being taken by the dominant owner to expand the area of, or improve the supply to, irrigation, though of course he cannot acquire a right to more than what he *claimed* (see also the passage from Farnham cited in Ma.-7, paragraph 35).

15. Again, Madras have all along taken exception to treating the year 1890 as a starting point. This is a clear misapplication of the rule of prescription referred to in the agreement. The Durbar know full well, as is clear from the case itself, that the extent of water now claimed by Madras is well within the quantity actually taken by Madras in the past and hence they are anxious to ignore the past altogether and start the case anew from 1890 and also rely on the argument that the user of the past was not proper or necessary, at any rate so much water is not required under modern conditions and they supplement this by the plea of abandonment. In dealing with this part of the case, one cannot help wondering at the refusal of the Durbar to perceive the inconsistency of the position taken up by them. They say that all the quantity of water that Madras was taking *prior to 1890* and all that Madras was then doing with it should not count. They contend at the same time that any increase of cultivation in the delta *subsequent* to 1890 should not count either. This is certainly giving to the year 1890 almost a mystic importance. It is said that this is so because 1890 is the beginning of the period of 20 years before the present dispute. But what of that? It cannot be pretended that was the *beginning of our rights*. We had extensive rights before: what has become of them? Their answer is that under the agreement it is not enough that Madras *had* those rights, but it is further necessary that those rights should be actually existing. This provokes the question why are they not in existence? It does not matter whether the water had been used quite in the same manner or in the same place, or perhaps on the same fields all along. Whether this is in accordance with the law of prescription or not, it is idle to contend that, while from 1835 onwards Madras has admittedly been endeavouring by enormous outlay of capital to put the seven feet flow of water in the Cauvery to the best use possible, the right to it has been abandoned by Madras. The Mysore argument, if accepted, necessarily involves this result, that by no amount of economy in the use of water, by no improvement in the methods of distribution and control, is Madras entitled to expand its irrigated area or improve the condition of the existing area even though it be without consuming a single additional drop of water. All economy in the use of it, all benefits accruing from improved irrigation works constructed by Madras are to ensure to the benefit of Mysore so as to entitle Madras only to a smaller quantity than before and thus save water more and more for Mysore. This is clearly a *reductio ad absurdum* and certainly could not have been the intention of the authors of the agreement of 1892. In fact, it is the very fallacy sought to be guarded against in the passage already extracted (paragraph 32 of Ma.-7) from Doss on Riparian Rights, where the author observes that the reference to *user* as determining the extent of the prescriptive right " must not be understood to imply that the owner " who has acquired the right . . . must not enlarge the area under cultivation, " for that would really prevent the growth of agriculture " (*vide* also the authorities extracted in paragraphs 34 and 35 of the above). The Durbar do not dispute the rules stated in these passages, but suggest a curious distinction (*vide* paragraph 13 of Appendix Q to their case), namely, that they refer to the enjoyment of a right that has been

acquired but throw no light on the question how the extent of the user is to be measured. To begin with, it is not correct to say that they do not deal with the question of measuring the extent of user. It will be seen from the extracts themselves that they do relate to the question of the extent of the right acquired by prescription. But assuming the distinction suggested by Mysore, what is the meaning of saying that the passages deal with the exercise of a right already acquired? And anyhow is that not the present case also? It is not that Madras had to acquire a right after 1890.

16. This is a fundamental fact that has frequently been pointed out in the Madras argument, but only to be quite as frequently ignored by Mysore in several parts of their argument. Thus again, in attempting to distinguish the decision in *Commissioner of French Hock v. Hugo* (L.R., 10 Ap., Cas. 336) the Durbar observe that the case cannot apply "to cases of statutory prescription under which the enjoyment of the right must be within a definite period from the date of suit" (*vide* Appendix Q to the Mysore case, paragraph 9). But what is the "suit" here. And further why should we rely only on 20 years' user after 1890. As pointed out in the Madras rejoinder (Ma.-11, paragraph 6), suppose the present dispute had arisen in 1891 or 1895; could it have been contended that Madras had no rights at all because 20 years had not elapsed since 1890? It may safely be assumed that Mysore won't contend so. Take again the argument of the Durbar (in paragraph 8 of appendix Q) that under the English Prescription Act the claimant of an easement "to avail himself of the statute" must show some act of user within one year of action and that (in paragraph 7 of Appendix Q) based on I.L.R., 26 Cal., 593, to the effect that at whatever time the suit is brought the enjoyment must be found to have continued till within two years of the suit and, if that cannot be found, the claim fails. These contentions overlook the fact that Madras are not now for the first time asserting their right founded merely on user since 1890, that we had considerable rights even before 1890 which are recognised by the agreement of 1892 and which it was the very object of the agreement to conserve. And it is from this point of view that stress was laid by Madras on the principle laid down by the Privy Council in *Commissioner of French Hock v. Hugo* that there is a difference between intermissions in or changes in the character of the employment of an easement during the time that it is being acquired (*i.e.*, when the right is not yet complete) and the same things happening after the right had been acquired, that the former would prevent the acquisition of a right but the latter may not suffice to extinguish the existing right. This is a fundamental difference resting on general principle and has nothing to do with any peculiarity of Roman-Dutch law.

17. If the Durbar can substantiate their contention that, since 1890 or 1892, Madras have abandoned their pre-existing rights, that will of course be a different matter. But in dealing with the rule of prescription, we have to proceed on this footing, that we had certain rights even in 1892, which it was the object of the agreement to conserve and the question is, is an extension of irrigation with the help of the same quantity of water as before in excess of our rights? If Mysore are right in saying that the right itself is measured by the irrigated acreage, *i.e.*, is confined to the water required for the particular acreage, how then can the dominant owner (even after the acquisition of the right) be entitled to use the water to cultivate a larger extent. But the authorities cited do clearly recognise such a right, and Mysore do not dispute that. Such a recognition is intelligible only on the footing that the extent of the right is to be measured "with reference to the quantity of water claimed and used and not with reference to the acreage of land irrigated." This is the real point of the authorities and that is just the point that the Durbar choose persistently to ignore. They started with saying that the acreage is the sole test; they now maintain that at any rate it is the chief criterion. It is respectfully submitted that on the authorities it is not the true criterion. The Madras claim, stated in paragraph 18 of Ma.-7 is that we are entitled to have as much water as we have claimed and taken in the past for all purposes connected with irrigation and so long as we do not take more water than that, Mysore would have no reason to complain or take advantage of any particular works that we may construct or any extension of irrigation that we may be able to effect. This position, it is submitted, is the only reasonable view possible and is fully supported by authority.

18. This is perhaps a convenient place to dispose of an ingenious argument founded by Mysore on the language of the issues of reference (see paragraph 14, My.-9). It is urged that if the real point for consideration is the limit flow that Madras are entitled to, apart from the extent of irrigated area, clause (a) of the second issue would be unnecessary. It is difficult to appreciate this argument. Any one acquainted with legal procedure knows that issues are raised with reference to the contentions of the parties (whether right or not) and do not imply any kind of "decision" as to their correctness. And after all, what is it that the language of clauses (a) and (b) of the second issue suggests? Clause (a) refers to "the extent of the prescriptive rights of Madras." Clause (b) has nothing to do with prescription, but raises a different question, *viz.*, what must now be done to conserve the rights of Madras [as ascertained under clause (a)]. Surely this contains no implication whatever as to the manner in which the prescriptive rights of Madras are to be measured. The argument sought to be drawn

in the same paragraph from the first clause of the terms of reference originally proposed by Madras has as little substance. The clause refers only to "the requirements of existing irrigation." It pleases Mysore to read into it a limiting reference to "the existing irrigated area." If the clause is read, as it properly ought to be read, in the light of the claim put forward by Madras on that very basis (*i.e.*, the claim in Ma.-1) there can be no doubt that this is not what Madras meant by that clause.

19. It is interesting to note that Mysore are not prepared to own all the results which their contention must necessarily lead to. In their reply to the Madras rejoinder, the Durbar state that they "do not deny that Madras are entitled to the benefits of the remodelling works so far as they do not imply abandonment of the rights already acquired and so far as they are co-extensive with the prescriptive rights actually existing." This is truly enigmatic. What do they mean by the qualification "so far as they are co-extensive with the prescriptive rights actually existing"? According to them, the prescriptive rights are confined to the particular acreage already irrigated. What then is the benefit which Mysore would concede to Madras as the return for the enormous sums spent on improvement of irrigation works, if it is not to be by expansion of irrigation? The Durbar then go on to add "Mysore are entitled to claim the benefits of abandonment—which such works may reasonably suggest." This takes us to the question, what is the abandonment which the remodelling of the anicut reasonably suggests and of which Mysore can claim the benefit? There is no force in the implication which the Durbar seek to draw (My.-9, paragraph 15) from the mere fact that Madras claim only 7 feet and not the whole flow (as in the olden days when there were no improvements in the irrigation works). For, this limitation (to 7 feet) is due to the fact that for nearly 50 years Madras claimed and took up to 7 feet under the conditions then existing and that is therefore the extent for which Madras can claim prescriptive rights.

20. The Durbar rightly state that abandonment is a question of "fact" to be determined from all the facts and circumstances of the case (paragraph 13 of the Mysore reply), and as already stated they confine their plea of abandonment to the one foot flow over the Upper anicut. What are the facts from which they want to draw the inference of abandonment? The only circumstance urged is the alteration made in the Upper anicut from 1899 to 1902. The Durbar say that these alterations "clearly show that Madras intended to cease to enjoy the easement" (paragraph 16 of My.-6). But the reasons for the alteration have been explained by Madras over and over again, and do they show any intention on the part of Madras to abandon pre-existing rights? The Durbar do not dispute the proposition that abandonment is a question of intention, that is, the facts alleged should be sufficient to warrant an inference that the person entitled intended to give up his rights. It is confidently submitted that no such fact can be alleged or found in the present case. The Durbar really confuse the issue by adding practically in the very same breath (with the question of abandonment) the argument that the permanent alterations to the anicut have rendered the former user unnecessary. This is the basis of their argument of cessation of easement of necessity to be dealt with presently. But it is utterly irrelevant to the question of abandonment. It is characteristic of the Mysore argument under more than one head to obscure the real issue by mixing up the several questions of the extent of the user in the past, the manner of the user at present, the necessity for the same in the future, the propriety of the user in the past, the several modes of redistribution between the Cauvery and the Coleroon, and to jumble all up in fixing the extent of the prescriptive rights of Madras.

21. It is evident that it is in view of the illogicality of the position contended for by them on this plea of abandonment that the Durbar sought to have a second string to their bow by arguing that the one foot user over the Upper anicut was "in law an easement of necessity" and that the right thereof "became extinct when the necessity thereof ceased as a consequence of the remodelling of the anicut" (My.-6, paragraph 15). The untenability of this argument was shown in paragraph 12 Ma.-11 of the Madras rejoinder, and Mysore now state that the rule as to easement of necessity was referred to only by way of analogy (see My.-9, paragraph 9). But the analogy is obviously unsound, for the very basis or reason of the rule (in the ordinary law of easements) does not admittedly exist here, and as before stated the rule of necessity or cessation of necessity has no application whatever with reference to prescriptive rights.

22. Reference is now and then made to non-user in recent years of this one foot flow. It is submitted that this has not been proved as a fact. But even assuming the fact to be so, it has already been shown that it is altogether a misnomer to apply here the term "non-user" in its legal sense. It cannot be contended that this extra one foot has not been flowing along the river and it will be idle to say that the water actually taken for irrigation is not from out of this one foot as well but only from the rest.

23. A considerable portion of the argument of Mysore on the question of the extent of the prescriptive right of Madras is altogether coloured by their view that it is to be determined not by the actual user in the past, but what according to mere opinion—whether it be of Madras officers or of Mysore officers or of the Committee of Arbitration—would have been proper user in the past, or at any rate would be necessary in the

future. It is in this connection that opinions expressed and calculations made by Madras officers in connection with the preparation of the Bhavani and Metur reservoir projects are strongly relied on by them. It is submitted that such a theory of fixing the extent of a prescriptive right is unknown in any system of law. The argument derived by Mysore for this purpose from the words "fair and reasonable" in clause 3 of the agreement is a perversion of the provision. It certainly could not have been intended that the extent of Madras rights to be safeguarded should depend not on the facts of actual user as proved, but on *opinions as to their propriety or necessity*, and there is nothing in the language of the clause to warrant the contention. We quite agree with Mysore that the question of extent of prescriptive right is a mixed question of law and fact and that the facts must first be ascertained and then the law applied. But the question of fact is, what has been the user in the past, not whether such user was proper and necessary or not. And as is established by the authorities cited in the Madras case (Ma.-7, paragraphs 34 and 35) the user is measured certainly as much by the *flow claimed as necessary* (though the opinions as to the necessity may be wrong) as by the quantity of water actually used in any particular year. Hence it is that reference was made to the Madras rules as showing their claim all along. As to the question of propriety, it must be remembered that in a sense all prescriptive rights are at their inception *founded on wrong*, such as trespass, etc. But the question of propriety or fairness is utterly irrelevant to the determination of the extent of a prescriptive right. To any lawyer, the proposition that a prescriptive right is to be measured with reference to an imaginary standard of fairness cannot but sound strange. As already pointed out, the words "fair and reasonable" in clause 3 of the agreement can properly be held to refer not to the ascertainment of the *extent* of the right, but only to the mode in which the enjoyment of the rights so ascertained is to be secured.

24. As to contention (b) of Mysore (referred to in paragraph 7 *supra*), i.e., that for five months (out of nine) there is no justification for the seven feet claim, it has been already shown (paragraph 41 of Ma.-7) that on any principle known to the law of prescription there is no warrant for such a division of the year when the claim or user during the past was not in terms definitely so limited. The only argument urged by Mysore is that during those five months a supply of seven feet is not *necessary* and cannot be profitably utilised. As an allegation of "fact," this is denied by Madras. But even assuming it as a fact, the question of necessity can have no legal bearing on the question of the extent of our *prescriptive* right. The point has been discussed *supra*.

25. The same argument applies with equal force to the attempt of the Durbar to confine Madras rights to the *average flow* computed over a number of years. It will certainly be a novel application of the rule of prescription to say that, though the claim all along was for a certain *maximum limit flow* and such flow was enjoyed whenever it was available, the right to be founded thereon is to be cut down *for ever*, because on some (or may be even many) occasions the water in the river did not come up to that limit. This will be in the very teeth of the numerous authorities cited in paragraph 41 of Ma.-7 which Mysore do not question.

26. It is, therefore submitted, in conclusion, that Mysore have shown no valid reason why on the basis of the long user of the past the prescriptive right of Madras should not be recognised to the whole flow of the Agunda Cauvery corresponding to a gauge reading of seven feet at the Cauvery dam under the conditions existing prior to 1899 during the period June to February.

27. Taking now the alternative claim (referred to in paragraph 10 *supra*) by way of separated heads, i.e., for the Cauvery (at the Cauvery dam), for the Lower Coleroon system and the Veeranam tank, etc. With reference to the Cauvery dam itself, the Durbar admit the prescriptive right of Madras only to a six feet flow. They admit that, as a matter of fact, seven feet over the Cauvery dam has been flowing and has been required and used by Madras for a long time past. But they say that this would not support the prescriptive right to seven feet within the meaning of the agreement, because it is only after 1896 that seven feet could have come to be used *for irrigation* and that prior thereto it was used "for purposes other than prescriptive use of water for irrigation." It must here be pointed out that the statement that seven feet over the dam *commenced* to be used for irrigational purposes only after 1896 is erroneous, and is due to a misinterpretation of the Madras rules of 1882 as to the regulation of water at the anicut. This extent of water had been used for the same purpose (i.e., for being put upon the land itself) even prior to 1896. Madras also take exception to the Mysore view that the user of the seventh foot at the dam prior to 1896 was for purposes other than irrigation.

28. In connection with the other head of the separated claim, viz., the supply claimed for the Veeranam tank, etc., it is necessary to draw attention to one mistake in the Mysore argument on this and connected questions. They take into account only the water regularly taken when the flow in the Cauvery is within the seven feet limit, but ignore the use that Madras made of flood water in times of freshes. This of course was not a steady source of supply, nor one regularly availed of. Undoubtedly Madras

did utilise in the past a portion of the flood supply especially for the Lower Coleroon system; and when it is now proposed by Mysore to impound the floods and cut off this source of supply, allowance must be made for the quantity of water that Madras used to appropriate in the past out of the flood water. The Mysore answer is that the Veeranam tank has got its independent catchment area and as part of the Lower Coleroon system will be sufficiently supplied by the water that they would concede to Madras over the Cauvery dam. But when it was pointed out (Ma.-3) in justification of the Madras claim that the catchment area of the Veeranam tank is utterly disproportionate to the area dependent on the tank for water-supply, and that the Coleroon system has hitherto been having the benefit of flood supplies which will be cut off by the proposed Mysore reservoir, the Durbar merely re-assert that under *present* conditions a separate supply to the Veeranam tank is *unnecessary* and that if suitable provision for delta irrigation is made it will *ipso facto* cover the needs of Coleroon irrigation as well (My.-4). This argument does not really answer the question. One of the questions at issue no doubt is what will be "suitable provision" taking all items into account. But as already shown, the question of the *extent* of our prescriptive rights, is preliminary thereto and must be determined on the basis of the user of the past and for this purpose the facts and figures connected with the supply claimed for the Veeranam tank are set out in paragraphs 35 to 41 of Ma.-8, paragraphs 33 to 35 of Ma.-9 and 72 to 98 of the Madras rejoinder (Ma.-12).

Part IX—Facts and Engineering Arguments—Second Issue.

Reference, Mysore Paragraphs 12 to 14.

29. The matter raised in these paragraphs being purely legal has been already dealt with in Part VIII above.

As regards Mysore statements in paragraph 13 regarding the Marikanave Tank project, it is altogether denied that the assent given by Madras to the construction of this reservoir can be made to bear the interpretation given it by Mysore. No notice was previously taken of the Mysore contention (paragraph 12, My.-6) as it was not then, and is not yet, supported by any evidence whatever.

Reference, Mysore paragraph 15.

30. Madras deny that there has been any abandonment of rights existing prior to remodelling.

This and the other matter contained in the first clause of paragraph 15 being clearly matters of law, have been already dealt with in the legal arguments (Part VIII).

31. The claim put forward by Madras is based on the methods and quantities of actual use and enjoyment and on the application of the rules of regulation actually in force. The term "full and ample" quoted by Mysore from the first clause of the rules of regulation at the Grand anicut of 1892 refers to the *average supply* which was considered ample by the framers of the rules and has no reference to *limit of useful supply*. The rules drawn did not limit the supply to be passed to this average although it was quite practicable to do so on all but three or four days a year in which floods in excess of about 200,000 cusecs are passing and yet the rules specifically enjoin passing into the delta far larger quantities than the supply noted as full and ample. The matter is dealt with in greater detail in Ma.-12, Part VI, paragraphs 35 to 45.

32. Madras have not urged that disrepair of works would entail acquisition of right to additional water, but have stated that if, as argued by Mysore improvements affecting economies entailed loss of prescriptive right to the original quantities of water, the reverse proposition would necessarily also hold. Mysore have now however stated they do not deny that Madras are entitled to the benefit of the remodelling works, that is of the improvements carried out by them.

Reference, Mysore paragraph 17.

33. The quotation made by Mysore is not a fair representation of what Madras stated in paragraph 10, Part VI, Ma.-12. It is there stated that although 176,334 acres were cultivated prior to 1890 the suggestion that the area of cultivation was limited to this is denied. The suggestion by Mysore that because some details and records of cultivation going back over 20 years are not forthcoming, the inference is that the cultivation was non-existent is denied.

All the channels for which records cannot be produced are old channels constructed and in full use for many years before 1890. Madras claim that the amount and mode of user for the irrigation above the Upper Anicut has not been increased since 1880, and that any scattered minor extension of areas of irrigation which has taken place since then has been due to greater efficiency in control and distribution of the water to which there is prescriptive right.

Reference, Mysore paragraph 18.

34. The total area under the Vadavar and Veeranam tank combined is 63,000 acres and this being so, it is quite immaterial to the matter at issue whether this is divided up into—

{ 11,000 acres under the Vadavar direct,
 { 52,000 acres under the Veeranam tank,
 or
 { 17,000 acres under the Vadavar direct,
 { 46,000 acres under the Veeranam tank.

It is regretted that the information asked for on the subject has not yet been received.

Reference, Mysore paragraph 19.

35. The records of areas of wet cultivation between 1880 and 1890 are incomplete. The details which are available are abstracted in Appendix XXI.

The original file on the subject is open for reference.

Reference, Mysore paragraph 20.

36. The legal aspects of the matter advanced by Mysore in paragraph 20 have already been fully discussed in Part VIII above.

The whole of the principal works on the Cauvery both in Mysore and Madras are diversion works, and aim at controlling, to the greatest extent deemed economically feasible, the distribution of the total water received in the proportions best suited to the conditions of use required. It is altogether denied that there is any obligation on the Madras Government to restrict any part of the water to which they have right to any particular area.

It is altogether denied that diversion of water to which Madras has right from the Coleroon to the Cauvery delta system or *vice versa* imposes on Mysore any more onerous burden and no proof or argument in support of this contention has been adduced. What has to be decided is the limit incidence of flow in the Agunda Cauvery below which interference or interruption of the natural flow would constitute an infringement of the existing prescriptive rights of Madras, and this limit has to be fixed on a consideration of the whole conditions and necessities of Madras irrigation and existing modes of enjoyment not only for the Cauvery Delta system and Coleroon Lower Anicut system, but for the system of irrigation channels between Bhavani and the Upper Anicut.

The circumstances and conditions of irrigation of the whole of the irrigated tracts must be considered as a whole, and it is impracticable to take any part of the system and consider it an altogether separate and independent entity from another part. It is reasonable and proper to consider and study separately the conditions and requirements of irrigation supply for various tracts irrigated under different limiting conditions, but in finally giving a finding under the second issue all the circumstances of the whole combined system must be considered and the limit fixed in such a way as to safeguard the existing prescriptive rights of the whole considered as one system.

The proposition of Mysore is altogether untenable.

37. There is no objection to considering separately the requirements and conditions of supply of the Cauvery and Coleroon systems in the first instance. The final decision to be

Reference, Mysore paragraph 21.

arrived at is the limit flow in the Agunda Cauvery at the Upper Anicut to which Madras is entitled having in view the requirements of the whole system of irrigation both above and below that work.

The whole of the Mysore arguments as regards the supply of the Coleroon are directed to attempt to prove that no specific supply is required for the Coleroon system and that adequate supplies would be received by percolation, seepage, etc., from the supplies passed to the Cauvery Delta and yet in this paragraph they state that the requirements must be considered under two distinct heads and the quantities of water required for one must not be mixed up with what is required for the other.

Requirements of Cauvery Delta.

Reference, Mysore paragraph 22.

38. The requirements of Madras for purposes of the Cauvery Delta irrigation alone prior to remodelling of the Upper Anicut included three necessities—

- (a) water for irrigation passed over the Cauvery dam,
- (b) water for scouring which passed through the undersluices of the Upper Anicut,
- (c) water necessarily passed over the Upper Anicut to keep up the level required over the Cauvery dam.

While (b) and (c) was not passed on to the fields in the Cauvery Delta, they are a necessity for securing the supplies and ensuring the conditions of river bed and are necessary for irrigation of that area and in use and enjoyment for that purpose.

Further, the water so passed into the Coleroon in the interests of the Cauvery delta area was again used for the irrigation of the Coleroon Lower Anicut irrigation and therefore doubly used.

The necessities of allocation and use of water for scour have been explained in Madras Part II, paragraph 30, Ma.-8 and Part III, paragraph 9 Ma.-9.

The necessity of scour however has been much more strongly urged by Mysore than by Madras—*vide* My.-7 (Part II, paragraphs 40 and 41).

On both hands the necessity of scour is admitted.

This being so, there is prescriptive right to water for scouring. The conditions and rules of 1882 prescribe the opening of the undersluices for scouring at all times when 7 feet or over is passing the Cauvery dam, and except in times of scarcity, when 6½ feet is passing, and the Madras claim has been limited to the flow required to give 6½ feet with undersluices open which is equal to the flow required to produce 7 feet with undersluices closed.

The necessities of scour are admitted by both parties and it is quite open to argument that Madras rights embrace water for scouring with a 7 feet gauge reading. It has been considered however that the water due to 7 feet without scouring under the conditions prior to 1899 will under existing conditions, protect Madras irrigation and the claim has been limited to 6½ feet with undersluices open or 7 feet with undersluices closed.

The former figure on the reading of the rules of 1882 is clearly within the Madras rights while the mode of actual user fully supports the rules.

39. No such admission as is claimed by Mysore in the last three lines of this paragraph has been made and the suggestion that the magnitude of the works of Mysore does not affect Madras is obviously unfounded. The fact that Madras have assented to the construction of a small reservoir but refuse assent to a large one alone, negatives the suggestion made.

Reference, Mysore paragraph 23.

40. Mr. Larminie wrote in 1900 and at that time according to the rules then in force for four years, the lowest level at which undersluices might be opened was 7 feet, while the actual regulation followed these rules. From 1882 the rules had enjoyed never opening with a gauge of less than 6½ feet, and not opening after any scarcity with less than 7 feet, while the actual user under these rules had the effect of not opening before 7 feet was attained more often than opening at 6½ feet. In the face of this, mere opinion can have little value. The value of expert evidence as against evidence of actual rules may best be realised by considering what value would be placed on expert evidence which laid down as a necessary supply a limit which was in excess of that enjoined by the rules and actual use.

41. The Government of Madras base their claims on facts, *viz.*, actual evidence of enjoyment and rules of regulation and submit that expert opinion has no value when conflicting with such actual proved facts.

Neither the rules of 1882 at the Upper Anicut nor those of 1892 at the Cauvery-Vennar regulators support the interpretation put by Mysore on Mr. Larminie's statements.

42. The raising of the top level of the gates did not prove that the previous limit useful supply was 6 feet, but the raising as well as actual gauge readings and rules prove the contrary.

Reference, Mysore paragraph 27.

The previous useful supply was 7 feet and over up to 8 feet and the raising of the level clearly proves that it was considered desirable to pass 7 feet and over up to 8 feet more frequently than could be done under the previously existing conditions.

This is the only object which could have been served by raising the level of the top of the shutters. The other improvements to be effected by remodelling would equally well have been served with 4 feet shutters which would have been much less costly to instal.

43. The argument of Madras is that under the rules of 1882 the enjoyment of a flow exceeding useful limits was of frequent occurrence. The conditions then, unlike the conditions now, entailed drawing rules in view not only of supply but of risk of excessive water.

Reference, Mysore paragraph 28.

Under these conditions a limit of 6½ feet in times of non-scarcity can be well understood in view of the liability to flooding which could not be excluded.

Madras agree that it is rather to the new conditions and rules after full control was obtained that one must look to gauge what water has been taken *with intention and for purposes of use*.

44. As regards (a), Madras agree to the proposition that before construction of the Cauvery-Vennar regulators the quantities of water entering the Cauvery delta were subject to only very limited control.

Reference, Mysore paragraph 29.

As regards (b), Madras deny that, after the regulators were constructed, it was necessary in protection of the regulators involuntarily to pass extra water into the Cauvery and Vennar.

This was necessary only on a few days and the occasions when it was necessary have been shown in Appendix XVIII (Ma.-12) for the years 1900 to 1908 and total to eleven occasions in all.

It is the record of gauge readings and consideration of rules in force after the present control was established that give a measure of the water passed *with intention and for purposes of use* into the delta.

45. It is absolutely denied that a 6 feet gauge could not be secured consistently with the opening of undersluices. No competent man who wished to scour as soon as water could be spared and who could spare water with a 6 feet gauge would make such rules as those of 1882 to secure this. He would, as soon as water rose to 6 feet, open the undersluices gradually and regulate the opening so as to maintain water at as near 6 feet as was possible with the sluice power available. The intention of the rule was clearly that 6½ feet always, and in times of scarcity 7 feet should be passing over the Cauvery dam and was required for supply before any water was to be allocated to scour. The matter is clearer from the fact that water passed for scour with a 6 feet gauge is more efficient than a similar quantity passed with a 6½ feet gauge and had the object of the 1882 rules been only to maintain 6 feet and use the balance of water for scour the rule was clearly defective and not calculated to produce the result required in a reasonably efficient manner.

Reference, Mysore paragraph 30.

46. The seven feet flow was not, as stated by Mysore, only after remodelling, fixed as the minimum limit flow before opening sluices in the Upper Anicut, the limit was fixed absolutely without exception from 1896, while from 1882 the 7 feet flow was the limit which applied to more than half the occasions of opening undersluices. The Upper Anicut was remodelled, because the advances in engineering facilities and appliances had placed at our disposal methods of control much more efficient than had been previously in use. There is little doubt that such a work as the present Upper Anicut would have been built by Sir A. Cotton in 1836, if this had been practicable in those days.

Reference, Mysore paragraph 31.

The accumulations of sand above the Upper Anicut gave trouble from the time of the construction of the Upper Anicut in 1836. On this account, the undersluices were constructed in 1846. There is nothing to show or to lead one to believe that the Upper Anicut was reconstructed on account of any recent developments of a grave nature or that the construction has materially altered the state of the sand deposits at the head of the Cauvery. The rules of 1896 were recast in 1905, but no alteration of the 7 feet limit was then made, while a study of the actual regulation shows that as much as 7½ feet is forced frequently into the Cauvery intentionally, and occasionally even more, when it could be safely and easily passed into the Coleroon. Such extra supplies are authorised by the rules to be ordered by the Executive Engineer and the record shows that they are actually occasionally passed when available, especially between the middle of July and the middle of September, to supplement the ordinary 7 feet limit.

The Mysore contention that the 7 feet limit was fixed to provide for temporary and abnormal conditions is pure conjecture, and it is also pure conjecture that the conditions making it necessary have ceased to exist, and this is altogether denied.

47. It does not need the aid of Kennedy's theory to enable an engineer, who considers the conditions of the Upper Anicut with gauge readings between limits of 6 and 7 feet, to realise that scour efficiency diminishes as the water level increases. Kennedy's theory is useful in enabling definite figures and critical velocities to be quoted. As a general proposition the condition of scour efficiency is quite clear to any engineer who considers the conditions, quite apart from the theory of critical velocities advanced by Mr. Kennedy. The proposition was originally advanced with confidence by the Madras Engineers without any consideration of Kennedy's theory; and under the then-existing conditions and limit of gauge readings it is submitted that there could have been no obscurity or uncertainty about it at the time the rules of 1882 were framed.

Reference, Mysore paragraph 32.

The last clause of this paragraph which is stated to be a fact by Mysore is altogether denied by Madras and is not supported by either proof or probability and imputes by inference careless neglect and wasteful use of water to the framers of the rules of 1882.

Reference, Mysore paragraph 33.

The discharges of paragraph 29, Part VI, Ma.-12, are reproduced here for ready reference in million cubic feet per day—

Gauge.	Over Cauvery dam.	Over anicut.	Through undersluices.	Total.
Six feet	1,625	86	669	2,380
Six and a half feet	1,950	366	725	3,041
Seven feet	2,300	644	Sluices closed.	2,944

The rules of 1882 enjoin not opening undersluices till 6½ or 7 feet is realised according to the state of previous supply and closing when the gauge falls to 6 feet. That is, when the gauge falls to 6 feet, the undersluices will be gradually closed so much as is necessary not to allow it to drop below 6 feet.

The Mysore contention is that 6½ feet was only inserted in the rules, because when the undersluices were opened the level would fall 6 inches to 6 feet.

The contention now is that at 6 feet the undersluices should be closed. Great stress is placed on the admitted necessities for scour. When is scour water to be allowed? The Madras Government's contention is that 6½ feet with scour is the minimum of their prescriptive rights. Mysore advance 6 feet as the limit required by the rules. They insist on the paramount necessities of scour. Under the rules the minimum amount of water which allows both 6 feet and scour is as stated in Madras paragraph 29, Ma.-12, 2,380 mills. cubic feet per 24 hours; this quantity is slightly more than the equivalent of 7 feet on the Cauvery dam under existing conditions with all sluices of the Upper Anicut closed. It is unreasonable to say 6½ feet is only required for purposes of getting scour water and still maintaining six feet, and also that with six feet scour water was not used; yet this is the argument advanced by Mysore.

Reference, Mysore paragraph 34.

49. There is no such admission implied by Madras in their paragraph 30 as is stated by Mysore.

The legal points raised have been dealt with in Madras Part VIII above.

50. The contention of Mysore is that water used for scour although admittedly required for use for this purpose before remodelling may not be used for any other purpose. Scour, however, is certainly a purpose intimately connected with irrigation and water required for scour is as necessary as is the water in a channel which is needed to raise the level of the water so as to make channel irrigation possible. It will be a very unnatural and unduly restricted interpretation of the agreement to confine the rights of Madras to the water actually put upon the land itself. The purposes of irrigation necessarily mean and include all purposes incidental thereto, and further, as already pointed out, the water used for scouring itself finds its way into the Coleroon system and was not without use for irrigational purposes there. It is urged on behalf of Mysore that after the improvements in the anicut scouring is no longer necessary. This is not correct. But, however that be, is that any reason why Madras should lose their right to the water hitherto used for that purpose? Why should Madras not use it for extending or improving their own irrigation? Is it not really denying to Madras the benefits of all improvements effected by them, if they are to be told that they cannot use that water for any other purpose? Surely, there can be no question of abandonment here as Madras have all along been claiming and planning to use that water for some useful purposes. The Mysore argument under whatever head advanced after all comes back to and hinges on the assumption that Madras can claim as of right not the usual quantity of water, but only such quantity as may now be necessary for the former irrigated area.

Reference, Mysore paragraph 35.

The necessity for scour does not cease with the reconstruction of the Upper Anicut; with the shutters down the silt will still accumulate in front of this work. Scouring is still and will always be a necessity and now as at all times since 1896 has been practised as soon as flow in excess of 7 feet on the Cauvery dam is realised.

The conditions and efficiency of scour during floods are much improved by the remodelling, but the incidence of floods especially in bad years will be greatly affected by the proposed Mysore Reservoir.

51. The Mysore statement that the rules of 1882 were not strictly observed is denied and the instances quoted as showing non-operation of the rules are instances of "operation of the rules." The claim of Madras is that under the operation of the rules of 1882 it was more usual for the undersluices to be kept closed till a gauge reading of 7 feet was realised than to open them with a lower gauge, and this supports their claim to 7 feet whenever required—*vide* Ma.-8, Part II, paragraph 30 and Ma.-9, Part III, paragraph 8.

Reference, Mysore paragraph 36.

52. There appears no reason to believe there was error in the passage quoted which is Major Oakes' description of the 150 yards calingulah in 1873.

Reference, Mysore paragraph 37.

The discharge, 32,130 cusecs, mentioned by Major Oakes may have been erroneous, but does not differ greatly from that of Captain Mead's discharge curve of 1866 which stated quantities very greatly in excess of what was actually passing.

A note (Appendix XXIII) shows the circumstances under which the discharge curve of 1866 differs so much from that of Major Montgomerie and from the discharge curve based on actual gauging.

The 150 yards calingulah as already stated in paragraph 34, Part VI, Ma.-12, was built to supplement the Upper Anicut and the intention was to have the crest at about a level corresponding to that of that work.

Reference, Mysore paragraph 38.

53. The supply of 17,344 cusecs is not the limit of flow to be admitted to the Cauvery and Vennar under the rules of ¹⁸⁹²₁₈₈₈.

The full and ample supply alluded to in rule 1 is much below the limit of flow which the rules specifically direct shall be admitted to the Cauvery and Vennar, whenever available and as already explained it refers to the *average flow* which was considered a suitable full supply for the areas to be irrigated, that is, the supply which if given every day as a steady flow would, it was considered, suffice.

It is not stated or claimed by Madras that the maximum discharges enjoined to be passed into the Cauvery under the rules of ¹⁸⁸⁸₁₈₉₂, that is, discharges up to a level of 7½ feet, were all required for irrigation; it is, on the contrary, stated that they were partly fixed by the conditions imposed by the falling shutters installed on the Grand Anicut—*vide* Ma.-12, Part VI, paragraph 39—and it is further stated that the rules which were in force till 1902 did not enable one to judge from the evidence of the rules what was the maximum quantity of water which was admitted *for supply* into the delta.

The rules of 1902 were the first drawn under conditions not involving "falling shutters" and in these it is laid down that the level of water to be by rule admitted through the Cauvery regulator before opening the Grand Anicut sluices is limited to 6½ and in the Vennar to 8 feet, and it is considered that this defines the approximate limit of useful supply. This totals to 31,090 cusecs. It is not put forward or suggested that this supply is required, or even desirable, if passed continuously from day to day for weeks together, and the limits claimed by Madras do not suggest this, nor do the conditions of natural flow connote this.

What is advanced by Madras is that 7 feet of the Cauvery dam shall be passed whenever available and that occasionally for a few days extra supplies up to 7½ feet are actually passed and required for irrigation of the Cauvery and Vennar under existing conditions and have been so used for many past years.

It may be noted that the normal limit supply to the Cauvery and Vennar combined under the 7 feet limit at Cauvery dam would be about 24,000 cusecs at the regulators, allowing for surplus over 150 yards calingulah and draw off and loss in transmission. This connotes a gauge reading of 5½ feet in the Cauvery and 7 feet in the Vennar taking the quantities from the curve of discharges suggested by the Assessor. In column 9, Appendix XXIV, the discharges into the delta due to such gauge limits are shown.

Reference to the tables of rear gauge readings of the Cauvery and Vennar, Appendix II (Ma.-8) and Appendix XVIII (Ma.-12), clearly shows that such gauge readings are in *constant* use and that also higher gauge readings have been in occasional use from the time when effective control was first established.

Previous to such dates the high gauge readings were higher, but as these were not wholly controlled by the requirements of supply, the conditions do not admit of argument of use and necessity being applied with the same force in their case.

54. The conditions involving the use of the Cauvery and Vennar as flood carriers only occur seldom, not on an average on three days a year, but they do sometimes occur. The actual days on which they have occurred are given in Appendix XVIII. Madras deny the general statement that the rivers are in frequent use as flood carriers and that the gauge readings enjoined by rule, or carried on the orders of the Executive Engineer, were carried for flood disposal purposes or for security of the regulators.

General statements that this is so are not proofs. Madras have stated on what days water was carried at a high level involuntarily on consideration of flood and security, and any rebutting statements should, it is submitted, be equally specific.

55. The statement here made by Mysore is not borne out by the rule 2 of 1892 which specifically enjoins proportionate distribution, and not distribution by turns. The record of actual distribution was made in accordance with these rules. The rule cannot bear the interpretation put on it by Mysore.

56. The rules of 1905 delegate to Executive Engineers powers of regulation giving certain standards to be worked to by the local staff in the absence of specific orders.

Under these conditions the measure of use is the gauge readings actually maintained under such system of control and these are displayed in Appendix VIII (Ma.-8) and Appendix XVIII (Ma.-12).

It may be noticed however that under the application of the Assessor's curve the discharges are—

	CUSECS.
4½ feet, Cauvery	14,000
7 feet, Vennar	7,600
	21,600
Add—discharge over 150 yards calingulah draw off and loss in transmission by seepage, etc.	1,800
Total ..	23,400

This is equivalent to 6½ feet normal discharge of the Cauvery dam. Thus even accepting the contention of Mysore as regards 4½ and 7 feet limit at the regulators the Madras limit would be 6½ feet on the Cauvery dam.

The records, however, show that the actual user for irrigation was materially more than the above and was generally 7 feet on the Cauvery dam when available and not infrequently the equivalent of 7½ feet and even more.

57. As shown already, the regulation of the Cauvery and Vennar entailing high gauge readings is only due to flood conditions on an average less than three days yearly, and mere statements to the contrary cannot be taken as proof that it is otherwise.

The moment the question is put as to why it was either necessary or desirable in the interests of safety, or flood regulation, on any day not specified already in Appendix XVIII to pass a high supply, there is no reply to be given.

In view of the liability to loss of crop under both Cauvery and Vennar by submergence in the vicinity of the coast, it would obviously be foolish to pass into the delta large quantities of water if these supplies were not required. While it is not suggested that prior to the introduction of the rules of 1902, that is, in the "falling shutter" period, all water passed was intended for supply, this is maintained as regards the period after that date, and rules and records support this contention. It is for those who deny it to give specific proof in support of such denial.

58. Madras have not suggested the throwing of their rules overboard, but they have suggested that if the methods of user were shown to be consistently at variance with the rules, then the latter and not the rules are the best evidence of use, and therefore would have preference as evidence.

In the cases under consideration there is no conflict between the rules and the methods of user, but it is necessary to refer to the records of user to see to what extent the permissive clauses in the rules have been availed of.

Further, where there is a doubt as to the meaning and intention of a rule, it is from the record of actual user that this doubt may be set at rest.

59. Major Oakes was writing in 1873 before the Cauvery and Vennar regulators were built and when the Vennar head was an off-take from the Cauvery 3 miles above the Grand Anicut.

There can be no doubt that what Major Oakes meant was that 17,600 cubic feet of water passed down the Cauvery at the Grand Anicut excluding the Vennar with water just at the crest of the anicut and by raising the water 2 feet by means of shutters, 23,650 cubic feet of water would be forced down the Cauvery.

As regards the actual quantities, it is likely that Major Oakes may have been in error, but as regards gauge readings there is no room for error.

The Vennar in those days used to get a very bad supply with less than 6½ feet on the Cauvery dam, and it is probable that under the conditions represented the off-take of the Vennar would have been only some 5,000 or 6,000 cusecs.

The crest of the Grand Anicut has not been altered and that crest level is 4.67 feet above the sill of the Cauvery regulator at which level is the zero of the gauge.

Thus Major Oakes gave 17,600 cubic feet as the discharge of the Cauvery with a gauge of 4.67 feet. The Assessor's curve gives a figure for 4.7 feet of 15,000 cubic feet, and it appears probable that Major Oakes' figure was excessive.

The discharges at the Cauvery dam in 1873 used to be generally taken from Captain Mead's curve of 1866 which gave for a gauge reading of 6 feet, a discharge of 24,515 cusecs.—*vide* Appendix XXII which was much in excess of the true discharge owing to the use of an unsuitable formula. The discharge of the Cauvery at the Grand anikat may have been computed in a similar manner.

The discharges may be wrong, and probably were so, but the gauge readings are not open to doubt or dispute.

60. The Madras point as regards the conditions at the Grand anikat in 1873 is that it was then necessary, at some risk and disadvantage, to maintain dam stones and planks for forcing down the Cauvery 2 feet extra depth of water, when 4.67 feet could be obtained without any such device.

The Vennar head being 3 miles up, the planks and dam stones were used solely in the interests of the Cauvery and could serve no other possible purpose.

This is the very strongest evidence of the necessity and intentional use of 6½ feet of water in the Cauvery as far back as 1873 and this is a very strong proof of the Madras contention on this matter. This further clearly disproves the full and ample nature of a 4½ feet supply, if such 4½ feet is considered to be a limit and not, as really meant, an average supply.

Reference, Mysore paragraph 47.

61. Madras adhere to their claim as regards the limit of water required at the Cauvery dam.

62. The matter is clear as regards the Metur project gauge readings. Mysore allow *limit gauge readings* on natural flow 25 per cent. higher than the Metur project *average gauge readings*.

Reference, Mysore paragraph 48.

This does not give 25 to 30 per cent. more supply than the Metur project or anything at all approaching to it.

63. As regards the inaccuracy of the discharges recorded in Madras records, the table,

Reference, Mysore paragraph 49.

Appendix D, speaks for itself. There appears no question that the figures are so incompatible with each other that they cannot all be correct. It has always been stated by Madras that their discharges were unreliable with the exception of those at the Upper anikat and at Bhavani bridge, which are based on the gaugings and computations of 1909.

It was the known and proved unreliability of the recorded discharges that led to the gaugings of 1909 being instituted, which gaugings necessitated the delay of a whole year in the preparation of the Metur project.

Mysore here allude to the *alleged inaccuracy of Madras discharges*.

Is the inference that Mysore consider them accurate? The figures in Appendix D alone make it clear that they cannot be so.

As regards the use of water in June, Madras contend that the records of regulation at the only two places where regulation will avail in passing, or not passing, water into the delta (viz., the Upper anikat and the Grand anikat) show that the freshes of June were, as a rule passed into the delta when received. The fact of seldom receiving any considerable quantity of water in early June is not a reason for depriving Madras of their undoubtedly existing right to the enjoyment of the early freshes when received up to the limit of flow laid down in the existing rules.

64. As regards absorption in canal and channel beds, the first freshes must be to a great extent

Reference, Mysore paragraphs 50 and 51.

used to fill up the porous sub-soil and margins of the river and channel beds. It is futile to

say water for this is not required below the Upper anikat, as it is obvious the necessity exists in all channels with porous beds of which there are many hundreds of miles.

Further when water is first run on to fields the absorption is very great and this is especially so in the early part of the season as rainfall in June is scanty. The custom of Madras is to use the first freshes after the beginning of June to fill up the rivers and delta channels, and their claim is to the continued enjoyment of this right.

The computation by Mysore is altogether at fault. First the computation of Madras for the absorption of 1 mile of channel 1,000 feet wide is reduced by one-third for no stated reason, although Madras computation is based on clearly defined data. The computation is then applied only to the river above the Upper anikat which is, it may be remarked, of much greater mean width than 1,000 feet and probably nearer 2,000 feet.

The area of river and channel beds below the Upper anikat which is fully ten times as much as that above is ignored. It is especially to filling up the delta rivers and channels that the early freshes of June are applied. It is clear that water for filling these must be supplied before the channels become efficient means of carrying water. The computation by Mysore might be multiplied by twenty and still be found quite inadequate to fill up with water the sandy beds of the delta rivers and channels.

It is to be realised that the system is one in which drainages and natural rivers are used for irrigation and the area of bed of the sources of irrigation is three or four times as great as in a modern system designed for carrying only irrigation supplies. In the month of June, every river bed and margin sucks in water like a sponge and a reference to the discharges over the Cauvery dam and at the Upper anikat in the first half of June (Ma.-9, Part III, paragraph

38) gives some idea of the way water is lost in this month in even that short, though wide, length of river bed. The discharges at the Grand anikat are, it is admitted, open to accusation of unreliability, but they are at least on as strong a basis as those at the Lower anikat.

65. It is submitted that Mysore have not met the Madras contentions and that the limit flow which is suggested by them does not give even an approximation to the protection to be

given under the terms of reference, viz., *the maintaining unimpaired the prescriptive rights of Madras*.

Reference, Mysore paragraph 53.

66. The statement here made that the position taken up by Madras is directly opposed to what law and equity permit, is denied.

The subject-matter of paragraph 53 (My.-9) being purely legal, it has been taken up and replied to in Madras Part VIII.

Reference, Mysore paragraph 54.

67. The matter of remissions due to submergence in the worst supply year on record, 1899-1900, has been examined.

Of the total remission in 1899-1900 in the Tanjore delta 54.4 per cent. is recorded as due to submergence.

It will be seen that the loss due to submergence is a little more than half the total remissions.

As the year 1899-1900 was noted not only for failure of river flow, but also for failure of the rainfall in the north-east monsoon, the records of rainfall have been tabulated for all the stations in the delta along the coast, south of the Coleroon and east of the Mayavaram-Muttupet Railway, from 1st October to 10th January with the following results, the months being divided into three periods:—

Months.	1st to 10th.	11th to 20th.	21st to end.
October	0.04	4.87	22.41
November	2.02	2.09	2.99
December	1.11	1.76	0.02
January	Nil	..	..

The above represents the rainfall along the coast the rainy zone of the delta in which the losses by submergence always occur.

It will be seen that the north-east monsoon rains were very much below normal throughout the period except in the last part of October when the rain was very heavy, over 22 inches falling in ten days.

The great remission by submergence in this year of drought can be now explained in view of the conditions examined.

The year was throughout one of deficient river supplies, and transplantation at the tail ends of the channels near the coast was in consequence behindhand. As always happens under such conditions as a result the crops were quite young when the torrential rains of late October fell and all the young crops were submerged and totally lost.

It will under this explanation be realised that, although the statement in the Madras triennial report quoted by Mysore is literally correct, it is nevertheless misleading. Generally with regard to paddy total submergence of the crops for some days destroys the crop, but it is not injured if the head is not submerged. Thus when the crop is high, the same amount of flooding as will totally destroy a young crop does little or no damage.

It is common after loss of crop by submergence for the area to be replanted and cultivation started afresh and under such conditions a crop is frequently obtained. In 1899 the supplies of rain and river water after the end of October was so deficient that this could not be done and thus the area destroyed by the October rains obtained remissions for submergence, and thus in the year when supplies were the lowest on record, remissions for submergence as well as also for deficient supply were the greatest recorded.

Remission for submergence is very common in lands lying along the coast in the taluks of Mayavaram, Negapatam and Tirutturaiappundi, especially in the first and last named. This is invariably caused by the torrential rainfall in the north-east monsoon which is especially heavy along the coast. The drainage difficulties are great as outfalls into the sea become inefficient during periods of low flow and bars form across them. Further from time immemorial irrigation water and drainage are carried into the same channels and, as efficient irrigation calls for water running at a high level, and efficient drainage the reverse, liability to submergence along the coast after torrential rain is great. Statements of remissions in the delta for twenty years which have lately been received from Collectors have been found to display such glaring discrepancies on comparison with recorded rainfalls and river discharges that they have been referred back for scrutiny and explanation. The information asked for by the Arbitrator on the subject will be furnished on the earliest possible date.

The fact that there is constant liability to loss of crop by submergence, due to the torrential rainfall of the north-east monsoon which is of a cyclonic character, does not entail absence of loss from deficient supply even in the same tracts during other parts of the period during which the crop is on the ground, while it is quite common for the crops in the eastern parts of the delta to be suffering from submergence, while those further west are suffering from deficiency of supply.

It may be noted that roughly speaking crops suffering badly from submergence are totally lost and the losses from this cause are more nearly fairly represented by the area on which remission is granted than is the case with losses from deficient supply.

The yield is very frequently affected by deficient supply without any total loss being suffered and the area on which remission is given for deficient supply is no measure whatever of the area which has severely suffered on this account. Remission is only given for total loss of crop and no remission is given even on a two-anna crop.

68. Sir J. Benton drew his inferences from the rules of regulation actually in force at the Upper anicut and the quantities of water subject to the seven-feet limit laid down in those rules was the quantity he considered, was required for the Cauvery delta.

Reference, Mysore paragraph 55.

It is altogether contrary to fact to state that Sir J. Benton neglected the rules of regulation in drawing his inferences. It has never been suggested by Madras that Mysore should not impound when a flow is secured to Madras up to the limit claimed.

69. These contain irrelevant statements outside the scope of the issue now under consideration, which is considered solely in deciding the flow in the Aganda Cauvery at the Upper anicut which will preserve unimpaired the existing rights of Madras.

Reference, Mysore paragraphs 56 and 57.

Mysore paragraph 57.

70. This is a general statement and contains no new argument requiring to be met.

71. This paragraph of Mysore involves consideration of the figures contained in Appendix V of Sir J. Benton's note of the 12th May 1911 (page 50, Ma.-8a) and this matter is taken up here before dealing with Mysore contentions.

Reference, Mysore paragraph 58.

The matter of these figures has been previously dealt with in Ma.-12, Part VI, paragraphs 61 to 63.

It is there stated (paragraph 61) that the endeavours made to trace the source of the figures in column 10 had failed and further (paragraph 63) that the basis of crop period, columns 3 and 4, could not agree with the basis of average discharge, columns 5 and 6, as otherwise there could be no discrepancy of totals as the method of computation was correct. Further search has resulted in discovery of the basis of the figures for nearly all the period and the matter is made clear in Appendix XXII. The results show that the inference in paragraph 63 was quite correct. The basis of the figures is now clear and they work up, with the exceptions stated, to the figures of discharges given in the Madras annual river diagrams.

The question of the accuracy of these latter figures has been taken up in paragraphs 67 and 68 of Part VI, Ma.-12, and has been dealt with by the Assessor before whom and the Mysore representative all the initial records which could be found on the subject of the methods of computation were laid. The Assessor has drawn out a curve and table of discharges based on it which he considered would fairly represent the discharges of the Cauvery and Vennar as obtained from the record of rear gauge readings [Ex. A 4 (b)] and intimated that any arguments put forward having as a basis the discharges of the Cauvery and Vennar below the regulators would be considered to be fairly stated if based on these discharges. In accordance with this, Mysore have based their table, Appendix G-1 (My.-9), on this curve, while Madras have recomputed all their discharges for Cauvery and Vennar for years 1890 to 1909 from the same curve.

In the statements which follow the discharges of Cauvery and Vennar are from this revised computation.

72. The contentions of Mysore in paragraph 64, My.-7, were met in the rejoinder of Madras Part VI, paragraph 70, Ma.-12, only by denial of the reliability of the figures in appendix V of Sir J. Benton's note.

Reference, Mysore paragraph 58, My.-9 and paragraph 64, My.-7.

It is, now however, possible to go into the matter more in detail using the figures of discharge from the Assessor's curve in correction of and comparison with the inaccurate figures in column 10, Appendix V, in the above note. The totals of figures at the foot of the columns, Appendix G, My.-7, are reproduced in columns 4, 5, 6, Appendix XXIV, of this rejoinder while the corrected yearly discharges of Cauvery and Vennar (June to January) following the Assessor's curve are stated in column 7. From the corrected figures, it will be seen that the quantities at the Cauvery dam which would have been realised under Mysore proposed rules, column 5, are in every year but two less, and in most years much less, than the quantity passed into the Cauvery and Vennar.

It is further to be pointed out that it is necessary to make a deduction from the discharges of the Cauvery dam for losses in transmission and draw-off.

There are 6,700 acres of irrigation between the regulators and the Cauvery dam while the losses by percolation, chiefly into the Coleroon, are very considerable. These losses are held by Mysore to be so great, as to be the principal source of supply of the Lower Coleroon system and that they constitute an adequate supply for the whole area under that system. While Madras absolutely deny this, they do not deny that the losses into the Coleroon by leakage and seepage are considerable and this must be considered in comparing the discharges at the Cauvery dam with the discharges past Cauvery and Vennar regulators.

73. The figures of Sir J. Benton of total discharges into Cauvery and Vennar have now been replaced by those in column 7, Appendix XXIV.

Reference, Mysore paragraph 59.

The Mysore contention is that the whole of this quantity is not used for irrigation but that some of it is surplused without use, and that to such extent the quantity passed into the delta is excessive. There is no measure of the total quantity of water passed into the sea, and even if there was, it would not greatly help as the rainfall in the strip of 10 or 15 miles width along the coast is in the north-east monsoon specially heavy and of a torrential and cyclonic character, inducing sudden and heavy local floods. Putting aside rainfall, it is probable that in a good year considerable quantities of water after passing over the fields pass through drains into the sea, while in a bad year, there is also necessarily some but much diminished drainage so passed. It is to be realised that it is necessary for efficient rice cultivation to keep the water on the fields changing, and a free change of water is very beneficial to cultivation while stagnation of water connotes a bad crop. Drainage is thus an absolute necessity to rice cultivation and in the case of this deltaic tract spreading out like an open fan from an apex at Cauvery-Vennar regulators, to a great expanse along the coast on all of which expanse the water must be kept changing, the passing of considerable quantities of drainage water into the sea is a necessary corollary of successful cultivation. The remark in the triennial report of 1901-1902 does not suggest that all the water passed into the sea was wasted, but suggests that some of it was in excess of requirements.

During the period to which this refers the "falling shutter" regulation rules at the Upper Anicut were in force which enjoined passing up to 7½ feet into the Cauvery and it is admitted that excesses over about 6½ feet were passed to suit the conditions of these shutters, and that water over this limit passed into the Cauvery was frequently not necessary for irrigation.

This was altered from 1902 when the rules of that year specifying a 6.2 gauge limit were introduced.

Thus the remark in the triennial report is as a fact quite justified.

For instance, the quantity of water passed into the delta in 1900-1901 was certainly more than was required for irrigation, and to a minor extent this also applies to 1901-1902.

In the light of this consideration the remark is perfectly correct, and it in no way implies that passing water from a delta into the sea is necessarily an indication of non-user; this is indeed a necessity of delta irrigation and the only way of changing the water on the irrigated tracts along the coast.

74. It is denied that the measure of the inaccuracy of Sir J. Benton's figures is only the measure of difference between total supply and supply utilized. The inaccuracy of Sir J. Benton's figures and the reasons for this inaccuracy have been clearly explained.

Reference, Mysore paragraph 60.

75. The totals of Mysore table, Appendix G-1, are reproduced in column 10, Appendix XXIV, and may be compared with the totals given in column 5 which shows the totals at the Cauvery dam due to Mysore rules. From the totals in column 5 according to Mysore contentions, most of the water required for the supply of the Lower Coleroon anicut system must be deducted, as also ordinary loss by percolation, and draw-off for 6,000 acres.

Reference, Mysore paragraph 61.

Comparing the quantities however without deduction, it will be seen that the quantities given under Mysore rules, column 5, are less than the quantities at Cauvery-Vennar regulators, column 9, in nine years out of twenty. The figures in column 9 show the figures advanced by Mysore as the quantity to which under the rules of 1888-1892 Madras have a right at these regulators.

Madras have strongly combated this latter contention and shown that the rules do not justify such an interpretation, but even assuming it to be correct, the Mysore figures clearly show that the Mysore proposed limits at the Cauvery dam are quite inadequate to supply even the Cauvery delta, neglecting the Coleroon system altogether as well as draw-off and ordinary transmission losses between the Cauvery dam and the Grand Anicut.

The Mysore contention in paragraph 61 is an absolute admission that their proposed limit at the Cauvery dam does not fully protect Madras even as regards the Cauvery delta system, but that it does so in many cases and in others nearly does so—vide the last clause in paragraph 61.

76. In this paragraph the local conditions of supply, the fluctuating character of the same, the wide and winding nature of the rivers and channels, and the porous nature of the subsoil in the Cauvery delta are all ignored, and rainfall is the only local condition considered.

Reference, Mysore paragraph 62.

It is advanced that 72 inches delivered on the fields is sufficient to raise a rice crop. The figure is not unreasonable on the assumption that this is delivered on the fields as assumed by Mysore and that the incidence of delivery is in accordance with requirements and fully controlled.

No allowance is made for loss in transmission between the head and the field in main canals, distributaries and water-courses.

The loss in such distribution even in well-designed modern systems is very great and varies from 40 to 75 per cent. of the whole supply.

Further, the area irrigated, 890,000 acres, considered excludes consideration of the double cropped area 90,000 odd acres. On this basis and taking the loss between the head and the fields as 40 per cent. only, the water required is $(3\frac{1}{2} \times 980,000 \times 43,560) \times \frac{1}{4}\%$ c.ft. = 217,000 million cubic feet.

If such a supply were delivered at the Cauvery dam in the form of a steady and well-controlled supply, it would suffice.

The allowance *exclusive of rainfall* made in the Metur project was—

	INCHES.
For double crop to raise two crops	66.05
For single crop land	49.45

This was *head duty at the Cauvery dam* and not allowance *delivered on the field* and totals to 190,000 million cubic feet yearly as a steady and fully controlled supply.

Compare this with the Mysore allowance of 42 inches on the fields and making no allowance for double crop land or for the fluctuating and uncertain incidence of flow, and it will be realised that even on purely theoretical considerations the supplies suggested by Mysore as denoting the limits of useful supply to Cauvery and Vennar are altogether inadequate.

Comparison of these total theoretical quantities with the figures given in Appendix XXIV, column 8, which shows the supply advanced by Madras as roughly representing *useful supply* to Cauvery and Vennar from 1902 to 1904 and column 7 which shows the useful supplies of the later years and it will be seen that these totals are reasonable having in view the fluctuating and uncertain nature of supplies.

77. The figures given by Sir J. Benton have been shown to be altogether wrong. The figures given by Mysore in paragraph 63 have also been shown to be calculated on a wrong basis and to be very much less than actually allowed by Madras in their Metur project involving steady and assured supplies. The arguments here given by Mysore are based on altogether faulty figures and cannot be sustained.

Reference, Mysore paragraph 64.

The last clause is an admission by Mysore that the proposals put forward are knowingly such as will not fully safeguard Madras.

78. It is noted that Mysore repudiate any intention to advance that the standard of supply of a bad year should be applied in fixing the requirements of Madras.

Reference, Mysore paragraph 65.

79. It is in their arguments regarding the interpretation of the rules of Regulation of 1882 at the Upper Anicut that Mysore have admitted that the limit to which Madras is entitled is a six feet gauge-reading on the Cauvery dam.

Reference, Mysore paragraph 66.

Madras did not advance that the figures in the table Appendix G involved an admission of this.

Reference, Mysore paragraph 67.

80. It is here admitted by Mysore that on her own figures and contentions Madras interests are not fully safeguarded.

81. The Madras claim and the terms of reference both confine the second issue to what is the flow which will preserve unimpaired the prescriptive rights of Madras.

Reference, Mysore paragraph 68.

The question is not what will adequately preserve Madras interests, but what will fully preserve unimpaired Madras existing rights.

It is only by *mere flow* that Madras rights can be preserved and it is to natural flow within certain limits to which Madras lay claim.

82. Madras advance that allowances for rainfall worked out from the incidence of observed daily fall cannot be made on a basis of fixed rules. The basis of the rules advanced by Mysore is unsound for the reasons already stated.

Reference, Mysore paragraph 69.

The working will be still more impossible and the basis still more unsound now that it is advanced by Mysore that the period of transmission of flow from Kannambadi to the Cauvery dam has been underestimated.

The incidence of useful rainfall is wrongly computed in Mysore rules.

The actual application of the rules, even if drawn on an admittedly sound basis, would be impossibly complicated and would entail the consideration of the incidence and effect of the various rainfalls, registered at different stations in the huge irrigated tract, on the numerous blocks receiving varying quantities of rain. The upper areas which are the most difficult to command are the blocks which receive normally the least rain and it is quite common for the coast areas to be flooded and submerged, while the upper crops are perishing from want of water.

It is only under exceptional conditions of widely distributed rain that restriction of supply for rainfall would be safe and Madras cannot agree to the rules formulated by Mysore which are neither on a sound basis nor practically workable.

Lower Coleroon Anicut System.

83. The flow which under existing conditions is useful for supply of the Lower Coleroon system at any time when the Veeranam tank is not full is the whole natural flow of the river including all floods and this is the only limit, under such conditions, of the strict legal right of Madras.

Reference, Mysore paragraph 70.

The Madras Government have recognized that such a method of user entails on Mysore unduly onerous conditions and have restricted their claim to the flow in the Aganda Cauvery at the Upper Anicut which under the conditions which obtained prior to remodelling was required to give a flow of 7 feet over the Cauvery dam. To this they claim to have prescriptive right and the proofs of the claim have been adduced.

The question of how the water to which Madras are adjudged to have right will be used in the future does not arise. The contention of the Mysore Darbar as regards Coleroon supplies is that all necessary supplies are obtained by leakage, seepage and involuntary surplus from the water passed over the Cauvery dam primarily for the supply of the Cauvery delta system.

Under such a contention, it is hard to understand the other contention that the flow of the Aganda Cauvery should be separated into two distinct parts and separate allocation of water required for each branch of the river below the Upper Anicut.

The 644 million cubic feet which is included in the Madras limit flow claim over and above what under existing conditions will produce a flow of 7 feet over the Cauvery dam will be utilized *when it is available* in giving supply to the Coleroon system and in giving occasional additional water to the Cauvery and Vennar.

84. Under existing conditions when all the natural flow of the Cauvery which is not passed through the Cauvery and Vennar regulators flows through the Coleroon, the supplies to that system are sufficient. The existing conditions are altogether different from those which will obtain if the Mysore reservoir is built, and it is only by leaving water sufficient to allow of the passing of specific supplies into the Coleroon over and above what is required for the Cauvery delta that this system can be given adequate protection.

Reference, Mysore paragraph 71.

It is denied that Madras have in any way changed their position and the fact that their prescriptive right to all the limit flow asked can be maintained under considerations affecting only the Cauvery delta surely is strengthened by the fact that the supply of the Coleroon system for which water is undoubtedly required is proposed to be furnished within the same limit flow.

85. The actual method of arriving at the figure 644 million cubic feet has been fully and clearly explained and the figures have never been questioned. There has been no alteration. The claim to additional occasional supplies for the Cauvery system was made in the Madras original claim (Ma. 1, para. II-O) and reference to the record of actual discharges will show that such occasional additional supplies have passed over the Cauvery dam and into the Cauvery and Vennar for as long as there are records.

Reference, Mysore paragraph 72.

The proof of necessity is only clear after the means of efficient control and exclusion were available and it is therefore especially to the gauge reading after 1902 that attention is drawn to prove the passing of occasional additional supply in excess of 7 feet which could have been diverted into the Coleroon at the Upper Anicut but were intentionally passed over the Cauvery dam and into the Cauvery and Vennar. An examination of the daily registers shows that during this period such supplies were frequently deliberately passed, especially between 15th July and 15th September. It is on actual enjoyment as revealed by the water registers that the original claim to extra occasional supply was based and it was only withdrawn in the revised claim, because it is covered by the 644 million cubic feet.

86. The Madras Government have made a claim to a limit flow in the Akanda Cauvery at the Upper Anicut which is intended to safeguard and supply all irrigation both above and below the Upper Anicut. The claim is based on a consideration of the requirements of the whole of the river systems of irrigation.

Reference, Mysore paragraph 73.

below the Upper Anicut. The claim is based on a consideration of the requirements of the whole of the river systems of irrigation.

Reference, Mysore paragraph 74.

87. The Coleroon system is supplied—

- (1) by water passed through the Upper and Grand Anicuts and over the 150 yards calingulah including floods;
- (2) by percolation and leakage and drainage;
- (3) by run-off of rainfall from the intercepted catchment area.

Seepage from the river bed and margins whereby a river continues to flow for weeks after any surface drainage runs into it, is the chief source of the continuous flow of the Coleroon. A fresh converts the river bed into a reservoir which gradually gives out its store. The cutting off of much flood water and in a bad year of most flood water cannot but greatly affect Coleroon supplies on days when no flow is being passed through the surplus works. The proposed Mysore reservoir will have this effect.

The cutting off of floods will also directly and greatly diminish the supplies of the Veeranam tank which takes into it a percentage from all floods as already explained.

The whole conditions of supply of the Coleroon will be materially altered by the Mysore project and under such conditions specific supplies must be allowed to replace the supplies cut off through the interference with the natural flow now enjoyed.

The specific supply is not claimed for every day, but only when there is a natural flow of more than 7 feet (2,800 million cubic feet) in the Akanda Cauvery at the Upper Anicut.

The Mysore contention that because the flow claimed is only seldom realised in certain years is not a reason for reducing, but for increasing the flow required when it does come.

If 7 feet or even 6½ feet were a constant flow, nothing more would be required.

88. The Metur project is only a project still unsanctioned and the peculiar conditions of the Lower Coleroon irrigation and of the

Reference, Mysore paragraphs 75 and 76.

Vadavar supply were not known to Colonel

Ellis when he drew it up. The water to be impounded by Madras under this project which was to be withdrawn from the Cauvery flow was to be impounded in the interests of and at the call of the area affected and therefore deficient supply could be rectified by issues from the reservoir.

The conditions of the Lower Coleroon system, including the Vadavar and the Veeranam tank have been studied and explained in detail in the descriptive portions of this case and it will be clear from these that they have been dealt with in an inadequate manner in the Metur project.

Reference, Mysore paragraph 77.

89. What is here put forward is that seepage and leakage alone is sufficient to supply the Coleroon irrigation.

This irrigation is about 112,000 acres of which 63,000 acres come under the Vadavar and Veeranam tank. The area directly under the Vadavar and which is not supplied through the tank is about 11,000 acres requiring a flow of about 20 m.c.ft. per day.

For the direct irrigation of the whole area under the Vadavar including the tank area, a flow of approximately 90 m.c.ft. per day is required so that the flow required through the Vadavar which will irrigate the whole ayacut without drawing on the tank impounded supplies, is 110 m.c.ft. per day.

The tank capacity is sufficient to supply the 52,000 acres under it for 11 days from a full tank.

The supply of the Lower Anicut system—112,000 acres—requires a daily flow of about 194 m.c.ft. per day.

Referring to Mysore Appendix K. and K-1, column 12, it will be seen that this column refers to the necessities of the direct irrigation under the Vadavar exclusive of Veeranam tank ayacut, that is, it does not provide the quantity required for direct irrigation of the whole area under the Vadavar—63,000 acres, but only for the 11,000 acres above Veeranam tank. When the quantities in column 11 of Appendix K-1 amount to 20 millions cubic feet, the supplies passed are sufficient for the direct irrigation only of the area—11,000 acres. When the supplies in column 11 amount to 110 millions cubic feet, the flow is sufficient for the direct irrigation of the whole area under this channel of supply—63,000 acres—without any assistance from the catchment or impounded store of water in Veeranam tank.

Mysore states that examination of the tables (K-1) will show that the "flow of the Lower Anicut canals have been maintained," meaning presumably that the supplies required for full direct supply have been maintained, throughout the whole period without any specific flow, except on rare occasions from the Upper Anicut or Grand Anicut or 150 yards calingulah.

The suggestion is that unpreventable leakage and seepage fully supply the requirements. Scrutiny of the tables shows, however, that precisely the opposite is the case, and that a few days after direct supply from the above surplus works (column 6) has ceased, the supplies of the Vadavar (column 11) generally dwindle to below what is required for the 11,000 acres, leaving the whole ayacut under Veeranam tank dependent on the already impounded supply.

It will further be seen by scrutiny that the *rare periods* in which supplies are received from the surplus works above (column 6) except in June and after 1st November amount to 175 days, out of a total of 379 days, or nearly half the period. The claim that adequate supplies were passed during periods when for any considerable number of successive days no water was passed over surplus works into the Coleroon is negated by the tables.

The contention of Mysore that the supplies at the Lower Anicut have been well maintained when there were no specific recorded flow for long periods into the Coleroon is disproved by the tables.

For instance, take 1899. In July there was no specific discharge (column 6) from the 20th July to 14th August. During this period the discharge of the Vadavar was utterly insufficient even for the 11,000 acres direct irrigation under it for every single day from the 23rd July to the 15th August, while the discharge was "nil" for 21 days out of the 25. There was a small discharge of water from the surplus works into the Coleroon on 15th and 16th August and to this the Vadavar responded and gave just enough supply for its direct ayacut (excluding Veeranam tank) for 2 days, and after that the supplies again dwindled to materially below what was required for the direct ayacut.

The table put in by Mysore shows that the supplies in the Vadavar dwindle and become quite inadequate as soon as the figures in column 6 are nil for any considerable number of successive days. In the latter part of the year, this is not so marked, because the receipts from the catchment of the river below the Upper Anicut are in the north-east monsoon considerable.

In 1905, exactly the same thing is observable from the 9th to 28th August and from 16th to 30th September.

In 1906, owing to no discharge passing the surplus works, supplies of the Vadavar are very inadequate for the last week of September and the first week of October.

The figures in the tables, columns 6 and 11 do not support the Mysore arguments but on the contrary show that after a few days, the effect of closing all direct supply from the Cauvery is a marked diminution of the supplies passed into the Vadavar and a very inadequate flow in that channel.

It is claimed that columns 6 and 11 of table K-1 shows precisely the reverse of what is claimed for the table in Mysore paragraph 77.

90. The suggestion of Mysore here made is that the Madras discharges of the Lower Anicut

Reference, Mysore paragraph 78.

were advanced by the Madras Government as accurate. This is altogether the reverse of the

fact. The discharges were called for by Mysore and in handing them over at Ootacamund at a meeting of the Arbitration Committee, the Madras representative stated that these discharges were produced as they stood from Madras records, but that the figures were unreliable and only the discharges at the Cauvery dam and at Bhavani bridge were advanced by Madras as reliable.

The daily tables K-1 have been examined and it is found that they omit a very material item from consideration under heading column 8 which should be the algebraic sum (column 7—column 6). The omission is the minus figures. Thus when there is a gain in discharge at the Lower Anicut over the corresponding recorded total discharges of the Upper Anicut 150 yards calingulah and Grand Anicut, the amount of such gain is recorded. When however as very frequently happens, a loss in transmission takes place, this has not been considered. It has been explained above that a very material item in sustaining the flow of the Coleroon is the seepage from the river-bed itself impounded during periods of considerable flow, and given out when the surplus works above are shut down and having this in view the omission to include the record of loss vitiates the whole of Mysore table Appendix K-1 and the abstract of this, Appendix K of part II, Mysore 7.

A revised set of abstract showing the figures which ought to appear in the Mysore Appendix K has been drawn up (Appendix XXV). In drawing up these abstracts, the discharges over the 150 yards calingulah given by Mysore have been retained although the source from which these discharges have been obtained, cannot be traced.

It will be seen from the revised tables that continuous half-monthly gains in transmission which are displayed in Mysore tables are not borne out by the recorded discharges and frequent, great and unexplained losses are recorded.

The column 8 (c) of Appendix XXV shows the net half-monthly result. It is only to be expected that there will be considerable unaccounted—for gains in transmission in the Coleroon after rainfall in the catchment, or when a low stage succeeds a considerable fresh, and indeed in all periods of very low stage of flow. Madras do not attempt to argue on the figures in the

revised column 8 and admit that the discharges of the Lower Anicut are unreliable, but put it on record that the Mysore table omits very material items, and that the net total of column 8 should be (column 7 — column 6) and should show minus as well as plus results.

Under this explanation, it will be clear that the figures in paragraph 78 are erroneous and misleading as they ought to be the algebraic total of (column 7 — column 6).

The figures in the columns of the table below are from appendix XXV and from appendix K, My.-7, and show the differences resulting.

Year.	Total, column 7, appendix K.	Total, column 6, appendix K.	Difference, column 7, minus column 6.	Mysore figures, column 8, appendix K.
June to January	1899-00 62,018	52,335	9,683	20,594
	1904-05 189,980	134,100	55,880	63,634
	1905-06 150,777	115,103	35,674	54,439
	1906-07 261,074	175,295	85,779	103,112
June to September	1899-00 52,808	52,335	473	11,384
	1904-05 177,690	131,326	46,364	54,103
	1905-06 83,788	65,672	18,116	27,615
	1906-07 150,004	135,861	14,143	38,156

It will be seen that the figures quoted by Mysore are misleading.

Further, the figures quoted include all inflow from rainfall into the Coleroon from its catchment of 1,077 square miles. This is after heavy rainfall very considerable and this is frequent in the north-east monsoon. Last November (1913) big flood passed over the Lower anicut when both Upper and Grand anicuts were closed.

The statement of Mysore that extra flow in the Coleroon (column 7) can only be derived from leakage is quite wrong in fact. Inflow from rainfall, and seepage from the stores left in the river-bed by freshes, are both fruitful sources of supply—the former, especially from October, and the latter especially in the earlier months of the year.

Reference is invited to the figures tabulated above separately for the south-west monsoon.

It is in the south-west monsoon that the Lower Anicut system is almost altogether dependent on Cauvery water, and the freshes of this period both during, and after, actual incidence of flow in this river are a very valuable source of supply which will be materially impaired, should the Mysore project be carried out.

It is claimed to have been shown that the conclusions of Mysore are based on inaccurate figures, inaccurately put forward, and that the figures themselves do not support Mysore contentions.

91. The suggestion made that seepage in the Coleroon will not be affected by the reduction of supplies passing in the Cauvery and of the freshes and floods in the Coleroon is utterly untenable. Leakage and seepage from the Cauvery vary in amount with the height of flow and quantity of water passing down it.

Reference, Mysore paragraph 79.

Seepage from the Coleroon bed is dependent on the incidence and height of freshes passed down the Coleroon. Reduction in either the quantity passed down the Cauvery, or in the freshes passed into the Coleroon must reduce the resultant leakage and seepage. This is not a matter open to doubt. Even therefore if the Mysore contentions that seepage can supply all requirements under present conditions were true, which is denied, it would not at all follow that under the reduced flow occasioned by the new conditions the proposition would still hold.

Reference, Mysore paragraph 80.

92. The study of the table, K₁ do not tend to confirm the Mysore contentions.

93. In the Madras Part II, paragraph 38 (Ma. 8), it is stated that Veeranam tank does not begin to impound till there is a flow at the Lower Anicut of 25,674 cusecs. The expression "begins to impound" there used had reference to conditions in which the inflow from the Vadavar into Veeranam tank included the daily draw off from the tank for supply of irrigation under it. That is, that unless inflow exceeded drawing off there was no impounding.

Reference, Mysore paragraph 81.

The argument used by Mysore, that when the supply is less than what is required for impounding, such supply is useless, is so patently untenable that it only requires to be stated, to be dismissed.

Further, Mysore has taken the figures relating to the conditions of the Lower Anicut before remodelling. Such a condition involves the necessity for much more water than is claimed, as Madras are not claiming their full legal rights as regards the Lower Anicut.

94. There is no reason to suppose that at the time of remodelling of the Upper Anicut

Reference, Mysore paragraph 82.

there existed any new, or aggravated set of unfavourable conditions, but the power of control, and the undoubted superiority of the type of the new work proposed, as regards both flood discharge and supply, rendered remodelling very desirable. The trouble from sand accumulations was not new in 1898, but had been an ever-present trouble from the time of the construction of the Upper Anicut. The reconstruction of the Upper Anicut does not render scour unnecessary, but floods passed into the Coleroon act more efficiently in effecting scour than was the case with the old work.

95. It is noted that Mysore admit that the volume of water passed by high floods has an

Reference, Mysore paragraph 84.

important bearing and effect on the supplies to the Coleroon system. The Madras Government have, subject to the allowance of adequate specific provision for the Coleroon system, to replace the losses by impounding in Mysore reservoir waived their right to such floods, but note that the importance of floods in the Coleroon in their effect on the Lower Anicut system supplies, which they have all along urged are now recognised by Mysore.

96. It is denied that seepage alone can adequately supply the Coleroon system under

Reference, Mysore paragraph 85.

existing conditions of natural flood and flow, but even if this were the case, it cannot be contended that the amount of flow due to seepage will not be materially reduced by reducing the number and quantity of freshes passing down the Coleroon, and reducing the supplies passing down the Cauvery.

Seepage and leakage from the Cauvery to the Coleroon increase and diminish with water levels in the Cauvery and the reduction of such levels connotes reduction of seepage.

Reduction of supplies to the fields connotes reduction of surface drainage from these.

Under existing conditions occasional freshes are an essential to adequate supply and seepage alone is quite inadequate. How much more inadequate would it be under proposed conditions?

97. The consideration of the second remodelling of the Lower Anicut by cutting down the

Reference, Mysore paragraph 86.

crest 2 feet while retaining the height of the top shutters, when resting on the crest, unaltered does not materially affect this case. The work was, it is found, not actually carried out till the year 1910.

98. In a good year, the effect of the Mysore reservoir on the incidence of floods will not

Reference, Mysore paragraph 87.

be such as to seriously injure Madras, but this is not so in a bad year. In such a year the cutting off of flood water by Mysore would, without compensation in the form of specific supply, greatly affect the supplies at the Lower Anicut due to both direct impounding from floods and seepage due to past floods.

99. The Government of Madras protest most strongly against the misrepresentation conveyed

Reference, Mysore paragraph 88.

in this paragraph. Madras paragraph 99, Part VI (Madras 12), specifies "the whole natural flow of the river", but this is wrongly represented by Mysore as the "average estimated natural flow."

This reference arose from My. 7, Part II, paragraph 78, and the words "Even if the waiver is now withdrawn, they are entitled to the natural flow of the river after the customary Mysore requirements are satisfied."

When this was read, the Madras representative asked if this was an admission that Madras was entitled to such natural flow; on this being assented to by the Mysore representative, it was asked that this should be stated in writing.

Both the Arbitrator and the Assessor thereupon expressed the opinion that the statement was clear admission of the Madras right, and the Mysore representative said that as the right was already admitted in writing under the signature of the Secretary to Government, Mysore, he could not see why any further demand was made.

The Madras representative in view of the opinions expressed then withdrew his request. The Madras Government claim that they are entitled to hold the Mysore Darbar to the admission made.

The compromise to which the Madras Government are prepared to agree so as to facilitate the working of the Mysore project in the hot weather is stated in Part VI, paragraph 99 (Ma. 12).

Madras-Cauvery channels above the Upper Anicut.

100. It is not immediately apparent how the limit flow to be settled as required at the Upper Anicut to conserve unimpaired Madras rights will be affected by consideration of the conditions of irrigation of channels taking off many miles up river and quite outside the influence of the diversion works at this place and it is regretted that the conditions of irrigation of these Upper

channels have not previously been clearly put before the Arbitrator. The reason is that it is only recently that the full significance of these conditions has been recognised by the Madras representative.

101. At first sight it appears that if sufficient limit flow at the Upper Anicut is allowed to fully protect the interests of irrigation below, the interests of irrigation above will be fully protected as these channels, being situated higher up the river, will already have taken all the water they require before the flow reaches the Upper Anicut. This would be so, if there were anicuts below the offtakes of these channels holding up water to the level of full supply at the head of each channel and thus enabling the required water to be drawn off by the higher channel before any is passed down.

There are however no anicuts on the Cauvery between the confluence of the Bhavāni and the Upper Anicut and the channels take off from the river without the supply being assisted by any diversion work.

102. Most of the channels have open heads but a few have head sluices. Their condition of supply are different and must be considered separately for two seasons:—

- (a) The season of freshes from the first fresh in May or June to December.
- (b) The low river season—December to May or June.

In these channels irrigation goes on continuously throughout the year.

103. In the season of freshes the level of water entering at the head of the channels with open heads is the same level as the water level in the Cauvery at the place of offtake and thus the amount of water entering the channel varies with the stage of the main river. In order to prevent damage from quantities of water passed into the channels in excess of their requirements or carrying capacities, surplus works are provided. In channels where there are head sluices, these are used for this purpose.

In this season therefore the supplies to these channels are fluctuating and the fluctuations depend on the natural fluctuations in incidence of level of water in the river, that is on the stages of flow. The limit of useful supply is that stage of flow which will cause as much water to enter a channel as the channel can carry or make use of. In this season a low river connotes a very deficient supply and a high river a good supply.

104. It will be clear that the prescriptive rights of Madras in this season for the purpose of supply of these channels embrace all natural flow up to a stage of river, flow giving maximum useful supply to each channel. As it is settled that the limit flow of the Aganda Cauvery at the Upper Anicut shall be that fixed for defining the rights of Madras, the question is what is the quantity of flow of the Aganda Cauvery at the Upper Anicut which connotes the stage of river above required to give maximum useful supply to the Upper channels. Any reduction below this limit of the flow at the Upper Anicut must reduce the useful supply of these Upper channels.

The stage of river flow which gives full useful supply to the channels between Bhavāni and the Upper Anicut is about 2,800 to 2,800 million cubic feet in 24 hours or a stage between say 7 and 7½ feet at the Cauvery dam. It is believed that stages of over 8 feet are not useful while stage of under 7 feet involve material reduction of useful supply throughout the season of freshes.

It is not possible to give an exact figure to connect the stage at the Upper Anicut with the stage at the different points of offtake all up the river and only an approximation can be furnished.

The limit of maximum useful supply to these Upper channels is an even more important matter to these channels during the later part of the season of freshes than in July-August. Fairly liberal supplies are common in the earlier months, in the later months supplies are on most days quite inadequate and are only recouped by occasional freshes. Although rainfall increases as the season progresses, this increase is nothing like so great as it is in the delta tracts and thus the channels require in proportion a greater average river supply in these months to keep the irrigation in good condition. The times of scarcity for these channels are from September to November when the ordinary river flow connotes a stage of river between 3½ and 5½ feet on the Cauvery dam.

In the season of freshes up to December the seasonal incidence of flow of the river does not permit the construction of korambus which are universally employed in the low river season for this purpose from December to the first fresh.

105. In low river season "korambus," which are long brushwood spurs, are run out from the heads of the channels upstream into the river and by this means sufficient flow is held up and diverted into the channel head to supply the irrigated area. These korambus are maintained throughout the hot weather until washed away by the first freshes. It is only by these means that the flow of the river can be diverted into the channels with a low river.

Limit flow required at the Upper Anicut.

106. In considering what is the limit flow in the Aganda Cauvery at the Upper Anicut required, it is necessary to consider the requirements of the whole system of irrigation considered together and not as has been suggested by Mysore to estimate separately the requirements of each.

For the upper channels the limit stage of flow which will fully preserve the prescriptive rights of these channels is practically that which is claimed as necessary for the preservation of the rights of Madras below the upper anicut and it is to be recognised that disturbance of the natural flow below these limits would reduce the customary useful supplies of these channels, even if there were no system of irrigation below also calling for its full customary useful supply.

Part X—Facts and Engineering Arguments.

REJOINDER OF MADRAS TO MYSORE REPLY PART III (MY. 9)—THIRD ISSUE.

107. With reference to Appendix X (Ma. 10), it is contended by Mysore that it is impossible

Reference, Mysore paragraph 91.

that the figures of discharges shown can be accurate on the grounds stated. The discharges of the Cauvery dam are liable to fluctuations of as much as 10 per cent. from the normal curve in accordance with the incidence of previous flow, and the flow after a prolonged period of low river is reduced, while the reverse is the case after a prolonged stage of good fresh. On this occasion, the river had been continuously below normal for a considerable time and in consequence the quantities at the Cauvery dam may have been less than the normal discharges due to gauge readings by anything up to 10 per cent. It is not claimed that this is so, but there is a reasonable probability of this. Ten per cent. of 195,046 would be 19,504 and this is a consideration which should not be overlooked.

Again it is urged by Mysore that no inflow was received from the Bhavāni during the period. This is incorrect and the records show a flow during this period which by adding together the average daily discharge in cusecs totals to 9,854, not counting leakages through the great length of anicut and percolation or surplus from the Kalingarayan channel and the irrigation under it which extends for 30 miles in a narrow strip along the right margin of the Cauvery.

Again no consideration has been paid to the rainfall falling on the catchment below the Bhavāni and above the Upper anicut in the period referred to.

There was fairly heavy rain in the catchment draining into the Cauvery left side below the Amaravati confluence.

In the second half of August, there were 2 inches of rain in this catchment, while between the 1st and 18th September there were another 2 inches.

As regards the direct irrigation between Bhavāni and the Upper anicut, channels having heads independent of any anicut only receive small supplies with the river in the stage of flow representative of this period (5½ to 3½ on the Cauvery dam). These channels only receive adequate supplies with a stage of river flow of 6 feet and upwards on the Cauvery dam, unless at a time of year permitting the erection of "korambus" which enable water to be diverted into the channel heads.

If the above points are taken into consideration, the matter assumes a different aspect from that in which it is represented in Mysore paragraph 91.

108. Even if the arguments and conclusions of Mysore paragraph 91 were admitted, they do not support the inference made in paragraph 92.

Reference, Mysore paragraph 92.

109. The Madras computations are based on the only available recorded discharges. They are not based on either the allowances of the Metur Project or those made by Mr. McHutchin.

Reference, Mysore paragraph 94.

110. It is not clear what useful purpose will be served by the proposed observations below the confluence of the Bhavāni and Amaravati (rule 8, Mysore Appendix E). The observations are unlikely to materially assist in fixing the time of transmission.

There appears however to be no objection to taking these, except the expense and labour and the multiplication of gauging stations involved.

111. It has been settled that all papers should be shown to the assessor regarding the extension of irrigation above Kannambadi and regarding compensation to and resettling of the ryots disturbed by submergence in the Mysore reservoir waterspread area.

Reference, Mysore paragraph 99.

112. A reference to paragraph 32 of Sir J. Benton's note shows the conclusions arrived at

Reference, Mysore paragraphs 100 and 102.

which involve the method of measurement in Mysore of limit flow, and in the explanatory final remark sub-paragraph (v) he says: " . . . as will be seen from sub-paragraphs (i) and (ii) above in which I have endeavoured to clearly explain that the Mysore Darbar are to have all the surplus supplies to which they have any claim under the existing agreement placed unconditionally at their disposal." It was under acceptance of conditions (i) and (ii) that the balance was to be unconditionally at the disposal of Mysore. These conditions are based on a

system of measurement in Mysore and only in Mysore and Madras most strongly hold that a system of measurement in Madras must entail complications, friction and interference with all future development in Madras which must produce intolerable conditions.

The existing rights of Madras include rights of improvement and development of irrigation resources and the Madras Government claim that these rights shall be preserved to them.

The concession to Mysore of any right of future interference with the development of irrigation resources in Madras would undoubtedly impair the existing right to development at will in all the country below the Mysore boundary and the Madras Government claim this as one of their existing important rights which must be preserved unimpaired.

It is strictly on the basis of the agreement of 1892 and the preservation of existing rights of Madras unimpaired that this Government claim that this matter shall be decided.

A system of measurement at the Upper Anicut concedes to Mysore rights in the flow of the Bhavani, the Amaravati and all the basin of the Cauvery to which she has no title whatever, and in just so much as it does this it impairs the existing rights of Madras in these streams and imposes on Madras a burden never before existing and thus takes away from the existing rights.

113. The object of Mysore is to get as much water for impounding as possible. The object of Madras is to safeguard her existing rights both as regards incidence of flow and limit quantity of useful flow and existing rights to development. It is the Madras contention that their existing rights must be fully provided for and only under methods by which this is fully provided for, will any mode of impounding be satisfactory.

114. The figures of Mysore tables, revised for a time of transmission of four days in place of three days, still show that the rules constitute a material interference with, and restriction on the rights of Madras which Mysore have advanced as being the proper ones.

The interference is material as regards—

- (a) quantity of useful flow which is materially less than the rules allow;
- (b) incidence of flow which is materially more fluctuating than the natural flow within the useful limits.

Other objections are stated in later paragraphs.

115. In the table given in Mysore paragraph 109, it is submitted that column 3 is an admission of deficiency of supply.

It is claimed that the quantities in column 4 constitute a "set off" against this. This is an altogether illogical and untenable claim.

The hypothesis on which the tables are drawn and Mysore rules framed is that the limit flow allowed in the rules (which are the limits on which the tables are drawn) is the *maximum useful flow* and will fully preserve Madras rights unimpaired.

If this is admitted, excess over this cannot be *useful flow*. If it is not admitted, the basis of the rules on which the tables are drawn is faulty and no argument or deduction can be made from them.

It is not open to take Mysore limits for drawing the tables and argue that every day on which flow is not reduced by impounding below this Madras interests are fully conserved and also to argue that on days on which the flow is in excess of this this flow or any part of it is "useful surplus." Under the hypothesis of the rules, the figures in column 7 are useless surplus and the table is an admission of the Madras contention.

Madras state that the Mysore limits are not the full useful limit and in the original tables drawn by them have named the limit which they claim, and drawn their tables for that limit treating all excess over it as useless and all flow below as "useful".

If Mysore admit the higher flow to be useful, they must alter their rules and the basis of their tables.

Reference, Mysore paragraph 110.

116. As regards "useful surplus," the arguments in the last paragraph need not be repeated.

The Madras case did not state that the quantity of deficient water would entail a reduction of area cultivated, but stated what area could be cultivated with the quantity of water of which by hypothesis, they were wrongfully deprived; this was stated with a view of formulating in general terms what such a reduction amounted to. What would actually happen in such a case would be:—

- (a) In a good year the average outturn of crop per acre would be reduced,
- (b) In a bad year, the reduction would entail probable failure more or less complete to an area several times larger than that stated as the area equivalent to the deficiency.

The suggestion that water in excess of what is the *maximum useful limit supply* could be used to extend cultivation under existing conditions is obviously untenable.

117. The incidence of natural flow is fluctuating and the diagram of flow serrated. This is by all admitted to be an unfavourable condition for irrigation. Any system which makes the natural flow still more fluctuating and the diagram still more serrated imposes more unfavourable conditions on irrigation and must undoubtedly impair Madras existing rights to the natural incidence of flow within useful limits.

Reference, Mysore paragraph 111.

118. The argument here is that the infringement of Madras rights is "only a very little one." Madras do not admit this but claim that Mysore have admitted that the Madras rights are not maintained unimpaired.

Reference, Mysore paragraph 112.

Reference, Mysore paragraphs 113 and 114.

119. These again are admissions of interference but a pleading that it is insignificant.

Five per cent. on one million acres is 50,000 acres and one per cent. is 10,000 acres.

Surely this is in no way negligible or insignificant. The loss to the landholders would be very heavy.

120. The reference to tables based on the flow of part of a single season cannot be seriously taken as proof of absence of interference with rights.

Reference, Mysore paragraph 115.

It is only by applying the test of working tables to the flow of a long series of years that the effects of the changes and rules suggested can be estimated.

121. Madras demand to be fully safeguarded in the worst year as well as in every year and the necessity is obviously greater in a bad year. It is denied that Madras have stated they have no intention of seeking full protection in the worst year.

Reference, Mysore paragraph 116.

Reference, Mysore paragraph 117.

122. This is an admission that Mysore rules fail to fully protect Madras. Also see paragraph 119 above.

123. The Madras claim is that the system and rules of impounding in Mysore reservoir must be such as will preserve unimpaired the existing prescriptive rights of Madras.

Reference, Mysore paragraph 118.

It is contended that no system involving measurement at the Upper Anicut and necessity of passing compensation water can fulfil such a requirement. In addition to the objections to the Mysore rules stated under headings (a) and (b), paragraph 114 *supra*, the system has the following inherent defects:—

(c) It entails rights to interference and restriction on expansion and development of irrigation in Madras which rights do not now exist. Madras claim that the right to non-interference and to development is an existing one.

(d) The system has the fatal defect that the measurements at the Upper Anicut cannot give a basis on which the natural flow can be computed.

124. All examination of the working of the Mysore system and the general effect of such a system can be stated in the form of tables for past years for which the natural flow at both Kannambadi and the Upper Anicut is already known. From this known natural flow the computation of amount of compensation water can be made.

If the natural flow were not known, reasonably accurate computation would be impossible.

This defect is one which has not been before stated and was not before clearly appreciated; but it appears to be one which is, apart from the other grave objections, fatal to a system of issue of compensation water on measurements of flow at the Upper Anicut. The defect above stated will be best illustrated by reference to working tables.

Reference is made to the printed tables, Appendix XIX (Ma. 13), in which the time of transmission is three days, rather than to the Mysore tables (Appendix R.My. 9) which have not been printed and are therefore not convenient for reference. It is to be understood that this is only done for convenience of illustration and the argument referred to in either table is the same.

In the tables, the figures in column 7 and in column 5 "Net flow at Cauvery dam" are obtained from computation from the already recorded natural flow (column 3).

These latter figures would not be available for working Mysore system in the future and the measurement to be taken would give the figures to be entered in column 7 from which column 4 figures could be computed.

These measurements will, however, result in higher comparative discharges than those now shown in column 5 whenever there is impounding.

As an illustration, it will be obvious that in cases where *minus* figures now appear in column 5 and column 7 this could not be a result of actual measurement and further that even a *nil* flow could never be recorded.

There are two causes for this:—

(1) A rapidly falling inflow in a river bed at a low stage of flow results in a flow in the river in excess of the actual inflow; this is due to seepage from the bed and sides. Let this excess equal S .

(2) The reduction of incidence of natural water level in the Cauvery would result in all the channels between Bhavani and Upper Anicut, which do not take off from anicuts, getting materially less supply than they would under the incidence of natural flow. Let this reduction equal R .

The figures in column 5 (or column 7) obtained from actual measurement will be in excess of the figures giving true results by the quantity $(S + R)$ and as a result of computation of "natural flow" will be in excess by the same amount. There are no means of determining the actual values of the above excess from day to day, but some idea of the quantities which may be involved can be formed by reference to the *minus* figures in column 5, Table III-A (Appendix XIX Ma. 13). These *minus* figures cannot exceed the value of R for the corresponding date.

The amount of compensation water to be passed has to be computed from the measurement of actual flow at the Cauvery dam and the above source of error which will be both indeterminate and of constant occurrence will be seen to be also material as regards quantity and the effect will be a reduction of supplies of compensation water due to Madras.

Further even if the quantity due to R could be determined in every case and allowed for in compensation water, it would be very frequently impossible to pass this compensation water into those channels which had originally been deprived of this supply which are the channels taking off between Bhavani and the Cauvery dam.

Again the flow at the Cauvery dam is not constant for the same gauge reading, but varies as much as ten per cent. on either side of the normal, being less after periods of continuous low river and *vice versa*. This would affect Madras adversely just at the times when water was most wanted. The adverse effect on Madras would be the greater, as the incidence of continuous absence of freshes would under the new conditions be longer and more frequent than under the existing ones.

125. The matter of the effect of stage of river flow on the supply of channels above the Upper Anicut has been considered separately in the arguments on the second issue and this has further an important bearing on the matter of altering the incidence of flow. A certain level is required to feed any water into each channel before the erection of "korambus".

The addition, to the river supply by way of compensation, of sufficient water to supply these channels would, by no means, secure the possibility of passing the water into the channels.

If the channels under the incidence of natural flow get a deficient supply, this is the act of God and there is no infringement of rights, if, however, the natural flow is disturbed and thereby the supply suffers, the rights of the ryots are certainly impaired and infringed.

126. To recapitulate, the Government of Madras object to the Mysore system and rules on the grounds—

- (a) that it does not preserve their prescriptive rights unimpaired as regards quantity of flow;
- (b) that it fails in a similar manner as regards incidence of flow;
- (c) that it will impair existing rights to full control and development of works in the basin of the Cauvery below Mysore and above the Upper Anicut;
- (d) that it is impossible under the system proposed to make any accurate measurement of the compensation water due to Madras.

APPENDIX XXI.

FIRST GROUP.

STATEMENT showing the area irrigated by the channels and tanks fed by the Cauvery and its tributaries above the Upper Anicut during the years 1880 to 1889 so far as records are forthcoming.

District.	Taluk.	River.	Tributary or channel.	1880.	1881.	1882.	1883.	1884.	1885.	1886.	1887.	1888.	1889.	Remarks.
1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
Salem ..	Salem, Tirumangaluru and Chengode ..	Tirumangaluru river or Sarabanganadi ..	....	ACS. 2,313 1,745	ACS. 2,415 1,846	ACS. 2,343 1,836	ACS. 2,471 1,876	ACS. 2,289 1,461	ACS. 2,319 1,848	ACS. 3,160 1,764	ACS. 3,150 2,087	ACS. 2,741 1,863	ACS. 2,878 2,086	Figures in respect of certain works fed by the Tirumangaluru and Omalur rivers are not available. Figures are not available.
Coimbatore ..	Dharmapuri ..	Thoppayar ..	....	234	284	242	275	264	249	258	259	272	265	The records connected with these are reported to have been destroyed.
	Gobichettipalayam, Bhavani and Erode.	Bhavani ..	Thadapalli and Arankotal channels including Ananthasagar tank. Kalingsarayan channel.	..	..	..	..	..	..	..	..	..	..	Information not available.
	Avanashi ..	..	Other channels ..	167	224	234	240	253	256	203	228	236	246	In the case of Coonoor and Kallar river channels information is not available.
	Avanashi, Coimbatore, Palledam, Dharmapuri and Erode.	Noyil ..	....	1,756	2,333	2,423	4,264	4,640	4,581	6,302	6,577	6,670	6,801	For some of the channels and tanks in Coimbatore and Erode taluks, accounts are not available for the years 1880 to 1889 inclusive.
Trichinopoly ..	Udamalpet and Dharmapuri ..	Amaravati ..	22 channels ..	(e) 1,514	10,193	10,217	10,170	10,217	10,255	10,202	9,888	9,916	10,032	(a) This represents the area in 1880 under some of the channels in Udamalpet taluk only.
	Kallitalai ..	Amaravati ..	4 channels ..	..	..	..	..	..	..	..	..	..	..	The other figures, i.e., from 1881 to 1889, are the areas under the channels in Dharmapuri taluk and under some of the channels in Udamalpet taluk and exclude the areas under the channels in Karur taluk.
				..	..	..	..	..	..	..	..	..	..	Information not available. The Collector of Trichinopoly has not given separate figures for the area under the Amaravati channels in Kallitalai taluk. A further reference to him has been made.

Statement showing the area irrigated by the channels and tanks fed by the Cauvery and its tributaries above the Upper Anicut during the years 1880 to 1889 so far as records are forthcoming—cont.

District.	Taluk.	River.	Tributary or channel.	1880.	1881.	1882.	1883.	1884.	1885.	1886.	1887.	1888.	1889.	Remarks.
1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
Madura	Palni ..	Amaravati ..	Nanganjiyar ..	ACS.	ACS.	ACS.	ACS.	ACS.	ACS.	ACS.	ACS.	ACS.	ACS.	Figures are not available. Areas under some of the works connected with the Shunmuganadi are not available for the years 1880 to 1883 and 1885 to 1889. Information is not available for the years 1880 to 1883 and 1815 to 1889. Figures are not available for some of the works. The Collector of Madura reports that the area under the tanks and channels fed by the Varattar in Dindigul taluk is not available.
			Shunmuganadi ..	3,310	3,395	3,478	3,495	5,957	4,807	4,870	4,824	4,761	4,701	
			Poranthalar ..	851	880	919	945	851	927	895	881	902	904	
			Pachiyar ..	..	..	..	..	1,540	..	..	..	..	..	
			Nallathangayar ..	122	119	121	123	128	64	48	60	58	55	
			Varattar ..	1,716	1,409	1,690	1,704	1,945	1,673	1,312	1,669	1,434	1,581	
			Odai flowing into Varattar.	..	..	..	..	..	..	..	..	..	..	
			Varattar flowing into Kodavanar.	..	..	..	..	..	..	..	..	..	..	
			Santhanavardhani ..	..	..	..	..	..	..	..	..	..	..	
			Odai flowing into Kodavanar.	..	..	..	..	..	..	..	..	..	..	
Coimbatore	Dindigul ..	..	Odai flowing into Santhanavardhani.	..	..	..	..	..	..	..	..	..	..	The Collector of Madura reports that the information for these works, which are in Dindigul taluk, is not available.
			Kodavanar ..	..	..	..	..	..	..	..	..	..	..	
			Sirumalai odai flowing into Santhanavardhani.	..	..	..	..	..	..	..	..	..	..	
Trichinopoly	Karur ..	Cauvery ..	Nittar.	..	..	..	..	..	..	..	..	..	..	The Collector of Coimbatore reports that the accounts of irrigation are not available. The Collector of Trichinopoly has reported that the area in Karur taluk is not available. The Collector of Trichinopoly has not furnished the information separately for the Cauvery and Amaravati irrigation in Kulittalai taluk. The average of the irrigation of the four Amaravati channels of later years (2,584 acres) has been deducted from the Collector's total for the taluk and the balance is shown against this entry.
			Karumalai odai.	..	..	..	..	..	..	..	..	..	..	
Trichinopoly	Kulittalai	..	Kathirayar ..	..	..	..	..	..	..	..	..	..	..	
			Pogalore channel ..	..	..	..	..	..	..	..	..	..	..	
			Vangal do. ..	..	..	..	..	..	..	..	..	..	..	
			Nerur do. ..	..	..	..	..	..	..	..	..	..	..	
Trichinopoly	Kulittalai	..	Krishnarayapuram channel.	7,881	8,275	8,856	8,656	8,729	8,849	8,865	8,880	8,930	9,069	
			Mahadanapuram channel.	..	..	..	..	..	..	..	..	..	..	
			Marudur Natta voikal.	..	..	..	..	..	..	..	..	..	..	
			Nangam voikal ..	..	..	..	..	..	..	..	..	..	..	
			..	..	..	..	..	..	..	..	..	..	..	

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Statement showing the area irrigated by the channels and tanks fed by the Cauvery and its tributaries above the Upper Anicut during the years 1880 to 1889 so far as records are forthcoming—cont.

District.	Taluk.	River.	Tributary or channel.	1880.	1881.	1882.	1883.	1884.	1885.	1886.	1887.	1888.	1889.	Remarks.
1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
Trichinopoly	Nainakkal ..	..	Raja channel ..	ACS.	ACS.	ACS.	ACS.	ACS.	ACS.	ACS.	ACS.	ACS.	ACS.	
			Mohanur channel ..	5,215	5,251	5,260	5,257	5,190	5,329	5,252	5,254	5,217	5,248	
			Komarapalaiyam channel.	..	..	..	..	..	..	..	..	..	..	
			Ayilur channel ..	..	..	..	..	..	..	..	..	..	..	
			Siplaputhur channel.	..	..	..	..	..	..	..	..	..	..	
			Tottiyam Chinna channel.	..	..	..	..	..	..	..	..	..	..	
			Tottiyam Periya channel.	..	..	..	..	..	..	..	..	..	..	
			Srinivasanallur channel.	12,218	12,262	12,253	12,745	12,431	12,822	12,958	12,789	12,848	12,240	
			Musiri Voikal (channel).	..	..	..	..	..	..	..	..	..	..	
			Amur Voikal (channel).	..	..	..	..	..	..	..	..	..	..	
Trichinopoly	..	..	Konasalam channel ..	..	..	..	..	..	..	..	..	..	..	
			Uyyakondan channel.	..	..	..	..	..	..	..	..	..	..	
			Ramavitalai channel.	..	..	..	..	..	..	..	..	..	..	
			Peruvilai channel ..	57,005	57,643	57,694	58,080	57,590	56,534	58,711	58,706	58,547	60,819	
			Panguni channel ..	..	..	..	..	..	..	..	..	..	..	
Trichinopoly	..	..	Ayyan channel ..	..	..	..	..	..	..	..	..	..	..	
			..	..	..	..	..	..	..	..	..	..	..	

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APPENDIX XXII.

Note regarding figures of "Average discharge at head" Appendix V of Sir J. Benton's note of 12th May 1911 (Exhibit Ma. 8-a).

It is stated in Ma. 12, Part VI, paragraphs 61 to 65, that endeavour has been unsuccessfully made to trace the source of the figures in columns 3, 4, 5, 6 of this appendix and further that the basis on which average discharge was computed (columns 5 and 6) must have been different except for the years 1907-08, 1908-09 and 1909-10 from that on which the figures in columns 3 and 4 were computed.

2. Further enquiry has just disclosed the basis of figures in columns 5 and 6.

The discharges for the period referred to shown in columns 5 and 6 are found to be—

For figures in column 5 the average recorded discharge of the Cauvery and Vennar for the months of June to November (183 days).

The figures in column 6 is the average recorded discharge of the Cauvery and Vennar for the months of December to March (121 days).

Thus the figure in column 5 should be 183 days and in column 6 should be 121.

The figures were given correctly for a single year 1897-98.

The figures of 1899-1900, 1905-06 and 1906-07 are an exception to the above, as the discharge diagrams for the last two years were finally prepared on the basis of Mr. Griffith's method of sluice discharges, whereas the original figures of 1905-06 were computed on the basis of the curve of 1900-01.

The figures of 1905-06 correspond to those of the curve of 1900-01.

The causes of discrepancies in figures of 1899-1900 and 1906-07 have not been traced.

The figures for August 1898 in the river diagram is printed 6,666, whereas it ought to be 9,999.

The original of the figures for all years from 1896 except 1899-1900 and 1906-07 has thus been traced.

For years prior to 1896 Madras original discharge diagrams are with Mysore.

The reason why Sir J. Benton's figures do not agree with the figures in the annual river diagrams is thus that given in Madras, Part VI, paragraph 63, viz., that the basis of the discharges and of the crop period do not correspond.

This is now shown to be the case and the basis of each is now known.

W. M. ELLI, Col., R.E.,
Madras Representative.

STATEMENT showing the average discharge at head of Cauvery delta during the irrigation season.

Years.	Discharge in cusecs as given in columns 5 and 6 of Sir J. Benton's Appendix V.		Discharge in cusecs computed from discharges shown in monthly river diagrams.		Remarks.
	First crop.	Second crop.	First crop.	Second crop.	
1	2	3	4	5	6
1896-97	17,193	2,868	17,193	2,868	Diagrams for years prior to 1896 have been sent to Mysore. In the administration reports the discharges of Cauvery only available.
1897-98	18,074	890	18,074	890	
1898-99	18,128	2,174	18,128	2,174	
1899-1900	10,290	509	7,808	45	
1900-01	20,735	596	20,735	596	* These are based on the diagram figures which are different from those from which the figures in columns 2 and 3 were deduced by the Executive Engineer for E.I. statement.
1901-02	15,828	2,329	15,828	2,329	
1902-03	12,106	2,843	11,939	2,843	
1903-04	15,418	3,792	15,478	3,793	
1904-05	11,931	137	11,985	137	
1905-06	9,200	470	11,079	1,065	
1906-07	10,906	1,903	11,444	1,222	
1907-08					
1908-09					
1909-10					

First crop season taken as June to November inclusive.

Second crop season taken as December to March.

Note.—Discharge in column 4 is the average total discharge of June to November from river diagrams.

Discharge column 5 is the average discharge from December to March from annual river diagrams.

APPENDIX XXIII.

Note on differences of discharges for the same gauge readings, Cauvery dam, recorded in the curves of Captain Mead and Major Montgomerie.

From Major Montgomerie's diagrams of 1881 of the discharges of the Cauvery dam, it appears that the discharges computed by him in 1881 and those computed by Captain Mead in 1866 were calculated from formulæ noted below:—

Major Montgomerie's from Kutter's formula with co-efficient .0325.

Captain Mead's from Bazin's formula with co-efficient .93.

2. With a view of testing from a similar section how far the discrepant results are due to the different formulæ used, actual computations have been made from each formula with a surface fall of 3 feet per mile for the discharge through a section of the river just below the Cauvery dam (as actually recorded in 1909) for gauge readings 5, 6, 7 feet on the Cauvery dam. The results are given below in cusecs:—

Gauge, Cauvery dam.	Discharge, Captain Mead's formula.	Discharge, Major Montgomerie's formula.
5	15,347	8,684
6	24,515	14,651
7	37,023	23,352

The discharges actually computed by Captain Mead in 1866 and Major Montgomerie in 1881 are as below; also the gauged discharges of 1909.

Cauvery dam gauge.	Discharge, Captain Mead, 1866.	Discharge, Major Montgomerie, 1881.	Gauged discharge, 1909.
5	14,340	8,150	11,600
6	25,200	16,500	18,850
7	38,010	27,230	26,680

It will be seen that the differences between Major Montgomerie's and Captain Mead's discharges are almost altogether due to the different formulæ used.

3. The discharges of Major Montgomerie agree fairly with the gauged discharges of 1909 for stages of flow between 6½ and 7½ feet while the formula used is that recognised as a reliable one. The great discrepancies below 6½ feet between the gauged discharges and those of Major Montgomerie may be attributed to fallacy involved in the arbitrary assumption made by that officer that the amount of observation by sand deposit on the Cauvery dam was a certain stated condition for each gauge reading being the same always for the same gauge and varying from nil at 7 feet to 60 per cent. at one foot. The assumption is such as could not be correct as it is not the gauge reading of any day but the antecedent conditions of flow which have deposited or scoured the sand. Except as regards this the discharges of Major Montgomerie's computation agree fairly with the observed discharges.

4. While there may have been some variations in the quantity of sand deposited in the Cauvery bed, the variations of the discharges recorded are not due to this cause to any marked degree, but are almost altogether attributable to the different methods of computation adopted.

APPENDIX XXIV.

TABLE of discharges, Cauvery dam, from the curve of 1909 and of Cauvery and Vennar regulators from the Assessor's curve.

Year.	Discharges, Cauvery dam limit gauge within.				Combined discharge, Cauvery and Vennar regulators.				
	Total discharge.	Seven-foot limit.	Six-foot limit.	Limits of Mysore proposed rules.	From Appendix V, Sir J. Benton's note of 12th May 1911.	Total discharge from rear gauge readings.	Limit gauge—Cauvery 6-2, Vennar 8-0.	Limit gauge—Cauvery 5-5, Vennar 7-6.	Limit—Cauvery 11,850 cusecs, Vennar 6,100 cusecs, from Mys. 9, Appendix G-1.
1	2	3	4	5	6	7	8	9	10
1890-91	225,302	204,209	175,108	163,431	129,078	206,273	198,795	187,965	162,603
1891-92	260,013	234,892	184,037	175,896	128,398	239,568	237,281	230,452	186,203
1892-93	282,643	244,637	212,045	204,940	143,184	252,178	244,232	234,743	190,506
1893-94	326,551	309,513	273,784	225,374	179,123	271,707	269,623	265,806	232,465
1894-95	217,923	207,779	195,549	184,354	125,501	202,534	199,774	195,978	172,581
1895-96	299,587	273,365	236,750	210,742	164,095	278,455	267,380	258,006	217,378
1896-97	422,540	310,678	259,982	225,999	227,560	382,001	357,134	320,607	244,141
1897-98	393,379	299,394	260,577	220,527	205,990	380,041	354,724	322,632	240,784
1898-99	351,568	315,730	274,879	210,491	173,508	330,999	325,927	308,487	250,172
1899-1900	166,457	157,199	139,785	132,123	117,312	159,638	159,593	149,248	129,416
1900-1901	391,181	270,580	221,267	210,753	229,671	348,867	314,678	277,405	211,697
1901-1902	334,082	308,263	236,895	219,432	204,624	286,573	283,978	268,652	218,501
1902-1903	293,619	268,964	239,716	191,965	173,109	230,882	228,978	217,580	190,263
1903-1904	407,641	349,895	291,018	224,944	223,145	298,002	289,286	277,749	236,499
1904-1905	250,736	216,800	180,760	162,033	128,933	201,218	200,594	185,579	163,559
1905-1906	185,994	176,636	164,934	158,659	165,265	156,740	156,740	155,722	138,573
1906-1907	243,397	223,131	197,226	183,140	165,701	173,194	173,194	171,468	158,382
1907-1908	295,859	241,750	208,438	197,405	236,777	225,919	221,018	206,521	181,737
1908-1909	220,127	194,762	174,212	163,995	177,068	166,741	166,741	166,741	143,592
1909-1910	313,084	272,464	255,348	221,747	252,337	245,757	245,757	244,951	211,886

* Mysore figure corrected as there was an error in addition.

APPENDIX XXV.
TABLE revising and amplifying Mysore Appendix K (My. 7).
Year 1899-1900.

Months.	Feet into Coleroon.	Upper amount into Coleroon.	Grand amount into Coleroon.	Discharge over 150 yards collingish.	Total of columns 3, 4 and 5.		Total observed discharge at Lower Coleroon.	Quantity due to leakage.	Lower amount into Coleroon.	Net quantity used for irrigation (column 7—column 9).	Quantity passed through Vennar.	Quantity required for direct irrigation 20 m.o.ft. per day.	Net flow into Vennar tank (column 11—column 12).	Average flow per day in Vennar (column 11 divided by 15).
					a	b								
June	I 11,880 II 11,880	11,880	1,568 3,372	1,568	1,568 16,820	1,568 16,820	4,173 14,305	2,609 738	4,172 8,203	1 6,102	3 750	608 618	220 389	398 41
July	I 17,555 II 497	17,555 497	4,305 ..	2,533 168	24,338 665	24,338 665	19,741 2,018	372 361	18,369 1,078	1,352 940	873 263	297 160	576 103	58 18
August	I 339 II 62	339 62	239 ..	70 30	309 92	309 92	361 924	341 332	..	361 872	60 144	60 136	..	4 10
September	I 1,927 II 5,127	1,927 5,127	..	540 913	2,467 6,039	2,467 6,039	4,202 7,084	2,222 2,298	2,872 5,640	1,330 1,444	416 579	241 297	177 282	195 285
Total	..	..	..	..	52,335	52,335	52,808	11,384	..	..	..	..	..	..
October	I 11,880 II 11,880	11,880	1,568 3,372	1,568	1,568 16,820	1,568 16,820	4,173 14,305	2,609 738	4,172 8,203	1 6,102	3 750	608 618	220 389	398 41
November	I 17,555 II 497	17,555 497	4,305 ..	2,533 168	24,338 665	24,338 665	19,741 2,018	372 361	18,369 1,078	1,352 940	873 263	297 160	576 103	58 18
December	I 339 II 62	339 62	239 ..	70 30	309 92	309 92	361 924	341 332	..	361 872	60 144	60 136	..	4 10
January	I 1,927 II 5,127	1,927 5,127	..	540 913	2,467 6,039	2,467 6,039	4,202 7,084	2,222 2,298	2,872 5,640	1,330 1,444	416 579	241 297	177 282	195 285
Total	..	..	..	..	52,335	52,335	52,808	11,384	..	..	..	..	..	..
Grand total	..	..	..	..	52,335	52,335	52,808	11,384	..	..	..	..	..	..

Note.—Figures in column 5 (b) are those entered in Mysore statement. The source has not been traced. Figures in columns (a) denote Mysore figures of Appendix K, Part II (My. 7). Figures in columns (b) denote the results of check as made by Madras. Figures in column 8 (a) and the red-inked figures column 8 (b) are the sum of the difference of daily flow of column 7 and column 6 when former is greater. The minus figures column 8 (b) in italics are the sum of the difference of daily flow of column 7 and column 6 when latter is greater. Figures column 8 (c) are [column 7 (b) — column 6 (b)] minus figures being in italics.

Table revising and amplifying Mysore Appendix K (My. 7)—cont.

Year 1905-1906.

Months.	Fortnights.	Upper anicut into Coleroon.	Grand anicut into Coleroon.	Discharge over 150 yards calingulah.	Total of columns 3, 4 and 5.	Total observed discharge at Lower anicut.	Quantity due to leakage.	Lower anicut into Coleroon.	Net quantity used for irrigation (column 7 — column 9).	Quantity passed through Vadavar.	Quantity required for direct irrigation 20 m.e. ft. per day.	Net flow into Veeram tank (column 11 — column 12).	Average flow per day in Vadavar (column 11 divided by 15).
1	2	3	4	5	6	7	8	9	10	11	12	13	14
		a	b	a	b	a	b	a	b	a	b	a	b
June ..	I	..	..	..	..	4,630	4,255	4,630	4,255	4,619	4,219	11	6
	II	..	..	..	..	1,091	1,447	971	1,327	981	1,358	110	39
July ..	I	7,091	7,091	7,733	7,733	16,133	15,034	2,463	2,462	12,198	13,021	2,833	2,013
	II	23,916	23,916	11,142	11,142	2,278	2,287	37,345	37,345	47,162	49,767	11,445	12,422
August ..	I	444	444	1,322	1,322	991	991	2,757	2,757	6,264	6,208	3,507	3,451
	II	..	..	..	..	63	63	1,643	1,642	1,579	1,579	..	..
September ..	I	2,488	2,488	4,470	4,470	465	465	8,323	7,423	6,469	6,468	1,552	1,570
	II	..	..	..	..	27	27	..	..	1,496	1,495	1,468	1,484
Total ..		..	..	..	..	65,672	64,172	83,788	86,316	27,615	..	..	..
October ..	I	6,902	6,902	6,288	6,288	120	120	13,310	13,310	21,576	21,576	8,266	8,266
	II	14,509	14,509	11,296	11,296	416	416	26,221	26,221	38,439	35,883	11,584	10,024
November ..	I	..	..	..	..	..	..	..	..	1,239	1,244	1,239	1,244
	II	..	..	..	..	..	..	..	..	1,866	1,802	1,866	1,802
December ..	I	..	..	..	..	..	..	..	..	976	976	976	976
	II	..	..	..	..	..	..	..	..	743	743	743	743
January ..	I	..	..	..	..	..	..	..	..	769	769	769	769
	II	..	..	..	..	..	..	..	..	1,381	1,363	1,381	1,363
Total ..		..	..	..	..	39,531	39,531	66,989	64,366	26,824	..	..	..
Grand total ..		..	..	..	..	106,103	103,703	150,777	150,672	64,439	..	..	..

Note.—Figures in column 5 (b) are those entered in Mysore statement. The source has not been traced.
 Figures in columns (a) denote Mysore figures of Appendix K, Part II (My. 7). The figures in columns (b) denote the results of check as made by Madras.
 Figures in column 8 (a) and the positive figures column 8 (b) are the sum of the difference of daily flow of column 7 and column 6 when former is greater.
 The minus figures column 8 (b) in italics are the sum of the difference of daily flow of column 7 and column 6 when the latter is greater.
 Figures in column 8 (c) are [column 7 (b) — column 6 (b)] minus figures being in italics.

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Table revising and amplifying Mysore Appendix K (My. 7)—cont.

Year 1906-1907.

Months.	Fortnights.	Upper anicut into Coleroon.	Grand anicut into Coleroon.	Discharge over 150 yards calingulah.	Total of columns 3, 4 and 5.	Total observed discharge at Lower anicut.	Quantity due to leakage.	Lower anicut into Coleroon.	Net quantity used for irrigation (column 7 — column 9).	Quantity passed through Vadavar.	Quantity required for direct irrigation 20 m.e. ft. per day.	Net flow into Veeram tank (column 11 — column 12).	Average flow per day in Vadavar (column 11 divided by 15).
1	2	3	4	5	6	7	8	9	10	11	12	13	14
		a	b	a	b	a	b	a	b	a	b	a	b
June ..	I	657	657	..	..	..	..	..	..	..	..	..	..
	II	..	..	657	..	..	..	..	..	..	..	..	..
July ..	I	31,744	31,744	14,160	15,807	3,293	3,293	49,197	50,344	67,140	67,144	18,123	17,158
	II	..	..	..	..	..	..	..	..	..	..	..	..
August ..	I	9,476	9,476	1,955	2,129	1,383	1,383	12,814	12,998	16,071	16,131	4,905	4,802
	II	41,070	41,970	15,877	19,710	2,668	2,668	59,615	64,348	48,544	48,544	10,243	9,455
September ..	I	11,058	11,058	1,673	2,998	1,438	1,438	14,169	15,494	15,942	15,942	2,674	2,659
	II	..	..	..	..	66	66	..	..	1,910	1,913	1,814	1,847
Total ..		..	..	..	..	135,861	143,897	150,004	150,071	38,156	..	..	..
October ..	I	8,280	8,280	..	2,551	1,142	1,142	9,422	11,973	10,901	11,302	2,520	1,267
	II	24,335	24,335	..	11,100	332	332	24,667	35,767	38,250	37,900	14,947	12,938
November ..	I	..	..	1,885	..	..	..	1,885	11,881	9,738	11,881	7,853	7,853
	II	5,204	5,204	..	11,646	99	99	5,303	16,949	26,632	28,755	22,244	13,686
December ..	I	..	..	3,859	..	..	..	3,859	6,486	6,486	6,486	6,486	3,352
	II	..	..	2,693	42	42	42	2,735	4,626	4,626	4,584	2,000	1,609
January ..	I	..	..	..	..	..	..	1,437	1,437	1,437	1,437	1,437	848
	II	..	..	..	..	..	..	..	..	..	..	..	..
Total ..		..	..	..	..	39,434	73,168	101,070	101,092	64,956	..	..	..
Grand total ..		..	..	..	..	175,295	217,065	251,074	251,163	103,112	..	..	..

Note.—Figures in column 5 (b) are those entered in Mysore statement. The source has not been traced.
 Figures in columns (a) denote Mysore figures of Appendix K, Part II (My. 7). Figures in columns (b) denote the results of check as made by Madras.
 Figures in column 8 (a) and the positive figures in column 8 (b) are the sum of the difference of daily flow of column 7 and column 6 when former is greater.
 The minus figures column 8 (b) in italics, are the sum of difference of daily flow of column 7 and column 6 when the latter is greater.
 Figures in column 8 (c) are [column 7 (b) — column 6 (b)] minus figures being in italics.

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Exhibit Ma.-15.

1910.

STATEMENT of area of irrigation under the Cauvery channels between Bhavani and Upper anicut requiring water between February and June.

Channel.	Second crop.	Perennial.	Total.
	ACS.	ACS.	ACS.
1. Pogalore channel	887	..	887
2. Vangal channel	433	..	433
3. Nerur channel	262	..	262
4. Krishnaroyapuram channel	760	41	801
5. Mahadanapuram channel	341	57	398
6. Marudur Nattu voikal	3,581	1,190	4,771
7. Nangam voikal	1,277	228	1,505
8. Raja channel	2,920	..	2,920
9. Mohanur channel	1,535	..	1,535
10. Komarapalayam channel	991	..	991
11. Ayilur channel	580	..	580
12. Sipplaputhur channel	1,086	..	1,086
13. Tottiem Chinna voikal	2,131	..	2,131
14. Tottiem Periya voikal	303	..	303
15. Srinivasanallur channel	149	..	149
16. Musiri voikal	1,089	..	1,089
17. Amur voikal	414	..	414
18. Konasalam voikal	176	..	176
19. Uyyakondan channel	7,493	..	7,493
20. Ramavaitalai channel	294	..	294
21. Peruvalai channel	3,237	..	3,237
22. Panguni channel	2,088	..	2,088
23. Ayyan channel	9,944	..	9,944
24. Kattuputhur channel	1,827	900	2,727
Total ..	43,798	2,416	46,214

Note.—Figures are not available for perennial crop for items 1, 2 and 3, 8, 9, 10 and 19 to 23. In the case of items 11 to 18, it is reported that the area of perennial crop is included under second crop.

7th January 1914.

W. M. ELLIS, Col., R.E.,
Madras Representative.

Exhibit Ma.-15 (a).

STATEMENT showing the area of second and perennial crops under the channels fed by the Cauvery between the Bhavani and Upper anicut for the years 1890, 1895 and 1900.

	1890.		1895.		1900.	
	Second crop.	Perennial.	Second crop.	Perennial.	Second crop.	Perennial.
	ACS.	ACS.	ACS.	ACS.	ACS.	ACS.
1. Pogalore channel	..	..	..	..	1,053	..
2. Vangal channel	..	..	396	..	482	..
3. Nerur channel	1,812	..	1,180	..	143	..
4. Krishnaroyapuram channel	861	41	922	160	985	148
5. Mahadanapuram channel	498	42	413	111	404	4
6. Marudur Nattu voikal	3,257	642	3,496	1,484	3,437	713
7. Nangam voikal	1,298	623	889	591	793	326
8. Raja channel	..	..	..	..	..	..
9. Mohanur channel	..	..	..	..	..	..
10. Komarapalayam channel	..	..	..	..	..	..
11. Ayilur channel	515	101	423	196	457	54
12. Sipplaputhur channel	622	300	513	270	793	321
13. Tottiem Chinna voikal	897	395	1,688	679	1,600	530
14. Do. Periya voikal	218	42	213	65	195	84
15. Srinivasanallur channel	31	64	270	200	201	39
16. Musiri voikal	661	46	1,392	64	799	56
17. Amur voikal	845	32	512	55	398	62
18. Konasalam voikal	200	7	364	15	220	29
19. Uyyakondan channel	4,916	..	5,462	..	6,069	..
20. Ramavaitalai channel	195	..	216	..	240	..
21. Peruvalai channel	1,828	..	1,558	..	1,832	..
22. Panguni channel	1,637	..	1,874	..	2,082	..
23. Ayyan channel	6,595	..	7,827	..	8,141	..
24. Kattuputhur channel	1,800	900	1,800	765	1,800	900
Total ..	27,324	3,232	30,808	4,535	32,124	3,326

NOTE.—Item No. (1)—Figures for second crop for 1890 and 1895 and figures for perennial crops for the three years are not available.
(2)—Figures for second crop for 1890 and perennial crops for three years are not available.
(3)—Figures for perennial crops are not available.
(4) to (10)—No figures are available for the second and perennial crops.
(11) to (24)—It is reported that perennial crops are included with second crops.

W. M. ELLIS, Col., R.E.,
Madras Representative.

Exhibit Ma.-16.

Further Extract put in by Madras as Addenda to Exhibit A-7.

Major Montgomerie's report.

Paragraph 2.—“How long the Coleroon has been the main effluent of the Cauvery, or if it has always been so, is a disputed question which need not be taken into consideration here. It is sufficient, for the present inquiry, to know that, under the existing régime of the delta, the Coleroon below the Grand anicut has a capacity sufficient to take one-half of the maximum discharge, which has to pass through the delta into the sea at any one time (*vide* table on sheet No. I or Appendices Nos. I and II). Its maximum discharge is almost the same as that of the Aganda Cauvery at the head of the Seringam Island and is consequently about double that through the Cauvery dam, or over the Upper anicuts.”

Paragraph 36.—“From what has been said on the subject it must be sufficiently clear that, owing to the extent and geographical position of the delta, and the country draining directly into it, no scheme for the complete exclusion from the Delta proper the Grand anicuts of all Cauvery floods except what is required for irrigation is either practicable or advisable.”

Paragraph 38.—“From the general map of the Delta, sheet No. I, and the statement printed on it, some idea of the capacities to be given to these surplus outlets may be arrived at. They must in any case (to carry off local floods alone) have a combined capacity more than sufficient to carry off the whole of the possible maximum flood of 14 feet on the Cauvery Dam gauge; and, as a maximum flood of 14 feet on the Cauvery dam gauge occurs only once

in about 50 years, and then probably in conjunction with a local abnormal flood in only one section of the delta, the extra capacity to be given to these outlets to take off the total discharge will depend upon the precision and the accuracy with which the upper floods are distributed and regulated among them. If this is properly done as it ought to be, the distributing rivers of the delta and their outlets will not be required to be increased in capacity and protected by flood banks very much more than will be absolutely necessary to withstand local floods alone. On the other hand, if the upper floods are not regulated, but merely distributed between each affluent in proportion to its capacity, it evidently follows that the distributaries and their outlets must have nearly twice the capacity, which is required for local floods. Fortunately for the delta the contracted state of the Cauvery and Vennar rivers at the head of the delta places a limit on the floods that can enter it, and this quantity is probably not more than 131,000 cubic feet per second."

Paragraph 39.—"The very great importance to the community at large of the proper maintenance and conservancy of the surplus rivers and channels, which, owing to the peculiar circumstances of the Cauvery delta, not infrequently remain for several consecutive years without being required to perform their own particular functions, has been repeatedly brought to notice."

Paragraph 44.—" The site for the regulators selected by Captain Mead is by all agreed to be the only proper site. And there is no doubt that, had that officer been in possession of the further data now available, he would have seen the impossibility of passing over the grand anicut, with its low flat arches of 6 feet rise, and a clear waterway of only 2-75 feet between tops of dam stones and haunches, the very great bodies of water which must occasionally be dealt with, and which may be as much as 180,000 cubic feet per second into the Coleroon. . . . A vented dam similar to those to be provided to the Cauvery and Vennar heads, should undoubtedly be built in the place of the Grand anicut."

Paragraph 69.—"This would at once account for the apparent waste of water in the delta and the persistent avidity with which the cultivators keep their sluices fully open even during high floods: and when we read the sagacious observations made by Major Oakes, R.E., . . . with the light now before us, we will at once see the correctness and force of his remarks, to the effect that it would probably be the ruin of the delta to limit the supply entering it to 3 or 5 cubic yards per hour per acre, to any other specified quantity; and that, in fact, the proper supply of the Cauvery delta cannot be estimated by the small intermittent quantities entering it during the lower stages of the river, and that in reality the delta is not receiving a proper supply until the rivers are actually in "good floods" as any native of Tanjore would express it."

Paragraph 70.—"The actual water-supply of the delta being only one-half that which has hitherto been considered the case, the storing of the surplus water in the upper valley of the river becomes doubly necessary;"

Paragraph 75.—"As the control and manipulation of the sand along the river beds is effected with so much facility, the only possible objections to its entering the rivers of the delta are—

First.—The diminution of the waterway of the Cauvery at the head of the Seringam Island, by which the supply of water which enters the delta in low freshes may be somewhat diminished.

Second.—The silting up of some of the irrigation channels, especially those in lower parts of the delta, by the influx of sand through their head sluices.

The first objection is more apparent than real as will presently be explained. But the second is one that cannot be altogether avoided. . . ."

Paragraph 78.—" It will be seen from the synoptical table of discharges accompanying this report that, although the volume of water which enters the delta by the Cauvery dam is only 8,150 cubic feet per second when there is 5 feet on the gauge, the volume is increased to 16,500 cubic feet per second when there is 6 feet on the gauge. This latter quantity would give 2-67 cubic yards per hour per acre for the 800,000 acres irrigated and when there is 6 feet on the Cauvery dam gauge only 1,100 cubic feet per second escape over the Upper anicuts, so that the delta receives very nearly a full theoretic supply of 3 cubic yards per hour per acre before there is any great waste over the Upper anicuts."

But under the present conditions, under which the delta receives its water-supply, the question really is, not what is a theoretic continual supply, but what would be the quantity which the delta could fully utilize in the event of a low fresh of, say, 8 or 9 feet on the Cauvery dam gauge during a precarious season when every cubic foot of water would be of great value for the cultivation."

Mr. Hughes' Preliminary Report.

Paragraph 10.—"The Upper Anicut was built in 1836 across the head of the Coleroon and improved in 1843 by enlarging the scouring sluices in the hope of preventing the accumulation of sand and silt above the anicut. An estimate for cutting down the anicut 4 feet and fitting 6 feet lift shutters on it has been recently sanctioned and the work will be put in hand this year. In 1845 a dam was built across the head of the Cauvery 6 feet below the anicut crest for 1,650 feet length with two steps each 150 feet $\times$ 1½ feet at either flank making the total length 1,950 feet. It is not known what the level of the Cauvery bed was at the time this dam was constructed. For a great many years past, it has been practically permanent in its average level (during low water at least) of 3 feet below anicut crest."

Mr. Larminie's Report.

Paragraph 26.—"I cannot agree with the argument that during the earlier months of the season much of the present supply could be dispensed with, the usual theoretic considerations as to quantity of water and area under plough cannot with safety be applied. The practical fact remains, that under the present régime it is only possible in the earlier half of the season (speaking broadly) to start and carry through the cultivation of the western half of the delta. Were the present supply reduced the progress of cultivation would be still more retarded."

Paragraph 31.—"But it seems almost superfluous to seek for arguments in favour of maintaining a full supply all through the irrigation season, the advantages of doing so, being so clearly proved in numerous instances."

Paragraph 48.—"From the foregoing table, it will be seen that the excess discharge, over that due to six feet, at the Cauvery dam plus the discharge over the Upper Anicut during the same period of 37 days in an average year, amounts to 125,348 mills. cubic feet or as much as one of the years of maximum discharge of the Bhavani at the Kodiveri while the actual discharge over Todivelli Anicut during the same period (or nearly so) was 21,875 mills. cubic feet or 17½ per cent. of the former. These figures, rough though they may be, conclusively show the large amount of water, which goes to waste through the Coleroon and Cauvery, the excess discharges over what is required to maintain full supply for irrigation being 56,359-929 and 68,987-808, respectively, quantities large enough to fill very large reservoirs on either the Cauvery or in Pattukkottai or both, and this leads to the consideration of the question of a reservoir, on the Cauvery, which has also been talked of for a long time."

Paragraph 49.—"I have endeavoured to show, as I am convinced would be the case, that the construction of a large reservoir on the Bhavani, could not be carried out without interfering with the supply to Tanjore to a most injurious extent. While on the other hand, a very large reservoir could be formed on the Cauvery without so interfering in any way."

"Such a reservoir would admit of six feet being maintained on the Cauvery dam all through the irrigation season, and were this accomplished, further improvements in Tanjore might safely be left to the ryots; while the irregularities of cultivation would very soon disappear."

Paragraph 52.—"To sum up.—The backward and irregular rate of cultivation in Tanjore being due to a short water-supply prevailing off and on throughout the irrigation season, if the district is to be materially benefited, it can best be done by insuring a full and regular supply at its head source, the Cauvery dam."

Colonel Smart's Report.

Appendix I.

Paragraph 5.—"On the Coleroon side there are two channels taking off above the Lower Anicut and which do not come under its influence—the Ponneri and Manniyar. The Ponneri gets a full supply with a rear gauge reading of 5 feet when C.D. reads 6-50 to 7-0 but the channel gets some land drainage. The Manniyar only begins to receive a supply when C.D. reads 6; it is really dependent on local surplus and on any supply that can be spared directly from the Cauvery. If the delta supply is increased from 15th September to 15th October, as proposed under the Cauvery reservoir, the supply of the Manniyar will be much increased. The irrigation under the channel is always included in that of the Cauvery. At the Lower Anicut there are three channels, the North and South Rajan channels, the supply of which is secured

and the irrigation under which rarely requires protection. The supply of the Vadavar, a high level channel, with a fall of only 6 inches per mile, is, however, often deficient, and the irrigation under it, and the Veeranam tank containing when full a fortnight's supply for the area under it, then suffers. The area under the Vadavar and the Veeranam tank requires protection when the Tanjore irrigation is suffering, and if gauges are reduced as proposed by Mr. Hughes, the work done in raising the Coleroon anicut will be neutralized during the proposed reduction.

Paragraph 6.—The facts with regard to "abnormal" supply were known to the older Engineers, as, on the Vennar side where the area drained is considerably greater than on the Cauvery, the full "normal" supply was fixed at 2 cubic yards per hour per acre, whilst the Cauvery supply was taken at 3 cubic yards per hour per acre. The following extracts also show this:—

Colonel Oakes in his report printed with G.O. No. 1894, dated 16th June 1866, says "Five feet of water over the Cauvery dam ought to afford a full and sufficient supply to the irrigation dependent on the Cauvery. The first great branch from the Cauvery is the Vennar, and though the cultivation below the point of bifurcation under these rivers bears the proportion of about 9 to 10, the waterway over the respective dams is nearly 7 to 4, so that the Cauvery receiver far more than its share of water, and yet, owing to the defective state of the river, the Mayavaram taluk does not receive a sufficient supply unless seven feet of water are flowing over the Cauvery dam, or until the district receiving nearly double the supply it ought to require, and even then a portion of the Shiyali taluk receives but a very scanty supply. The cultivation in this taluk, I should however mention, is, and always has been, in a great measure dependent upon local rain during the north-east monsoon for its supply of water." (And Colonel Oakes might well have added parts of Negapatam and Tirutturaippundi taluks.)

Paragraph 11.—It is submitted that the statement that Colonel Oakes *evidently considered* that five feet permanent supply was sufficient is not supported by paragraph 11 or the extract quoted in this by Colonel Smart. The whole of paragraph 11 and the extract is requested *verbatim* with Colonel Smart's marginal note.

"As 6 C.D. is the undoubted standard of Tanjore there should be no reduction on that gauge for storage, and, in order to prevent any loss to the irrigation above the Upper Anicut and under the Coleroon, I have proposed that during the south-west monsoon, there should be no storage below 6.5 C.D. This, in my opinion, should be at once declared the absolute minimum. Colonel Oakes, who had a very long experience of the district, was of opinion that water should not be stored below 8 C.D. during July and 7 C.D. during August, as the following extract from his report printed with G.O. No. 1894, dated 16th June 1866, paragraph 9, will show:—

"But reservoirs for storing water for purposes of irrigation capable of containing 800,000,000 cubic yards of water would be invaluable. During the past ten years such reservoirs by retaining all water over 8 feet above the Cauvery dam in July and that above 7 feet in August in bad years could have been filled every year with the exception of 1858, when the south-west monsoon failed and could have maintained a permanent depth of 5 feet of water on the Cauvery dam for four months in 1859 and 1862, for three and a half months in 1856, 1857, 1860, 1863, 1864, and 1865 and for nearly three months in 1861, and this not by robbing the district of its water when the floods were low, but by relieving it of some of the superfluous water it did not require when the floods were high, they would have tended to prevent injury to the river banks in the delta."

"Colonel Oakes thus supports my view as to storage though he places the limit under which storage should not take place considerably higher than I do. Whether my limit should be raised will have to be considered when the necessary full investigation has been undertaken, but we may say at once that it cannot be lowered as proposed by Mr. Hughes."

Paragraph 12.—The conditions of irrigation in Tanjore have not altered since the days of Colonel Oakes. A number of regulators have been built both on the Cauvery and Vennar and it is possible that we have obtained more command with smaller gauge readings at the Upper Anicut; but my experience, which, I believe, will be borne out by local officers, is that 6 C.D. is a minimum required (1) from July to 15th August. On the Vennar all main regulators have been built and yet 6 C.D. is required to give flush irrigation on that side. On the Cauvery the regulators proposed to be built may bring the Mayavaram and Shiyali lands which, as Colonel Oakes observed, require 7 C.D. for full supply within the 6 C.D. limit; but it will certainly do no more.

Neringipet Project—G.O. No. 971 I. of 2nd August 1904.

The various reports of Colonel Smart regarding drainage of the delta and regarding construction of separate specific works have been produced and perused by the Assessor.

Mr. Higham's Note.—"It follows first, that the construction of a large storage work is obligatory, if any material increase of existing irrigation is to be contemplated; and secondly, that if such a work is constructed the onus of proving to the satisfaction of the courts that water is stored only when in excess of requirements for old irrigation, will lie with the Government or officers of the Irrigation Department. The reservoir must be designed with reference to this all-important consideration."

Mr. Moss' Report—Page 1.—"The average total yearly discharge of the Cauvery at the Upper Anicut is 450,000 mills. cubic feet . . . of the total discharge 270,000 mills. cubic feet is supplied by the south-west monsoon and 180,000 mills. cubic feet by the north-east monsoon . . ."

Last Bhavani Project—Page 3.—"Mr. Moss reported that while the discharge of the Upper Bhavani amounted to 36,000 mills. cubic feet per year the quantity that could safely be utilised could not be more than 5,000 mills. cubic feet."

Exhibit Ma. 17.

Note on cross section of the Cauvery between Cauvery dam and the Grand Anicut.

The only sections of the Cauvery between the Cauvery dam and the Grand Anicut before remodelling which are forthcoming is a set of sections of Captain Mead of 1867.

It is on record that a section of the Cauvery in 1899 was existent in 1909. It is most unfortunate that this section about which enquiries have been made during the last two years should have been lost.

Subsequent to remodelling there are sections at a short distance below Cauvery dam in 1902, 1903 and 1906.

There are sections of 1905 and 1906 plotted and again sections of 1909. The sections of 1909 were taken as near the positions of sections of 1867 as possible. The position appears to have been located by measurement on the plan of 1867.

The sections of 1905–1906 appear to have been located in the same way. There is in the case of these sections some doubt as to the exact location except in regard to Trichinopoly bridge and the 150 yards calingulah.

Fortunately these are more important than the sections lower down being 3 and 9 miles from the Cauvery dam. As regards No 1 sections, this was taken in 1867 and 1909 over the site of the Cauvery dam.

It is not clear where the sections of 1905 and 1906 were taken except they were not at this place as the flanks of the section show nanal padugai which is not found in the immediate vicinity of the Cauvery dam and the width of river is altogether different.

The only sections clearly located are those of 1867 and 1909 at the Cauvery dam, and 1867, 1905, 1906 and 1909 at the 150 yards calingulah, and at Trichinopoly bridge.

The examination of the sections do not lead to any very definite conclusions. On the whole there is no well-defined tendency either to silt or scour.

The section of 1867 at the Cauvery dam shows a mean bed level not differing materially from that of 1909, while the average does not very materially differ from the 3 feet over the Cauvery dam which Mr. Hughes states to have been known to be the general average for many years previous to the time of his writing in December 1898: he says: "It is not known what the level of the Cauvery bed was at the time the dam was constructed. For a great many years past it has been practically permanent in its average bed level (during low water at least) of 3 feet below the anicut crest."

Examining the sections of 1867, 1905, 1906 and 1909 at the 150 yards calingulah and Trichinopoly bridge, it is clear that there has been rather a tendency to silt since 1867, but on the whole, making allowance for annual fluctuations, no very great changes are recorded.

The lower cross sections are not so clearly located and show in some cases results which appear quite unreliable especially as regards the 1905 and 1906 sections Nos. 11 and 13. In respect to this, the Executive Engineer who sent them to this office remarks in his No. 737-S.E., dated 22nd August 1912, "In cross sections Nos. 11 and 13 the levels of 1905 show an abnormal rise of the river bed at these places when compared with the levels of other years and at other places, it seems possible that the levels have been connected to a wrong B.M. or datum, but in the absence of field books this cannot be verified."

Generally it is submitted that the sections show that no very material change in the upper part of the Cauvery has taken place and whatever evidence there is regarding the deposit of shoals on the Cauvery dam supports Mr. Hughes' statement of 1898 that there has been no material change. The loss of the sections of 1899 was very regrettable, but it is considered

that Mr. Hughes' statement certainly would have applied to the condition of the shoals about the time at which he wrote which was the time when the remodelling of the Upper Anicut was sanctioned.

8th January 1914.

W. M. ELLIS, Col., R.E.,
Madras Representative.

Exhibit Ma.-17 (a).

Letter—from the Hon'ble Col. W. M. ELLIS, R.E., Acting Joint Secretary to the Government of Madras, Public Works Department (Irrigation Branch).
To—the Inspector-General of Irrigation, and Assessor, Mysore-Madras Arbitration.
Dated—Chepauk, the 10th January 1914.
No.—201-Arb.

With reference to your proceedings of 8th instant, I forward a statement of the further information regarding the average bed levels of the Cauvery called for.

I send a second copy which I would ask you, if you approve, to forward to the Mysore Representative.

LEVELS OBTAINED FROM SECTIONS OF THE CAUVERY.

Information called for by the Assessor.

A table giving the information called for by the Assessor in the Proceedings of 8th January 1914 is attached.

2. The table show the reduced mean bed levels of the Cauvery from sections of 1867 and 1909 at

- (a) the Cauvery dam ;
- (b) the 150 yards calingulah 3 miles below the Cauvery dam ;
- (c) Trichinopoly bridge 9 miles below the Cauvery dam.

3. The mean bed level of the Cauvery at the Cauvery dam works out to—

1867	2.26 feet above crest.
1909	2.94 " "

Mr. Hughes (Chief Engineer for Irrigation) writing in December 1898 just before the work of remodelling the Upper Anicut was commenced, states that the mean bed level at the Cauvery dam had been practically unaltered for many years and averaged about 3 feet over the crest of the Cauvery dam.

This is about 9 inches higher than shown in the section of 1867, but agrees very closely with the section of 1909.

4. The table shows mean bed levels (reduced to a different datum level) of the Agunda Cauvery 1,000 feet above the Cauvery dam and Upper Anicut and of the Cauvery 1,000, 2,000 and 3,000 feet below the Cauvery dam in 1902, 1903 and 1906.

5. As regards the section of the Agunda Cauvery 1,000 feet above the Upper Anicut, the river is here 4,700 feet wide and it is reasonable to consider separately the mean bed level of the right and left halves of the section, the right half being the section immediately above the Cauvery dam (1,950 feet length), while the left half is that which is immediately above the Upper Anicut and which one would expect would be more specially affected by the remodelling of that work. This, one sees, is the case as the level in the right half remaining practically unaltered throughout the period while in the left half there is a continuous reduction of level of the sand deposits.

W. M. ELLIS, Col., R.E.,
Madras Representative.

TABLE showing mean bed levels of the Cauvery in years 1867 and 1909.

	1867.	1909.	Difference.
(a) Cauvery dam	290.46	291.14	+ 0.68
(b) Mean bed level Cauvery at 150 yards calingulah	281.21	281.36	+ 0.15
(c) Mean bed level Cauvery at Trichinopoly	262.27	262.99	+ 0.72

TABLE showing mean bed levels of the Cauvery in years 1902, 1903 and 1906.

	1902.	1903.	Difference between 1902 and 1903.	1906.	Difference between 1902 and 1906.
CAUVERY.					
(d) Mean bed level Cauvery 1,000 feet below Cauvery dam.	237.70	237.86	+ 0.16	238.84	+ 1.14
(e) At 2,000 feet below Cauvery dam	238.37	238.17	— 0.20	237.32	— 1.04
(f) At 3,000 feet below Cauvery dam	238.61	235.82	— 2.79	236.73	— 1.88
(g) Agunda Cauvery— 1,000 feet above Cauvery dam and Upper Anicut—					
Right half of section	239.31	239.84	+ 0.53	239.25	— 0.06
Left half of section	242.06	241.30	— 0.76	240.63	— 1.43
Whole cross section	240.68	240.67	— 0.11	239.96	— 0.72

NOTE.— + Figures show increase in sand deposit.
— " " decrease in sand deposit.

Exhibit Ma.-17 (b).

Note dated 13th January 1914 regarding levels of the river-bed at the Cauvery dam.

In continuation of the statement attached to letter No. 201-Arb., dated 10th January 1914, from the Joint Secretary to Government of Madras, to the Assessor and Inspector-General of Irrigation, a set of annual river survey charts of the head-works at the Upper Anicut and Cauvery dam for the years from 1885-86 up to 1910-11 have now been found and examined.

The chart for one year 1901-02 only is missing and it is believed that on account of the extensive works in progress at the Upper Anicut it is probable no chart for that year was prepared. The charts for the remaining 26 years are available for examination.

2. From the sections of 1867 and 1909 already examined the mean bed-levels at the Cauvery dam were found to be—

1867—2.26 feet above the crest of the Cauvery dam.	
1909—2.94 do.	do.

3. A table of yearly mean levels along the line of the dam for the above 26 years has been computed and is attached.

It will be seen that the maximum mean level was 4.03 above the dam crest, in 1900-01, and the minimum 2.07 in the preceding year.

Fluctuations of level occur from year to year between these extreme limits, but there is nothing throughout the whole period to indicate any material change in bed-level or conditions of silting.

In 1898, Mr. Hughes wrote that the mean level had not materially varied for many years and was about 3 feet.

The record of these charts shows that from 1885-86 to 1898-99 the average works out to 2.83 feet. Omitting the three years during which works were in progress and taking the average of the years 1902-03 to 1910-11, this works out to 2.85 being materially the same average for the ten years after remodelling as for the 14 years before and varying from year to year between about the same limits.

4. In view of all the facts now available, it is submitted that the record shows no indication of any marked change between 1885 and 1910 and that the section of 1867 points to materially similar conditions prevailing at that time.

The average depths over the Cauvery dam recorded are—

Before remodelling—2.83 feet varying between 3.44 and 2.14.

After remodelling—2.85 feet varying between 3.35 and 2.28.

W. M. ELLIS, Col., R.E.,
Madras Representative.

Years.	Above Cauvery dam crest 236.24.	Reduced mean bed levels of the Cauvery at Cauvery dam.	Remarks.
1867	2.26	238.5	From old section.
1885-86	2.86	239.10	
1886-87	2.14	239.40	
1887-88	2.64	238.88	
1888-89	3.17	239.41	
1889-90	3.11	239.35	
1890-91	2.72	238.96	
1891-92	3.13	239.37	
1892-93	2.96	239.20	
1893-94	2.85	239.09	
1894-95	2.94	239.18	
1895-96	3.44	239.68	
1896-97	2.90	239.14	
1897-98	2.08	238.32	
1898-99	2.64	238.88	
Total	39.59	..	
Average	2.83	..	
1899-1900	2.07	238.31	
1900-01	4.03	240.27	
1901-02	..	..	No chart map available.
1902-03	2.90	239.14	
1903-04	2.88	239.18	
1904-05	2.60	238.74	
1905-06	2.28	238.52	
1906-07	2.79	239.03	
1907-08	3.28	239.52	
1908-09	3.35	239.59	
1909-10	2.98	239.22	
1910-11	2.68	238.92	
Total	25.64	..	
Average	2.85	..	

Exhibit Ma.-18.

Cauvery channels above the Upper Anicut.

These channels are supplied by direct flow from the Cauvery river without the intervention of anicuts and the incidence of supply is fluctuating and in accordance with the fluctuations of the levels of water in the river opposite the points of offtake incidental to natural flow.

The limits of natural flow required to give full useful supply to these channels has only now been made the matter of investigation and the conditions of supply to these channels have been only described in any detail in the Madras case, Part IX, paragraphs 100 to 105 (Ma. 14).

It is here stated that during the season of freshes the stage of river giving full supply to these channels is that generally denoting a stage at the Upper Anicut of gauge reading 7 to 7½ feet, Cauvery dam, with the Upper Anicut shutters closed.

Further that levels above 8 feet on Cauvery dam were not useful and that reduction of levels below 7 feet involved reduction in useful supply to these channels.

2. Regular daily gauge readings are only available for some of the channels, viz.—

	ACS.
Pugalur channel	2,400
Marudur Nattu voikal	6,500
Wyyacondan channel	26,000
Musiri Nattu voikal	2,600
Nangam channel	2,300
Amoor channel	800
Tottiem Peria voikal	1,200
Do. Chinna voikal	4,000

Item (1) is the only channel above the confluence of the Amaravati for which regular gauge readings are available.

Items (2) and (3) are the two most important channels below the confluence of the Amaravati. The gauge readings and conditions of irrigation of these have been considered. They have all head sluices and under ordinary circumstances the full supplies carried when the water levels in the main river permit are—

	Head sluice rear gauge. feet.	Discharge cusecs.
Pugalur	5	..
Marudur	4.7	168
Wyyacondan	5.6	765

The above statement can be verified from the record of daily gauge readings of these channels.

3. In order to get the stage of river at the Upper Anicut which generally agrees with the conditions of full supply to these channels diagrams have been drawn showing, for days in which the Upper Anicut was closed and the Cauvery dam gauge read between 4 and 7½ feet, what were the front gauge readings of the channel head sluices corresponding to the gauge at Cauvery dam. From these diagrams an approximate relation between the gauges is obtained. The diagrams have been drawn for the months of June, July, August, as the relation is less subject to disturbance by local rain during this period than during other months.

The minimum front gauge to give the required full supply rear gauge are approximately—

	FEET.
Pugalur	5.15
Marudur	4.9
Wyyacondan	5.75

The diagrams show that the corresponding Cauvery dam gauge height are—

	FEET.
For Pugalur channel	6 to 6½
„ Marudur	6½ to 7½
„ Wyyacondan channel	6½ to 7½

For the last two channels a reading of 7 feet will generally give full supply, but this is not always so.

4. It is claimed that facts now stated supported by the diagrams and record of gauge readings substantiate the statements of Ma. 14, paragraph 104, that 7 to 7½ feet on the Cauvery dam connotes the stage of river giving full supply to the Madras Cauvery channels taking off above the Upper Anicut.

W. M. ELLIS, Col., R.E.,
Madras Representative.

Exhibit Ma.-18/a-1.

Cauvery dam and Pugalur channel.

	Cauvery dam north gauge.		Pugalur channel.		Cauvery dam north gauge.		Pugalur channel.
June 1911.				June 1912—cont.			
29th 6 A.M.	6.5	28th 6 A.M.	6.2	18th 6 A.M.	3.5	17th 6 A.M.	3.10
30th do.	6.2	29th do.	5.3	19th do.	4.5	18th do.	2.95
July 1911.				20th do.	3.7	19th do.	3.05
1st 6 A.M.	5.9	30th June 6 A.M.	4.8	21st do.	5.9	20th do.	4.45
2nd do.	5.4	1st July do.	4.5	22nd do.	5.7	21st do.	4.85
3rd do.	5.1	2nd do.	4.8	23rd do.	6.9	22nd do.	5.45
4th do.	4.8	3rd do.	4.0	27th do.	5.9	26th do.	4.55
5th do.	4.6	4th do.	3.75	28th do.	5.0	27th do.	3.75
6th do.	4.7	5th do.	3.90	29th do.	4.4	28th do.	3.30
7th do.	4.6	6th do.	3.80	30th do.	4.0	29th do.	3.05
8th do.	4.6	7th do.	3.9	July 1912.			
9th do.	5.1	8th do.	4.2	1st 6 A.M.	4.0	30th June 6 A.M.	3.7
10th do.	4.8	9th do.	3.95	2nd do.	5.3	1st July do.	4.15
11th do.	5.2	10th do.	4.50	3rd do.	5.6	2nd do.	4.40
12th do.	6.0	11th do.	5.40	4th do.	5.5	3rd do.	4.30
13th do.	6.3	12th do.	5.40	5th do.	5.5	4th do.	4.3
August 1911.				6th do.	5.0	5th do.	3.8
7th 6 A.M.	6.8	6th 6 A.M.	5.6	7th do.	4.4	6th do.	3.3
8th do.	6.4	7th do.	5.3	8th do.	4.3	7th do.	3.4
9th do.	6.0	8th do.	4.9	9th do.	4.1	8th do.	3.1
10th do.	5.7	9th do.	4.6	10th do.	3.7	9th do.	2.8
11th do.	5.4	10th do.	4.4	11th do.	3.5	10th do.	2.7
12th do.	5.6	11th do.	4.7	12th do.	3.6	11th do.	3.3
13th do.	7.0	12th do.	6.3	17th do.	7.0	16th do.	6.1
14th do.	6.2	16th do.	5.5	18th do.	6.3	17th do.	5.3
15th do.	5.5	17th do.	4.8	19th do.	5.6	18th do.	4.5
16th do.	5.2	18th do.	4.4	20th do.	5.2	19th do.	4.1
17th do.	4.9	19th do.	4.1	21st do.	4.9	20th do.	3.95
18th do.	4.8	20th do.	4.1	22nd do.	5.1	21st do.	4.8
19th do.	4.9	21st do.	4.1	August 1912.			
20th do.	5.0	22nd do.	4.2	16th 6 A.M.	7.0	15th 6 A.M.	6.2
21st do.	5.0	23rd do.	4.3	17th do.	6.6	16th do.	5.7
22nd do.	6.0	24th do.	5.3	18th do.	6.3	17th do.	5.3
23rd do.	5.8	27th do.	5.0	19th do.	6.2	18th do.	5.1
24th do.	5.2	28th do.	4.4	20th do.	6.3	19th do.	5.1
25th do.	4.7	29th do.	4.0	21st do.	6.6	20th do.	5.6
26th do.	4.1	30th do.	3.8	June 1913.			
June 1912.				8th 6 A.M.	3.8	7th 6 A.M.	4.0
6th 6 A.M.	1.9	5th 6 A.M.	3.75	9th do.	4.6	8th do.	3.1
7th do.	4.6	6th do.	3.15	10th do.	4.0	9th do.	2.6
8th do.	4.1	7th do.	2.70	11th do.	3.9	10th do.	2.7
9th do.	3.4	8th do.	2.45	12th do.	3.4	11th do.	2.3
10th do.	3.4	9th do.	2.50	13th do.	3.0	12th do.	2.1
11th do.	3.1	10th do.	2.25	14th do.	3.3	13th do.	2.5
12th do.	3.0	11th do.	2.20	15th do.	5.2	14th do.	4.0
13th do.	2.7	12th do.	2.15	16th do.	6.0	15th do.	5.2
14th do.	2.6	13th do.	2.15	21st do.	4.6	20th do.	3.3
15th do.	2.7	14th do.	2.15	22nd do.	4.4	21st do.	3.3
16th do.	2.6	15th do.	2.05	23rd do.	4.1	22nd do.	2.8
17th do.	2.6	16th do.	2.40	24th do.	3.7	23rd do.	2.5

Cauvery dam and Pugalur channel.—cont.

	Cauvery dam north gauge.		Pugalur channel.		Cauvery dam north gauge.		Pugalur channel.
June 1913—cont.				August 1913.			
25th 6 A.M.	3.4	24th 6 A.M.	2.3	1st 6 A.M.	6.9	July.	
26th do.	3.1	25th do.	2.1	13th do.	7.1	31st 6 A.M.	5.8
July 1913.				August			
4th 6 A.M.	5.4	3rd 6 A.M.	4.3	12th 6 A.M.	6.4	12th 6 A.M.	6.4
5th do.	6.0	4th do.	4.8	13th do.	5.7	13th do.	5.7
6th do.	5.6	5th do.	4.4	14th do.	5.3	14th do.	5.3
7th do.	5.9	6th do.	4.6	15th do.	5.1	15th do.	5.1
8th do.	5.0	7th do.	3.7	16th do.	4.8	16th do.	4.8
9th do.	4.5	8th do.	3.3	17th do.	4.5	17th do.	4.5
10th do.	4.7	9th do.	3.9	18th do.	4.4	18th do.	4.4
11th do.	4.9	10th do.	3.7	19th do.	4.3	19th do.	4.3
12th do.	4.6	11th do.	3.5	20th do.	4.2	20th do.	4.2
13th do.	4.4	12th do.	3.3	21st do.	3.9	21st do.	3.9
14th do.	4.3	13th do.	3.4	22nd do.	3.9	22nd do.	3.9
15th do.	4.7	14th do.	3.7	23rd do.	4.0	23rd do.	4.0
16th do.	4.5	15th do.	3.5	24th do.	4.2	24th do.	4.2
17th do.	4.4	16th do.	3.4	25th do.	4.4	25th do.	4.4
18th do.	4.9	17th do.	5.2	26th do.	5.2	26th do.	5.2
28th do.	6.8	27th do.	5.7	27th do.	5.1	27th do.	5.1
29th do.	6.4	28th do.	5.2	28th do.	5.9	28th do.	5.9
30th do.	6.7	29th do.	5.5	29th do.	5.6	29th do.	5.6
31st do.	6.7	30th do.	5.7	30th do.	6.0	30th do.	6.0
				31st do.	5.7	31st do.	5.7

Exhibit Ma.-18/b-1.

CAUVERY dam and Wyyacondan.

Month.	Date.	A.M. or P.M.	Cauvery dam north gauge.	Wyyacondan head sluice front gauge.	Month.	Date.	A.M. or P.M.	Cauvery dam north gauge.	Wyyacondan head sluice front gauge.
1910.					1910—cont.				
June ..			Nil.		July—	26th	A.M.	5.7	5.2
July ..	4th	A.M.	7.0	5.3	cont.	27th	P.M.	5.5	5.1
	5th	P.M.	7.0	5.3		28th	A.M.	5.2	5.0
	14th	P.M.	6.8	5.6		29th	P.M.	6.3	5.3
	15th	P.M.	7.0	5.9		30th	A.M.	6.9	5.3
	16th	P.M.	6.9	5.6		31st	P.M.	6.9	5.2
	17th	P.M.	6.7	5.2		1st	A.M.	6.8	5.2
	18th	P.M.	6.5	5.4		2nd	P.M.	6.5	5.2
	19th	P.M.	7.0	5.7		23rd	A.M.	6.6	5.6
	20th	P.M.	7.0	6.3		24th	P.M.	6.7	5.2
	21st	P.M.	6.4	5.1		25th	A.M.	6.6	5.1
	22nd	P.M.	6.0	5.1		26th	P.M.	6.6	5.3
	23rd	P.M.	5.7	4.9		27th	A.M.	7.0	5.5
	24th	P.M.	5.4	4.8		28th	P.M.	6.9	5.5
	25th	P.M.	5.2	4.6			A.M.	6.7	5.4
	26th	P.M.	5.0	4.5			P.M.	6.7	5.5
	27th	P.M.	5.0	4.5			A.M.	7.0	5.5
	28th	P.M.	4.9	4.4			P.M.	6.0	5.4
	29th	P.M.	4.8	4.2					
	30th	P.M.	4.7	4.2					
	31st	P.M.	4.5	4.0					
		P.M.	4.5	4.1					
		P.M.	4.5	4.2					
		P.M.	4.5	4.3					
		P.M.	6.0	5.9					

Cauvery dam and Wyyacondan—cont.

Month.	Date.	A.M. or P.M.	Cauvery dam north gauge.	Wyyacondan head sluice front gauge.	Month.	Date.	A.M. or P.M.	Cauvery dam north gauge.	Wyyacondan head sluice front gauge.
1911.					1912—cont.				
June ..	29th	P.M.	6.5	4.1	July—	20th	A.M.	5.2	4.5
	30th	A.M.	6.2	4.8	cont.	21st	"	4.9	4.35
July ..	1st	P.M.	6.0	5.0		22nd	"	5.1	5.3
	2nd	A.M.	5.9	4.8	August.	16th	"	7.0	5.2
	3rd	"	5.4	4.6		17th	"	6.6	4.8
	4th	"	5.1	4.5		18th	"	6.3	4.8
	5th	"	4.8	4.6		19th	"	6.2	4.7
	6th	"	4.6	4.5		20th	"	6.3	4.9
	7th	"	4.7	4.7		21st	"	6.6	5.3
	8th	"	4.6	4.7	1913.				
	9th	"	4.6	4.8					
	10th	"	5.1	4.9	June ..	9th	P.M.	4.3	4.4
	11th	"	4.8	4.8		10th	A.M.	4.0	4.2
	12th	"	5.2	5.2		14th	P.M.	4.3	4.5
	13th	"	6.0	5.5		15th	A.M.	5.2	4.6
August.	7th	A.M.	6.3	6.1		16th	P.M.	5.5	4.7
	8th	"	6.4	5.8		18th	A.M.	6.0	5.1
	9th	"	6.0	4.9		20th	P.M.	6.8	5.1
	10th	"	5.7	4.8		21st	P.M.	4.8	4.5
	11th	"	5.4	4.5		22nd	A.M.	4.6	4.5
	12th	"	5.6	5.0		23rd	P.M.	4.5	4.5
	13th	"	7.0	5.6		24th	A.M.	4.4	4.4
	14th	"	6.2	5.3		25th	P.M.	4.2	4.35
	15th	"	5.5	5.1	July ..	4th	A.M.	4.1	4.3
	16th	"	5.2	4.8		5th	"	5.4	4.9
	17th	"	5.2	4.8		6th	"	6.0	5.2
	18th	"	4.9	4.6		7th	"	5.6	5.1
	19th	"	4.8	4.7		8th	"	5.9	5.1
	20th	"	4.8	4.7		9th	"	5.0	4.7
	21st	"	4.9	4.7		10th	"	4.5	4.5
	22nd	"	5.0	4.8		11th	"	4.7	4.7
	23rd	"	5.0	4.8		12th	"	4.9	4.6
	24th	"	5.0	4.8		13th	"	4.4	4.4
	25th	"	6.0	5.5		14th	"	4.3	4.4
	26th	"	5.8	5.3		15th	"	4.7	4.5
	27th	"	5.2	5.0		16th	"	4.5	4.5
	28th	"	4.7	4.7		17th	"	4.4	4.4
	29th	"	4.1	4.6		18th	"	4.9	4.4
	30th	"				19th	"	6.8	4.8
	31st	"				20th	"	6.4	4.6
1912.						21st	"	6.7	5.0
June ..	7th	A.M.	4.6	4.3		22nd	"	6.7	5.0
	8th	P.M.	4.3	4.2		23rd	"	6.9	5.1
	18th	A.M.	4.1	4.1		24th	A.M.	7.5	5.5
	19th	P.M.	4.1	4.5		25th	"	7.1	5.2
	20th	A.M.	4.5	4.5		26th	"	6.7	5.0
	21st	P.M.	4.0	4.3		27th	"	6.7	5.0
	22nd	P.M.	5.2	4.8	August.	1st	"	6.9	5.1
	23rd	A.M.	5.9	5.1		12th	"	7.5	5.5
	24th	P.M.	5.8	5.0		13th	"	7.1	5.2
	25th	P.M.	5.7	4.1		14th	"	6.7	5.0
	26th	P.M.	6.5	4.5		15th	"	6.2	4.8
	27th	A.M.	6.9	4.8		16th	"	6.0	4.6
July ..	1st	A.M.	4.0	4.2		17th	"	5.7	4.4
	2nd	"	5.3	4.6		18th	"	5.4	4.2
	3rd	"	5.6	4.8		19th	"	5.3	4.2
	4th	"	5.5	4.8		20th	"	5.2	4.2
	5th	"	5.0	4.6		21st	"	5.0	4.1
	6th	"	4.4	4.3		22nd	"	4.8	3.9
	7th	"	4.1	4.2		23rd	"	4.8	4.0
	8th	"	4.3	4.3		24th	"	4.7	4.1
	9th	"	4.1	4.2		25th	"	5.0	4.3
	10th	"	..	..		26th	"	5.1	4.5
	11th	"	..	..		27th	"	5.9	4.9
	12th	"	..	..		28th	"	5.9	4.9
	13th	"	7.0	5.5		29th	"	5.6	5.1
	14th	"	6.3	5.4		30th	"	6.0	5.2
	15th	"	5.6	4.8		31st	"	5.7	5.0

Exhibit Ma.-18/c.-1.

CAUVERY dam and Marudur Nattu voikkal.

	Cauvery dam.		Marudur Nattu voikkal (12 hours previous).		Cauvery dam.		Marudur Nattu voikkal (12 hours previous).
June 1912.				June 1913—cont.			
7th 6 A.M.	4.6	6th 6 P.M.	4.0	14th 6 A.M.	3.3	13th 6 P.M.	2.7
8th do.	4.1	7th do.	3.5	15th do.	5.2	14th do.	4.1
9th do.	3.4	8th do.	3.2	16th do.	6.0	15th do.	4.7
10th do.	3.4	9th do.	3.3	17th do.	4.0	16th do.	3.5
11th do.	3.1	10th do.	3.1	18th do.	4.4	17th do.	3.2
12th do.	3.0	11th do.	3.2	19th do.	4.1	18th do.	3.0
13th do.	3.5	12th do.	3.7	20th do.	3.7	19th do.	1.9
14th do.	4.5	13th do.	3.6	21st do.	3.4	20th do.	2.0
15th do.	3.7	14th do.	3.2	22nd do.	3.1	21st do.	1.9
16th do.	5.9	15th do.	4.4	July 1913.			
17th do.	5.7	16th do.	4.3				
18th do.	6.9	17th do.	5.0	4th 6 A.M.	5.4	3rd 6 P.M.	3.5
19th do.	7.0	18th do.	6.5	5th do.	6.0	4th do.	3.9
20th do.	5.9	19th do.	4.0	6th do.	5.6	5th do.	3.9
21st do.	5.0	20th do.	3.5	7th do.	5.9	6th do.	4.1
22nd do.	4.4	21st do.	3.2	8th do.	5.0	7th do.	3.3
23rd do.	4.0	22nd do.	3.0	9th do.	4.5	8th do.	3.0
24th do.		23rd do.		10th do.	4.7	9th do.	3.2
25th do.		24th do.		11th do.	4.9	10th do.	3.25
26th do.		25th do.		12th do.	4.4	11th do.	2.9
27th do.		26th do.		13th do.	4.3	12th do.	2.8
28th do.		27th do.		14th do.	4.7	13th do.	3.2
29th do.		28th do.		15th do.	4.5	14th do.	3.1
30th do.		29th do.		16th do.	4.4	15th do.	3.1
31st do.		30th do.		17th do.	4.9	16th do.	4.0
July 1912.				18th do.	6.8	17th do.	3.6
				19th do.	6.4	18th do.	3.3
1st 6 A.M.	4.0	30th 6 P.M.	3.6	20th do.	6.7	19th do.	3.6
2nd do.	5.3	July.	4.1	21st do.	6.7	20th do.	4.0
3rd do.	5.6	1st 6 P.M.	4.3	22nd do.		21st do.	
4th do.	5.5	2nd do.	4.3	23rd do.		22nd do.	
5th do.	5.5	3rd do.	4.1	24th do.		23rd do.	
6th do.	5.0	4th do.	4.1	25th do.		24th do.	
7th do.	4.4	5th do.	3.6	26th do.		25th do.	
8th do.	4.3	6th do.	3.2	27th do.		26th do.	
9th do.	4.1	7th do.	3.2	28th do.		27th do.	
10th do.	3.7	8th do.	3.0	29th do.		28th do.	
11th do.	3.5	9th do.	2.6	30th do.		29th do.	
12th do.	3.5	10th do.	2.5	31st do.		30th do.	
13th do.	3.6	11th do.	2.9	August 1913.			
14th do.	7.0	12th do.	4.8				
15th do.	6.3	13th do.	4.3	1st 6 A.M.	6.9	31st 6 P.M.	4.2
16th do.	5.6	14th do.	3.9	July.			
17th do.	5.2	15th do.	3.4				
18th do.	4.9	16th do.	3.3	1st 6 A.M.	7.5	31st 6 P.M.	5.0
19th do.	5.1	17th do.	3.3	2nd do.	7.1	1st 6 P.M.	4.4
20th do.		18th do.		3rd do.	6.7	2nd do.	3.9
21st do.		19th do.		4th do.	6.3	3rd do.	3.6
22nd do.		20th do.		5th do.	6.0	4th do.	3.4
August 1912.				6th do.	5.7	5th do.	3.0
				7th do.	5.4	6th do.	2.85
16th 6 A.M.	7.0	15th 6 P.M.	4.3	8th do.	5.3	7th do.	2.7
17th do.	6.6	16th do.	4.0	9th do.	5.2	8th do.	2.5
18th do.	6.3	17th do.	3.8	10th do.	5.0	9th do.	2.3
19th do.	6.2	18th do.	3.7	11th do.	4.8	10th do.	2.6
20th do.	6.3	19th do.	4.0	12th do.	4.7	11th do.	3.6
21st do.	6.6	20th do.	4.5	13th do.	4.7	12th do.	3.6
June 1913.				14th do.	5.0	13th do.	3.4
				15th do.	4.8	14th do.	3.0
8th 6 A.M.	3.8	7th 6 P.M.	4.0	16th do.	4.8	15th do.	3.0
9th do.	4.6	8th do.	3.8	17th do.	4.7	16th do.	3.0
10th do.	4.0	9th do.	3.2	18th do.	5.0	17th do.	2.85
11th do.	3.9	10th do.	3.0	19th do.	4.7	18th do.	2.7
12th do.	3.4	11th do.	2.5	20th do.	4.7	19th do.	2.5
13th do.	3.0	12th do.	2.35	21st do.	4.7	20th do.	2.5
				22nd do.	4.8	21st do.	3.3
				23rd do.	4.8	22nd do.	3.6
				24th do.	4.7	23rd do.	3.6
				25th do.	5.0	24th do.	4.2
				26th do.	5.1	25th do.	4.3
				27th do.	5.9	26th do.	4.5
				28th do.	5.9	27th do.	4.9
				29th do.	5.6	28th do.	4.9
				30th do.	6.0	29th do.	4.6
				31st do.	5.7	30th do.	4.5

Exhibit Ma.-19.

With reference to Madras (Ma. 14), appendix XXII, a table is now produced as requested by the Assessor showing the resulting combined discharges of the Cauvery and Vennar regulators as shown in Sir J. Benton's note of 12th May 1911, appendix V, column 10 and the discharges now obtained on method explained in appendix XXII and the discharges recorded in the Madras Annual river diagrams.

Years.	As reproduced from column 10, appendix V of Sir J. Benton's note of 12th May 1911.	Re-calculated as per method appendix XXII, Ma. 14.	Discharges recorded in the Madras annual river diagrams.
1	2	3	4
	M.C.FT.	M.C.FT.	M.C.FT.
1896-1897	227,560	301,825	303,985
1897-1898	206,990	295,076	296,520
1898-1899	173,508	230,297	231,375
1899-1900	117,312	123,924	123,980
1900-1901	229,671	334,076	336,330
1901-1902	204,624	274,609	276,126
1902-1903	173,109	218,492	219,888
1903-1904	223,146	284,707	285,380
1904-1905	128,933	190,929	192,050
1905-1906	165,265	186,306	187,208
1906-1907	185,701	199,991	201,268

The average daily discharge figures reproduced from Madras Administration reports in Sir J. Benton's note of 12th May 1911, appendix V, column 5, were found by adding the average daily discharge for each month, June to November, and dividing by 6 instead of taking the whole discharge for the period and dividing by 183, and similarly for period, December to March. This gives a small error and to this is due the small differences in columns 3 and 4.

W. M. ELLIS, Col., R.E.,
Madras Representative.

Exhibit Ma.-20.*Remissions—Delta System in the delta irrigated area, Tanjore district.*

In accordance with the wishes of the arbitrator enquiries have been made regarding the yearly record of remissions due to deficiency of supplies of water given in the Cauvery delta in the twenty years, 1890 to 1909. Further, as directed, enquiry was made as regards the losses which are due to poor outturn of crop attributable to deficient supply in the same period.

2. As regards remissions, these are only granted in the case of irrigated crops where total failure of crop occurs or when owing to failure in the supply of water to the area no crop has been put in. The records of remissions are kept not by systems but by taluks. In the figures produced, the Collector of Tanjore has omitted the amounts of remissions in the non-delta taluks (Pattukkottai and half Tanjore). These are deducted from the totals of the district to get the remissions in the delta. The records of remissions show the reasons for remissions under three heads (viz.)—

- (i) withered crop, that is, failure of planted crop due to deficient supply.
- (ii) submergence and other causes producing failure of planted crop.
- (iii) waste or unplanted areas.

Item (iii) is sub-divided by the Collector in a separate statement into—

- (a) Lands left waste owing to deficient water.
- (b) Do. do. submergence.

This statement is appended as Table I. Table II shows total areas of remissions on the delta lands of Tanjore district due to deficiency of water which includes items (i) and (iii) (a) above and remissions due to submergence and floods, items (ii) and (iii) (b).

3. It has to be noted that the area of the Coleroon Lower Ancient System, south of the Coleroon which form part of the Tanjore district delta lands, are included in these figures.

4. The resulting total shows remissions of revenue in twenty years of Rs. 4,44,104 for deficient supply and Rs. 3,24,741 for submergence.

It is brought to notice that in 1899 the loss due to submergence, Rs. 2,82,205, was to a great extent, really, although indirectly due to deficient supply as explained in Madras Part IX, paragraph 66 (Ma. 14), and had the year been a normal one except for the floods of the second-half of October, the total remissions due to submergence would not have been great. The

figures given for the above paragraph Ma. 14 require some revision as the original figures given by the Collector are reported by that officer after further scrutiny to be inaccurate. The differences now shown are not very material and the jamabandi report of 1899-1900 now attached fully supports the explanation of the losses given in the Madras case.

5. There is no direct record of the losses incurred by short outturn of crop, but there is record of the estimated yearly outturn of paddy crop from 1901 to 1910 under the headings shown in the attached table III which is furnished by the Collector of Tanjore.

This officer suggests that the losses of ryots due to deficient water-supply may be estimated as under the following assumptions:—

(1) That if supplies of water are adequate and suitable in the delta, that it is a fair assumption that the yield will be a-12-anna one at least. If they do not yield this, they have either been damaged by deficient supply or by submergence.

(2) That 30 kalams per acre is assumed as the equivalent of a-12-anna crop.

(3) That the value of paddy during the period 1901 to 1910 is Rs. 1-8-0 per kalam. This is put forward as a fair valuation.

(4) That the average yield of crops recorded to yield between 8 and 11 annas is 10 annas, between 4 and 7 annas is 5 annas, and

„ 0 „ 5 „ 2 „

Table IV shows the resulting yearly loss of paddy in kalams.

6. The total losses to ryots yearly for deficient supply is computed on the above assumptions taking the proportion which the loss due to deficient supply bears to the whole loss as the same as the proportion of remission for the year due to deficient supply bears to the whole remission.

7. The resulting table of losses to ryots due to deficient supply (Table V, col. 6-a) shows loss in the ten years from 1901 totalling to 402 lakhs and averaging, say, 40 lakhs yearly. Losses due to floods comes to 244 lakhs in the same period.

8. The method of computation is, however, likely to exaggerate the latter figure as losses due to submergence are to a considerable extent total losses and if the crop is not totally destroyed, it is frequently not badly injured by submergence. This however does not hold in the case of losses due to deficient supply and considerable losses from this cause may be suffered in a year in which no considerable remission is granted. This point is emphasized in the jamabandi report of the year 1890, a year of low supply but also of small remission.

9. The Collector's annual jamabandi reports attached to this note give further details regarding the yearly conditions of supply and attention is especially invited to these.

W. M. ELLIS, Col., R.E.,
Madras Representative.

TABLE I showing remissions for waste on account of deficiency of water and floods, Tanjore district.

Fasl.	Years.	Waste.			Remarks.
		Owing to deficiency of water.	Owing to floods.	Total of columns 3 and 4.	
1	2	3	4	5	6
		RS.	RS.	RS.	
1890	1890-91	1,516	..	1,516	
1891	1891-92	7,884	..	7,884	
1892	1892-93	134	..	134	
1893	1893-94	..	..	..	
1894	1894-95	2,530	..	2,530	
1895	1895-96	1,866	..	1,866	
1896	1896-97	1,486	..	1,486	
1897	1897-98	1,350	..	1,350	
1898	1898-99	..	6,426	6,426	
1899	1899-00	1,69,933	..	1,69,933	
1900	1900-01	1,170	..	1,170	
1901	1901-02	820	..	820	
1902	1902-03	..	1,243	1,243	
1903	1903-04	..	10,092	10,092	
1904	1904-05	12,659	..	12,659	
1905	1905-06	1,113	..	1,113	
1906	1906-07	203	..	203	
1907	1907-08	51	..	51	
1908	1908-09	7,328	..	7,328	
1909	1909-10	3,381	..	3,381	

TABLE II showing the total remission for each fasli from 1300 to 1319 in the deltaic parts on account of deficiency of water and floods, Tanjore district.

Facil.	Year.	Due to deficiency of water.	Due to floods	Total of columns 3 and 4.
1	2	3	4	5
		RS.	RS.	RS.
1300	1890-91	2,330	306	2,636
1301	1891-92	11,169	2,181	14,100
1302	1892-93	14,699	16	14,714
1303	1893-94	1,631	5,789	7,420
1304	1894-95	5,952	913	6,865
1305	1895-96	1,866	311	2,177
1306	1896-97	1,486	1,184	2,670
1307	1897-98	3,850	1,487	5,337
1308	1898-99	2,639	32,826	35,464
1309	1899-00	2,93,779	2,20,002	5,13,781
Total ..		3,40,201	2,64,963	6,05,164
1310	1900-01	3,317	1,718	5,035
1311	1901-02	871	..	871
1312	1902-03	132	4,449	4,581
1313	1903-04	1,019	20,451	21,470
1314	1904-05	35,026	1,760	36,786
1315	1905-06	1,777	28	1,805
1316	1906-07	26,023	16,549	41,572
1317	1907-08	559	698	1,257
1318	1908-09	17,847	9,936	27,783
1319	1909-10	17,382	6,189	22,521
Total ..		1,03,903	59,778	1,63,681
Grand Total ..		4,44,104	3,24,741	7,68,845

TABLE III.

Year.	Fasli.	13 to 16 annas.	12 annas.	8 to 11 annas.	4 to 7 annas	0 to 3 annas.	Total.
1	2	3	4	5	6	7	8
		ACS.	ACS.	ACS.	ACS.	ACS.	ACS.
1900-1901	1310	69,071	448,951	278,812	30,391	824	823,049
1901-1902	1311	81,558	510,400	286,539	44,886	2,587	925,970
1902-1903	1312	32,008	342,567	444,560	101,823	5,538	926,516
1903-1904	1313	18,774	858,839	447,113	87,169	10,459	922,754
1904-1905	1314	69,071	94,251	386,323	162,678	72,426	784,749
1905-1906	1315	9,525	273,894	452,755	95,208	90,034	821,416
1906-1907	1316	15,341	268,141	431,856	163,727	89,626	918,691
1907-1908	1317	8,359	324,559	485,498	91,580	18,247	928,243
1908-1909	1318	4,069	159,161	477,101	243,533	87,412	931,326
1909-1910	1319	10,704	723,132	33,275	7,057	2,669	776,837
Total ..		318,480	3,498,895	3,728,352	1,028,102	280,222	8,849,551

TABLE IV.

Year.	Ten annas.	Loss in kalams.	Five annas.	Loss in kalams.	Two annas.	Loss in kalams.	Total loss in kalams cols. 3, 5 and 7.
1	2	3	4	5	6	7	8
1901	278,800	1,894,000	30,400	53,200	820	20,500	1,467,700
1902	286,540	1,432,700	44,900	785,750	2,590	64,750	2,283,300
1903	444,580	2,222,900	101,820	1,781,550	5,540	188,500	4,142,950
1904	447,110	2,235,550	87,170	1,525,475	10,860	271,500	4,032,525
1905	386,320	1,931,600	162,680	2,848,900	72,430	1,810,750	6,589,250
1906	452,750	2,263,750	95,200	1,666,900	90,030	2,250,750	6,180,500
1907	431,860	2,159,300	163,720	2,965,100	89,620	990,500	6,114,900
1908	485,500	2,427,500	91,580	1,602,650	18,250	456,350	4,486,400
1909	477,160	2,885,500	343,580	4,267,900	37,400	935,000	7,688,400
1910	33,270	166,350	7,050	122,875	2,670	66,750	356,475
Total	..	..	..	..	..	..	43,242,300
Average for ten years	..	..	..	..	..	..	4,324,230

TABLE V.

[illegible]

Extracts from the Jamabandi Reports—Fasli 1300 (1890-91).

Paragraph 2, Season and rainfall.—The rainfall was favourable to cultivation in the early part of the year, but was subsequently deficient and ill-timed. In the south of the district (Pattukkottai) a severe drought up to October was followed by heavy floods, doing considerable damage to some of the villages and rain-fed tanks. The total rainfall in the year was greater than in the preceding year, being 40.47 inches against 37.28 inches in 1889-90. According to the manual, the total average for both monsoons is 40.8 inches (page 41). The average of the five years ending March 1889 was 52.75 inches. There were good freshes in the rivers in the months of July, September and October 1890.

Paragraph 3, Condition and outturn of crops.—The eastern portion of the delta received an inadequate supply of water after October, and the dry crops in parts suffered from want of timely rain.

The outturn is generally allowed to have been below the average, and if the complaints and declarations of the cultivators be believed the deficiency was considerable. The amount of remissions cannot be taken as a gauge of the outturn, for no remission is granted on two-crop land if one crop is saved, and none is given on one-crop land unless the harvest is totally lost.

The amount remitted was only Rs. 3,142 against Rs. 24,222 in fasli 1299. In that fasli, large remissions had to be made in the Pattukkottai taluk where there is an extensive area of wet land depending entirely for irrigation on small rain-fed tanks.

Paragraph 10, Cl. 2.—The amount remitted on "waste" was Rs. 2,022 against Rs. 4,995 in the previous fasli. The remission was granted in the four taluks of Mayavaram, Shiyali, Tirutturaippundi and Pattukkottai owing to deficient rain and supply in the rivers in the latter part of the year.

Extracts from the Jamabandi Reports—Fasli 1301 (1891-92).

Paragraph 2—Season and rainfall.—The total rainfall during the year (46.70 inches) exceeded, not only that of the year preceding (40.47), but also the average of the twenty years ending 1889-90 (44.24 inches). But it was neither timely nor well distributed. Unusually copious showers in May led to extensive cultivation in the dry taluks, but the ensuing drought till October caused a very short harvest of the early crops. In December a deluge of rain flooded the Shiyali and the Mayavaram taluks, and did considerable damage. Floods also caused damage to a smaller extent in the south of Pattukkottai. The season was, however, favourable to cultivation in the latter part of the year, and the supply of water was generally sufficient for wet and garden cultivation throughout the season.

Paragraph 10, Cl. 2.—The amount remitted on "waste" was Rs. 7,884 against Rs. 2,022 in fasli 1300. The remission was granted in the three taluks of Mayavaram, Shiyali and Tirutturaippundi, and was necessitated by the failure of timely rains and freshes in the early part of the season and by floods in December. Remission was granted by the Sub-Collector with the utmost caution, and I was satisfied at the time that the grant of it could not be refused.

Paragraph 12, Cl. 2.—There is an increase of Rs. 5,093 under occasional remissions. It is due to the same reason as that given in paragraph 10 *supra*. After the floods in Mayavaram and Shiyali had subsided, the lands were again planted and the crops then suffered from insufficiency of water.

Extract from the Jamabandi Report—Fasli 1302 (1892-93).

Paragraph 2. Season and rainfall.—The total rainfall during the year was only 32.82 inches against 46.70 inches in the preceding year and 44.25 inches, the average of twenty years preceding 1890-91. In the early part of the year, from April to September, the rainfall (19.33 inches) was much in excess of that in previous years, and there was also a good supply of water for irrigation in all the rivers. Thus, fortunately, the early crops, both wet and dry, were all that could be desired. The latter part of the year, from October onwards, was marked by a very severe drought. The rainfall during this period was only 13.49 inches against 38.00 inches in the preceding year and 28.51, the average of twenty years preceding 1890-91. There was a pitiable loss of crop, both wet and dry, in the non-deltaic portions of the district and the eastern parts of the district also suffered severely, thus necessitating the grant of large remissions. The long drought came to an end in March 1893 when there was a phenomenal rainfall which, though quite untimely, did much good in replenishing the wells on which a considerable area of maize, ragi, chillies, tobacco and other garden crops depended. The season was generally so bad that the Board found it necessary to call for special season reports, which were ordered to be discontinued only on the 8th July 1893, the season having shown a decided tendency to improve.

Vide B.P. Mis. No. 4059, dated 8th July 1893.

Paragraph 11, Cl. 2. Waste remitted and charged.—The amount remitted on waste is Rs. 5,514 against Rs. 7,884. The decrease under this item is due to timely rains in the early part of the year in fasli 1301. The remission was granted to a large extent in the taluks of

Tanjore and Pattukkottai which suffered most from the failure of the monsoon, and partly in the taluks of Kumbakonam and Tirutturaippundi (Rs. 39 in Kumbakonam and Rs. 95 in Tirutturaippundi). Mr. Winterbotham satisfied himself by personal inspection that the remissions granted chiefly in Tanjore and Pattukkottai taluks were quite necessary. They are less than what he had anticipated.

Paragraph 13, clause 2.—There is a net increase of Rs. 22,930 under the head of occasional remissions. The total amount of remission, including waste remitted (Rs. 5,514), is Rs. 34,660 which is much below the estimate formed by Mr. Winterbotham.

Extract from the Jamabandi Report—Fasli 1303 (1893-94).

Paragraph 2—Season and rainfall.—The total rainfall during the year was 53.39 inches against 32.80 inches in 1892-93 and 44.3 inches, the average of twenty years. In July 1893 the rainfall was propitious, and compared with the previous year, there was a large area under dry cultivation. In August, September and October it was under average and the harvest of early dry crops was poor. The feature of the year was a tremendous downpour towards the end of November. The Vennar breached in several places and wide tracts of country from Tanjore down to the sea were under flood for three days. The low parts of Tanjore town was submerged and many people were saved by boats. Near Nidamangalam half a mile of the railway line was washed away. Viewing the floods at the time, it was apprehended that the loss of crop must be disastrous; but when the water subsided, it was found that the paddy was, generally speaking, none the worse for the immersion. The loss was restricted to fields recently transplanted, or where the grain was in ear: such areas were fortunately not extensive. The amount of remission granted for land submerged or inundated was only Rs. 5,789 and was confined almost exclusively to the taluks of Shiyali and Tirutturaippundi lying at the tail end of the irrigation channels of the delta and always suffering from defective drainage. There was not much difficulty felt in the delta in the early months of the calendar year.

Paragraph 10—Waste remitted and waste charged.—The amount remitted on waste was Rs. 3,854 against Rs. 5,514 in fasli 1302. The remission was granted in three taluks, viz., Shiyali, Negapatam and Pattukkottai.

In the Shiyali taluk the villages at the tail end of the Pudumaniyar generally suffer from want of water and remissions are usually granted for waste. In the Pattukkottai taluk the indifferent character of the season in the early part of the year and the heavy floods of November necessitated the grant of remissions. The amount remitted in the Negapatam taluk was insignificant. Remission was granted with the utmost care.

	Rs.	
Shiyali	2,809	
Negapatam	151	
Tirutturaippundi	2,829	
Total	5,789	

is due to the more favourable character of the season. Nearly the whole of the amount remitted was in Pattukkottai taluk, the two taluks of Mayavaram and Tirutturaippundi giving only a small percentage. The heavy floods of November 1893 rendered necessary the grant of remission of assessment on crops damaged by submersion in the taluks of Shiyali, Negapatam and Tirutturaippundi. The amount remitted in each is given in the margin.

Extract from the Jamabandi Report—Fasli 1304 (1894-95).

Paragraph 2—Season and rainfall.—The total rainfall during the year was 35.17 inches against 53.39 inches in 1893-94 and 44.3 inches, the average of twenty years ending 1889-90. Till the close of July, the freshes in the delta rivers and channels were timely and sufficient. The progress of cultivation in the delta was normal. The local rainfall was however short, and in the dry parts, the cultivation was backward, but this was compensated for to some extent by the subsequent rains in August and September, so that on the whole, the south-west monsoon was fair. The north-east monsoon rains were however deficient and from January onwards want of rain and water in rivers was much felt. In the upland parts of Tanjore and portions of Kumbakonam and Tirutturaippundi taluks, the wet crops suffered to a slight extent; on the whole the season was fair.

Paragraph 10, clause 2—Waste remitted and waste charged.—The amount remitted on the waste was Rs. 2,530 against Rs. 3,854 in fasli 1303. This remission was granted in four taluks—Tanjore, Kumbakonam, Shiyali and Tirutturaippundi. The amount of remission granted was highest in the Shiyali taluk, in which Rs. 1,003 was granted on lands at the tail end of the Pudumaniyar which generally suffer from want of water. Next comes Tirutturaippundi with a remission of Rs. 944. It is well known that this taluk suffers from want of proper drainage, especially in the portions round Talanayar. In Tanjore and Kumbakonam the state of season necessitated the grant of small remissions. Remissions appear to have been granted with proper care.

Paragraph 12, clause 3.—*Remissions.*—The decrease in the amount of remissions granted on account of submerged or inundated lands was due to the absence during the year of the heavy floods which necessitated the grant of remissions in fasli 1303.

Extract from the Jamabandi Report—Fasli 1305 (1895–96).

Paragraph 2.—*Season and rainfall.*—The total rainfall in the district during the year averaged 54.58 inches against 35.17 inches in the previous year, and 43.81 inches the average of the 25 years ending December 1894.

In October 1895, owing to heavy rains and high floods there were breaches in the Cauvery, in the Kumbakonam and Mayavaram taluks, and in the Coleroon, in the limits of Rettaikulam village, Shiyali taluk. In the former case, crops on about 425 acres in the Mayavaram taluk suffered but there was no necessity for the grant of any remission. In the case of the Coleroon, lands near Kodaiyampalayam, etc., were submerged while the irrigation source of the wet lands of Rettaikulam village was cut off, in consequence of which the "wet" lands of the village were ordered to be transferred to "dry" (Board's Proceedings Mis. No. 779, dated 15th February 1896). Portions of the Shiyali taluk, where drainage is defective, also suffered from excess of rains. The remission granted in Shiyali taluk amounted to Rs. 2,177 as detailed below:—

Remission for waste	..	..	..	..	..	..	Rs.
Do. for shavi, "pal," etc.	..	..	..	..	..	..	1,866
							311
Total	..						2,177

Paragraph 16.—*Waste remitted and waste charged.*—The extent of waste on which assessment was remitted was 372 acres assessed at Rs. 1,866 in Shiyali taluk against 593 acres assessed at Rs. 2,530 in last year as noted below; remission for waste in holding was granted in the villages of Arasur, Kattur, Pudupatnam and Mahendrapalli, Shiyali taluk, the irrigation sources of which were cut off owing to breaches in the Coleroon at the beginning of the fasli.

Extract from the Jamabandi Report—Fasli 1306 (1896–97).

Season and rainfall.—The total rainfall in the district during the year averaged 49.47 inches against 54.58 inches in the preceding year and 43.81 inches, the average of the 25 years ending December 1894. The rainfall during the south-west monsoon (8.74 inches) was much below that in 1895–96 (20.27 inches) or the average of the 25 years ending December 1894 (15.71 inches); and as a consequence, parts of the Tanjore, Tirutturaippundi, Mannargudi and Pattukkottai taluks, which are dependent on rain, suffered during the period. The rainfall during the north-east monsoon (40.73 inches) was more copious than that in 1895–96 (34.31 inches). The rains of November and December 1896 were heavy and caused some damage to crops in the Shiyali taluk; while the rain in February 1897, which was unseasonable, affected the outturn of the lands, the crops on which had not been harvested till then. At the end of July 1896, the Cauvery rose suddenly to 20.20 feet in consequence of which the Coleroon the Palavar, the Manniyar and the Arasalar breached in several places. The tracts that suffered were the country adjoining the Manniyar in Kumbakonam taluk, the northern part of the Mayavaram taluk and almost the whole of the Shiyali taluk.

On the whole, the season cannot be said to have been a good one.

Paragraph 13.—*Waste remitted and waste charged.*—The extent of land left waste, the assessment on which was remitted, was 293 acres, assessed at Rs. 1,486 in Shiyali and Mayavaram taluks, against 372 acres assessed at Rs. 1,866 in the Shiyali taluk in fasli 1305. The extent of waste charged was 128,220 acres against 110,635 acres in fasli 1305. The increase was due to the less favourable character of the season.

Paragraph 15, clause 2.—*Submerged or inundated (item 3).*—The increase of Rs. 873 was due to floods which necessitated grant of remissions as detailed below:—

Tanjore taluk	..	..	..	..	..	..	Rs.
Kumbakonam taluk	..	..	..	..	..	..	21
Shiyali taluk	..	..	..	..	..	..	156
							1,007
Total	..						1,184

Extract from the Jamabandi Report—Fasli 1307 (1897–98).

Paragraph 2.—*Season and rainfall.*—The total rainfall in the district during the year averaged 30.20 inches against 49.47 inches in the preceding year, and 43.81 inches, the average of 25 years ending December 1894. The rainfall during the south-west monsoon (18.07 inches) was more copious than 1896–97 (8.74 inches) and the average of the 25 years ending December 1894 (15.71 inches). This favoured the cultivation of the early crops. The north-east monsoon (12.13 inches) was, however, a failure and considerable anxiety was felt in the beginning in consequence. The rainfall in October (3.34 inches) was scarcely half, and that in November 1897 (3.04 inches) only about 28 per cent. of the average (7.98 and 10.93 inches, respectively). This scanty rainfall retarded the sowing of dry crops and manavari (rain-fed) paddy, in the Kadarambam (dry) parts of the district and the rain-fed "dry" and paddy crops sown with the aid of rain in September 1897 suffered much for want of rain. In the deltaic portion "manavari" (rain-fed) paddy crops shared the same fate as those of upland portion. The supply of water in the rivers was short in this season, and consequently wet crops in parts of Tanjore, Mayavaram, Shiyali and Nannilam fared badly. In the southern and western parts of the Pattukkottai taluk, the samba paddy crop withered in small patches here and there as also the "Kuttalai" and "Kumbalai" paddy crops on high lands in the Mannargudi taluk. The state of crops was, however, considerably improved by the rainfall of December 1897 (4.04 inches) which was not too late to save the crops, though the outturn was affected. On the whole, the season, though not good, scarcely deserves to be classed as bad.

Paragraph 11.—*Waste remitted and waste charged.*—The extent of land left waste, the assessment on which was remitted, was 798 acres assessed at Rs. 3,146 in Mayavaram, Shiyali, Nannilam, Tirutturaippundi and Pattukkottai taluks against 293 acres assessed at Rs. 1,486 in Shiyali and Mayavaram taluks in fasli 1306.

The extent of waste charged was 132,098 acres against 128,220 acres in fasli 1306. The increase is due to the less favourable character of the season.

Paragraph 13.—*clause 2—Shavi or loss of produce (Item 1).*—The remissions under this head were granted in the following taluks:—

	..	..	..	..	..	..	..	..	Rs.
Tanjore	..	..	..	..	..	..	..	..	313
Mayavaram	..	..	..	..	..	..	..	..	2,055
Tirutturaippundi	..	..	..	..	..	..	..	..	125
Pattukkottai	..	..	..	..	..	..	..	..	2,124
Total	..								4,617

and was necessitated by the failure of the north-east monsoon as explained in paragraph 2 above.

Clause 3.—*Submerged or inundated.*—Rs. 1,487 were remitted under this head in the following taluks:—

	..	..	..	..	..	..	..	..	Rs.
Negapatam	..	..	..	..	..	..	..	..	788
Tirutturaippundi	..	..	..	..	..	..	..	..	699
Total	..								1,487

During September and October 1897 there were high floods in the Velaranniyam canal as well as in the Harichaniranadhi which falls into the canal. The canal water overflowed its banks and breached them in some places. The floods in the irrigation channels also rose high and the combined floods lay on the ground for a number of days together and the crops affected thereby were much damaged. The Executive Engineer, Negapatam division, has stated that necessary arrangements have been made to strengthen the banks of the canal and prevent similar damages in future.

Extract from the Jamabandi Report—Fasli 1308 (1898-99).

Season and rainfall.—The total rainfall in the district during the year averaged 58.25 inches against 30.20 inches in the previous year and 43.81 inches, the average of the 25 years ending December 1894. The rainfall during the south-west monsoon (15.98 inches) was less than in

North-east monsoon—	INCHES.
Average rainfall in 1897-98	12.13
“ “ “ “ in 1898-99	42.27
Average of 25 years ending December 1894	28.10
Total rainfall (both monsoons), 1897-98	30.20
“ “ “ “ “ “ 1898-99	58.25
Average, 25 years “ “ “ “	43.81

the previous year (18.07 inches) but a little above average of the 25 years ending December 1894 (15.71 inches). The rainfall during the north-east monsoon (42.27 inches) was much greater than in the previous year (12.13 inches) and much above the average of the 25 years ending December 1894 (28.10 inches).

The rainfall during November (18.92 inches) and December 1898 (12.35 inches) was very heavy with the result that, owing to floods in the rivers, breaches occurred and wet crops were damaged in several places, chiefly in Mayavaram, Shiyali, Nannilam, Negapatam and Tirutturaippundi taluks. The damage to crops, however, was not great. In Shiyali, a large extent of land was recultivated, while in parts of Negapatam and Tirutturaippundi recultivation was not possible owing to defective drainage. The dry crops fared well during the year, except in a portion of the Tanjore taluk, where the groundnut crop suffered from excessive rains. On the whole the season may be said to have been favourable.

Waste remitted and waste charged.—The extent of land left waste, the assessment on which was remitted was 1,593 acres assessed at Rs. 6,426 in Mayavaram, Shiyali and Tirutturaippundi taluks against 797 acres assessed at Rs. 3,145 in Mayavaram, Shiyali, Nannilam, Tirutturaippundi and Pattukkottai taluks in fasli 1307 and this is due to larger extent of wet land having had to be left uncultivated in Tirutturaippundi taluk which has not proper drainage owing to the heavy rains and floods from October to December 1898.

Paragraph 13—Submerged or inundated.—The increase as compared with previous year is due to the heavy rains of November and December last and the consequent floods and breaches adverted to in paragraph 2 *supra*. The largest amount was granted in Tirutturaippundi taluk which adjoining the Vedaraniyam canal suffers from defective drainage. The improvement of the drainage of the rivers of this taluk which at present discharge themselves into the canal, seems to be under the consideration of the Public Works Department. The villages of the Negapatam taluk in which remission was allowed are also those which similarly suffer from defective drainage being situated by the side of the canal. Portions of Mayavaram, Shiyali and Nannilam taluks which are situated at the eastern extremity of the delta also suffered from the heavy rains and floods and hence the remissions in them.

Extract from the Jamabandi Report—Fasli 1309 (1899-1900).

Paragraph 2—Season and rainfall.—The total rainfall in the district averaged 44.02 inches against 58.25 inches in the previous year and 43.81 inches, the average of the twenty-five years ending December 1894. The rainfall during the south-west monsoon (16.42 inches) was a little in excess of that of the previous year (15.98 inches) and of the average of the 25 years

North-east monsoon—	INCHES.
Average rainfall in 1898-99	42.27
“ “ “ “ 1899-1900	27.60
Average rainfall of 25 years ending December 1894	23.10
Total rainfall (both monsoons), 1898-99	58.25
“ “ “ “ “ “ 1899-1900	44.02
Average rainfall of 25 years ending December 1894	43.81

ending December 1894 (15.71 inches). The rainfall during the north-east monsoon (27.60 inches) was much less than in the previous year (42.27 inches) and a little less than the average of the 25 years ending December 1894 (28.10 inches). The season began with heavy rainfall in April coupled with freshes which lasted from the middle of April till the beginning of May.

In May, the rainfall was about the average, and in June, July and August below it. The freshes which lasted from about the middle of June to the end of August was so scanty that the water failed to reach many of the lower reaches. The result was that (1) crops transplanted in July and beginning of August, and the seedlings, perished in many places about the middle of August, and (2) the cultivation of 136,554 acres of wet land was retarded. September had its average rainfall as also freshes; but this was followed by the October rains which were excessive, especially along the coast in Shiyali, Mayavaram and Negapatam where the rainfall amounted to 25.69, 24.49 and 29.10 inches, respectively, in the week ending 20th October, resulting in the greater portion of the lately transplanted crops being seriously damaged or totally destroyed over large tracts near the coast in Shiyali, Mayavaram and Negapatam and in the eastern portions of the Nannilam and Tirutturaippundi taluks. Added to this, the storm of the 12th November damaged the standing wet crops throughout the Negapatam taluk, along the sea coast in the Mayavaram taluk and in parts of the Mannargudi taluk. Further, owing to the absence of any rain to speak of from the middle of November and great scarcity of water in the rivers, the crops on a large portion of the cultivated area in the several taluks of the district failed. On the whole the season was extremely unfavourable.

Paragraph 11—Waste remitted and charged.—The extent of land left waste, the assessment on which was remitted, was 33,361 acres assessed at Rs. 1,70,689 extending over all the taluks against 1,593 acres assessed at Rs. 6,426 in fasli 1308 in Mayavaram, Shiyali and Tirutturaippundi

The extent of waste charged was 168,535 acres against 132,318 in fasli 1308. The increase is due to the extremely unfavourable character of the season.

Paragraph 13—Occasional remissions.—The increase against items 1 (shavi or loss of produce), 3 (submerged or inundated), 4 (tirvakammi), and 5 (fasalkammi or second crop not cultivated) is due to the extremely unfavourable character of the season (*vide* G.O. No. 341, dated 10th April 1900, communicated in B.P. Mis. No. 2430, Revenue Settlement, Land Records and Agriculture, dated 15th May 1900, and G.O. No. 2267, dated 27th August 1900, communicated in B.P. Mis. No. 4521, Revenue Settlement, Land Records and Agriculture, dated 3rd September 1900).

Extract from the Jamabandi Report—Fasli 1310 (1900-01).

Season and rainfall.—The total rainfall in the district during the year averaged 49.54 inches against 44.02 inches in the previous year and 44.40 inches, the average of the 30 years ending 31st December 1899. The rainfall during the south-west monsoon (19.82 inches) was in excess of that of the previous year (16.42 inches) and of the average of the 30 years ending 31st December 1899 (15.77 inches). The rainfall during the north-east monsoon (29.72 inches) also exceeded that of the previous year (27.60 inches) and the average of the 30 years ending 31st December 1899 (28.63 inches). The season commenced with heavy rains in April. Owing to high floods in the rivers in July and August, some of the rivers and channels overflowed their banks, and breaches occurred in several places, wet crops and seedlings in the taluks of Shiyali, Mayavaram, Kumbakonam, Nannilam and Tanjore having been submerged and damaged in consequence. The damage caused, however, was not great and almost the whole of the flooded lands was cultivated. The crops in some of the villages in the Talanayar group (Tirutturaippundi taluk) where drainage is defective suffered to some extent by the rains of November and December. On the whole, both the wet and dry crops fared well during the year.

Items 1 to 5—Occasional remissions.—The decrease against items 1 (shavi or loss of produce), 3 (submerged or inundated), 4 (tirvakammi), 5 (fasalkammi or second crop not cultivated) is due to the favourable character of the season in fasli 1310, while that of the previous year was extremely unfavourable.

The remissions under “submerged or inundated” and “fasalkammi” were due to the floods in July and August 1900. The sum of Rs. 876 shown under the former head in Tanjore represents one-third of the assessment on registered double crop land, the crops on which were lost by the floods and relates chiefly to the villages of Sathanur (Rs. 218) and Maruvur (Rs. 636) referred to in Board’s Proceedings No. 182, dated 21st June 1899: while the sum of Rs. 832 shown against Tirutturaippundi relates to two villages in the Talanayar range wherein crops were similarly lost. The amount shown under “fasalkammi” represents the second crop charge on registered single crop lands, the first crop on which was lost by floods.

Extract from the Jamabandi Report—Fasli 1311 (1901-02).

Season and rainfall.—The total rainfall in the district during the year averaged 46.19 inches against 49.54 inches in the previous year and 44.40 inches, the average of the 30 years ending 31st December 1899. The rainfall in the south-west monsoon was somewhat less than that of the preceding year, though in excess of the average of the 30 years ending December 1899. The rainfall during the north-east monsoon was also slightly less than that of the previous year, though it exceeded the 30 years’ average to an inappreciable extent. The year commenced with a poor rainfall in the months of April, May and June. There were some breaches in the month of July 1901 in the Cauvery near Kumbakonam and in some of the minor rivers and branches owing to high floods, but they were soon closed and there was not much loss or damage as the floods soon subsided. Both the wet and dry crops fared well during the year.

Extract from the Jamabandi Report—Fasli 1312 (1902-03).

Season and rainfall.—The total rainfall in this district during the year averaged 49.86 inches against 46.19 in the previous year and 44.40 which is the average of the 30 years ending December 1899. The rainfall in the south-west monsoon was less than that of the previous year and the 30 years’ averages during the north-east monsoon, however, the rainfall was greatly in excess both of that of the previous year and of the average of 30 years. There were in consequence heavy floods in rivers in October resulting in loss of crops in consequence of which remissions were found necessary. Excepting these cases, the wet and dry crops generally fared well during the year.

Waste remitted and waste charged.—The extent of land left waste the assessment on which was remitted during the year was 294 acres bearing an assessment of Rs. 1,243 in Mayavaram, Shiyali and Nannilam and Tirutturaippundi taluks against 182 acres assessed at Rs. 820 in the Shiyali taluk in the previous year.

The increase is due to floods, etc., necessitating the grant of remission on this account.

Occasional remissions—

	RS.
(1) Shavi or loss of produce	88
(2) Short crop	Nil
(3) Submerged or inundated	3,206

There were floods in the year in consequence of which crops suffered necessitating the grant of remissions.

Extract from the Jamabandi Report—Fasli 1313 (1903-04).

Paragraph 2.—The total rainfall in the district during the year averaged 58.61 inches against 53.77 in the previous year and 44.40 which is the average of the 30 years ending December 1899. The rainfall in the south-west monsoon was greater than that of the previous year. During the north-east monsoon the rainfall was slightly less than that of last year but slightly greater than the average for 30 years. Owing to abnormally heavy rains in December, there were heavy floods resulting in loss of crops necessitating grant of remissions.

Paragraphs 6 and 7.—The percentage of the extent cultivated to the total holdings was less than in the previous year in all the taluks. The chief reason for the decrease is the late freshes and heavy untimely rain referred to *supra*.

Waste remitted and charged.—The extent of land left waste the assessment on which was remitted during the year, was 2,424 acres bearing an assessment of Rs. 10,092 in all the taluks except Tanjore, Nannilam and Pattukkottai against 294 acres assessed at Rs. 1,243 in the previous year. The increase is due to floods.

	RS.
Shavi	883
Short crop	45
Submerged or inundated	10,373
	<u>11,301</u>

Paragraph 9.—There is a marked increase against items 1 to 3 under occasional remissions which is due to crops having suffered by floods.

Extract from the Jamabandi Report—Fasli 1314 (1904-05).

The rainfall in the district during the year averaged 57.36 inches against 58.61 in the previous year and 44.40 which is the average of the 30 years ending December 1900.

Conditions and outturn of crops.—The total extent of cultivation, dry and wet, under first and second crops during fasli 1314 is less when compared with the corresponding figures for fasli 1313. The decrease under all the items except second crop wet is due to the unfavourable character of the season owing to want of rain and the insufficient supply of freshes in the rivers in the latter part of the cultivation season.

Waste remitted.—The extent of land left waste, the assessment on which was remitted during the year, was 8,337 acres bearing an assessment of Rs. 34,642 in all the taluks except Mayavaram, against 2,424 acres assessed at Rs. 10,092 in the previous year. The increase is due to drought.

Remissions.—The increase occurs only against item 1 (shavi) which is due to severe drought during the latter part of the season.

Extract from the Jamabandi Report—Fasli 1315 (1905-06).

Paragraph 2—Rainfall.—The aggregate rainfall of the period under report (35.6 inches) was greater than that recorded in the previous year (28.5 inches), the excess being particularly marked in the months of October, November and January; on the other hand there was a noteworthy deficiency in July and in December. The variations gave rise to the distinctive features of the year, viz.—

- (i) the late commencement of wet cultivation (first crop),
- (ii) a certain amount of damage from excessive rain to the “kar” and “kuruvai” crops harvested in October, and

(iii) widespread apprehensions of crop-failure owing to the exceptional drought in December which continued until about the 20th January, when abnormal rains saved the situation, changing short-crops to full outturn and preventing absolute failure except in very limited areas.

The taluks which suffered most were Pattukkottai and Tanjore (southern portion), but the extent of damage attributable to deficient or rather unseasonable rainfall throughout the district was inconsiderable, and the season may fairly be characterised as not unfavourable.

Extract from the Jamabandi Report—Fasli 1316 (1906-07).

Paragraph 2—Character of the season.—The rainfall was scanty during June and July; but this deficiency was more than made good by the heavy showers of August. Rain was scanty again in September. The total rainfall during the south-west monsoon however nearly approached the average. Freshes arrived later than usual. The result was that the sowing of paddy was retarded, resulting in considerable decrease in the total area in that crop. The rains of October were somewhat more than normal. The fall was abnormal in November (especially in the latter portion) being nearly double the average. This state of things continued with slight intermittance during the first part of December. The eastern and south-eastern portion of the district suffered in consequence from numerous floods and breaches. The deficiency in the area of wet cultivation in the preceding season was in no way nearly made up by the very large increase during this season, but a large proportion of the immature crops perished or yielded only a nominal outturn. The area under second crop wet was also diminished. The heavy rains were however most welcome in the dry portions of the district. All the rain-fed tanks received a full supply, with the result of a noticeable increase under dry cultivation in first and second crop. The rest of the year was normal and calls for no special remarks. The season may, on the whole, be characterised as not unfavourable. Had the rains of November not been quite as heavy, the year would have been an exceptionally good one. No calamity of any importance occurred during the year.

Paragraph 8 (a).—Waste remitted and waste charged.—As the breaches occurred as early as November, there was time for the ryots to cultivate their lands subsequently. As a rule remission for waste was not granted unless it was clear that the land was left waste for causes beyond the ryots' control. The subsequent recultivation resulted in an appreciable decrease in the extent of waste remission.

Extract from the Jamabandi Report—Fasli 1317 (1907-08).

Paragraph 2—Character of the season.—The rainfall was scanty during the months of June, July and August; in September it approached the average. The total rainfall during the south-west monsoon was less than the average by 3.62 inches. This was made good by the timely arrival of freshes. The sowing of paddy was commenced in time in all the deltaic taluks and an increased extent was brought under wet cultivation during the south-west monsoon as compared with the previous year. In October and November, the rains were somewhat above the average, but fell off again in December. The general effect was to retard the progress of wet cultivation in non-deltaic tracts. In Pattukkottai taluk the crops sustained serious damage from failure of rains, and remission had to be granted in consequence to the extent of Rs. 17,957. Taking the district as a whole, the season may be characterised as favourable.

Paragraph 9—Remissions.—Remissions amounting to Rs. 75,928 were granted on account of occasional and fixed remissions during the fasli against Rs. 1,02,413 in the previous fasli. Details of the net decrease of Rs. 26,485 will be found in statement No. 4. The bulk of the season remissions appertains to the Pattukkottai taluk, where a remission of Rs. 14,524 was granted on account of shavi. On the other hand, there was practically no remission on account of floods.

Extract from the Jamabandi Report—Fasli 1318 (1908-09).

Character of the season.—The rainfall was inadequate during July and August but was above the average in September. The rainfall during the south-west monsoon was, on the whole, less than the average for the period. The freshes in the rivers were a month late. In consequence of this there was an appreciable decrease in the extent of wet cultivation during the south-west monsoon as compared with the previous year. In October, the rainfall was much above the average, but fell off again in November and December. The general result was that the wet cultivation was retarded and crops more or less damaged. Remission of land revenue was granted to the extent of Rs. 24,040-10-0 in Shiyali, Mayavaram, Nannilam, Negapatam, Tanjore and Pattukkottai taluks. Taking the district as a whole the season must be considered to have been unfavourable. No calamity of any importance occurred during the year.

Taking the district as a whole the extent cultivated was somewhat smaller than in the previous fasli. This may be attributed to the absence of timely rains and to late freshes.

The bulk of the season remissions appertains to Mayavaram and Shiyali taluks. Remission on account of shavi was less than in the previous year but the amount of flood remissions was larger. The district as a whole suffered from scanty rainfall in July, August, November and December, but the Mayavaram and Shiyali taluks suffered from excessive rains in September and October.

Extract from the Jamabandi Report—Fasli 1319 (1909-10).

Character of the season.—The rainfall was inadequate in July, but was above the average in August and September 1909. The rainfall during the south-west monsoon was sufficient and the freshes were received early in the rivers. In consequence, there was increase in the extent of cultivation during that period compared with that corresponding in the previous year. The north-east monsoon was a failure and this accounts for the decrease in the first and second crop under dry cultivation. There was, however, an increase in the extent of cultivation under first and second crop under wet, owing to freshes having continued to flow in the rivers sufficient to encourage the sowing of short crops, but these suffered badly from insufficiency of water and in consequence, the remission of land revenue to the extent of Rs. 71,318 was granted. Taking the district as a whole the season must be considered to have been unfavourable. No calamity of importance occurred during the year.

The extent cultivated in the district showed a small decrease comprised of an appreciable decrease in the non-deltaic taluks and Negapatam and a small increase in the other taluks, the result of short rainfall especially in the north-east monsoon. The season may be described as favourable in the deltaic tracts and a little less than favourable in the rest of the district.

The bulk of the season remissions appertains to Tanjore, Pattukkottai (dry) and Mayavaram (deltaic) taluks. Remission on account of shavi was much greater than in the previous year, but the amount of flood remission was less. The results are explained by the scanty rainfall from October 1909 to January 1910 and the excess of water due to untimely rain and want of drainage facilities in the taluks of Shiyali and Negapatam.

Exhibit Ma. 21.

Note on the stage of flow required to give full supply to the Madras Cauvery channels above the Upper Anicut.

This note is a rejoinder to the Mysore note, dated 28th January 1914 (My.-15) of which a copy was received by the Madras Government on 29th January 1914.

2. It is not practicable to transform stage of flow at the various channel heads to a corresponding stage at the Upper Anicut, but it is possible to draw reasonable assumptions from the diagrams Ma.-18-a, b and c. On these diagrams two lines are drawn showing what is considered fair representation of the limits of flow and high stage of gauge reading at the Upper Anicut corresponding to each stage of river flow at the point of off-take.

It is claimed that the lower of these two lines in combination with the height of the head sluice upper gauge which can give full supply fairly shows the limit stage below which impounding will deprive these channels of useful supply. This stage is shown below :—

	Acres	Full supply in front, feet.	Stage at Upper Anicut C.T. gauge.
For Pugalore channel	2,400	5.15	5.9
For Marudur Nattu voikal	6,500	4.90	6.5
For Wyyacondan	26,000	5.75	6.5

The claim now made is that a stage of 6½ feet is required to give full supply to the upper channels.

3. It will be noticed there are isolated readings below the lower line. These may be explained as possibly on some occasions due to errors, but generally they are considered due to the fact that the leading channels between the river and the sluices (except Pugalore sluice) are long, about half mile in the case of Marudur channel and over one mile in the case of Wyyacondan channel. All the channels run across the drainage of the country and take in cross-drainage. Thus it not infrequently happens that the channels have nearly full supply from that source and that the sluices are regulated only to admit a portion of the full supply. Under such conditions the surface fall of the water in the leading channel would be materially reduced and therefore a higher front gauge reading would be realised than would be possible under normal conditions in which all the supply has to be passed in from the Cauvery.

The Marudur Nattu voikal is a channel which especially is liable to inflow of water from local cross-drainage. In such times the head sluice would be either altogether closed or nearly so and the specially numerous discrepant low gauge readings of the diagram of this channel may be attributed to this cause. Under this explanation it is claimed the lower lines in the diagrams fairly represent the true limit.

W. M. ELLIS, Col., R.E.,
Madras Representative.

2nd February 1914.

Exhibit Ma.-22.

MADRAS THIRD REJOINDER TO MYSORE REPLY My.-12.

PART XI.—LEGAL ARGUMENTS.

1. Much as the Madras Government would prefer to avoid saying anything by way of retort they are unable to leave unchallenged the suggestion in paragraphs 1 to 7 of My.-12 of "changes of position primarily on the part of Madras." Such allegations, unless clearly well founded and substantially correct can serve no useful purpose, but it takes up a regrettable amount of time and space to expose them so as to correct erroneous impressions they are calculated to leave. But for the lengthiness and number of the pleadings and memoranda, this Government would have gladly left them to speak for themselves.

(a) The first statement in paragraph 2 of My.-12 is that *after much discussion* it was *conceded by Madras* that it would be sufficient to determine the rights of Madras as legally acquired and actually existing in 1910. This is far from correct. The Madras Government never controverted the proposition; it is the Darbar that at one stage put forward a suggestion inconsistent with it. As was explained in paragraph 3 of Ma.-3 (see also Ma.-1-d), the earlier correspondence on the part of both the States was confined to the quantity of water which Madras required *under the conditions existing in 1910*; and even when suggesting the draft terms of reference as late as the 4th July 1913, the issue proposed by this Government was "what is the quantity of water to which Madras is entitled for 'requirements of existing irrigation'" (see My.-1-a, paragraph 6). The basis of "calculation of prescriptive rights" was not adverted to and much less disputed; and it is much in the same spirit that in the first Madras statement (Ma.-1) this Government contented themselves with putting forward their proposals (*vide* Ma.-1, paragraph II). It will also appear from My.-1-a, that it was the first issue proposed by the Darbar (about the end of June 1913) that sought to fix the rights of Madras to what they were *when the agreement of 1892 was made* (and not, as they would now have it, to what they were in 1910 on the basis of the agreement of 1892) and Madras took exception to this limitation in their telegram to the Resident, dated 4th July 1913 (*vide* paragraph 6, My.-1-a). From paragraphs 4 to 8 of Ma.-1-d, it will be seen that even on the 21st of July 1913, the Madras representative continued under the impression that Mysore sought to define Madras rights by what they were in 1892, whereas his own contention was that according to the agreement Madras would be entitled to *those existing at the date of dispute*, Madras had thus invariably and all along based their claim on the agreement of 1892 on the footing that their rights under the agreement were those which they were exercising in 1910. It is only in My.-1-a that the Darbar took exception to Madras referring to *existing irrigation* and stated that Madras were only entitled to such rights as are given to them by the agreement of 1892, and in My.-1 the Darbar defined these rights as those actually exercised by Madras about the year 1890 and continuously enjoyed thereafter till 1910. Though My.-1-a is dated 12th July 1913, it was put in before the arbitrator only on the 21st July, *i.e.*, some days after Ma.-1 had been put in and even after Ma.-1-d. Madras *unhesitatingly* accepted the view that they are entitled to the quantity they had a prescriptive right to in 1910 (*vide* Ma.-3) and thence forward the only difference (as pointed out by the arbitrator himself) was as to the *extent* of such right. Even in Ma.-1-d, the Madras representative had stated that if new proposals should be put forward by Mysore, the Madras rejoinder "may take the form of an alternative statement of our demands." This is what was done in Ma.-3, in answering paragraphs 3 and 4 of My.-1.

(b) Paragraph 2 also refers to an alleged concession supposed to be wrung from Madras that under the agreement of 1892 Madras could acquire a right by prescription "only to what they have been utilizing for *irrigation*" and reference is made to Ma.-1 (evidently Ma.-7), paragraph 32 and Ma.-14, paragraph 12. This, again, is not correct. The position accepted by Madras is that their prescriptive right is measured by the accustomed flow restricted by the limit of *user* of the water. This certainly had not to be extorted from Madras as a concession "after much argument," as is evident from the very fact that their claim throughout has been to a *limit flow* based on their requirements and past user. The user by Madras has been for purposes connected with irrigation and that is accordingly the user on which their claim is founded; but Madras have all along maintained that in determining the extent of the prescriptive user in the past, the user

to be taken account of covers not merely the water actually put on the fields, but also the water used for purposes incidental to irrigation, such as scouring, raising the level of the water in the stream, etc. In respect of these questions, there has never been any "change of position" on the part of Madras.

(c) Paragraph 3 would seem to have been put in only for want of a better argument and the assumption that Madras was ignorant of the pleadings in the case is purely gratuitous. A perusal of paragraphs 3 to 12 of Ma.-7 ought to convince one that the "indefiniteness" of the first issue is adverted to in paragraph 3 not as an "objection" but to explain the endeavour in the subsequent paragraphs to deal with the several points which (so far as one could gather from the pleadings and other materials) may be considered to fall under the general language of the issue. Paragraphs 4 and 5 merely eliminate certain questions. Paragraph 7 deals with the application of the words "fair and reasonable" in rule III of the agreement; paragraphs 8 to 10 with the bearing of Sir K. Seshadri Ayyar's memoranda of 1890 and 1899; and paragraphs 11 and 12 with the "law of prescription" likely to have been contemplated by the agreement. The question had to be dealt with in this somewhat hypothetical form, because there was nothing on record to indicate with any precision what were all the questions intended to be brought in under the head of "interpretation." No such issue had been put forward in any of the draft terms of reference suggested by Madras or Mysore or by the Government of India. On the 7th August 1913, the Madras representative expressly raised the question of making the first issue more specific, but the Arbitrator seems to have thought it unnecessary and made the suggestion (referred to in paragraph 8 of Ma.-7) that it should be understood in the light of the memorandum attached to My.-2 and the arguments directed to the points raised in that memorandum. This made the issue very comprehensive. In any court of law, these memoranda (of Sir K. Seshadri Ayyar) would have been ruled out as irrelevant to the question of "construction"; but in view of the position then taken up by Mysore and the suggestion of the Arbitrator, the theories and hypotheses put forward by Sir K. Seshadri Ayyar had to be dealt with in Ma.-7. As pointed out in paragraph 13 of Ma.-7, Mysore had not altogether abandoned these views in framing their pleadings. They also thought fit to make allegations of "one-sidedness" against the agreement and a suggestion of "pressure" by the Government of India in bringing it about. Even during the course of these proceedings the Mysore representative desired the Arbitrator to express his opinion on the merits of the agreement. The Madras Government were thus compelled to examine the question in all its possible aspects to show the untenability of Sir K. Seshadri Ayyar's theories and to disprove the allegations of one-sidedness. It was after that memorandum (whether it was on account of it or not, it is unnecessary to enquire) that the Darbar came forward with a statement in My.-6 that "Mysore do not rely on any unlimited natural right at all in this particular case (paragraph 10; the italics are ours) and the allegation of "one-sidedness" in the agreement was no longer adverted to. It thus becomes unnecessary for Madras to dwell any further on the question of the precise scope of the first issue. It is however worth noting that in spite of the disclaimer of "natural rights" in paragraph 10 of My.-6, the Darbar still cling to Sir Seshadri Ayyar's theories when they observe (in paragraph 3 of the same) that his memorandum of 1890 with the forwarding letter to the Resident, etc., presents a very complete and cogent exposition of the agreement of 1892 and . . . the opinions . . . cannot but be entitled to great weight at the hands of the Arbitration Committee, etc.

(d) The arguments on the question of "permissive user" and "joint possession" were necessitated by the reference to these in Sir K. Seshadri Ayyar's memorandum.

(e) The suggestion in paragraph 5 that Madras at first objected to the form of issue 2 (a) and that the objection was given up later on, is clearly erroneous. It will be noticed that paragraph 6 of Ma.-7 occurs in the course of the discussion of the scope of the first issue. The second sentence of the paragraph expressly admits the relevancy and propriety of the question raised by the second issue. The point sought to be maintained in that paragraph is that Mysore are not right in the construction of paragraphs 3 and 4 of the agreement suggested by them in paragraph 16 of My.-1 and the corresponding paragraph of My.-4. The Madras Government have not changed their position in this respect, but, as stated already, the question originally came up under issue 1 and as there has been no subsequent discussion of that issue and the Darbar did not think fit to pursue this particular point any further, the question has not been since adverted to.

(f) The allegation in paragraph 6 is a like incorrect and misleading. It mixes up two questions raised by Madras and on neither of them have Madras ever changed their position. As stated already, Madras did maintain and still continue to maintain that it is not the function of the Arbitrator "to devise a method" for the best utilisation of the water, but to decide on particular proposals of the Darbar. As to the introduction of the element of "fair and reasonable" in deciding the question of the extent of Madras prescriptive rights, it is amusing to find that the Darbar state that the "challenge was practically dropped." The Mysore argument which is imagined to have led to this result is that contained in paragraph 9 of My.-6, and the Madras reply to it will be found in Ma.-11, paragraph 4. It will be seen that far from showing any intention to give up the original

argument, this paragraph in the Madras reply asserts again that the element of "fair and reasonable" cannot be introduced into the consideration of the question of the extent of the prescriptive right (whether on the point of fact or on the point of law). The Darbar make a point of the fact that an argument is not repeated over and over again in every memorandum. For obvious reasons, it was considered unnecessary merely to repeat an argument in the old form, i.e., unless there was anything new to add or to reply to. But there never has been any doubt or ambiguity as to the position taken. In paragraph 23 of Ma.-14, the words occurring are "the arguments derived by Mysore for this purpose from the words "fair and reasonable" in clause 3 of the agreement is a perversion of the provision, etc. To any lawyer the proposition that a prescriptive right is to be measured with reference to an imaginary standard of fairness cannot but sound strange. As already pointed out, the words "fair and reasonable" can properly be held to refer not to the ascertainment of the extent of the right, but only to the mode in which the enjoyment of the rights so ascertained is to be secured." One cannot be expected to use stronger language than this to re-assert the original contention of Madras and it passes one's comprehension to understand how the Darbar construe this as a change of position, or as dropping the challenge, and in fact practically admitting their contention.

(g) As to the allegations in paragraph 7, the reasons which necessitated the discussion of the doctrines of international law and the law of riparian rights in Ma.-7 have been set forth under head (c) above. It is surely ridiculous to suggest that the law of prescription was almost entirely disregarded in Ma.-7, and that Mysore had to come to the rescue by drawing attention pointedly to this error. The question of the law of prescription and of the extent of the prescriptive rights of Madras is dealt with at length in paragraphs 18 to 36 of Ma.-7 and some of the Mysore objections to the extent of the Madras claim are dealt with in paragraphs 37 to 46 of Ma.-7. Of course the Darbar cannot expect the Madras arguments to be just what the former wish or just what would suit them; and the only answer that the Darbar thought fit to make to the Madras arguments on the question of the law of prescription was that contained in paragraphs 10, 11 and 17 of My.-6. These may best be left to speak for themselves. Paragraph 12 of My.-6 dealt with a proposition never disputed by Madras and paragraph 13 contained no arguments. Paragraph 15 sought to bring in some arguments from the law of easements, such as, loss by abandonment, cessation of necessity, fulfilment of purpose and aggravation of the burden, etc.,—questions unconnected with "prescription" (though of course they may be said to be relevant in connection with the expression "actually existing" in rule III of the agreement). Madras naturally could not but point out in paragraph 7 of Ma.-11 that the Mysore argument on the application of the law of prescription took no notice whatever of the numerous authorities cited in the Madras memorandum and that they were not disposed of merely by saying that they related to the usage of other countries. The arguments drawn by Mysore from the law of easements were examined and criticised at length in paragraphs 10 to 13 of Ma.-11. The answer of the Darbar to this is given in the second half of paragraph 4 of My.-9 and in Appendix Q they submitted a note purporting to show that the authorities cited by Madras have little or no bearing on the points in dispute. The soundness of the comments in appendix Q, My.-9, is discussed in paragraphs 15 and 16 of Ma.-14. As to the law of easements, the Darbar contented themselves with stating that they referred to it only as furnishing the nearest analogy. They took no note of the Madras argument that even on the footing of the applicability of the ordinary law of easements, their contentions were untenable (see also paragraph 21 of Ma.-14). In My.-12 the Darbar make the complaisant assumption that "Madras have said nothing to invalidate the pleas" of Mysore based on the analogy of the Law of easements (paragraph 26). With these observations, Madras would leave it to the Arbitrator to judge which side has ignored, and found it convenient to ignore, the law of prescription.

The above rough summary of the course of the pleadings is, it is submitted, sufficient completely to disprove the allegation of "changes of position" on the part of Madras and the suggestion of "concessions" forced from them and to show on whom lies the responsibility for changes if any.

2. Coming now to the points which Mysore regard as "still at variance," the first

My.-12, paragraphs 9 and 22 to 24.

question dealt with by them is as to the application of sections 26 and 27 of the Limitation Act. The Darbar contend that this question is of "much practical significance, as it explains why 1890 is taken in this case as the starting point of the prescriptive period and why Mysore urge that the enjoyment of any right claimed by Madras should be found, if the right is to prevail, to have continued to within two years of the suit (My.-12, paragraph 9). As this aspect of the question is also touched on in paragraphs 22 to 24 of My.-12, they may also be conveniently referred to and dealt with here. The Darbar say they cannot understand why Madras should, while agreeing to the calculation of their rights as in the year 1910 on the basis of the agreement of 1892, take exception to the proposition that the Madras right is confined to what can be shown to have been uninterruptedly enjoyed for 20 years since 1890. But for this statement of the Darbar, one would have

thought that the point had been made sufficiently clear in every successive memorandum submitted on behalf of Madras. The Madras argument on the question consists of the following steps:—

(i) Sections 26 and 27 of the Limitation Act are *statutory* provisions and it is not the ordinary course when two *States* enter into an agreement, to apply to the same, the provisions of a statute which necessarily applies only to *subjects*; and in this particular case, it would be all the more so, as it is not *necessary* to refer to any statute, for the general principles of prescription have long been known and recognised apart from any statute. This argument urged in Ma.-7, paragraph 12, was not answered by Mysore (paragraph 7 of My.-9 does not relate to this) and therefore was not repeated in Ma.-11.

(ii) Further, the rules laid down in sections 26 and 27 of the Limitation Act cannot appropriately be applied here, because there is no "suit" and the condition that the enjoyment must be continued to within two years next before the institution of the suit cannot be complied with (Ma.-7, paragraph 20). This argument was not even adverted to in My.-6 and though Madras re-affirmed their position in Ma. 11 (paragraph 5) the Darbar contended themselves in My.-9 with stating that it would be "proper" to presume that sections 26 and 27 were present before the minds of the parties and in their own way added, "This view is practically conceded". Where it is conceded, one cannot find, unless a denial means an admission. This argument is, however, now adverted to in paragraph 23 of My.-12 where on the authority of "standard dictionaries" it is suggested that for the purpose of applying section 26 here "suit must be taken to mean dispute". Even the man in the street knows that a *suit* is different from a *dispute*. A dispute may have lasted for years and years before it culminates in a suit. The Limitation Act refers to the date of "the institution of the suit" as a specific and definite point of time; and the most essential requisite of a statutory rule is that its application should be *certain*. Which date are we to regard as the date of "institution" here? Surely not the mere commencement of the differences between Mysore and Madras; and the impropriety of regarding the commencement of Arbitration proceedings as the "institution of suit" has been referred to as early as in Ma.-7 (paragraph 20). Mysore have urged nothing in answer to that.

(iii) It was stated in the Madras arguments that the question of the particular rule applicable was not of much practical consequence, because except for this arbitrary limit of "two years within suit" there was no difference in substance between the rule of common law prescription and the rule enunciated by statute, and in this case, it is not alleged that anything particular had happened within two years before dispute. The changes in the Madras user which the Darbar relied on had taken place in the years 1898—1901 and their effect on Madras rights (whatever it be) would be the same whether the one rule or the other applied. The Darbar now say they lay stress on the point because, according to them, on it will depend the further question whether or not 1890 is to be regarded as the starting point for the calculation of Madras rights. It is shown in the next paragraph that even for this purpose it can make no difference.

(iv) As to the method of fixing the time with reference to which the *prescriptive* user is to be considered the Madras argument was set forth at length in Ma.-7, paragraphs 22 to 25. It is in essence this—that the rights saved by the agreement in favour of Madras are not merely rights acquired *during the 20 years before dispute*, but rights acquired *at any time even prior thereto provided they are "actually existing" at the date of dispute*. As the Darbar plead inability to understand this proposition, let us see if there is any real difficulty in understanding it. The saving expression in rule III of the agreement is "*prescriptive right already acquired and actually existing*." Surely this does not mean *only* the rights acquired during the last 20 years. No doubt *at least* 20 years' user is necessary to give a prescriptive right. But a right may have been enjoyed for 50 years before dispute and it cannot be said that it is only the user of the last 20 years that gives the right. Applying this here, the right of Madras in 1910 are not necessarily *only* those acquired by the user between 1890 and 1910. They may as well be the rights *existing in* 1890, provided they have not been *lost* since. That is why Madras object to regarding 1890 as the *starting point* for acquisition of rights by Madras. Madras say, "we had certain rights in 1890 (by the user of several decades prior thereto), we have not got to acquire them anew. Where then does section 26 of the Limitation Act come in and why should we calculate any *new period of twenty years after 1890*. If we claim any new rights, then of course we must show the exercise of such new rights for a period of twenty years, but no such right is claimed." The further step in the Madras argument is "there were these prescriptive rights even in 1890, and we are entitled to them under the agreement". Mysore reply, "No, you may have had those rights in 1890; but you cannot have them now under the agreement unless those rights are *"actually existing"*". Madras rejoin, "Yes, those rights are actually existing; because we have never given them up or lost them, but, on the other hand, are doing everything in our power to make the best use of them". It is hoped that the above analysis will show that there is no mystery or difficulty about the Madras argument on this point. The real question in the case, as will be seen from the above, is *not* whether Madras had acquired a right after 1890, but whether

the long existing rights of Madras (acquired, say, by the user between 1830 and 1890) of which the parties to the agreement were fully cognisant, can be said to be no longer "actually existing" by reason of anything that has happened in recent years. Mysore admit even in My.-12 (paragraph 24) that the agreement does not wipe out all previous rights actually earned by Madras and say, "but in order that they should be recognised as actually existing when the dispute arose, the necessary proofs should be adduced by Madras. Take this to be so, but that is not the same thing as *acquiring* a right by twenty years user after 1890. Then why hark back to section 26 of the Limitation Act and the user for twenty years *after* 1890. The reason is not far to seek. The Darbar contend that the improvements effected by Madras in the Upper anicut in 1899—1902 have in effect reduced the rights of Madras (in the sense of the quantity of water that Madras can claim). In the attempt to substantiate this contention, Mysore cannot naturally be content merely to urge that such improvements work a "cessation" of prior rights within the meaning of the agreement. One would find it hard to accept the contention that one spends money on improvements for the pleasure of having one's rights cut down as a consequence. It, therefore, suits them better to argue that the rights of Madras can be regarded as acquired only by the *continuous* user of the last twenty years—they know there has been a change in the Madras user in the middle of this period. It is in this connection that reference was made on behalf of Madras to the decision of the Judicial Committee in Commissioners of French Hock v. Hugo (L.R., 10 Appeal cases 336), as laying down that a change in the user may be sufficient to *prevent the acquisition* of a right by prescription but *not to work a loss or cessation of a prescriptive right already acquired* (vide Ma.-7, paragraph 25, and Ma.-14, paragraph 16). The Darbar sought to distinguish that case in appendix Q, My.-9, to their memorandum. The distinction suggested has been examined in paragraph 16 of Ma. 14 where it is shown that it only rests on the assumption that the present is a case of *acquisition by user within the last twenty years*. It is submitted that this contention of Mysore has been amply refuted.

3. It is in view of this aspect of the case urged by Madras, viz., that they had long ago acquired a prescriptive right to all the water that is now claimed, that Mysore put forward two arguments—

(a) That even before the alterations in the Upper anicut Madras had *not* acquired a right to as much water as they now claim, and

(b) that in respect of a certain portion of the water that Madras was then entitled to, namely, one foot over the Upper anicut the right must now be held to have *ceased* in consequence of the improvements in the Upper anicut effected 1898—1901.

It is in connection with the second of these arguments (b) that the Darbar raised the question (i) of *abandonment* of that portion of the water by Madras, (ii) *loss* of the right to the same by non-user, and (iii) *cessation* of the right by virtue of the cessation of the necessity therefor (treating it as an easement of necessity). There has never been any misapprehension on the part of Madras as to these contentions. The Madras answer to them was—

(i) that abandonment is a question of "intention" and the facts and circumstances connected with the improvements in the Upper anicut do not warrant the inference of an intention on the part of Madras to *abandon* pre-existing rights.

(ii) that there has been a variation in the manner of user and *no non-user* of the right in the only sense of that term known to law, viz., the *absolute disuse* which alone under the law will *extinguish* an existing right and even assuming non-user, the extinction can happen only if the "non-user" continues for the prescriptive period, i.e., 20 years according to Mysore.

(iii) that the rule of cessation of necessity cannot be pressed into service here: because, this is not the case of an "easement of necessity"—to which *alone* that rule applies—and there is no analogy between the reasons underlying that rule and the circumstances of the present case. The argument in support of these answers are set out in Ma.-7—paragraphs 21, 25, 26, 27 to 29, 44, 45, in Ma.-11—paragraphs 6, 11 to 13, and in Ma.-14—paragraphs 19 to 22, and it is needless to recapitulate them here. But before leaving this question, it is necessary to add a few remarks on the Darbar's observations in this connection in My.-12, paragraph 17. In the second part of paragraph 17, it is urged by Mysore that "even assuming for the sake of argument that Madras had earned a prescriptive right to seven feet flow in the Akhanda Cauvery prior to the remodelling it is inadmissible under section 26 of the Limitation Act as the enjoyment of the right in that manner has ceased from the date of the remodelling of the anicut." This is a fair sample of their argument on this question. The fallacy underlying it can be shown in a moment. *Ex-hypothesi* a prescriptive right to seven feet flow had been acquired by Madras prior to the remodelling. What then has section 26 of the Limitation Act to do? The Darbar may urge (and evidently this is what they intend) that the right has since been lost; but section 26 does not provide for the *loss* of the right, so why drag it in? Again, what if the enjoyment of the right *in that manner* (the italics are ours) has ceased? If we enjoy the right *in a different manner*, that cannot take away our rights. This has been the burden

of the whole argument. Now, look at the next sentence: "The right asserted underwent both physically and legally a radical change in consequence of the remodelling and also of the nature of the user that followed it". There can be no physical change in the right. The change was in the manner of the enjoyment. It is said that after the remodelling a limit flow of seven feet at the Cauvery dam is secured without necessitating at the same time any overflow at the Upper anicut. What of that? The right of Madras should be measured *not* with reference to their distribution arrangements (as between the right branch and the left branch) which must necessarily vary from time to time, but in terms of the required depth of flow in the main river (*i.e.* the Akhanda Cauvery) and it is as an index to this that the seven feet depth at the Upper anicut is constantly referred to. If this is borne in mind, the argument based on the remodelling of the anicut and its effect on the distribution of water between the right branch (Cauvery) and the left branch (Coleroon) or on the regulation of the flow in the right branch (*i.e.*, over the Cauvery dam) can have no force. It is in view of this difficulty that the Darbar deny that Madras ever had a prescriptive right to a seven feet flow in the Akhanda Cauvery. This is question (a) *supra*.

4. In a sense the point covered by question (a) is the most material. On this, the Madras claim (as already stated) is that for irrigation below the point of bifurcation of the Akhanda Cauvery this Government is by prescriptive right entitled to a limit flow of seven feet in the Akhanda Cauvery (as measured at the Upper anicut). The Darbar dispute this claim on the following grounds:—

(i) That as a matter of fact Madras have not for the prescriptive period used seven feet water even over the Cauvery dam and cannot therefore be said to have enjoyed seven feet flow in the Akhanda Cauvery.

(ii) That even if it be found that Madras have used seven feet over the Cauvery dam, this would give a right only to *seven feet over the Cauvery dam* and not to seven feet in the Akhanda Cauvery, because the portion of such water not flowing over the Cauvery dam has not been used by Madras but merely surplussed or wasted over the Upper anicut.

(iii) That in any event such use as Madras might have made of the seventh foot of water has not been for the purposes of irrigation and therefore cannot create a prescriptive right in favour of Madras, within the meaning of the agreement.

(iv) That, whatever may be the depth of flow required or used by Madras, the extent of Madras rights should be measured chiefly with reference to the *acreage of irrigation* in the past.

(v) That in some seasons or months of the year, Madras could not have had or could not have used so much as seven feet flow.

These arguments have been examined fully on former occasions and it is necessary here to do little more than to state the Madras answers to them and to give references to those portions of the Madras memoranda where they are found. A few comments may then be added on the remarks in My.-12:—

(i) In answer to the first of the above contentions it is hardly necessary to state that the whole Madras case rests on the claim that a seven feet flow in the Akhanda Cauvery has been prescriptively enjoyed by Madras. The facts necessary to establish this have been set forth in the "facts" portion (so to say) of each memorandum and it is for the Arbitration Committee to find what they establish. But in determining the effect of these facts, it must be remembered, as stated in the authorities referred to in paragraphs 32, 34 and 35 of Ma.-7 that the "extent of user" which in the eye of the law they are held to establish is not merely that shown by the *actual use* but that shown by the *extent of claim* and the *intention* which accompany the same. It is this principle which is constantly ignored by Mysore. The Madras case is that they have all along claimed to use a seven feet flow in the Akhanda Cauvery and have all along worked up to it and it is in the light of that circumstance that the *actual user* must be taken into account when deciding the extent of "prescriptive use" shown by Madras.

(ii) The second argument of Mysore above noted is that set forth in paragraph 10 of My.-9 and in a slightly different form in paragraph 20. As shown in paragraphs 10, 11 and 12 of Ma.-14 this distinction between the flow over the Cauvery dam and the flow in the Akhanda Cauvery has no foundation in legal principle. Where a claim has been generally asserted to a particular limit flow in the river, it is opposed to all principle to say that the right thereby acquired is to be measured not with reference to the *general level of the water*, but at a particular point where the level of the water has been artificially raised by our own works and it is all the more so when the proposal is to measure the right not by the flow in the *main river* but by the level to which the water has (by artificial means) been brought up in one of the *branches*. Madras deny that the flow into the Coleroon was altogether a mere waste. It was used (whatever be the extent of the use) for purposes connected with irrigation and there is no warrant for the Mysore contention that the *extent of Madras rights should be measured not by the usually required flow in the Akhanda Cauvery but by the quantity used under each distributing branch*. In this view, the observations in paragraphs 18 and 19 of My.-12 do not require detailed consideration.

The flow always claimed is a seven feet flow in the Akhanda Cauvery and it is no answer to split it up into six feet flow at one point and a seven feet flow (brought about by Madras works) at another point. It will be strange to hold that the prescriptive right of Madras is to vary with every engineering device by which Madras may succeed in raising the level of water at one part of the river without a corresponding depth at the other side of the stream.

(iii) It is urged that such user as there might have been of the seventh foot of flow or of the flow into the Coleroon was not user for irrigation. One answer to this is that the

agreement does not confine the rights of Madras to the water used for irrigation only. But Madras also contend that the user referred to has been for irrigation. The Darbar say (in paragraph 20 (3) of My.-12) that the Madras arguments are vitiated by the erroneous assumption that "there is no difference between using a flow required *directly* for irrigation and a flow *indirectly* connected with irrigation." Madras do not deny that for some purposes there may be a difference between the two things but they do assert that for the present purpose there is no difference between them. When a "prescriptive rights to use" water for irrigation" is claimed or acquired, it will cover *all purposes connected with irrigation*. The Darbar do not choose to define what they would understand by the expression "purposes of irrigation."

(iv) The next point taken is that the right of Madras is only to take as much water as may now be required to irrigate the *particular acreage* which has been irrigated under

the delta irrigation during the past 20 years. The answer of Madras is that they are entitled to take *as much water* as they have been taking in the past, *i.e.*, the full customary flow of water in the river up to a limit of 7 feet, and it is no concern of Mysore whether that quantity is used to irrigate a smaller acreage or a larger acreage. The question has been fully discussed in Ma.-7, paragraphs 31 to 36 and Ma.-14, paragraphs 13 to 18 and the authorities are conclusive on the point in favour of Madras contention. Paragraph 25 of My.-12 contains nothing new. Nobody suggests that irrigation is to be conceived of *without reference to lands* but the conception does not necessarily involve the notion of a particular acreage. The passages quoted do not deal with the *exact extent* of the right cited in Ma.-14, paragraph 14, itself furnishes the answer.

(v) The question of the absence of non-use of a 7 feet flow in some seasons or months of the year and its effect on the *extent of Madras rights* has been discussed in Ma.-7,

paragraphs 41 and 42. Mysore refer to this aspect in a way in paragraph 21 of My.-12. With reference to this it is sufficient to say that the passage from Doss on Riparian Rights cited in Ma.-14, paragraph 14, itself furnishes the answer.

5. It only remains to say a word on the argument urged by Mysore (My.-12, paragraph 28) with reference to the opinions expressed by Madras officers on certain former

occasions. They say, "it is strange to find Madras contending that the opinions of the Madras officers and even of the Arbitration Committee *regarding the extent of the prescriptive rights* are of no value in this controversy" (the italics are ours). There cannot be a more palpable misstatement of the Madras argument. If the opinion of the "Arbitration Committee" *regarding the extent of the prescriptive rights* is to be of no value here, what else is the Arbitration Committee for? Surely, Madras could never have said anything so absurd. What Madras contended was (i) that the opinions expressed by Madras officers as to *what they thought would be sufficient* allowance for the delta irrigation are beside the present controversy, because we are now concerned with *what has been the actual user*. The difference will be clear on a moment's consideration. The officers referred to were not thinking of the *extent of Madras rights*; they clearly assumed that Madras could take more water and utilise it for irrigation elsewhere. Again, *they did not say that 6 feet or 6½ feet flow was all that was being actually taken by Madras for the delta irrigation*. On the other hand, the very tenor of their reports shows that they found more water being taken for the delta irrigation than they would consider necessary under certain different conditions and hence they went on to suggest that a smaller quantity would under certain circumstances suffice for the delta and that the extra quantity could be *better utilised elsewhere*. It is thus clear that their opinions cannot be reasonably taken into account either on the question of the *extent of Madras rights* or on the question of the *actual quantity of water taken* by Madras for delta irrigation and hence it was contended that these opinions are beside the present controversy. In calculating figures for projects, it will invariably be found that the officers concerned regard the actualities as erring on the side of excess and trying to fix what they consider necessary or sufficient for the existing requirements, proceed to suggest a better use for the extra quantity. How then can the opinion expressed by them throw light on the extent of *actual user*? If such reports do contain such figures of actuals (as distinguished from *opinions as to what would be sufficient*), Madras never objected to the figures being taken into account. It is the *opinions* that have been objected to. In the same way, Madras took exception to the Mysore argument that the opinion of the

Arbitration Committee as to what they would consider *sufficient* should decide the question of the extent of the prescriptive rights. This is merely a different aspect of the Mysore argument on the application of "fair and reasonable". It must be remembered (as is shown by the correspondence printed as Appendix A to the Madras case) that at the time the agreement of 1892 was being negotiated the Madras Government desired that all reference to "law of prescription" should be dropped and the whole matter settled on the basis of "fair and reasonable". It then suited Mysore to insist that this would not do and they urged that it should not be open to Madras to disregard the law of prescription (*vide* letter from Colonel Bowen, R.E., to G.T. Walch, Esq., dated 20th July 1891). This will equally apply to Mysore. The proper construction of rule III, as it now stands, is that the "existence and extent" of Madras rights should be determined in accordance with the law of prescription. Mysore object to this distributive reading of the rule. But that this is its natural construction and that that is how Mysore too read it is shown by the frame of the issues suggested by them before the Arbitration Committee (*vide* the terms attached to My.-1-a). The first issue proposed by them is "what is the quantity of water required . . . for the protection of the Madras Government's prescriptive right, etc., etc." The second is "in what fair and reasonable manner" according to the same agreement should the supply due to Madras be regulated and measured in order to protect the prescriptive rights of Madras." This is just the sense in which Madras say that the agreement should be interpreted. Otherwise it is not possible to see (and in spite of the arguments urged in Ma.-7, paragraph 7, Ma.-11, paragraph 4, Ma.-14, paragraph 23, Mysore have not shown) how any test of "fair and reasonable" is to be fitted into the law of prescription or the enquiry as to past user. The only relevant question for the Committee to consider is what has been the actual depth of flow claimed and taken by Madras in the past at the Akhanda Cauvery above the point of bifurcation.

6. As to the Madras claim to "the hot weather flow" (My.-12, paragraphs 11 to 16), Madras did not suggest that ordinarily the question of prescription would not arise also with reference to it; but in view of the previous correspondence and admissions on the point, it was deemed unnecessary to consider the question with reference to the law of prescription.

Treating of the five phases which, Mysore allege, exhibit successive claims of Madras in the matter of hot weather discharge.

First phase.—Madras dealt quickly and tentatively with the Mysore project proposals, a very early reply having been specially asked by Mysore. Under these proposals the chief feature was the passing at Sivasamudram of a continuous flow all the year round for power of 1,000 cusecs.

In dealing with the matter it was assumed that the passing of this 1,000 cusecs was an integral part of the scheme to be dealt with and treated accordingly. In noting on the matter the year was therefore divided into two parts by the Special Superintending Engineer, viz.—

- (1) The months in which all natural flow up to a certain limit was required for Madras irrigation.
- (2) The months March, April and May in which all natural flow was allowed to be impounded by Mysore.

The Special Superintending Engineer erroneously recorded this as the months in which no irrigation water was required by Madras but this note was made under the assumption that the passing down of 1,000 cusecs steady flow was assured by the Mysore project. In addition to this no irrigation water is required or claimed for the months March to May.

Second phase.—This is quite consistent with the above and with the proposals of the project now before the Arbitrators but instead of 1,000 cusecs Madras have claimed a flow of not less than 900 cusecs in the hot weather to allow a fair working margin (Ma.-3, paragraphs 3 and 4). This claim was made in the belief that this was not a matter of controversy and that the passing of this flow was and is an integral part of the project under adjudication.

Third phase.—(Ma.-4, paragraphs 3 and 4). This was the claim put forward by Madras when Mysore repudiated any intention of guaranteeing this flow past Sivasamudram which forms one of the most important features of their project. In this the Madras Government say that in default of such guarantee they claim the whole "natural flow" of the river subject to the limit of flow at the Cauvery dam which their rules provided for, viz., that due to a seven feet gauge reading.

Fourth phase.—It may be here explained that throughout the proceedings the term "natural flow" has been used to describe the flow which under existing conditions would pass down the Cauvery. Thus "natural flow in the hot weather" and "natural flow minus the supply customarily drawn off the channels by Mysore for hot weather irrigation within their own territory" indicate precisely the same thing, but the latter term is a fuller description. The limit flow "1,000 mills. cubic feet per day (Ma.-10, paragraph 77) was inserted to represent whatever "limit flow" under the 2nd issue might be fixed by the Arbitrator and applied to the rules which form the subject of the 3rd issue.

Fifth phase.—Ma.-12, paragraph 89. The claim is exactly the same as the previous ones. In it the words "prior to the installation of power works" were inserted to make it clear that Madras recognised that Mysore had a right to the area of hot weather irrigation which was cultivated prior to installation of power work, which area has of late years been reduced in the interests of power. Under the above explanation it will be perfectly clear that on the Madras side there has been no change of attitude. As regards Mysore this is not so but quite the contrary:—

(a) Mysore put forward a project providing for passing throughout the hot weather a continuous steady flow of 1,000 cusecs past Sivasamudram which flow must pass down to Madras.

(b) On Madras claiming that a guarantee should be given that this flow, allowing a working margin, should not be interrupted or reduced Mysore denied that Madras have any right to it. My.-4-3 (iv.)

(c) Madras explained that it is part of the Mysore project and that it is accepted by Madras as a set-off against the whole natural flow, which it is proposed to allow Mysore to impound, but that, if this steady supply is withdrawn, Madras must claim that in place of it the "natural flow" should be passed down (Ma.-4, paragraphs 3 and 4).

(d) Mysore admit the above claim (My.-7, paragraph 78) and on being asked before the Arbitrator to confirm this admission the Mysore representative stated it was already made in writing under the signature of a Secretary to Government and was fully admitted.

(e) Mysore unjustifiably substitute the term "average estimated flow" for "whole natural flow" (My.-9, paragraph 88). On being taxed with this the Mysore representative asked for time to learn from his Government if this substitution is really meant.

(f) Mysore repudiate their admission and reproduce the word "average estimated natural flow" (My.-12, paragraphs 15 and 16). On being pressed with the enquiry as to what this term means a written statement was promised defining it.

It is submitted that it is not Madras who have shifted their position in this respect but Mysore and by the Mysore admission Madras have been prejudiced in preparing the relevant evidence on this matter. Details regarding the hot weather irrigation have recently been called for, but the full information desired is not yet forthcoming. This is altogether due to the full admission by Mysore, My.-7, paragraph 78, which rendered evidence and discussion on this matter unnecessary; this admission being subsequently repudiated the enquiries for full available statistics as regards this matter have only lately been undertaken and are not yet fully available. Meanwhile a statement of second crop and perennial area of irrigation in the channels above the Upper anicut is given in Madras Exhibit Ma.-15 (a).

PART XII.—FACTS AND ENGINEERING ARGUMENTS—SECOND ISSUE.

7. The statement of Mysore that "mere flow as such" was not demanded by Madras

Reference, Mysore paragraph 29. in the case of the Marikanave project in the note of the Chief Engineer for Irrigation No. 58 I. of 17th March 1882 (My.-11) is not in accordance with fact. In paragraph 4 of the note, a stage flow at Sankesala and Bezwada anicuts is taken as the limit of natural flow required before impounding could be permitted. This condition is preceded by a statement of areas irrigated, but the nature of the condition is specifically based on mere flow.

8. The interpretation of clause (b) of the second issue advanced by Madras (Part VIII, paragraph 18, Ma.-14) is adhered to.

9. Considerable sums have been spent in the last 20 years on general improvements of the channels and systems and on replacing open cuts in channel banks giving unregulated supply by pipe sluices, and the general development of control has resulted in more economical use of water, and in gradual extensions of irrigation. Neither the extent nor mode of user as regards water taken has however been altered or increased.

10. As regards the area irrigated under the Veeranam tank and the Vadavar, it is not very clear in what respect the differences of area quoted are material to consideration of the case.

Reference, Mysore paragraph 38. It is common ground that the total area irrigated under the Lower Anicut system has not materially changed for many years and is accepted by Mysore at 112,000 acres (My.-9, paragraph 18).

The figures given by Madras as to the area under Veeranam tank and the Vadavar Ma.-8, paragraph 37, were furnished by the Superintending Engineer and appear to have been extracted from G.O. No. 944 I., dated 1st September 1906, which sanctioned the estimate for raising the level of the Veeranam tank as they agree with the figures there given.

The figures given in G.O. No. 400 I., dated 24th September 1909, are repeated below in detail.

This Government Order is the report on the closure of the construction estimate of the Lower Coleroon Anicut system.

The extract of that part of the Government Order bearing on the matter is reproduced in Appendix XXVI. This is a brief description of the irrigation conditions of the Lower Anicut system and distribution of irrigation. It will be seen from this description that the total area is made up of as below:—

	ACS.	ACS.
North side—		
Vadavar	11,066	
Veeranam tank	45,159	
Khan Sahib's canal	12,946	
Ponneri tank	3,284	
North Rajan voikal	10,252	
		92,707
South side—		
South Rajan voikal	17,027	
Kumukumanniar	1,280	
		18,307
Grand total ..	111,014	

The sources of supply to Khan Sahib's canal are water passed through the south surplus sluices of Veeranam tank and the drainage and surplus water of lands under the Vadavar. One branch of the Khan Sahib's canal (the Govarapathu channel) gets a supply from the North Rajan voikal when there is deficient supply in the Khan Sahib's canal and thus has an outside source of supply. Under this description it is clear that the Veeranam tank and the Vadavar are the sources under which the greater part of the area under Khan Sahib's canal is supplied with water. It is a difficult point to decide what area is irrigated under each of the three main sources of supply, viz., the Veeranam tank, the Vadavar and the North Rajan voikal. It is submitted that, as the total area is undisputed, the matter is not a material one to the investigation.

The references made to the Collector of South Arcot as regards the area irrigated under the Veeranam tank have not been fully replied to as the accounts recording the sources of supply to each area are not kept and it has been necessary to institute enquiries in each village. Under the description given in Appendix XXVI, it will be realised that the source of supply to the area under Khan Sahib's canal is a mixed one and no return from the Revenue Department could settle the original source of supply of this area. It is submitted again that the total area not being in dispute the uncertainty as regards sources need not be pursued further.

Requirements—Cauvery Delta System.

11. The necessity of scour has been fully admitted and indeed insisted on by both parties, and Madras contend that the rules of 1882 show a clear right to a limit flow whenever available not less than that due to a 6½ feet flow over the dam with the under-sluices fully open under the conditions which obtained during the currency of these rules.

The necessity of scour still continues, but since remodelling and for some years (i.e., since 1896) prior to remodelling, the limit gauge at which scour was permitted was raised to seven feet.

This did not mean that the necessity of water for scour had ceased or altered, or has now ceased, but merely that later opinion was that, under the conditions existing in 1896, the seven feet rule provided for a more judicious distribution of the water than the rule of 1882. Scour is still as necessary as ever. Redistribution of the water available was then, and is still, an existing and prescriptive right.

Under the now existing conditions, it is possible to allocate sufficient water for scour, which water also supplies the Lower Anicut system, and maintain seven feet on the Cauvery dam when the flow in the Agunda Cauvery is the same as it was prior to remodelling with 6½ feet gauge and the under-sluices open. Thus for the same flow as would formerly have given a gauge reading of 6½ feet with scour, or seven feet without scour, we can under existing circumstances maintain seven feet with scour water, and this amount of water is fully established as the limit flow by the rules of 1882, 1896, and 1906. This quantity is, it is claimed under the most restricted reasonable reading of the rules of 1882, supported by the record of actual user under those rules, the lowest limit flow which can be adjudged according to law as the prescriptive right of Madras for the supply of the Cauvery delta system.

Mysore contend that the delay of opening till 6½ feet gauge was realised was only made because, with the same flow, the full opening of under-sluices at 6½ feet would have caused water to drop to 6 feet. Assuming, by way of argument, that the Mysore contention is correct, the discharge with 6 feet on the Cauvery dam with the under-sluices open prior to remodelling was 2,380 mills. cubic feet and this is more than the discharge due to seven feet on the Cauvery dam under the conditions now existing.

Mysore thus admit that this water is the least prescriptive right of Madras.

Mysore now argue that as under-sluices were never opened with six feet on the Cauvery dam, therefore the Madras contention above is unsustainable. It is futile to argue that 6½ feet gauge is only required because scouring will reduce the level to six feet, and that at six feet no scouring is allowable.

It is claimed that even under the contentions of Mysore the limit flow due to Madras under the rules of 1882 for the Cauvery delta is 2,380 mills. cubic feet per day, the amount due to six feet gauge with under-sluices open. Under the Madras contention it is 2,944 mills. cubic feet per day which is the amount due to 6½ feet with the under-sluices open, or seven feet with under-sluices closed under the conditions prior to remodelling.

12. Mr. Larminie never contended that six feet was the maximum useful flow, but that it was the limit below which no impounding should be permitted even for a reservoir

which aimed at maintaining a steady and secured flow at the Upper Anicut. The argument in Ma.-12, paragraph 40, deals further with this matter.

13. Useful limits do not change from year to year. It is only after full control of distribution was possible, that the actual incidence of control can show the intentional distribution of water for purposes of actual use.

Prior to acquiring control, evidence of actual use of water passing is open to the imputation that the water passed involuntarily and as a necessity of the case.

This is not the case in the Cauvery and Vennar after 1902 except on the days actually specified in Appendix XVIII, Ma.-12.

14. There is no difficulty in regulating the Cauvery and Vennar so as to avoid a head on the regulators of more than 4½ feet and no delay is necessary in regulating to secure this.

There is never any attempt made to adjust gauge readings to secure a head of 4½ feet, the rules of regulation allow any head not exceeding the named figure. The statement of Mysore here made is altogether denied.

15. Mysore here admit the Madras argument as a good one provided there is an establishment sufficiently intelligent to carry out the rule alluded to. The ordinary establishment is sufficiently intelligent to carry out such a direction, and this is proved by the fact that this very direction is now part of the rules in force with a view to maintain seven feet gauge reading—vide rule of 1905 for regulation at Upper Anicut, Appendix I (Ma.-8), which runs—

“The normal supply level for the Cauvery delta is seven feet on the Cauvery dam and this level should be maintained as long as possible by raising and lowering the anicut shutters.”

If six feet were read for seven feet and under-sluices for shutters, this rule would be the rule which should have been formulated in 1882 to provide for the efficient regulation if the contentions of Mysore were correct. The class of establishment employed is now the same as that employed in 1882 and the rules require no special intelligent staff to carry it out. There is no difficulty whatever in regulating according to such a rule.

Reference, Mysore paragraph 42. 16. This is answered in paragraph 11 above.

17. The question to be decided is not what would be the state of affairs under the provisions made in the Metur Reservoir Project, but what are the existing rights of Madras.

18. Madras paragraph 53 (Ma.-14) which is stated to “have been answered above” has not been so answered at all.

The only paragraph “above” which alludes to the regulation of the Cauvery and Vennar regulators is paragraph 40, and this does not meet or reply to the Madras contentions in paragraph 53. The Madras arguments in paragraph 53 are not in any way a repetition of those in paragraphs 43 and 44 (Ma.-14) as stated by Mysore; indeed 43 refers to the Upper Anicut and not to the Grand Anicut.

The contentions of Madras paragraph 53 have not been met by Mysore.

19. Here it is claimed by Mysore that the arguments of paragraph 54 (Ma.-14) have been met in the reply to Madras paragraph 44 (Ma.-14) which is answered in paragraph 40 (My.-12). This paragraph does not in any way reply to the Madras paragraph 54. The challenge to give some proof or specific statement of the general proposition that Cauvery and Vennar regulators are used constantly for flood disposal is not met at all. Paragraph 40, My.-12, is a general statement about the intelligence of the regulating staff, and the opinions of hydraulic engineers, both of which are denied and neither of which is relevant to the present paragraph (paragraph 54, Ma.-14).

20. The question at issue here is as regards the rules of 1902 for regulation of the Cauvery and Vennar regulators (Ma.-8, Appendix I). By inadvertence the original Mysore contention on this subject (paragraph 41, My.-9) was replied to with reference to the rules of 1892 (paragraph 55, Ma.-14). The Mysore contention is that the allowances noted as full supply, viz., $4\frac{1}{2}$ feet on Cauvery and eight feet on Vennar rear gauge, were only given on account of turns.

Turns are only resorted to in times when the supply by other means is too small to give efficient supplies to the area.

The rules referring to "Regulation in non-flood season" only apply to stages of river flow not greater than $4\frac{1}{2}$ feet Cauvery and eight feet Vennar. The last two clauses of the rules apply to these stages of flow only and for regulation at all other stages of flow the previous rules only apply, and to those only one must look to see what are the limits below which no surplusage through the Grand Anicut is permitted. These limits are 6.2 in the Cauvery and eight feet in the Vennar.

21. The argument of Mysore is "that six feet must have been the full supply limit prior to remodelling, considering that facilities have been afforded for forcing extra supplies after remodelling."

Reference, Mysore paragraph 48.

This refers to the limit gauge at the Cauvery dam.

This statement is made to rebut the statement of Madras that even accepting for purposes of argument the $4\frac{1}{2}$ feet rear gauge Cauvery regulator and seven feet gauge Vennar regulator, as being the full useful supply, that this is equivalent to 6.6 feet on the Cauvery dam.

The "argument" of Mysore does not in any way meet or rebut the proposition.

22. The Madras Government have never suggested that complete exclusion of floods in excess of the requirements of irrigation was either practicable or practised. Their contention has been that under existing conditions the admission of water through the Cauvery and Vennar regulators for the purpose of flood disposal was infrequent, and they have given a statement (Appendix XVIII, Ma.-12) of the occasions on which such floods have been admitted, which are very few.

Reference, Mysore paragraph 49.

The reply of Mysore in no way rebuts the Madras contentions (paragraph 57, Ma.-14). This paragraph of Mysore does not deal with or reply to Madras paragraph 58, although it claims to do so.

23. Madras state that the only possible object of the dam stones on the Grand Anicut was to force water in excess of 4.67 feet down the Cauvery at that work, while from all other considerations the existence of the dam stones was certainly very objectionable.

Reference, Mysore paragraph 50.

They contend that this is absolute proof of the then existing necessity for irrigation water up to a limit of 6.67 feet in the Cauvery.

Mysore do not attempt to deny or rebut this, but in reply state that—

Firstly, a gauge reading of 6.67 feet connotes a discharge of 30,000 cusecs. Major Oakes stated the discharge was 23,650 cusecs. Madras do not claim that 6.67 is always required, but produce absolute proof of its being intentionally forced down the Cauvery for purposes of irrigation when Major Oakes was writing.

Secondly, Mysore state that 26,680 cusecs (the equivalent of seven feet on the Cauvery dam) is the limit of Madras claim for Cauvery and Vennar.

This is not a fact:

Madras have stated several times (paragraph 56, Ma.-14 and other places) that the limit of occasional useful supply is $7\frac{1}{2}$ feet and even more on the Cauvery dam, and that while seven feet represents the limit ordinarily passed whenever received for the irrigation of the Cauvery delta, that occasional extra quantities are required and actually passed.

24. It is quite possible that the provisions made for the supplies to be passed in June provided in the Mettur Project might prove inadequate, but the miscalculations of such supplies could not inflict any permanent deprivation on Madras, because they would be impounded in the interests of, and at the call of, the same area.

Reference, Mysore paragraph 53.

Madras have never claimed that their requirements for June were the same as for July and August; under the incidence of natural flow up to the limit of Madras claim the quantity of water passing in June is without exception far less than in July and August. What is claimed by Madras is the natural flow for June up to this limit, and they contend that that flow is ordinarily used under existing conditions and has been so used for many years past.

25. This is a general statement and does not call for any reply. It is also considered irrelevant to the issue under consideration.

Reference, Mysore paragraph 54.

26. The figures in column 7, Appendix XXIV, are not exclusive of the quantities of drainage passed into the sea. This matter of drainage water has been dealt with (Ma.-14, paragraph 73). It is denied that the figures are necessarily high on account of the admission of water for disposal of floods. The reiterated general statements of Mysore to this effect have not been supported by any specific proof, while the denial of Madras is supported by proofs, and statements of facts the accuracy of which has been altogether unchallengeable by the other side.

The figures in column 5 (Appendix XXIV, Ma.-14) which represent the quantities due to Mysore limits at Cauvery dam when compared with column 10, the quantities which Mysore advance as due at Cauvery-Vennar regulators, fail to give this supply in seven years out of twenty, and thus making no allowance for the supply of the Lower Coleroon system, or for ordinary absorption and draw-off between the Cauvery dam and the regulators, even on their own arguments, Mysore rules give altogether inadequate supplies for the Cauvery delta system alone.

27. The time when losses in transmission occur between the Cauvery dam and the Grand Anicut is when there is little local rain. There is an anicut across the Kodamuruti river taking off the low flow of that river and such flow does not come into the Cauvery at all. The losses in transmission by seepage, percolation and surplus into the Coleroon, as also by draw off and ordinary absorption, are considerable between the Upper Anicut and the Grand Anicut and are not by any means made good by the Kodamuruti except after good rainfall in the catchment.

Reference, Mysore paragraph 56.

28. The reasons why there must be a material quantity of drainage from the delta lands are stated in Ma.-14, paragraph 73, and the necessity for change of water is admitted by Mysore. The discharges shown in column 7, Appendix XXIV, Ma.-14, include the water occasionally passed for flood disposal. These are not the figures put forward a what has been passed with intention for purposes of supply except after 1905-1906. The quantities passed for supply up to that year are shown in column 8 of the table. It is not suggested that on years of well-maintained abundant supply the crops would have suffered if given less water but the rules are framed with a view to ordinary conditions in good years, the crops get more than is absolutely necessary, and in bad years they suffer from want of water.

Reference, Mysore paragraph 57.

29. As regards the Madras Triennial report, 1901-1902, the remark made is materially correctly, taken, as it was made if as general statement not specially applied to any year or to the Cauvery delta system. The remark was made in the form of notes on the Gōdāvari system but is applicable to the whole Madras Presidency.

30. The Mysore admission here is that 72 inches is allowed per acre in Mysore exclusive of rainfall which may be taken a 25 inches in addition, and is also the allowance with reference to a controlled supply. In applying this figure to Madras, Mysore however, proceeded to deduct rainfall and to apply it to an uncontrolled and very fluctuating supply.

Reference, Mysore paragraph 58.

The explanation of Mysore as to the source of the 72 inches puts them in a worse position than before.

The allowance of 72 inches delivered on the fields if from a controlled supply and delivered as required has been stated by Madras to be adequate and this is adhered to.

The Mysore contention that above the fields means at the Cauvery dam is quite unreasonable.

Reference, Mysore paragraphs 59 and 60.

31. The figure 190,000 mills. cubic feet quoted by Madras was from the Mettur Project, Vol. I, paragraph 56.

This is the requirement for an assured and controlled supply under a reservoir. Adding to this 30 per cent. which is what Mysore at one time suggested and which cannot be maintained to be an unreasonable allowance for the fluctuating nature of flow, the total becomes 247,000 mills. cubic feet, and this supply given with normal

incidences as regards fluctuation and seasonal flow is a rough indication of the flow at the Cauvery dam required to secure the Delta irrigation. Compare this with the figures in column 3, Appendix XXIV, and it will be seen that this supply connotes a limit gauge of about seven feet, except in the bad years when the delta has suffered from deficient supplies.

32. The Mysore argument here is not clear. Under no circumstances could the Mysore Project lead to reducing the remissions or losses in Madras which, under existing conditions, must be granted. The possible effect is absolutely confined to the opposite result.

Reference, Mysore paragraph 61.

33. The rules of 1882 do not restrict their operation to any special months of the year and it is on the basis of these rules that Mysore admit the six feet limit. The modes of user under the rules was applied in the past and is still applied without any difference in working throughout the irrigation season.

Reference, Mysore paragraph 62.

Reference, Mysore paragraph 63.

34. Madras adhere to the views already expressed in Ma.-14, paragraph 82, and previously.

Lower Coleroon System.

35. The first suggestion made in this paragraph is that the whole average run-off from the catchment area, 1,077 square miles, draining into the Coleroon between the Upper and Lower Anicuts, is absorbed into the river bed by seepage immediately it is received in the river, and is stored and given out gradually.

Reference, Mysore paragraph 64.

It is suggested that the capacity of the river-bed available for effective sub-soil storage is 12,924 mills. cubic feet. Further it is suggested that in addition to this, 12,250 mills. cubic feet from floods coming from the Upper river will be stored annually in the river-bed and given out gradually as required for irrigation. Taking the whole content of the Coleroon river-bed for a depth of 2 feet and width of 2,000 feet as available for storage the total content for the length of 70 miles between the Upper and Lower Anicuts will be $(2 \times 70 \times 5,280 \times 2,000) \times \frac{1}{2} = 493$ mills. cubic feet. This is according to Madras basis of computation (Ma.-12, paragraph 50). Mysore computation (Ma.-9, paragraph 50) gives the storage capacity of the whole river from Kannambadi to the Upper Anicut (250 miles) as 583 mills. cubic feet. Yet here it is suggested that the storage of 70 miles is 12,924 mills. cubic feet. The propositions made are altogether extravagant and fanciful and the statements made are altogether denied.

36. The statement here made is denied. This is merely a repetition and has been dealt with in paragraph 11 (Ma.-12) and elsewhere.

Reference, Mysore paragraph 65.

37. The Madras contentions are not incorrect as regards the facts shown in tables K and K-1. Of the irrigation under the Lower Anicut system the area under the Vadavar and Veeranam tank comprises more than one half. The tables show that in the bad years for which the tables are drawn, the supplies passed down the Vadavar have been very inadequate for the areas commanded and further that the flow in the Vadavar dwindles to a very inadequate one immediately specific supplies from the Cauvery cease and *vice versa*.

Reference, Mysore paragraph 66.

It has been suggested that these figures of supplies are unreliable, because such inadequate supplies must have resulted in failure of crop.

In years when supplies from the Coleroon are inadequate the areas planted in the earlier part of the year are small and the bulk of the area is planted late; the course of cultivation has to be adapted to the character of the season. When a crop fails in the early part of the season the area is generally replanted. It is only when no crop has been raised from circumstances not in the control of the ryot that remission is given. The value of the crop, however, depends much on the period it stands on the fields. Six months paddy is more valuable than five months paddy and the former much more valuable than a three months crop.

The nature of the crop put in is varied in accordance with the month of planting. The absence of flow in the Vadavar and of supplies to Veeranam tank in the south-west monsoon may not greatly affect the total area of paddy on which assessment has to be paid, but it greatly affects the value and quantity of the yield, and the season of planting out the crop.

The building of the Lower Anicut and the alterations which have been made in this work have been chiefly in view to the more effective supply of the Vadavar and Veeranam tank, and it is submitted that it is by flow in the Vadavar that the character of the supplies passed must be chiefly gauged. The other channels are generally well supplied and it is the supply of the Vadavar that is the measure of the adequacy or otherwise of the supplies to the Lower Anicut system.

It is submitted Madras rightly considered the figures in column 11 and column 6 in Appendix K-1 in considering the effect of inflow from the Cauvery on the irrigation supplies of the Lower Anicut system.

The figures in column 11 are liable to far less inaccuracy than those in column 10, the former being the component of many discharges nearly all of which are known to be unreliable, while the latter is the deduction of the flow from a single gauge reading not subject to variation by regulation.

The figures in Appendix K-1, it is submitted, clearly show in form of flow in the Vadavar the value and necessity of actual supplies passed from the Cauvery to the Lower Coleroon irrigation system and the way in which the former responds to the increase and diminution of the latter.

38. It is obvious that when every source of supply is closed down the remaining flow of the Coleroon must all be obtained from seepage, leakage and run-off from rainfall.

Reference, Mysore paragraph 67.

It was understood that when Mysore said, in paragraph 77, My.-9, the supply in the Coleroon was maintained, the suggestion was that adequate supplies for irrigation were maintained. It is noted that Mysore deny the intention of making any such suggestion under these circumstances, it is not clear what Mysore contention was.

It is suggested by Mysore that *minus* figures should not be considered, and also that these are not lost but given out again on another day. Surely this implies that they should be considered, and that the *plus* figures on one day may be the output from the *minus* figures of another; thus the totals should be the algebraic sum of both as shown by Madras in Madras Appendix XXV and paragraph 90, Ma.-14. It is to be noted that the figures of discharges at the Lower Anicut are not reliable and inaccuracy and unreliability in many cases have been clearly proved and are not denied by Mysore. Exact computations cannot be reasonably based on such figures. The above general arguments with regard to Mysore contentions based on these figures are, however, submitted for consideration.

39. Mysore here argue that because the quantities of water passed down to Vadavar in the bad years for which the tables Appendix K-1 are drawn are quite inadequate for

Reference, Mysore paragraphs 68 and 69.

the supply of the area irrigated under the Vadavar and Veeranam tank, therefore the help which Veeranam tank gets from the Vadavar is insignificant. In these years supplies were abnormally bad and the resulting outturn of crop suffered in consequence. It is quite impossible that Veeranam tank could supply an area of 52,000 acres or anything like it from its own catchment. The capacity of the tank is such as only to be able to hold some 12 days' supply for its ayacut. The catchment area even according to Mysore calculation is only sufficient for 30,000 acres (My.-7, paragraph 72) and this is on a computation of the yield of the catchment without considering the very inadequate capacity of the tank. Even under this extreme calculation Mysore admit in the same paragraph that 22,000 acres under the tank require to be altogether supplied from the Vadavar and say it can easily get its supply from it. Now it is contended that the supply required from the Vadavar is so insignificant as to be not worth considering.

Madras computations regarding the irrigating capabilities of the Veeranam tank apart from the Vadavar are given in Ma.-12, paragraph 92.

It was chiefly for the feeding of the Vadavar that the Lower Anicut was first constructed in its present site. It was solely for the supply of the Vadavar that the level of the top of the shutters was raised two feet over the old solid crest level when remodelling the anicut in 1900 to 1902.

The supplies of the Vadavar are essential to the prosperity of the Lower Anicut System. The Mysore tables, appendix K-1, show that in bad years the supplies are very restricted and argue that under circumstances which cause great diminution to these supplies the irrigation will get on quite as well because under the restricted supplies the remissions have not been great. The inadequacy of the supplies is patent and surely conditions which cause any diminution of the same cannot be regarded as safeguarding the prescriptive rights of Madras.

It is noted that Mysore admit that the demand originally made by Madras (Ma.-1) for the specific supply of the Lower Coleroon Anicut System of a limit supply of 66 mills. cubic feet in 24 hours in addition to the limit gauge reading of 7 feet at the Cauvery Dam was a small one.

40. Madras have never suggested that the area under the Veeranam tank was wholly dependent on Coleroon water and have stated that during the north-east monsoon the supplies are chiefly derived from the catchment of the tank.

Reference, Mysore paragraph 70.

In years of bad supplies from the Coleroon, cultivation begins late and the yield of the ayacut suffers both in the matter of the quality and quantity of the paddy raised.

Because a crop of four months' paddy is raised in a year of deficient Coleroon supply over most of the irrigated area, this is no reason why such occasional deficiency should be increased by the action of Mysore.

41. The argument here used by Mysore is that because in 1899 water was involuntarily surplused at the Lower Anicut there is no reason to apprehend that even in the worst year Mysore reservoir will reduce the floods in a way prejudicial to the Lower Anicut System. The argument is not understood. Every flood helps to supply the Coleroon system both directly and by seepage and any diminution of flood necessarily reduces supplies.

The statement that in 1899 the Madras computation of floods at the Upper Anicut is underestimated is denied. It is high floods which may be underestimated by Madras. There were no high floods in 1899, the maximum gauge reading of the year being 8.8 and the gauge of the Cauvery dam was over 8 feet on only eight days throughout the year.

The necessity of surplus over the Lower Anicut is a recognised necessity, and Madras do not contend that Mysore should not be allowed to impound under any circumstances which appears to be the contentions of Mysore in the last clause of the paragraph under reply. It would have been open to Mysore to impound in 1899 under the conditions proposed by Madras a material quantity of the surplus referred to.

Hot Weather Flow.

42. Until the sitting of this Arbitration Committee, there was never any question as regards the hot-weather flow between Mysore and Madras.

Reference, Mysore paragraph 72.

The Mysore Project provided as an integral part of the project for the passing of a steady flow of 1,000 cusecs from Sivasamudram and the Madras Government taking this into consideration waived their rights to the natural flow of which they were in enjoyment, and stated that they would agree to the purposes of this project to the impounding by Mysore of the whole natural flow of the river during March, April and May. What was before the Government of Madras during all the discussions and correspondence was the conditions of the Mysore project which conditions involved the invariable passing for power of 1,000 cusecs and it was under such conditions that Madras assented to impounding by Mysore in March, April and May.

This assent was given, because it was considered that under conditions above such a change would not be injurious to Madras.

A steady flow of 900 cusecs was claimed by Madras only as a set-off against the then existing right to the whole natural hot weather flow of which they have present enjoyment.

43. The expression "the whole natural flow" used by Madras has always been subject to the understood limit flow of 7 feet at the Cauvery Dam. The matter of hot-weather flow has not been closely examined as it was believed that on this matter both sides were agreed and because it was admitted by Mysore (paragraph 78 My.-7) that Madras "are only entitled to the natural flow of the river after the customary Mysore requirements are satisfied." It was after discussion asserted by the Mysore Representative that this admission was intentional and no reservation was made. Mysore have now gone back on this and claim to have a limit flow fixed above which impounding may be allowed.

Reference, Mysore paragraph 73.

Under these circumstances, it is necessary to examine the records available of the flow of the Cauvery in the hot-weather months, March, April and May. The records of daily flow at Sivasamudram are available with Madras only from 1902 to 1908. This flow was computed under the directions of the Assessor (Exhibit A-5).

The flow daily at Bhavani Bridge is available for discharges of 1,000 cusecs and upwards, but it is not available for days of lower discharge.

A table has been prepared, Appendix XXVII, showing for months, March to May, the daily discharges at Sivasamudram and such discharges as are recorded at Bhavani Bridge three days later for the above years.

Another statement shows for the years 1891 to 1901 for these months the recorded discharges on any day at Bhavani Bridge when in excess of 1,000 cusecs.

Another statement in the same Appendix shows the number of days in each month that a discharge in excess of 1,000 cusecs passed Bhavani Bridge in March, April and May for the twenty years, 1891 to 1910 and in the each case the average discharge and maximum discharge during those days.

The hot-weather flow of the Cauvery is to a great extent dependent on the seepage from its sides and bed and from the seepage of its tributary streams. Every fresh or rise of flow causes the replenishments of the stores of water held in the river bed to be gradually given out as the water falls.

In March, the flow of the river is fed principally by seepage from the stores of the last floods. Any material rise in March is rare.

In April, there are thunderstorms which reinforce the supplies causing occasional small freshes of which a large proportion is absorbed in the river bed and have the result of increasing for days and weeks succeeding the hot-weather flow from seepage.

In May, there is frequently a good deal of rain in the hills of Coorg and adjacent parts and a distinct increase of flow to the Cauvery results.

These April and May rises are of the greatest importance in replenishing supplies while the latter also serve for contributing to filling up the river bed and so paving the way for the transmission of the June freshes.

In considering the limit of flow which is useful to Madras in this period, it is considered that all intermediate freshes react on the succeeding river flow and provide more water for the river channels. If however a fresh comes down of such magnitude as will wash away the koramboos at the heads of the channels, its usefulness in replenishing supplies will be more than counterbalanced by the harm it does to koramboos. Under these circumstances, the limit of useful flow is what will not disturb the koramboos. The stage of flow at which there is danger to koramboos is about 600 mills. cubic feet per 24 hours.

There is a lot of loss in transmission by absorption in April and May between Sivasamudram and Bhavani Bridge while there is much additional loss between this and the heads of the principal irrigation channels which require supply, most of which take-off below the confluence of the Amaravati. In view of this, it is considered that the limit of natural flow which must be passed on by Mysore to Madras to preserve Madras rights unimpaired should be 800 mills. cubic feet in 24 hours, say 9,000 cusecs measured at Sivasamudram.

This point is not directly involved in considering the Mysore project as at present advanced, but if it is considered that the Arbitrator should adjudicate on this point the claim of the Madras Government is to the whole natural hot-weather flow up to a limit of 9,000 cusecs at Sivasamudram. In the alternative, the Government of Madras are prepared to waive their existing rights as above formulated for the months of March, April and May in consideration of a continuous flow never less than 900 cusecs being passed down to them from Sivasamudram throughout this period.

44. The statement made by the Special Superintending Engineer in paragraph 2 of his note of 15th November 1910 is certainly a wrong one.

Reference, Mysore paragraph 74.

The note in which this officer reviewed the conditions of a Mysore Reservoir was drawn up very hastily between 7th November and 15th November and in it the assumptions made as a basis of working are stated. The assumption made by the Special Superintending Engineer (Colonel Ellis) for the purpose of drawing up working tables was correct as it was known to him, when writing; that 1,000 cusecs was to be passed for power and that this supply must be passed steadily to Madras. Under the circumstances, it is submitted that the statement made by Colonel Ellis that the year was divided into two periods and that March, April and May was classed as the period of the year in which there is no demand for irrigation water cannot be adduced as any proof that this was so.

As a fact Colonel Ellis was not aware, when he wrote, that the Cauvery channels required water after February, and it was only, when the enquiry in respect of the present proceedings was made that the actual requirements of these channels became known to him.

If Mysore rely on the Special Superintending Engineer's memorandum as proof of their contention, they should put it in.

45. The time available since December when it was first understood that the Mysore Darbar repudiated their admission that Madras rights extended to the whole hot-weather flow of the Cauvery subject to the customary draw off by Mysore channels has not been sufficient to get as full detail of the Cauvery irrigation in the hot-weather months as is desirable and further enquiry is being made.

Reference, Mysore paragraph 75 and Mysore note, dated 28th January 1914, on "average estimated natural flow."

A statement is however printed [Appendix XXVIII] giving the areas reported by the Collector of Trichinopoly to require water in the months of February, March, April and May in a normal year.

The areas of hot-weather irrigation (March to May) in other affected districts are small and do not materially affect the question. The area of hot-weather crop will vary with the character of the season and all the water passing down the Cauvery at this season is usually utilised for diversion into the channel heads by means of koramboos. There is much leakage through the koramboos, and the greater the amount and depth of hot-weather flow, the more abundant the supplies to the hot-weather irrigation up to the limits of flow named in paragraph 43. In the month of May, most of the rise in the river, which generally occurs is absorbed on the bed of the Cauvery and serves to prepare the river bed for passing down the more abundant flow of June.

It has been represented by Mysore that a flow as low as 90 cusecs has been recorded at Sivasamudram. This is the minimum flow ever recorded. The average flow of the lowest flow month is 433 cusecs on the computation furnished by Mysore.

The existing system of hot-weather irrigation in Madras is one which normally uses the whole natural flow during the hot-weather months.

For the large Wyyacondan channel, the koramboos is actually carried right across the river and this practice is a proof of use of the whole normal hot-weather flow.

A fresh not exceeding 9,000 cusecs in the upper river would be reduced to very small dimensions before reaching the Upper Anicut and would serve to reinforce and increase the river flow for many days after. It is submitted that during the hot weather all freshes are normally useful to, and used by, Madras up to the limit flow claimed.

46. The Mysore revised statement of the Madras rights for hot-weather flow is that these rights extend to the "average estimated natural flow." This is shown by Mysore as being (at Sivasamudram) as under:—

								CUSECS.
February	First-half	..	..	..	..	..	..	1,219
	Second-half	..	..	..	..	..	..	855
March	First-half	..	..	..	..	..	..	615
	Second-half	..	..	..	..	..	..	433
April	First-half	..	..	..	..	..	..	440
	Second-half	..	..	..	..	..	..	639
May	First-half	..	..	..	..	..	..	989
	Second-half	..	..	..	..	..	..	3,925

Under the Mysore admission Madras are entitled to this average flow (My.-12, paragraph 16).

Mysore, however, now explain that in place of this they suggest Madras should be allowed in each half-monthly period natural flow limited to 900 cusecs or to the above average flow whichever is less.

Mysore compute 600 cusecs as being required as a steady supply for Madras hot-weather irrigation and yet propose to limit the flow to natural flow subject to a maximum of 450 cusecs for one month and somewhat higher, but absurdly inadequate, limits in other months. The hot-weather irrigation duty is taken by Mysore as 100 acres per cusec which is counting water as $2\frac{1}{2}$ times as efficient in the hot weather as at other times.

Under the existing conditions of natural flow the Madras irrigation normally uses the whole natural flow of the Cauvery in the hot weather, and it is submitted that within the limit claimed such flow is useful in the months of March, April and May.

In the month of February, water is also required whenever available for the Cauvery Delta system and is used for this up to the full extent received under conditions of natural flow.

47. It is submitted that during the months, February to May, Madras actually make use of the full natural flow of the river and that in order to fully safeguard the rights of Madras the natural flow past Sivasamudram up to a limit of 9,000 cusecs must continue to be passed.

In the alternative, Madras will agree to allow Mysore to impound the whole natural flow of March, April and May subject to an undertaking to pass down from Sivasamudram a continuous flow never less than 900 cusecs during this period. This condition is an integral and necessary concomitant of the working of the project now the subject of this arbitration.

As regards the month of February, water is required during this month both for the channels above and below the Upper Anicut that is for Cauvery Delta and the Madras Government are not prepared to take during this month a continuous flow of 900 cusecs as a set off against the natural flow to which they are entitled.

Cauvery Channels above the Upper Anicut.

48. If the 7 feet limit which is passed for delta irrigation under existing rules at the Upper Anicut is not interfered with, the requirements of the upper channels on the Cauvery will be automatically met.

49. The construction of a reservoir on the Bhavani about which Mr. Hughes reported only entailed abstraction from the Cauvery total flow of a small proportion of the total

natural flow, estimated by Mr. Hughes as 15 per cent. Mr. Hughes' proposals for the Bhavani project were not to impound all flow exceeding 4.8 on the Cauvery Dam, but to impound to 15 per cent. of the whole flow whenever the natural flow at the Cauvery Dam was 5 feet or over. This would reduce a natural flow of 5 feet to 4.8 feet, and this, and not $4\frac{1}{2}$ feet as stated by Mysore, was Mr. Hughes' limit.

Under such a rule a natural flow of 7 feet would be reduced to $6\frac{1}{2}$ feet and so on and this is a very different proposal from limiting flow to 4.8 feet. While this proposal would have had some injurious effect on the supply of the upper channels, it would never have affected river levels by more than about 6 inches and generally by less than this, and would not have involved anything like the paralysing effect which the restriction of flow to a $4\frac{1}{2}$ feet gauge would entail.

Mysore have apparently not clearly understood the conditions of impounding involved in a Bhavani project and thus have not clearly represented this matter.

50. Mr. Larminie repudiated Mr. Hughes' proposal even under the limitations involved by the reservoir on the smaller river, but suggested a reservoir on the Cauvery to maintain 6 feet on the Cauvery Dam as a steady flow, all through the irrigation season (vide Ma.-16, Mr. Larminie's report, paragraph 49, printed with Part VI Proceedings).

With a steady flow of 6 feet throughout the irrigation season an adequate supply to the upper channels could, as a fact, be secured, as this would enable supplies from half a foot to one foot below full supplies to be steadily passed into the channels.

Colonel Smart generally agreed with Mr. Larminie, but to ensure adequate supplies to the Delta provided for a $6\frac{1}{2}$ feet standard.

It is to be remembered that the above standards were for steady flow.

There is nothing in the reports to show that these officers considered that the necessities of command and river stage in connection with the upper channels, but Mr. Larminie and Colonel Smart's proposals would not have injuriously affected them subject to the maintenance of the steady supply contemplated.

Mr. Hughes' proposals would have affected the supply of the channels probably to an extent of 10 to 15 per cent. of their supply. It is possible that Mr. Hughes who considered these channels and allowed for them as regards quantity overlooked the necessities of command, but nothing is recorded about this.

51. As regards the Metur Project, the proposals altogether overlooked the necessities of command and the project is certainly defective in this respect. These necessities have only quite lately been recognised, and it is only in this later part of these proceedings that the bearing of the gauge reading at the Cauvery Dam on the supply of these upper channels has been clearly realised. This is the reason why this matter was not taken up from the first, and the conditions and necessities of this irrigation only described at this later stage.

Whatever the other officers who have written on the subject may have done, the matter of command necessary for these channels was certainly overlooked by Colonel Ellis in drawing up the Metur Project.

It has been stated that adequate supply, if maintained as a steady supply, can be given to the upper channels with a 6 feet gauge. This is quite different from the maximum useful supply which is admitted whenever practicable because the supplies are fluctuating.

There is frequent scarcity in the Cauvery channels between September and November; the supplies are very fluctuating and often inadequate.

In bad years, Koramboos are constructed from about the 20th November and on one channel, the Wyyacondan, one is even put up occasionally in September when the river is low, but this is almost always washed away by a temporary rise of the river and another has to be constructed between November and January.

52. The procurable facts as regards gauge readings on these channels have been communicated in Ma.-18. These facts were not available when paragraph 104, Ma.-14, was written, and the 7 to 8 feet there specified were qualified by the statement "it is believed." The facts alluded to lead to the deduction that the stage of the flow at the Cauvery Dam required to give the maximum useful supply to these channels is $6\frac{1}{2}$ feet and not 7 to $7\frac{1}{2}$ feet as previously claimed, and it is now contended that interference in the reduction of natural flow of the river at any stage below that due to $6\frac{1}{2}$ feet at the Cauvery Dam will have the effect of reducing the useful supplies now passed under the incidence of such natural flow into these upper channels.

PART XIII.—FACTS AND ENGINEERING ARGUMENTS—THIRD ISSUE.

53. The necessity for further discharge observations has been admitted by both parties. The only matter at issue is the number of places at which such observations are necessary. It is considered that on this matter both parties will agree to abide by the decision of the Arbitration Committee.

54. The reply of Mysore does not dispose of the limitation qualifying Sir J. Benton's remark. It may be added Sir J. Benton's views are only those of a highly qualified expert, and in this matter they fully support the contentions of Madras as regards the whole case.

55. Madras do not make a claim that any allowance in the form of "limit flow" or quantity of flow shall be made with a view to any rights to future developments of irrigation, but they do claim that the mode of measurement fixed shall be such as shall not interfere with, or destroy, their existing rights of future development, by means of economies through subsidiary works.

As regards the system now proposed by Mysore, that part of it which provides for applying a factor to the flow at Kannambadi with a view to forecasting the probable flow at the Upper Anicut is recognised by Madras as a reasonable proposal, and one which, while giving to Mysore great advantages as regards impounding may, subject to fixing suitable factors, adequately protect Madras interests while leaving Madras and Mysore mutually free to develop irrigation resources by more economical distribution, by storage, etc.

The part of the system which is strongly opposed by Madras is that part which provides for measurements at the Upper Anicut and the system of compensation water. This is not by any means an essential, although it is an integral part of the Mysore new system, and it is not either easily, or accurately, workable. The matter is discussed further below.

56. The Government of Madras claim that except as regards such concessions in the matter of flood discharges, etc., which they are prepared voluntarily to concede, their rights shall be conserved unimpaired.

In regard to what Mysore terms "useful surplus", a decision which gives a limit flow which will preserve Madras rights unimpaired does not give scope for useful surplus over and above this limit as explained in Ma.-14, paragraph 115.

57. It is not a fact that no reservoir would be possible in Mysore without some disturbance of the quantity and incidence of natural flow of the river within the fixed limit flow.

The system of measurement proposed by Madras provided for this and the small reservoir to the construction of which Madras have agreed could be successfully worked under such a system without interference within the limit either of the incidence or quantity of natural flow.

Reference, Mysore paragraphs 90, 91 and 92.

58. Madras adhere to the arguments of their paragraphs 117 to 122.

It is denied that the *minus* figures are due to inaccurate estimate of the time of transmission, but it is recognised that time of transmission is a factor constantly varying and not capable of accurate statement. It is by examination of diagrams based on working tables that interference with incidence and quantity of useful flow can best be studied. The very fluctuating natural flow of the Cauvery is one of the great difficulties with which existing irrigation has to contend and any system which within the limits of useful supply makes these fluctuations greater *ipso facto* does hurt to Madras. A system of making up for deficient supplies by subsequent abundant, and frequently superabundant, ones cannot be considered as non-interference with existing rights, as the system entails injury to Madras.

59. The *minus* figures and other unmeasurable losses, which are correctly computed under Table III, but which would not be capable of computation without previous measurement of the actual natural flow at the Upper Anicut (column 3) are due to two causes, viz., deficient draw off (R) and absorption (S) (Ma.-14, paragraph 124) and not to losses (R) of the upper canals alone.

At certain times and especially in June absorption is great and for this reason *minus* figures appear with special frequency in this month, combined with the fact that natural flow is at this time frequently small. This matter of absorption is the explanation of the apparent discrepancies noticed in Mysore paragraph 94.

60. The Cauvery channels frequently take water at a duty of 30 acres per cusec and this in Madras and also in Mysore is the basis on which limit of useful flow is generally computed for these marginal channels.

Reference, Mysore paragraph 95.

61. It is true that the area of irrigation in June in these channels is below the normal area of later months, but the absorption in June is very great and this accounts for the persistent recurrence of *minus* figures in this month.

Reference, Mysore paragraph 96.

62. The losses of the upper channels are not confined to the days on which *minus* figures appear in the tables, but are suffered every day in which the natural flow of the river is reduced in quantity between the stage of flow which gives maximum useful supply to the channels and the stage which gives on supply. The loss is persistent and continues in these stages. The losses cannot be made up by sending down compensation water equivalent to the loss, but only by reproducing the stage of flow required to give back the deficiency which is a very different matter and impossible to effect in practice by means of compensation water. The Mysore contention that the losses are confined to very few days will be admitted as inaccurate under the above explanation.

63. This is again insistence on the value of *useful surplus* which Madras claim is an admission by Mysore that the "limit flow" of their proposals does not conserve unimpaired the rights of Madras.

Reference, Mysore paragraph 99.

64. It does not follow because a year is the worst on record that the deprivation and interference is in that year the greatest. Indeed, as interference can only occur on days of impounding, the interference will be on fewer days in years when impounding takes place less frequently. On the other hand a deprivation or unfavourable interference in a bad year has a worse result than a similar improper interference in a good year. The contention of Mysore in this paragraph is denied.

Reference, Mysore paragraph 100.

65. As noted above the consideration of future developments of irrigation in Madras is not made the basis of any claim in connection with the limit quantity of natural flow to which Madras has prescriptive rights, but it is claimed that the mode of measurement adopted shall not be one which will hamper future development of irrigation by Madras.

Reference, Mysore paragraph 101.

Expansion of irrigation does not necessarily mean use of more water. For instance in many channels in the area in question distribution of water to fields is by means of open cuts in banks or roughstone sluices of rectangular cross section not computed or proportioned to the area to be supplied.

Resluicing works in these channels have been going on gradually for many years, these works consisting in replacing such sluices or openings by pipe sluices with vents proportioned to the requirements of the area under them. By such works gradual extensions of irrigation and improvements of supply to tail-end lands are made possible through more economical distribution and without taking any more water than previously.

Any such expansion in the future will, under a system of measurement at the Upper Anicut, be made a matter of claim by Mysore as trenching on and reducing the flow at that place and thus increasing the amount of compensation water to be passed by Mysore. The result of this would be abandonment of all future attempts at economy or conservation.

Again the system makes any proposal for new tanks or reservoirs in the whole valley of the Cauvery above the Upper Anicut open to objection by Mysore as diminishing the flow there. Minor improvements are continually under consideration and introduction in this large area and under the Mysore proposals they will all have to be the subject of check and opposition in Mysore. As regards the effect of the Mysore system so far as it comprises compensation water and measurement at the Upper Anicut the same objections apply in regard to any larger schemes. Thus this system implies constant check on development, constant disputes and friction with Mysore, constant resort to lengthy and expensive arbitration.

The claim to conserve development rights already existing is made not as regards any quantity of water to be allocated against future development but as regards system of measurement, and it is claimed both as an existing right and as fair and reasonable that such a system of measurement shall be adopted as will not be open to the objection that it places obstruction of a grave nature in the way of all future development of resources by Madras in the valley of the Cauvery above the Upper Anicut.

The measurement at the Upper Anicut and passing compensation water much of which must be surplused to waste, is an integral part of the Mysore system but it is by no means an essential part. A reasonable increase in the proportion of water to be passed to Madras would obviate the necessity for compensation water and render all measurement at the Upper Anicut or below Sivasamudram unnecessary.

66. It will be impossible under the system of measurement at the Upper Anicut proposed by Mysore to make accurate measurement of the amount of compensation water due to Madras.

Reference, Mysore paragraph 101, last clause.

APPENDIX XXVI.

Extract from G.O. No. 400 I., dated 24th September 1909, approving the report on the closure of the construction estimate of the Lower Coleroon Anicut System.

For the purpose of working tables, when considering the incidence of flow of past years, this impossibility does not exist, as actual measurements of the natural flow are available, and with these as a basis to work on quantities of compensation water can be accurately computed, and the computations shown in the tables correctly represent matters as existing in the past. This would not be so after impounding commenced, since this knowledge of quantity of natural flow would not then be available.

Compensation water based on measured flow at the Upper Anicut will not represent the quantities unjustly withdrawn from Madras, but generally less quantities, which are moreover not susceptible of computation.

The headings in Table III, columns 5 and 7, involve inaccurate nomenclature and do not represent what the "net flow" or "resulting flow" would have been but merely the differences of the columns. To be strictly accurate the above words should be deleted from the headings of the columns.

The results of the computation are correct, and give correct figures for computing the compensation water in column 7, but the names given to the columns are incorrect. What the *resulting flow* at Cauvery dam on any day due to impounding at Kannambadi would actually be is not susceptible of accurate computation, and similarly from measurement of the resulting flow after impounding no accurate computation of the corresponding *natural flow* can be made.

From a knowledge of the *natural flow* measured at the Upper Anicut, a mathematically correct calculation of *compensation water* due to any specified impounding can be made from the basis of measurement of *resulting flow*, no correct computation of *natural flow* or *compensation water* can be made.

As under the Mysore proposals the latter only can be measured, there will be no basis for correct calculation of *compensation water*.

67. The basis of the inaccuracy of computations of compensation water is due to the quantities R + S as described in Ma.-14, paragraph 124.

Reference, Mysore paragraph 102.

The incidence of loss under the factor R is not confined to days when the tables show *minus* flow, but occurs as stated in paragraph 62 above on every day when impounding occurs and the stage of the natural flow of the river is between what would give to Cauvery channels anything between full useful supply and no supply.

68. It is perfectly true that the factor S will be negative as well as positive, but it will be positive on a falling river and the result would be that Madras would be deprived of water due when water was scarce, and given back water when water was plentiful.

Reference, Mysore paragraphs 103 and 104.

In addition, as a *minus* flow cannot be realised in nature, the occasions on which a *minus* flow is recorded by calculations would be also occasions on which loss would be suffered by Madras.

69. It is possible in a system in which the irrigation consists of a narrow strip of cultivation along the main river and when economical distribution of water is not practised that quantities of water within the limits stated may be returned to the river.

Reference, Mysore paragraph 105.

In the case of the Mysore Cauvery Project, the bulk of the irrigation is remote from the main river and in a very absorbed and porous soil. There are further a number of tanks in the area and drainage water from the fields will be caught up in these tanks.

The contention of return to the main river of any material percentage of the water placed on the land cannot be admitted with regard to any but the river side channels.

These channels already take large quantities of water—very much more than economical distribution would demand. Under the new system these channels which will be supplied with reservoir water will be remodelled and economies will be practised, and it is unlikely that the return to the river from them will be materially greater than it is at present.

70. As regards Marikanave reservoir, the stream across which the reservoir was made is comparatively small and quite devoid of marginal irrigation. It is not surprising that the introduction of a large reservoir and system of marginal irrigation should have resulted in a small flow being realised during dry months when the reservoir water is at high level or when irrigation is being practised along the margins. Such a result, if it is actually experienced, does not disprove the Madras contention as applied to such a river as the Cauvery which has been taking a great part of its flow, except during the flood season, into the marginal channels, from time immemorial.

Reference, Mysore paragraphs 106 and 107.

71. On all the above grounds, Madras retain their objections to any system of measurement which involves measurement at the Upper Anicut and the specific reasons for this are given concisely in Ma.-14, paragraph 126.

Reference, Mysore paragraph 108.

21. The North Rajan channel is provided with a head sluice of four vents each of 4' x 5' ; it is 28 miles 18.5 chains long and irrigates about 20,252 acres, with an F.S.L. of 6 feet on sill of head sluice corresponding to a discharge of 715 cubic feet per second, giving a maximum capacity duty of 27 acres per cubic foot per second. All the regulating works and head sluices for the branch channels have been constructed. The head sluice to Thirunarayur branch, the regulators at the tail end, and the works required, for diverting the surplus from this channel into the Gavarapattu channel were incomplete at the time the construction estimate was closed.

22. This (North Rajan) channel crosses in its course the old Coleroon (the chief drainage channel of this system) and the Gavarapattu irrigation channel where aqueducts have been built. Only one aqueduct was built at the former place, but subsequently another one was also built in connection with the improvements to the Chidambaram drainage (to be described later on). The Gavarapattu channel is a branch of the Khan Sahib's canal (to be described later on) and is used partly as a drainage and partly as an irrigation channel. The Khan Sahib's canal and the Gavarapattu channel are supplied from the North Rajan channel during times of scarcity and the works constructed for this will be described later on. Of these, the regulator across the Pettai branch and the surplus work to divert the water into the Gavarapattu channel were in progress at the time of closing of the construction estimates.

23. The Vadavar has an open head and is crossed at its head by means of a bridge of three arches, one of 60 feet span and two of 20 feet carrying the Madras-Kumbakonam road. The channel is a high level one and supplies 11,066 acres of direct irrigation by means of branch channels and empties itself into the Veeranam tank. Full supply is 8 feet on the theoretical bed which, however, is so considerably silted, that the F.S.L. discharges has been gauged at only 900 c.f.s. Its bed width varies from 60 feet to 100 feet. The head sluices of all the branch channels were being fitted with screw-gearing shutters at the time of the closing of the construction estimates.

24. The Veeranam tank is a very old tank supplied by the rainfall on its catchment of 195 square miles besides being fed by the Vadavar as just mentioned. It irrigates 45,159 acres by means of various channels, all of which are provided with head sluices with screw-gearing shutters. The tank has three surplus weirs and a natural paved byewash at its southern flank. There is also a surplus weir at the northern flank provided with screw-gearing shutters and a surplus sluice fitted with screw-gearing shutters at the same flank called the Shatlatope supply sluice.

25. The surplus over the southern weirs passes down an old drainage channel into the Khan Sahib's canal down which it passes to the two Kopadi weirs which discharge it into the old Coleroon.

26. The surplus over the northern surplus weirs enters the Vellar below the Shatlatope anicut and that over the sluice enters the same river above that anicut. This latter sluice is double-acting, for it occasionally supplies Vellar water to the Veeranam tank as well as being used more ordinarily to supply the Veeranam tank water to the Shatlatope anicut system.

27. The drainage from the lands under the Vadavar and the channel from the southern surplus weirs of the Veeranam tank unite to form the Khan Sahib's canal which, in its course, receives the drainage from the lands under the Veeranam tank also. This canal, though it is thus primarily a drainage channel, is used also for irrigation. For about five months in the year, during the monsoons, it was also at one time used as a means of communication from Bhavani on the Cauvery through Coimbatore, Salem, Trichinopoly and South Arcot districts to Porto Novo. It is now no more used as a navigation canal except for a little local traffic. When used for navigation it emerged from the Veeranam tank through two upper locks which have long since been demolished.

28. As an irrigation channel it irrigates about 12,946 acres. In the early part of the year the supply is very precarious, while in the rainy season it is excessive by reason of the abundant drainage. To provide a means for the supply of water for irrigation during times of scarcity a vent was opened in the side wall of the Puliyangudi aqueduct of the Rajan voikal. This aqueduct is an old work on the Rajan voikal at about 15 miles from the head, constructed for draining the lands between the river bank and the channel into the Khan Sahib's canal. As this drainage has been since diverted into the river, the aqueduct is not now in use.

29. The drainage received into the Khan Sahib's canal passes along it down to Kopadi weirs as above mentioned (paragraph 25). These weirs were constructed here in the right bank of the channel for discharging the surplus into the old Coleroon. The surplus water after passing over the weirs has to pass under the Rajan voikal and

one aqueduct was first constructed at this place. As the waterway of this was quite insufficient, another aqueduct was subsequently constructed as mentioned in paragraph 22. With a view to send down as much of the drainage through the old Coleroon and to prevent the Khan Sahib's canal from carrying more than what it can carry safely, a regulator and flood bank were constructed across the Khan Sahib's canal just below the surplus weirs. These works were under construction at the time the project estimate was closed.

30. A branch from the Khan Sahib's canal takes off at about a mile below the Kopadi weirs and is known as Gavarapattu channel. This channel is also both an irrigation and drainage channel, and irrigates about 2,500 acres. It suffers from scarcity of water in the early part of the season and later on just before harvest when there is not much drainage. To supply water during these times of scarcity, a sluice has been constructed in the right bank of the Pettai branch of the Rajan voikal. This work was under construction at the time of the closure of the project estimate. The old head sluice and Gavarapattu channel was about to be rebuilt on improved lines when the construction estimates closed.

31. To relieve the Khan Sahib's canal from the large quantity of drainage entering below the regulator and flood bank described in paragraph 29, three surplus works have been constructed on the canal, two on the right and the third on the left bank. The first of these is known as the Muthia Pillai surplus and is of three spans fitted with screw-gearing shutters of 10 feet $\times$ 4½ feet. The second is the one known as the Tiruvakulam (Tiruvarkulam) calingulah about two miles below the town of Chidambaram. This work had a solid body wall, and in order to give a greater waterway, the body wall was demolished, and the work fitted with lift shutters of five spans of 8 feet $\times$ 5½ feet each. These two surplus works discharge into the Uppanar drain. The third surplus weir discharges through an existing old drain into the Vellar. The fitting of the lift shutters of the Tiruvakulam calingulah was in progress at the time of the closure of the construction estimates.

32. The Khan Sahib's canal ends in the old Porto Novo lock through which boats used to pass into the Vellar backwater at Porto Novo. As the lock is not now in use, it is fitted with lift shutters and acts as a terminal escape for the Khan Sahib's canal.

33. The drainage from the middle portion of the area irrigated by the Veeranam tank is caught by means of a shallow tank known as Ponneri tank and irrigates about 3,284 acres. The supply is also supplemented by means of a channel from the Veeranam tank. The surplus of Ponneri tank and the drainage of that portion of the Veeranam tank which does not fall into the Khan Sahib's canal form a drainage channel known as Pasimuthan odai which empties itself into the Vellar about five miles from Chidambaram.

34. This is purely a drainage channel down to Chidambaram town but is afterwards used for the irrigation of about 2,880 acres. Near Chidambaram, it has been provided with a surplus work on its right bank known as Tillai Amman calingulah which discharges into the Khan Sahib's canal. At respectively one mile and two miles below this outlet, for the sake of holding up water for irrigation purposes, two calingulahs with solid body walls were built across the odai in old days. As these obstructed the free flow of drainage down the channel, the solid body walls were demolished and the weirs provided with lift shutters, each of four spans of 15 feet by 5 feet high. This work was in progress at the time of the closure of the completion estimate. The irrigation sluices taking off from the above drainage channel have been provided with rack and pinion shutters for the regulation of water, but this work had not been completed at the time of the closure of the construction estimates.

35. The old Coleroon, referred to in paragraph 29, is an old channel, and as it was not wide and deep enough to carry the large quantity of drainage entering it, it was widened and deepened on an estimate of Rs. 81,300 and the work was nearing completion at the time of the closure of the completion estimates. The drain was proposed to be widened to 130 feet, but after it had been dug to that width for some distance, it was found that the expense was likely to be very high and it was decided to reduce the width of the channel to 100 feet. The ultimate cost of the work was Rs. 81,300.

36. On the south or Tanjore flank of the Lower anicut the South Rajan voikal takes off with a sluice of two vents, each 8 feet $\times$ 7 feet built in a line with the anicut. A leading channel about a furlong in length connects this with the Coleroon and a scouring sluice to the left of the head sluice worked by shutters, keeps the former clear of silt. The South Rajan channel is about 28 miles long; is of varying width and very crooked in places; irrigates 17,027 acres situated in Kumbakonam, Mayavaram and Shiyal taluks of the Tanjore district, has a depth of 6 feet when carrying full supply and discharges 445 cubic feet per second, representing a maximum capacity duty of 38 acre per cubic foot per second. It has two masonry calingulahs built across it to raise water to high level lands near them; the first is at 12 miles and 200 feet and has recently been remodelled and fitted with shutters 8 feet $\times$ 3½ feet worked by rack and pinion arrangements. The second is at 17 miles, 6 furlongs and 630 feet and is an old work with

2½ feet upright stones built into it. Many main and minor branches take off from the South Rajan, but only a few of them have been provided with sluices at their heads; one of those, the Oosi voikal which takes off at 15 miles, 6 furlongs and 460 feet on the right bank is about a mile and a half long, has an open head and surpluses into the Pudumaniar which it supplements during periods of scarcity. The bridge at 15 miles and 2,000 feet which carries the Panangattangudi-Shiyali road and has been converted into a regulator worked by needle shutters, serves to divert water down this Oosi voikal. The channel crosses many drainage courses, the most important of them the Odiyar and the Kondappan Cauvery which it crosses by means of masonry aqueducts known, respectively, as the Narimudukku and the Kondappan Cauvery aqueducts, the other drainages are syphoned under the channel; a few more drainages enter the channel, one of them below the Sidhamalli calingulah near Kurichi village draining about 2.89 square miles; and this is received into the Coleroon through the surplus work at 14 miles 7 furlongs and 150 feet known as Vannaodappu, consisting of 4 vents 4' $\times$ 4'6" worked by needle shutters but now being rebuilt and fitted with screw-gear. The Alinjyiar and Olai voikal are also taken in and surplused by means of outlets in its left bank into the Coleroon. The channel is provided with eight road bridges and in ninth bridge takes the South Indian Railway over it, close to the Coleroon.

37. The Kumukkimanriar is 8 miles, 1 furlong and 313 feet long, has a fall of 6 inches per mile: discharges nearly 130 cusecs when running full: irrigates 1,280 acres of high land lying between it and the South Rajan, and supplements the Manniar also to a certain extent. The southernmost vent (6' $\times$ 7') of the South Rajan head sluice admits supply into the Kumukkimanriar when the drainage of lands served by the Manniar into its upper reach, and which enters the channel at its head, proves insufficient. There are a small number of irrigation sluices and two road bridges, one for Olugacherry at 3 furlongs and 530 feet and the other at its tail end. A few outlets built in it discharge the excess supply either into the South Rajan or the Odayar surplus while a syphon near its tail end leads the drainage of a small extent of land to the right of it into the Kondappan Cauvery. It crosses the Odayar by a masonry aqueduct 94 feet long from end to end and 13 feet broad, pierced with 5 vents each 3' $\times$ 6'. Close by it crosses the Oosiyar, a branch of the Odayar by another aqueduct similar to the above, to which Oosiyar water is raised by means of a regulator built in front of the first aqueduct and worked by rack and pinion shutters. A tail drop carrying also a roadway arranged to raise water to lands above, surpluses excess supply into the Manniar.

APPENDIX XXVII.

STATEMENT A.

STATEMENT of daily discharges in excess of 1,000 cusecs (86.4 million cubic feet per day) of the Cauvery at Bhavani bridge from March to May.

Dates.	Cauvery at Bhavani bridge.			Dates.	Cauvery at Bhavani bridge.		
	March.	April.	May.		March.	April.	May.
1891.				1891—cont.			
	MILL. C.FT.	MILL. C.FT.	MILL. C.FT.		MILL. C.FT.	MILL. C.FT.	MILL. C.FT.
1 ..	..	..	..	17 ..	..	..	..
2 ..	..	..	..	18 ..	..	..	..
3 ..	..	..	..	19 ..	545	..	..
4 ..	..	..	..	20 ..	424	..	..
5 ..	..	..	..	21 ..	151	..	..
6 ..	..	..	..	22 ..	117	..	..
7 ..	..	..	..	23 ..	99	..	..
8 ..	..	..	..	24 ..	..	..	..
9 ..	..	..	..	25 ..	..	..	..
10 ..	..	163	..	26 ..	..	..	104
11 ..	..	163	..	27 ..	..	..	99
12 ..	..	..	..	28 ..	..	..	94
13 ..	..	..	..	29 ..	..	92	94
14 ..	..	..	..	30 ..	..	..	94
15 ..	..	..	..	31 ..	..	..	94
16 ..	..	..	..				

NOTE.—Discharges below 1,000 cusecs (86.4 million cubic feet per day) are not recorded at Bhavani bridge.

Statement of daily discharges in excess of 1,000 cusecs (86.4 million cubic feet per day), etc.—cont.

Dates.	March.	April.	May.	Dates.	March.	April.	May.
Cauvery at Bhavani bridge.				Cauvery at Bhavani bridge.			
1892.				1893—cont.			
1	..	..	138	27	104	375	..
2	..	..	175	28	133	257	..
3	..	..	211	29	124	279	..
4	..	..	189	30	133	257	..
5	..	..	168	31	108	..	..
6	..	..	158				
7	..	..	234				
8	..	..	257				
9	..	..	211				
10	..	..	257				
11	..	..	189				
12	..	..	351				
13	..	..	719				
14	..	..	792				
15	..	..	719				
16	..	..	647				
17	..	..	575				
18	..	..	1,028				
19	..	..	647				
20	..	..	1,028				
21	..	..	1,113				
22	..	..	868				
23	..	..	515				
24	..	..	257				
25	..	..	211				
26	..	..	400				
27	..	..	611				
28	..	..	424				
29	..	..	120				
30	..	..	104				
31	..	..	163				
1893.				1894.			
1	151	..	..	1	..	..	129
2	124	..	..	2	..	..	120
3	104	..	..	3	..	..	120
4	104	..	..	4	..	..	189
5	94	..	..	5	..	..	189
6	94	..	..	6	..	..	180
7	124	..	..	7	..	..	168
8	124	..	..	8	..	..	163
9	424	..	..	9	..	..	163
10	375	..	..	10	..	94	163
11	326	..	..	11	..	104	163
12	302	..	..	12	..	120	168
13	351	..	..	13	..	112	138
14	302	..	..	14	..	108	138
15	351	..	..	15	..	104	129
16	326	..	..	16	..	104	129
17	424	..	..	17	..	104	129
18	424	..	..	18	..	108	129
19	515	..	..	19	..	120	148
20	151	..	..	20	..	112	163
21	108	..	..	21	..	108	138
22	94	..	..	22	..	104	124
23	94	..	..	23	..	104	120
24	94	..	..	24	..	104	112
25	94	..	..	25	..	94	148
26	94	99	..	26	..	94	163
				27	..	94	138
				28	..	..	163
				29	..	94	158
				30	..	94	151
				31	..	..	148
1895.				1896.			
1	..	..	..	1	..	..	..
2	..	..	..	2	..	..	..
3	..	..	..	3	..	..	..
4	..	..	..	4	..	..	..
5	..	..	..	5	..	..	..
6	..	..	..	6	..	..	..
7	..	..	..	7	..	..	..
8	..	..	..	8	..	..	..
9	..	..	..	9	..	..	..
10	..	..	..	10	..	..	163
11	..	..	..	11	..	..	129
12	..	..	..	12	..	..	95
13	..	..	..	13	..	..	..
14	..	..	..	14	..	..	..
15	..	..	..	15	..	..	..
16	..	..	..	16	..	..	..
17	..	..	..	17	..	..	..
18	..	..	..	18	..	..	..
19	..	..	..	19	..	..	..
20	..	..	..	20	..	..	..
21	..	..	..	21	..	..	..
22	..	..	..	22	..	..	..
23	..	..	..	23	..	..	..
24	..	..	..	24	..	..	189
25	..	..	..	25	..	..	611
26	..	..	..	26	..	..	351
27	..	..	..	27	..	..	257
28	..	..	..	28	..	..	158
29	..	..	..	29	..	..	138
30	..	..	..	30	..	..	120
31	..	..	..	31	..	..	104
1897.				1898.			
1	..	..	..	1	..	..	163
2	..	..	..	2	..	..	158
3	..	..	..	3	..	..	158
4	..	..	..	4	..	..	148
5	..	..	..	5	..	..	148
6	..	..	..	6	..	..	400
7	..	..	..	7	..	..	400
8	..	..	..	8	..	..	279
	..	..	..	9	..	..	211
	..	..	..	10	..	..	180
	..	..	..	11	..	..	168
	..	..	..	12	..	..	151
	..	..	..	13	..	..	133
	..	..	..	14	..	..	120
	..	..	..	15	..	..	112
	..	..	..	16	..	..	108
	..	..	..	17	..	..	108
	..	..	..	18	..	..	94
	..	..	..	19	..	..	168
	..	..	..	20	..	..	142
	..	..	..	21	..	..	133
	..	..	..	22	..	..	138
	..	..	..	23	..	..	107
	..	..	..	24	..	..	99
	..	..	..	25	..	..	107
	..	..	..	26	..	..	148
	..	..	..	27	..	..	142
	..	..	..	28	..	..	160
	..	..	..	29	..	..	175
	..	..	..	30	..	..	168
	..	..	..	31	..	..	92

NOTE.—Discharges below 1,000 cusecs (86.4 million cubic feet per day) are not recorded at Bhavani bridge.

Statement of daily discharges in excess of 1,000 cusecs (86.4 million cubic feet per day), etc.—cont.

Dates.	March.	April.	May.	Dates.	March.	April.	May.
Cauvery at Bhavani bridge.				Cauvery at Bhavani bridge.			
1895—cont.				1897—cont.			
17	..	..	151	9	..	..	112
18	..	..	138	10	..	..	94
19	..	..	138	11	..	..	104
20	..	..	151	12	..	..	94
21	..	..	138	13	..	..	108
22	..	..	129	14	..	..	158
23	..	..	129	15	..	..	172
24	..	..	158	16	..	..	189
25	..	..	138	17	..	..	120
26	..	..	138	18	..	..	124
27	..	..	148	19	..	..	99
28	..	..	142	20	..	..	99
29	..	..	158	21	..	..	99
30	..	..	138	22	..	..	99
31	..	..	129	23	..	..	94
				24	..	..	94
				25	..	..	104
				26	..	..	104
				27	..	..	104
				28	..	..	108
				29	..	..	112
				30	..	..	112
				31	..	..	112
1896.				1898.			
1	..	..	..	1	..	..	163
2	..	..	..	2	..	..	158
3	..	..	..	3	..	..	158
4	..	..	..	4	..	..	148
5	..	..	..	5	..	..	148
6	..	..	..	6	..	..	400
7	..	..	..	7	..	..	400
8	..	..	..	8	..	..	279
9	..	..	..	9	..	..	211
10	..	..	..	10	..	..	180
11	..	..	..	11	..	..	168
12	..	..	..	12	..	..	151
13	..	..	..	13	..	..	133
14	..	..	..	14	..	..	120
15	..	..	..	15	..	..	112
16	..	..	..	16	..	..	108
17	..	..	..	17	..	..	108
18	..	..	..	18	..	..	94
19	..	..	..	19	..	..	168
20	..	..	..	20	..	..	142
21	..	..	..	21	..	..	133
22	..	..	..	22	..	..	138
23	..	..	..	23	..	..	107
24	..	..	..	24	..	..	99
25	..	..	..	25	..	..	107
26	..	..	..	26	..	..	148
27	..	..	..	27	..	..	142
28	..	..	..	28	..	..	160
29	..	..	..	29	..	..	175
30	..	..	..	30	..	..	97
31	..	..	..	31	..	..	97
							92

NOTE.—Discharges below 1,000 cusecs (86.4 million cubic feet per day) are not recorded at Bhavani bridge.

STATEMENT of daily discharges of the Cauvery at Sivasamudram and discharges of 1,000 cusecs and upwards at Bhavani bridge three days later from March to May.

Dates.				March.		April.		May.	
				Cauvery at Siva-samudram.	Cauvery at Bhavani bridge.	Cauvery at Siva-samudram.	Cauvery at Bhavani bridge.	Cauvery at Siva-samudram.	Cauvery at Bhavani bridge.
1902.									
				MILL. C. FT.	MILL. C. FT.	MILL. C. FT.	MILL. C. FT.	MILL. C. FT.	MILL. C. FT.
1	..	..	..	34	..	21	..	126	99
2	..	..	..	33	..	20	..	44	104
3	..	..	..	41	..	19	..	91	109
4	..	..	..	31	..	19	..	83	109
5	..	..	..	29	..	20	..	81	114
6	..	..	..	27	..	20	..	83	104
7	..	..	..	25	..	20	..	120	109
8	..	..	..	22	..	20	..	225	119
9	..	..	..	27	..	21	..	223	114
10	..	..	..	32	..	22	..	132	112
11	..	..	..	34	..	21	..	122	112
12	..	..	..	37	..	14	..	92	122
13	..	..	..	45	..	23	..	89	112
14	..	..	..	43	..	25	..	88	107
15	..	..	..	43	..	91	..	91	99
16	..	..	..	38	..	101	..	97	97
17	..	..	..	29	..	99	..	216	122
18	..	..	..	28	..	97	..	211	132
19	..	..	..	25	..	240	..	182	279
20	..	..	..	24	..	91	..	206	257
21	..	..	..	20	..	111	94	196	143
22	..	..	..	18	..	113	92	231	153
23	..	..	..	19	..	129	88	93	163
24	..	..	..	22	..	126	114	88	183
25	..	..	..	24	..	128	104	78	153
26	..	..	..	26	..	122	99	128	211
27	..	..	..	21	..	120	109	285	153
28	..	..	..	19	..	109	99	142	173
29	..	..	..	24	..	96	99	61	178
30	..	..	..	20	..	92	104	100	153
31	..	..	..	17	..	..	..	53	135
1903.									
1	..	..	..	62	..	36	..	29	..
2	..	..	..	57	..	36	..	28	..
3	..	..	..	57	..	31	..	28	..
4	..	..	..	52	..	32	..	30	..
5	..	..	..	47	..	28	..	30	..
6	..	..	..	42	..	21	..	30	..
7	..	..	..	43	..	22	..	30	..
8	..	..	..	43	..	20	..	33	..
9	..	..	..	39	..	23	..	38	..
10	..	..	..	39	..	24	..	48	99
11	..	..	..	51	..	25	..	68	143
12	..	..	..	51	..	18	..	202	189
13	..	..	..	51	..	17	..	371	279
14	..	..	..	51	..	20	..	337	400
15	..	..	..	51	..	31	..	540	485
16	..	..	..	52	..	30	..	540	575
17	..	..	..	37	..	30	..	680	647

NOTE.—Discharges below 1,000 cusecs (86·4 million cubic feet per day) are not recorded at Bhavani bridge.

Statement of daily discharges of the Cauvery at Sivasamudram and at Bhavani, etc.—cont.

Dates.	March.		April.		May.	
	Cauvery at Siva-samudram.	Cauvery at Bhavani bridge.	Cauvery at Siva-samudram.	Cauvery at Bhavani bridge.	Cauvery at Siva-samudram.	Cauvery at Bhavani bridge.
1903—cont.						
	MILL. C. FT.	MILL. C. FT.	MILL. C. FT.	MILL. C. FT.	MILL. C. FT.	MILL. C. FT.
18	39	..	30	..	441	683
19	37	..	30	..	285	719
20	37	..	30	..	610	754
21	34	..	29	..	610	719
22	32	..	24	..	1,153	647
23	33	..	26	..	702	611
24	38	..	24	..	842	575
25	32	..	25	..	626	545
26	51	..	25	..	491	455
27	46	..	25	..	473	234
28	42	..	27	..	295	211
29	36	..	54	..	214	189
30	33	..	28	..	346	178
31	34	..	..	..	197	168

1904.

1	99	102	45	..	97	..
2	99	102	86	..	97	97
3	94	97	72	..	123	97
4	93	97	54	..	123	94
5	93	97	45	..	146	92
6	84	97	45	..	171	92
7	52	97	67	..	168	178
8	56	97	67	..	143	168
9	56	97	67	..	119	153
10	66	97	66	..	194	138
11	66	97	86	..	195	168
12	70	92	89	..	195	279
13	68	92	89	..	195	279
14	77	92	143	97	235	302
15	82	92	160	107	319	424
16	80	..	111	107	434	400
17	79	..	96	103	530	326
18	79	..	91	103	667	400
19	79	92	90	97	831	719
20	79	92	90	97	648	1,113
21	76	92	90	..	574	985
22	76	92	90	..	434	830
23	76	97	90	..	399	611
24	70	97	66	..	319	575
25	70	97	58	..	399	545
26	67	102	58	..	481	545
27	62	102	61	..	481	754
28	58	102	61	..	574	647
29	51	102	61	..	399	754
30	50	102	97	..	399	719
31	50	102	..	..	399	754

1905.

1	53	..	24	..	25	..
2	48	..	24	..	29	..
3	48	..	24	..	30	..
4	45	..	22	..	31	..
5	53	..	22	..	27	..
6	45	..	22	..	26	..
7	45	..	32	..	25	..
8	48	..	22	..	24	..

Note.—Discharges below 1,000 cusecs (86.4 million cubic feet per day) are not recorded at Bhavani bridge.

Statement of daily discharges of the Cauvery at Sivasamudram and at Bhavani, etc.—cont.

Dates.	March.		April.		May.	
	Cauvery at Siva-samudram.	Cauvery at Bhavani bridge.	Cauvery at Siva-samudram.	Cauvery at Bhavani bridge.	Cauvery at Siva-samudram.	Cauvery at Bhavani bridge.
1905—cont.						
	MILL. C. FT.	MILL. C. FT.	MILL. C. FT.	MILL. C. FT.	MILL. C. FT.	MILL. C. FT.
9	48	..	22	..	24	..
10	59	..	22	..	25	..
11	59	..	36	..	26	..
12	55	..	36	..	27	..
13	51	..	34	..	31	..
14	43	..	34	..	144	..
15	43	..	34	..	97	..
16	35	..	47	..	201	..
17	35	..	38	..	246	107
18	31	..	35	..	218	117
19	27	..	38	..	976	158
20	27	..	35	..	491	168
21	24	..	46	..	328	211
22	24	..	46	..	328	189
23	24	..	46	..	285	168
24	24	..	46	..	441	153
25	24	..	47	..	491	148
26	24	..	38	..	491	188
27	24	..	34	..	358	158
28	24	99	39	..	358	168
29	24	..	36	..	358	163
30	24	..	34	..	241	158
31	24	..	..	..	161	148

1906.

1	41	..	15	..	10	..
2	41	..	15	..	10	..
3	38	..	14	..	10	..
4	37	..	14	..	10	..
5	33	..	14	..	9	..
6	33	..	14	..	9	..
7	29	..	13	..	9	..
8	35	..	13	..	9	..
9	36	..	12	..	10	..
10	30	..	12	..	10	..
11	27	..	15	..	10	..
12	24	..	13	..	10	..
13	23	..	13	..	10	..
14	16	..	12	..	13	..
15	16	..	12	..	23	..
16	16	..	11	..	34	..
17	25	..	8	..	131	..
18	24	..	8	..	104	..
19	23	..	9	..	104	..
20	21	..	10	..	53	127
21	21	..	11	..	53	117
22	21	..	11	..	42	183
23	18	..	12	..	67	107
24	18	..	12	..	53	97
25	18	..	12	..	42	..
26	18	..	11	..	41	..
27	18	..	11	..	41	..
28	18	..	11	..	41	..
29	17	..	11	..	37	..
30	17	..	10	..	35	..
31	16	..	..	..	35	..

Note.—Discharges below 1,000 cusecs (86.4 million cubic feet per day) are not recorded at Bhavani bridge.

Statement of daily discharges of the Cauvery at Sivasamudram and at Bhavani, etc.—cont.

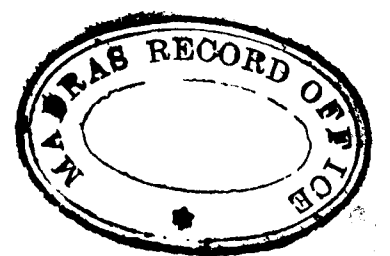
Dates.	March.		April.		May.	
	Cauvery at Siva-samudram.	Cauvery at Bhavani bridge.	Cauvery at Siva-samudram.	Cauvery at Bhavani bridge.	Cauvery at Siva-samudram.	Cauvery at Bhavani bridge.
1907.						
	MILL. C. FT.	MILL. C. FT.	MILL. C. FT.	MILL. C. FT.	MILL. C. FT.	MILL. C. FT.
1	51	..	27	..	105	..
2	51	..	30	..	137	..
3	32	..	30	..	137	..
4	30	..	32	..	137	..
5	30	..	51	..	105	..
6	30	..	51	..	105	..
7	30	..	51	..	50	..
8	30	..	51	..	50	..
9	30	..	32	..	50	..
10	29	..	31	..	50	..
11	51	..	32	..	50	..
12	51	..	32	..	116	..
13	51	..	32	..	68	..
14	51	..	51	..	68	..
15	51	..	107	..	115	..
16	51	..	107	..	115	..
17	32	..	106	..	115	..
18	32	..	106	..	119	..
19	32	..	106	..	87	..
20	31	..	106	..	87	..
21	51	..	106	..	87	..
22	30	..	107	..	105	..
23	27	..	107	..	101	..
24	24	..	107	..	77	..
25	25	..	87	..	57	..
26	24	..	87	..	57	..
27	22	..	87	..	77	..
28	23	..	106	..	81	..
29	22	..	106	..	328	..
30	26	..	106	..	249	..
31	29	..	..	..	151	..
1908.						
	MILL. C. FT.	MILL. C. FT.	MILL. C. FT.	MILL. C. FT.	MILL. C. FT.	MILL. C. FT.
1	19	..	34	..	69	138
2	22	..	35	..	69	153
3	34	..	40	..	69	168
4	37	..	40	..	60	138
5	35	..	40	..	43	138
6	35	..	40	..	51	143
7	35	..	35	..	73	168
8	35	..	35	..	328	268
9	35	..	35	..	328	400
10	30	..	35	..	441	387
11	30	..	35	..	371	387
12	28	..	35	..	285	375
13	32	..	35	..	196	351
14	36	..	35	..	163	326
15	35	..	35	..	129	326
16	35	..	35	..	105	326
17	35	..	153	..	105	302
18	32	..	97	..	105	290
19	32	..	103	..	105	279
20	28	..	103	..	105	..
21	27	..	67	..	228	..
22	27	..	133	..	371	..
23	28	..	133	..	371	..
24	28	..	163	..	441	..

NOTE.—Discharges below 1,000 cusecs (86.4 million cubic feet per day) are not recorded at Bhavani bridge.

Statement of daily discharges of the Cauvery at Sivasamudram and at Bhavani, etc.—cont.

Dates.	March.		April.		May.	
	Cauvery at Siva-samudram.	Cauvery at Bhavani bridge.	Cauvery at Siva-samudram.	Cauvery at Bhavani bridge.	Cauvery at Siva-samudram.	Cauvery at Bhavani bridge.
1908—cont.						
	MILL. C. FT.	MILL. C. FT.	MILL. C. FT.	MILL. C. FT.	MILL. C. FT.	MILL. C. FT.
25	27	..	133	..	223	..
26	35	..	108	..	157	..
27	35	..	163	..	105	..
28	35	..	108	..	105	..
29	35	..	108	..	79	..
30	35	..	84	..	72	..
31	31	..	..	..	60	..
1909.						
	MILL. C. FT.	MILL. C. FT.	MILL. C. FT.	MILL. C. FT.	MILL. C. FT.	MILL. C. FT.
1	..	..	..	..	..	107
2	..	..	..	..	..	..
3	..	..	..	..	..	..
4	..	..	..	..	..	..
5	..	..	..	..	..	112
6	..	..	..	..	..	107
7	..	..	..	..	..	412
8	..	..	..	..	..	6,620
9	..	..	..	..	..	2,286
10	..	..	..	..	..	3,640
11	..	..	..	..	..	3,546
12	..	..	..	138	..	2,216
13	..	..	..	117	..	1,297
14	..	..	..	107	..	905
15	..	..	..	138	..	683
16	..	..	..	117	..	545
17	..	..	..	107	..	515
18	..	..	..	97	..	455
19	..	..	..	97	..	400
20	..	..	..	97	..	424
21	..	..	..	..	..	400
22	..	..	..	..	..	351
23	..	..	..	..	..	291
24	..	..	..	..	..	246
25	..	..	..	189	..	211
26	..	..	..	158	..	211
27	..	..	..	127	..	211
28	..	..	..	107	..	173
29	..	..	..	97	..	158
30	..	..	..	..	..	163
31	..	..	..	..	..	178

NOTE.—Discharges below 1,000 cusecs (86.4 million cubic feet per day) are not recorded at Bhavani bridge.



STATEMENT C.

STATEMENT of number of days in each month for twenty years when there is a recorded flow at Bhavani bridge in March, April and May and the average daily flow of such days and the maximum recorded in million cubic feet per day.

	1890.	1891.	1892.	1893.	1894.	1895.	1896.	1897.	1898.	1899.
1	2	3	4	5	6	7	8	9	10	11
March.										
Number of days when there is flow over 1,000 cusecs.	..	5	..	31	3	..	..	..	..	..
Average flow of those days in mill. c. ft.	..	267	..	206	244	..	..	..	..	..
Maximum flow recorded in mill. c. ft.	..	546	..	515	545	..	..	..	..	..
April.										
Number of days when there is flow over 1,000 cusecs.	..	3	3	5	19	19	..	..	8	16
Average flow of those days in mill. c. ft.	..	139	108	302	107	181	..	..	167	307
Maximum flow recorded in mill. c. ft.	..	163	120	375	138	158	..	..	189	683
May.										
Number of days when there is flow over 1,000 cusecs.	31	6	31	..	31	31	11	31	29	29
Average flow of those days in mill. c. ft.	293	96	448	..	148	152	212	118	156	154
Maximum flow recorded in mill. c. ft.	868	104	1,118	..	189	375	611	189	400	351

	1900.	1901.	1902.	1903.	1904.	1905.	1906.	1907.	1908.	1909.
	12	13	14	15	16	17	18	19	20	21
March.										
Number of days when there is flow over 1,000 cusecs.	..	5	..	..	28	1	..	..	..	..
Average flow of those days in mill. c. ft.	..	101	..	..	97	99	..	..	..	..
Maximum flow recorded in mill. c. ft.	..	109	..	..	103	99	..	..	..	..
April.										
Number of days when there is flow over 1,000 cusecs.	1	..	10	..	7	..	..	..	..	14
Average flow of those days in mill. c. ft.	88	..	100	..	102	..	..	..	..	121
Maximum flow recorded in mill. c. ft.	88	..	114	..	107	..	..	..	..	189
May.										
Number of days when there is flow over 1,000 cusecs.	7	23	31	22	30	15	5	..	19	28
Average flow of those days in mill. c. ft.	113	250	140	432	441	157	116	..	266	959
Maximum flow recorded in mill. c. ft.	155	575	279	754	1,113	211	133	..	400	6,620

APPENDIX XXVIII.

STATEMENT showing the approximate areas of crops requiring water from February to May under the Cauvery channels in a normal year in the Trichinopoly district.

Taluk.	Area of crops requiring water in the month of				Remarks.
	February.	March.	April.	May.	
1	2	3	4	5	6
Trichinopoly	ACS. 9,424	ACS. 8,728	ACS. 7,648	ACS. 7,648	
Musiri	7,286	7,158	6,073	5,282	
Kulittalai	10,035	8,407	9,084	4,122	
Karur	3,357	2,868	2,286	2,140	
Namakkal	4,198	4,411	964	1,079	
Total	34,300	31,572	26,055	20,251	

Exhibit Ma.-23.

SHORT PRÉCIS OF THE MOST MATERIAL POINTS OF
MADRAS CASE.

SECOND ISSUE.

The basis of the original pleadings of Madras, part I (Ma. 1).—The estimate of the least limit natural flow at the Upper Anicut which under actually existing conditions, viz., the conditions existing subsequent to the remodelling of the Upper, Lower and Grand Anicats, would safeguard Madras rights was the basis of the original claim, Ma. 1—clause, II-a, c and d.

Amended pleadings by Madras are stated in part II (Ma. 3), paragraphs 3 and 4-II (i) and (iv) and also Ma. 4, paragraphs 3 and 4, clause (3).—The amendment was made owing to the claim of Mysore that "the Madras Government is accordingly entitled to the water-supply for irrigation acquired by prescriptive right." The claim to have strict law applied to the decision of limit quantity of flow at the Upper Anicut made by Mysore and admitted by Madras is upheld by the words of the agreement of 1892, clause III (Ma. 2) and the circumstances under which the reference to the "law on the subject of prescriptive right to the use of water" was retained in the agreement when the Madras Government wished it out are shown in appendix A, Ma. 11, letter of 20th July 1891, from the Chief Engineer, Mysore, to the Joint Secretary to the Government of Madras, Ma. 11, appendix A.

The law is thus now admitted by both parties as the basis on which the extent of prescriptive right has to be judged and Madras claim has been amended accordingly.

2. The reply to issue II which the Madras Government claim to be the proper one is given in Ma. 9, paragraph 44.

3. Madras Part II (Ma. 8) is descriptive. So far as the descriptions are concerned and statements of facts as apart from inferences the matter has not been disputed in any material point.

A question has been raised as regards the area of irrigation under the Vadavar and Veeranam tank throwing doubt on the areas in paragraph 35. The matter appears a minor one, but is dealt with in Madras, part XII, paragraph 10 and appendix XXVI. A clear understanding of the undisputed facts and descriptive details of works is essential to the case.

With the exception of certain inferences and remarks, principally in paragraphs 34, 45 and 47, there is no contentious matter in this part.

Rules of regulation, and information about the conditions of works which actually existed when the rules were framed are set forth.

Statements of areas irrigated above the Upper Anicut given in appendix III have been the subject of some contention and further tables amplifying these appear in appendix XV.

Appendix II, referred to in paragraph 47, has been replaced by a revised statement—appendix XVIII.

4. The remarks which follow are not designed to be a *resumé* of the whole case but to draw attention to the most material points of evidence on which the Government of Madras rely in support of their claims and contentions.

It is here premised that the exclusion of any point is not to be taken as ground for the inference that Madras abandon it or that it is not relied on.

5. To facilitate reference and to bring out the minor facts and arguments, a statement is attached to this précis giving a short descriptive title of the subject matter of each paragraph or set of paragraphs in the statement of the case and the replies and rejoinders to the same, giving against each descriptive entry the number of paragraph originally raising the point, and reference to the successive replies and rejoinders which have passed as regards it between the parties, with further reference to the appendices and exhibits bearing on the point.

A list of appendices and exhibits with entries of the paragraphs in which these are referred to is also given to facilitate reference.

6. The evidence on which the Madras Government rely to establish their contentions as regards the second issue is briefly set forth below. The facts adduced are not disputed—

(a) The record of gauge readings of Cauvery dam at the Upper Anicut and of water level above and below the Cauvery-Vennar regulators at the Grand Anicut (Madras appendices VI and VIII).

(b) The rules of regulation at the Upper Anicut from 1882 to 1910 (appendix I).

(c) The rules of regulation of the Cauvery-Vennar regulators at the Grand Anicut from the time of construction of the regulators to 1910 (appendix I).

The regulation has been carried out throughout the period covered by the rules in accordance with the specific executive directions laid down in the rules and, where these directions include permissive clauses, the method of actual use is the evidence of method and extent of user and this is to be found in the record of gauge readings, appendices VI and VIII.

In the case of the rules of regulation at the Grand Anicut the rules lay down the conditions under which ordinary regulation of the Cauvery and Vennar regulators must be subordinated to flood conditions, and the occasions and dates on which under these rules these conditions came into operation are recorded in appendix XVIII.

There is no conflict between the rules of regulation and the methods of actual regulation, but there are ambiguous expressions in rules, and the Madras Government rely for interpretation of the meaning of such ambiguities on the evidence available as the method of applying the rules, that is, the evidence of actual use is shown in appendices VI and VIII.

7. *Madras Prescriptive right for the Cauvery delta system.*—It is claimed to be established that this right is to the whole natural flow of the river up to a limit of 2,944 millions cubic feet per day. This claim is based on the rules of 1882 and 1896 for regulation at the Upper Anicut and on the actual incidence of distribution of flow resulting from the operation of these rules.

The evidence is given by appendices I and VI.

The arguments are to be found in Ma. 9, paragraphs 7 to 9, 13, 16, 17, 18.

Ma. 12, paragraphs 12 to 14, 19 to 33.

Ma. 14, paragraphs 38 and 39, 41 to 43.

8. The claims of Madras as regards prescriptive right to water acquired at the Upper Anicut for the Cauvery delta system have been contested by Mysore on the ground that according to rules and user for irrigation much less amounts of water have been passed for irrigation purposes through the Cauvery-Vennar regulators.

The contention of Madras in this respect is—

(1) That water for scour always was and still is a necessity to maintain in an efficient state the rivers supplying the Cauvery system.

(2) That this water for scour is not passed into the Cauvery delta although a right and necessity for irrigation purposes.

(3) Further it is again used for the supply of the Lower Coleroon system.

The necessity of water for scour is admitted by both parties.

It is dealt with in—

Ma. 9, paragraphs 8 and 9.

Ma. 12, paragraphs 24 to 32.

Ma. 14, paragraphs 8 and 43 to 50.

Part XII Ma. 22, paragraph 11.

The rules and modes of regulation and the water actually passed for irrigation through the Cauvery and Vennar regulators prove constant use in the past of water up to the limit of a 7 feet gauge over the Cauvery dam and occasional use up to more than 7½ feet.

The arguments and facts cited by Madras in support of the above are—

Ma. 8, paragraph 45.

Ma. 12, paragraphs 35 to 47 and appendices VIII and XVIII.

Ma. 14, paragraphs 43, 44, 53 to 61, and appendix XXIV.

Madras Part XII.

Ma. 22, paragraphs 13, 14, 18 to 23.

Note.—The appendix referred to paragraph 41 should be appendix VIII.

Note.—Paragraph 55 refers by oversight to the wrong rules. The matter is taken up again in Madras Part XII, Ma. 22, paragraph 20.

Particular attention is invited to the limits of flow which are claimed as useful and passed for use for purposes of irrigation through the Cauvery-Vennar regulators (Ma. 14, paragraph 53) and to the figures in appendix XXIV showing the quantities of water which the application of such limits to past years represents.

9. A few separate points to which special attention is invited are recorded below:—

(a) The actual operation of the rules of 1882 at the Upper Anicut involved waiting for a gauge reading of 7 feet on the Cauvery dam before opening under-sluiques on more than half the occasions on which under-sluiques were opened. This was under the strict operation of rules and not under any exceptional regulation as contended by Mysore, in My. 7, paragraph 43 and My. 9, paragraph 36.

Vide Ma. 8, paragraph 30

Ma. 9 " 8

Ma. 12 " 33

Ma. 14 " 51.

(b) Mysore have suggested that the alterations of rules for regulation at the Upper Anicut have been due to the altered conditions of the river-bed at the head of the Cauvery above the Cauvery dam.

The plans showing the yearly surveys of the river-bed available from 1886 to 1910 which have been produced completely disprove the suggestion of alterations and show that there has been no alteration. The results are noted in Madras exhibits Ma. 17 and 17 (a) and (b).

(c) Suggestions have been made that remissions constitute a measure of loss sustained by deficient supplies of water. The arbitrator has called for any statistics regarding such losses that are available; statements of remissions and estimates of losses with the jamabandi reports year by year for twenty years have been furnished in Ma. 20. It is claimed that it is clearly shown that great losses may be suffered by ryots when remission is insignificant—vide Madras exhibit Ma. 20 and especially the jamabandi report in the year 1890–1891, a year of small river supply and also small remission but of great loss to ryots.

(d) Statements without any proofs have been made constantly by Mysore that large quantities of water are under existing conditions constantly passed through the Cauvery and Vennar regulators for flood relief purposes.

The occasions under which water has been so passed since the existing control was obtained are shown in Madras appendix XVIII (Ma. 12) and the Mysore allegations disproved.

The matter is dealt with in—

Ma. 12, paragraphs 42 to 44.

Ma. 14, " 57 to 61.

Part XII, Ma. 22—paragraphs 13, 14, 18 and 19.

10. It is claimed that under the considerations alluded to above the prescriptive rights of Madras in 1910 on considerations of the requirements and modes of user for the Cauvery delta system alone are shown to amount to all natural flow in the Aganda Cauvery up to the limit flow which under the conditions existing prior to remodelling of the Upper Anicut was required to give a gauge reading of 7 feet on the Cauvery dam with under-sluiques closed or 6½ feet with under-sluiques open.

LOWER ANICUT.

11. The conditions of supply of the Lower Anicut are and have been since the original construction of the Upper Anicut dependent on unregulated succession of floods and very fluctuating flow. Under the conditions which existed prior to remodelling of the Upper Anicut, such flow was much more frequent in incidence. In consequence of the remodelling of the Upper Anicut, the Lower Anicut had to be raised 2 feet to compensate for diminution of such frequent unregulated incidence of flow.

Mysore proposals involve great diminution of both incidence of flow giving unregulated supply into the Coleroon and of quantities and frequency of floods.

The conditions of supply are such that all floods give useful supply unless Veeranam tank is standing full, thus strictly in law prescriptive rights under such condition exist to all floods. The Madras Government recognise that such a claim would impose an unreasonable burden on Mysore and that claim to all floods is waived in consideration of the recognition that the great reduction of unregulated supplies, which are now the chief source of supply to the system, must be replaced by a specific extra allowance over and above what is now necessary for the Cauvery delta system. The part of the system which suffers from deficient supply especially in the south-west monsoon is the Vadavar and Veeranam tank area (63,000 acres) and the conditions of supply to this part of the system are the key to the question of supply. This part is the one which suffers whenever supplies are deficient.

The conditions of supply of this system are not susceptible of brief and concise recapitulation and it is only by a study of the descriptions and statistics describing these conditions that a true understanding of this part of the problem can be obtained.

12. The Madras arguments however as regards it are mainly—

(1) That even under existing conditions supplies in the south-west monsoon are frequently deficient and inadequate and the irrigation under Veeranam tank and the Vadavar therefore suffers.

(2) Under conditions restricting existing supplies which the Mysore proposals involve, allowance of specific quantities in excess of the limit flow required for Cauvery delta is necessary for the Lower Coleroon system.

(3) The water claimed is included within the Madras prescriptive right for the Cauvery delta system and required for purposes of scour at the Upper Anicut, and will, under Madras proposals, be diverted on to the fields of the Lower Coleroon area after such use, and form so much of the supply of the Lower Coleroon system as is dependent on Cauvery water.

13. The paragraphs on which Madras rely cannot be concisely detailed and involve the whole arguments, but the index of paragraphs will enable any specific item of description or argument to be readily traced.

14. Special attention is invited to the following:—

(a) The tables and description in Ma. 8, paragraphs 39 to 41 and Ma. 9, paragraphs 10 to 14, which show the existing conditions of supply of Veeranam tank and the Vadavar from the Coleroon.

(b) Ma. 8, paragraph 42 and appendix IV, and Ma. 12, paragraphs 92 to 97, which show that in the south-west monsoon, all the Vadavar "direct area" and most of the area under Veeranam tank can only be supplied from the Coleroon as the local rainfall is small and uncertain at this time.

(c) Ma. 14, paragraph 89, and Madras part XII, Ma. 22, paragraphs 35 to 39, where it is proved that failure in supplying water to the tank means postponing planting the ayaat and consequent loss to the ryots though such loss does not ordinarily occasion remission of kist on the affected area.

(d) Ma. 12, paragraph 92, showing that the irrigating capacity of the Veeranam tank apart from the Coleroon is 10,000 acres whereas the area under it is 52,000 acres.

15. The claims of Madras as regards limit quantity of flow at the Upper Anicut will suffice to give sufficient water to the Lower Coleroon system under conditions now existing and the claim made has been restricted to this—My. 9, paragraphs 10 and 11.

MADRAS-CAUVERY CHANNELS ABOVE UPPER ANICUT.

16. Madras claim that for these channels alone it is necessary from June to November to preserve without diminution the natural flow up to a limit of 6½ feet Cauvery dam, north gauge.

The contentions regarding this are stated in—

Ma. 14, paragraphs 100 to 104.

Madras Part XII, Ma. 22, paragraphs 48 to 52.

Madras Exhibit Ma. 18 and 18-a, 18-b, 18-c.

Madras Exhibit Ma. 20.

HOT WEATHER SUPPLY.

17. The Mysore project provides for passing a continuous and unfailing flow at Sivasamudram of 1,000 cusecs and the Madras Government claim that this is an integral part of the project under consideration and that Mysore should undertake that this shall be passed without intermission. To allow a working margin Madras place the minimum flow at 900 cusecs. Subject to this being passed, the Madras Government agree to Mysore impounding the whole flow of the river in the months of March, April and May.

Ma. 3, paragraphs 3 and 4.

Ma. 4, paragraphs 3 and 4.

Ma. 9, paragraph 22.

18. In the alternative, the Madras Government claim that they have right by prescription to the whole natural flow of the river in the hot weather months subject to a limit flow of 9,000 cusecs past Sivasamudram.

Madras Part IV (Ma. 9), paragraph 21.

Madras Part VI (Ma. 12), paragraph 99.

Madras XII (Ma. 22), paragraphs 40 to 47.

The latter is a modification of the original claim as regards "limit flow." The original claim (Ma. 4, paragraphs 3 and 4, clause 3), was that the limit should be a 7 feet gauge at the Cauvery dam.

19. In formulating claims for the whole natural flow up to a limit specified in the Agenda Cauvery at the Upper Anicut, the Madras Government waived their right to floods so far as these can be impounded under the project now under consideration. The limit claimed is covered by their prescriptive right for the supply of the Cauvery delta only, which limit flow, by means of improvements, partly made already can be made to suffice for the supply also of the Lower Anicut system without detriment to existing irrigation.

Within the limits claimed the supply of the upper channels also will be protected.

20. *General consideration.*—This is not a case in which each party puts forward proposals for a project in which some compromise of the nature of give and take would be reasonable.

This is not a case for compromise. Any concession which infringes on the interest of Madras is a deprivation to existing and well-established interests of the Madras Government and Madras ryots.

The ordinary compromise which gives a little to each side is not justly applicable to a case in which the interests of one side are actually existent and well established while those of the other are merely prospective. Madras claim that their existing rights shall be fully safeguarded, and that in cases of doubt they are entitled to have the benefit of that doubt and their existing rights protected, not only from injury, but from all risk of injury.

Ma. 9, paragraphs 4 and 5.

Ma. 10, paragraph 80.

Ma. 12 " 70.

Ma. 13 " 25.

5th February 1914.

W. M. ELLIS, Col., R.E.,
Representative of Madras Government.

Exhibit Ma-23 (a) Index to paragraphs, Mysore-Madras-Cauvery Arbitration.

Catchword précis.	Madras part I, Ma.-7.	Mysore part I, My.-6.	Madras part V, Ma.-11.	Mysore part I, My.-9.	Madras part VIII, Ma.-14.	Mysore part I, My.-12.	Madras part XI, Ma.-22.	Reference to appendices (Ma. or My.).
<i>Legal arguments.</i>								
Points raised by second issue	2	7	2 and 3	2	3 and 17, 16	6 and 25	1 (c), 1 (c)	A (Ma.-11), A (My.-6).
Indefiniteness of first issue	3	8	4	2	3 and 17, 16	9 and 24, 23	1 (g), 2 (ii), 3 (iii), 4 (iv)	(My.-9) Q. paras. 4, 5, 6, 7 and 8.
1910 is the year to be considered in determining the existing right of Madras.	4	10	1, 2	1, 3, 4	3	7	1 (d)	Q. 1 and 3.
Scope of arbitration	5	11 and 16	4, 6 and 7	5, 10	3	4	1 (f)	Q. 12
Question to be decided "Extent" of Madras rights or consent to particular reservoir	6	15, 21 and 22	8 and 13	17	3	17	3 (iii)	..
Contention about the claim of "unlimited natural right" and Madras reply that the agreement precludes this contention based on the unlimited natural right	13	17	9	17	3	17	3 (iii)	..
Remarks on Sir K. Seshadri Ayyar and certain observations on Sir K. Seshadri Ayyar's memorandum	7	17	9	17	3	17	3 (iii)	..
Application and effect of "fair and reasonable"	8 to 10	17	9	17	3	17	3 (iii)	..
Memorandum of Sir K. Seshadri Ayyar's memorandum as to the object of the agreement of 1892	11, 18, 19 and 20, 25	17	9	17	3	17	3 (iii)	..
Interpretation of "prescriptive right" and "law of prescription"	12	17	9	17	3	17	3 (iii)	..
Common law "prescription" or statutory "prescription" and period of enjoyment. Arguments against applicability of statutory rules. Principles in determining loss of "prescriptive rights"	14 and 16	17	9	17	3	17	3 (iii)	..
Reasons for the application of international law in the memorandum of Sir K. Seshadri Ayyar.	15	17	9	17	3	17	3 (iii)	..
"Riparian rights" theory in international law and Privy Council on the extent of this right. Certain cases in Harvard Law Review about the law of riparian rights being applicable to the relation of two independent states. Agreement fair and intelligible on the basis of "riparian rights" theory.	16	17	9	17	3	17	3 (iii)	..
Argument of "permissive" user in the past, suggested to be entered by Sir K. Seshadri Ayyar cites certain cases from I.L.R. 11, Madras.	21	17	9	17	3	17	3 (iii)	..
Argument of Mysore on non-user and Madras contend that this applies to absolute non-user and not partial non-user.	22	17	9	17	3	17	3 (iii)	..
Arguments based on joint possession prior to rendition and principles of section 13 of Easements Act. Joint occupation does not destroy pre-existing rights.	23	17	9	17	3	17	3 (iii)	..
Mysore's general arguments on limitations stated and Madras reply that they are entitled to the supply of water actually used for irrigation of area in 1890. Madras have to prove that certain quantity was used peacefully and uninterruptedly for twenty years.	24	17	9	17	3	17	3 (iii)	..

Index to paragraphs Mysore-Madras-Cauvery Arbitration—cont.

Catchword précis.	Madras part I, Ma.-7.	Mysore part I, My.-6.	Madras part V, Ma.-11.	Mysore part I, My.-9.	Madras part VIII, Ma.-14.	Mysore part I, My.-12.	Madras part XI, Ma.-22.	Reference to appendices (Ma. or My.).
<i>Legal arguments—cont.</i>								
Limit of hot weather flow and "average estimated natural flow"	..	..	..	..	..	10 to 16	6	..
No total cessation of the exercise of the right and no abandonment of the immemorial right of Madras and some cases from 14 M. and W. 789 cited.	26 to 29	..	..	..	..	..	2 (iv)	Q./10 and 11.
Mysore contend that Madras lost the prescriptive right after the remodelling of the Upper Anicut. The fundamental fallacy underlying this argument. Works existed in 1836. Subsequent improvements to Upper Anicut simply diverted the excess flow that was passing into the Coleroon, in the Cauvery and thus facilitated efficient distribution of water to the existing wet lands that had been suffering. Limit flow of 7 feet on the Cauvery dam. This limit only was used in the irrigation of lands though excess in acreage. Mysore's contention that law of prescription applies only to water actually used and not that wasted into the sea.	23, 24, 31 to 36, 37 to 42, 43 to 46	12 to 15, 21	6, 7, 10 to 12	3, 4, 7 to 9	4, 5, 6 to 13, 17 to 28	2, 18 to 22, 26, 27, 28, 25	1 (b) and (g) 2 (i), (ii) 3 and 4, 5	Q./13, Q./15, Q./14
Objection of Mysore to the supply of water Coleroon irrigation and Veeranam tank and reduction in the canal supply is to be allowed on account of rainfall. Madras reply that, as rain is an uncertain factor, this need not be taken into account.	..	..	..	..	..	..	..	..
Nature of user	..	18	..	..	..	..	..	..
Reciprocal rights of Madras and Mysore and recent irrigation developments.	..	4 and 19	3	..	..	..	..	..
Place of measurement .. .	..	20	..	..	..	..	..	..
	..	1	..	..	..	..	..	..

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Exhibit Ma.-23 (b).

MYSOORE-MADRAS-CAUVERY ARBITRATION.

SECOND ISSUE—FACTS AND ENGINEERING ARGUMENTS.

Index to paragraphs.

Catchword précis.	Madras part II, Ma.-8.	Madras part III, Ma.-9.	Mysore part II, My.-7.	Madras part VI, Ma.-12.	Mysore part II, My.-9.	Madras part IX, Ma.-14.	Mysore part II, My.-12.	Reference to appendices (Ma. or My.).
Character of rainfall in the Cauvery basin ..	1	..	..	..	..	..	..	..
Supplies in the south-west monsoon dependent on hill catchments and the flow of the Cauvery in this monsoon.	2 and 4	..	..	..	..	..	..	..
Rainfall in the north-east monsoon is variable and conditions of flow in this monsoon.	3, 5 and 6	..	..	..	..	..	..	..
Forecasts of the character of the season is impossible ..	7	..	..	..	..	..	..	..
Large area under the direct irrigation by the Cauvery; Madras irrigation above and below the confluence of the Bhavani; delta irrigation under the Cauvery (appendix III).	8, 11, 12 and 13	..	..	..	..	..	..	III
Supplies in bad years compared with minimum estimated requirements and the necessity for receiving all water now delivered for irrigation.	9 and 10	..	..	..	..	..	..	..
General description of river branches below Upper Anicut ..	14	..	73	..	..	..	..	..
Original construction of Grand Anicut and alterations to this.	15 and 20	..	..	..	..	..	..	..
Construction of Upper Anicut in 1836, 1845 and in 1899 to 1902 and of 150 yards oalingulah; altered conditions through remodelling of the Upper Anicut.	16 to 18, 32, 33	7	..	..	31 and 82	..	..	..
Bridges and regulators at the old Vennar head and construction of Cauvery-Vennar regulators and new Vennar head.	19 and 22	..	..	..	..	..	..	..
Construction of Lower Anicut, 1836 ..	21	..	..	..	..	..	..	..
Remodelling of Upper, Lower and Grand Anicuts, 1899-1902.	23 to 28	..	..	..	82	..	..	..
Proposed arrangements and irrigation conditions under each both before and after remodelling.	..	..	..	..	..	..	..	..
Rules for regulation of Upper Anicut before remodelling and general conditions of the Cauvery delta supply under rules of 1882 and 1896 (appendix I).	29 to 31, 34	..	42	22, 27, 33 and 95	..	38 and 51	..	I
Description and working conditions of Lower Anicut prior to and after remodelling. Reasons for such remodelling.	35 to 41	7, 10 and 33	74 and 77	97	70 and 81	93	33	I
Description of the Vadavur channel.	..	..	..	..	..	..	..	..
Veeranam tank water registers (appendix IV) ..	42	..	74	..	..	..	..	..
Conditions of irrigation and regulation at Grand Anicut; description of Grand Anicut prior to remodelling; remarks on the conditions of working of Grand Anicut before and after remodelling (appendices I and II).	43 to 47	..	..	..	39	..	..	IV II

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Index to paragraphs—cont.

Catchword précis.	Madras part III, Ma.-9.	Mysore part II, My.-7.	Madras part VI, Ma.-12.	Mysore part II, My.-9.	Madras part IX, Ma.-14.	Mysore part II, My.-12.	Madras part XII, Ma.-22.	Reference to appendices (Ma. or My.).
Area of Madras Irrigation under the Cauvery and proposed extensions of irrigation in Mysore. Mysore states that 176,324 acres has been given in 1890 as irrigated under Upper Anicut whereas 208,628 acres was given in 1910. Madras should not claim prescriptive right for the area in excess, i.e., 32,289 acres. Madras contend that the figures are those given by Collectors and explain the reason for such increase. Area irrigated under Lower Anicut and this area was taken from G.O. No. 400 I. of September 1909 communicated to Mysore.	2 and 3	24, 35 and 27	2 to 9 and 10	15 to 19	30 to 35	30 to 33	8, 9 and 10	XV, S, XXI, XXVI.
Comparison of Madras existing interests with Mysore prospective interests.	4	..	..	..	..	..	..	..
Existing right to be fully safeguarded	5 and 6	..	..	..	..	..	..	..
Consideration of Madras prescriptive rights before remodelling of Upper Anicut.	7	28 and 29	11	20	36	34	5	..
Limit of 7 feet supply on the Cauvery dam to Cauvery system for silt clearance. Full prescriptive right not claimed by Madras but asks for 7 feet supply on the Cauvery dam. Contention put forward by Mysore regarding this limit flow at Upper Anicut.	8, 11, 13 and 24	30 to 32, 42, 43 and 69	12 to 14, 30 to 33	21 to 23, 34 to 36	37 to 39	35 to 37	11	..
Alteration to Vadavar and Veersnam to increase the capacity of the tank to irrigate Shatiatope system also.	12	..	..	..	..	..	..	..
Claims of supply made at Upper Anicut include provision for supply at the Lower Anicut. Also for irrigation of area above Upper Anicut and water required for this irrigation.	14, 15, 23, 19 and 20.	26	10	..	..	..	..	III
Water for scour a necessity and arguments regarding scour conditions.	9	40 to 43	25 to 32	30 and 35	38, 45 to 50	41 to 43	15, 16, 11, 17	..
Proofs on which Madras rely (i.e., water registers and rules for regulation of water) and rules for regulation indicate system of use and enjoyment.	16 and 18	..	..	..	..	..	..	I
Limited power of regulation prior to remodelling	17	..	..	..	..	..	..	..
Madras prescriptive right to hot weather flow and Madras state that they are prepared to waive their right to the whole natural flow of the river if 900 cusecs is passed down to Madras-Mysore State that there is no hot weather irrigation in Madras and so Madras waived their claims. If the waiver is withdrawn, Madras is entitled to the whole natural flow after the customary requirements of Mysore. Madras reply if 900 cusecs is not sent down, the whole hot weather flow will be claimed by Madras. Areas of hot weather irrigation, etc.	21 and 22	78	50 and 99	88	99	72 to 75	42 to 47	XXVII, XXVIII

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Index to paragraphs—cont.

Catchword précis.	Madras part III, Ma.-9.	Mysore part II, My.-7.	Madras part VI, Ma.-12.	Mysore part II, My.-9.	Madras part IX, Ma.-14.	Mysore part II, My.-12.	Madras part XII, Ma.-22.	Reference to appendices (Ma. or My.).
Table and statistics show flow under Mysore proposals. Madras states that disastrous results will follow if the Mysore proposals are accepted.	25, 27	61, 62, 32	53 and 54 54 to 58	53 54 to 64	66 67 to 77	53 to 60	25 to 31	XXII, XXIV G, H, P (II) G-1.
Mysore proposals do not conserve unimpaired Madras rights and Madras reasons for this statement. Loss due to inadequate supply and consequently the result is grant of large remissions year by year. Mysore contend that loss was due to inundations and Madras say in reply that remissions on account of failure of crops exceed those on account of inundations and remissions are not generally given on account of partial failure of crops. Madras state that it is reported in the triennial report that remissions are given on account of inundations. Some discrepancies in the discharges noted in the administration report and Madras explain the inaccuracy in these figures. Discharges of the Cauvery-Vennar regulators and assessor's curve.	26	60	52	52	65	..	..	..
Admission by Mysore regarding the uniform depth of flow allowed in the Metur project and the percentages allowed on it for uncertain and unsteady flow.	28, 29, 30, 31, 32	65	71	69	82	63	34	E and H.
Special allowances for rainfall in the north-east monsoon proposed by Mysore. Consideration governing such allowances for rainfall. Allowance for rainfall impracticable. Reference to Madras project as regards rainfall and conclusions regarding such allowances; substantial reduction in canal supply is possible on account of rainfall.	10 and 33	..	..	..	..	..	..	..
Specific supplies required for Coleroon system (paragraphs 35 to 41, Part II).	37	..	..	..	..	..	..	..
Places of freshes surplusing Grand Anicut and Upper Anicut. Discharges of 150 yards calingulah; uncontrolled freshes and floods are passed into this. Mysore contend that freshes and floods now enjoyed by Madras and passed into the Coleroon should be impounded in Mysore reservoir and no specific supplies given in their place and Madras reply that the supplies to Vadavar and Veeranam tank are sometimes inadequate even frequently under existing conditions of flood and surplus into the Coleroon made in place of impounded floods.	34	44 and 45	34	46	59 and 60	50	23	XXII XVIII
Mysore state that the early freshes of June are wasted into the sea and Madras reply that a portion is used in the absorption of channel and canal beds; the balance is used in watering seed-beds, etc., loss in transmission, etc., and so this cannot be taken as waste. Thus the Mysore statement is incorrect in support of which Madras furnish facts and figures. Mysore state some percentages allowed in the Metur project report on account of absorption in channel and canal beds represent the distance between reservoir and canal bed (Grand Anicut) and do not include distances throughout.	36, 38 and 39	57	50, 51	49 to 51	63 and 64	51, 52	24	D

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Index to paragraphs—cont.

Catchword précis.	Madras part III, Ma.-9.	Mysore part II, My.-7.	Madras part VI, Ma.-12.	Mysore part II, My.-9.	Madras part IX, Ma.-14.	Mysore part II, My.-12.	Madras part XII, Ma.-22.	Reference to appendices (Ma. or My.).
Mysore object that supplies for irrigation under Veeranam tank have been brought in for the first time and Madras reply that it forms part of Coleroon system and quote reasons for not specifying this.	35	(See also My.-4, paragraph 12.)			..	..	..	VII
Inaccuracy in the discharges recorded prior to 1909 and discharges recorded in Madras project report are based on the carefully conducted gaugings in 1909.	40	..	..	..	..	..	..	..
Irrigation under Cauvery channels above Upper Anicut and the area irrigated under them.	..	..	..	..	100 to 106	76 to 81	48 to 52	..
Area irrigated below Upper Anicut	41	..	..	..	..	..	..	..
Madras prescriptive right established by the rules of regulation in force and this has been expressed by Sir J. Benton. Mysore contend that bad years should not be taken in fixing limits of flow required and thus high limits of flow should not be demanded with a view to avoid remissions.	42	63 and 64	59 to 70	45 and 65 to 65	58 and 78 to 81	61 and 62	32 and 33	XVII, E.G.
References made by Mysore regarding opinions expressed and proposals made in the Madras project. Madras state that there is no objection to this if a continuous and unfailing supply to meet the requirements of Madras irrigation is given from the Mysore impounded supplies. Mysore contend that no such uniform supply is provided in the Metur project and different limits are proposed for various months of the year.	43	56	48 and 49	48	62	..	..	..

Index to paragraphs—cont.

Summing up of Madras claims.	Madras part III, Ma.-9. 44	Mysore part II, My.-7.	Madras part VI, Ma.-12.	Mysore part II, My.-9.	Madras part IX, Ma.-14.	Mysore part II, My.-12.	Madras part XII, Ma.-22.	Reference to appendices (Ma. or My.).
Limit of considerations of prescriptive rights of Madras ..	..	23	1	12 to 14	29	29	7	I, X, I, VI, XV, VIII, XXI, XXIII, XVIII, XXIV
States 6 feet is the correct limit of supply to Madras and quotes evidences in support of this from Mr. Larminie, Major Oakes and Bhavani project reports and from Upper Anicut conditions and also from Metur project report states that 6.0 on the gauge mentioned in rule 2 of 1882 rules for regulation represents the limit of full supply to delta (paragraph 4, My. 9). Mysore remark that 6 feet is quite adequate as the crest of the level of the old anicut of the Coleroon was raised 2 feet higher.	..	33 to 41, 53, 55, 58, 59, 66, 67	15 to 24, 45, 47, 52, 72 to 75, 91	24 to 33, 36 to 42, 47, 70 to 73	40 to 42, 45 to 49, 51 to 56, 83 to 86, 61	38, 41, 42, 44 to 48, 50	11, 12, 15, 16, 18 to 21, 23	
Meaning of the expression "full and ample" in rules of 1888 and interpretation of other clauses. (Also paragraph 45, part II, Ma. 8).	..	46 to 50	35 to 41	28, 29	43, 44	39, 40	13, 14	
Explanation of excess discharges through Cauvery and Vennar regulators.	..	51	42 to 44	44 to 46	57 to 61	49, 50	22, 23	XVII, D. VIII, XVIII VI, VIII, XVII

Index to paragraphs—cont.

Catchword précis.	Madras part III, Ma.-9.	Mysore part II, My.-7.	Madras part VI, Ma.-12.	Mysore part II, My.-9.	Madras part IX, Ma.-14.	Mysore part II, My.-12.	Madras part XII, Ma.-22.	Reference to appendices, Ma. or My.
Mysore remark that the increase of limit flow in the Lower Anicut for the safety of this anicut when the floods in the Coleroon rise is no contention for the supplies in excess of limit required for delta irrigation.	..	52	42	44	57	49	22	XVIII
Excess quantity passed during floods is no criterion of actual requirements.	..	54	46	..	..	..	..	XVIII
General consideration against the claims and certain remarks of Mysore on the minus figures shown under "leakage, etc."	..	68	76 to 87	74 to 82	87 to 94	64 to 70	35 to 40	V, K-1, K, T and XXV
Interception of floods by the Mysore reservoir is immaterial.	..	70	88 to 90	83, 84	95	71	41	T, W. T, W
Detailed examination of the claims for irrigation to areas under Veeranam tank and replenishments from the Veeranam tank catchment. Mysore state that Veeranam tank can irrigate 30,000 acres by rainfall in the catchment and the balance by the Vadavar (22,000 acres).	..	71, 72	91, 92	85	96	71	41	
Inferences from the Madras statement (paragraph 38 of part II, regarding the filling of the Veeranam tank and Mysore state that the extra flow of 644 millions cubic feet per day required for filling the Veeranam tank is untenable.	..	76	97	..	..	..	..	..
Net supply required through the Vadavar and the interpretation of the rules in support of this. Mysore contend that the irrigation under Veeranam tank will be unaffected if the tank fills or not. (Part II, paragraphs 37 to 42 of Madras and table on page 14 and appendix IV and Mysore appendix K and L).	..	73 to 75	93 to 96	85	96	71	41	I, IV, K, L and W
Remodelling of Lower Anicut has no effect on the controlling of the floods through the Coleroon and this would have fared well, had sill been raised instead of being lowered in replenishing the Veeranam tank. (Paragraph 41, part II of Madras.)	..	77	98	86, 87	97, 98	71	41	T, W

Madras Appendices.

Subject of the appendices.	Madras part II, Ma. 8.	Madras part III, Ma. 9.	Madras part VI, Ma. 12.	Madras part IX, Ma. 14.	Mysore case, My. 7.	Mysore case, My. 9.	Mysore case, My. 12.	Madras part XII, Ma. 22.
Ma. 8 and 9 (I)—Rules of regulation of the Upper, Lower and Grand Anicuts.	29,41	16	37	..	..	..	..	15 and 20
Ma. 8 and 9 (II)—Table showing occasions of carrying water in the Cauvery and Vennar at depth exceeding full supply stated in the rules.	47	..	42	53	51,52	..	..	This table has been superseded by that in Appendix XVIII.
Ma. 8 and 9 (III)—List of channels taking off from the Cauvery between the Upper Anicut and the Phavani and areas irrigated.	12	19	..	..	..	..	..	..
Ma. 8 and 9 (IV)—Statement of water levels, the Veeranam tank, 1890 to 1909.	42	..	..	..	75	..	..	..
Ma. 9 (V)—Diagram showing area charged as irrigated in the Cauvery delta and the Lower Coleroon Anicut systems.	..	..	76	..	..	..	..	..
Ma. 8 and 9 (VI)—Gauge readings, north gauge, the Cauvery dam, 1880 to 1909.	..	..	31 and 44	..	..	..	..	..
Ma. 8 and 9 (VII)—Provisional rules defining the method of passing down supplies required for irrigation in the Madras Presidency.	..	35	..	..	..	..	..	..
Ma. 8 and 9 (VIII)—Daily register—Front and rear gauge readings, Cauvery and Vennar from 1890 to 1910, June to January.	..	..	37, 44	56	..	..	..	..
Ma. 10 (IX)—Note by Col. Ellis on computations of discharges at Sivasamudram.	}			Refers to third issue.				
Ma. 10 (X)—Table of discharges of the Cauvery by float observations at Danakere and corresponding discharges at Sivasamudram, Bhavani Bridge, and Upper Anicut.								
Ma. 10 (XI)—Extract from register of discharges of the Cauvery at Sivasamudram and Upper Anicut.								
Ma. 10 (XII)—Extract from registers of discharges of the Cauvery at Sivasamudram and Bhavani Bridge.				Refers to third issue.				
Ma. 10 (XIII)—Tables M and N showing working Mysore system of regulation.	}							
Ma. 10 (XIV)—Table showing discharges of the Cauvery at Sivasamudram, Bhavani Bridge and Upper Anicut, 1902 to 1909, June to September.								
Ma. 12 (XV)—Statement showing the area of irrigation under the Cauvery and its tributaries above the Upper Anicut for years 1890, 1895, 1900, 1905 and 1910.	..	..	6	..	25,26	32	..	..

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Madras Appendices—cont.

Subject of the appendices.	Madras part II, Ma. 8.	Madras part III, Ma. 9.	Madras part VI, Ma. 12.	Madras part IX, Ma. 14.	Mysore case, My. 7.	Mysore case, My. 9.	Mysore case, My. 12.	Madras part XII, Ma. 22.
Ma. 12 (XVI)—Copy of demi-official letter from the Joint Secretary to the Government of Madras to the Inspector-General of Irrigation, dated 18th September 1911.	..	..	15	..	..	..	..	..
Ma. 12 (XVII)—Comparative statement of annual discharges of the Cauvery and Vennar in m.c.ft. June to January 1890 to 1910.	..	..	41, 61, 63 and 66	..	..	..	..	..
Ma. 12 (XVIII)—Table showing occasions of carrying water in Cauvery and Vennar at depth exceeding full supply stated in the rules of regulation in force.	..	..	42 and 46	44, 53, 54, 56 and 57	..	46	..	13,22
Ma. 13 (XIX)—Table III-A	Third issue only.							
Ma. 13 (XX)—Extract from "Madras Mail," dated 19th May 1913.	Refers to third issue only.							
Ma. 14 (XXI)—Statement showing the area irrigated by the channels and tanks fed by the Cauvery and its tributaries about Upper Anicut for 1880 to 1889.	..	..	..	35	..	32	..	..
Ma. 14 (XXII)—Note regarding figures of "Average discharge at head," Appendix V of Sir J. Benton's note of 12th May 1911 (Ma. 8 a).	..	..	..	59 and 71	..	..	..	..
Ma. 14 (XXIII)—Note on the differences of discharges for the same gauge readings, Cauvery dam, recorded in the curves of Captain Mead and Major Montgomerie.	..	..	..	52	..	..	..	..
Ma. 14 (XXIV)—Table of discharges, Cauvery dam, from the curve of 1909 and of the Cauvery-Vennar regulators from the Assessor's curve.	..	..	..	53, 72, 73, 75 and 76	..	55, 57 and 59	..	22, 28 and 31
Ma. 14 (XXV)—Table revising and amplifying Appendix K (My. 7).	..	..	..	90	..	..	..	38
Ma. 22 (XXVI)—Extract from G.O. No. 400 I., dated 24th September 1909.	..	..	..	..	..	..	..	10
Ma. 12 (XXVII)—Statement of daily discharges in excess of 1,000 cusecs of the Cauvery at Bhavani bridge and Sivasamudram for years 1902 to 1908, March to May, A, B and C.	..	..	..	..	..	..	..	43
Ma. 22 (XXVIII)—Statement of area of hot weather irrigation in Trichinopoly district.	..	..	..	..	..	..	..	45

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Mysore Appendices.

Subject of the appendices.	Mysore case, My.-7.	Mysore case, My.-9.	Mysore case, My.-12.	Madras part VI, Ma.-12.	Madras part IX, Ma.-14.	Madras part XII, Ma.-22.
My. 6-A.—Sir K. Seshadri Ayyar's letter and memorandum of June 1890.						
My. 6-B.—Rules for the regulation of water at Upper Anicut of July 1882.	40	..	..	..	REMARKS.—These are rules items given under (IX), and (X. Madras Appendix I).	
My. 7-C.—Rules for the regulation of water at Cauvery-Vennar regulators, dated April 1888, and revised rules of August 1894.	44	..	..	..	..	..
My. 7-D.—Table of discharges in m.c. feet in the month of June for the years 1890 to 1909.	57	49	51	51	63	..
My. 7-E.—Provisional rules for working the Mysore reservoir.	..	..	..	60 and 71	..	..
My. 7-F.—Statement showing areas irrigated as compared with supplies under different conditions.	..	..	..	..	..	..
My. 7-G.—Tables showing quantities of flow that would have been available for Madras irrigation with the limits proposed by Mysore.	64	54, 58, 64 and 66.	..	58 and 60	72 and 79	..
My. 7-H.—Tentative rules for making allowance for rainfall.	65	69	..	71	..	..
My. 7-K.—Statement of discharges in the Coleroon showing the quantities used for irrigation of the Lower Anicut system.	68 and 75	77	66, 69 and 70	81 and 82	89 and 90	87
My. 7-L.—Abstract of Appendix IV of Madras case showing the conditions of Veeranam tank and the area irrigated under the Coleroon for the 20 years ending 1909-1910.	75	..	..	..	..	..
My. 8-M.—Discharges of the rivers, the Bhavani, the Amaravati and the Noyel.						
My. 8-N.—Madras Table N (improved) ..						
My. 8-P.—Working tables I ..	..	..	..	..	..	..
Do. do. II ..	..	56	..	..	..	..
Do. do. III ..	..	..	..	..	..	..
My. 9-Q.—Brief notes on cases quoted by Madras.	..	..	..	..	..	..
My. 9-G1.—Statement of fortnightly discharges of the Cauvery and Vennar.	..	61	..	..	71, 75	..
My. 9-K1.—Daily discharges at the Lower Anicut.	..	77, 80	66 to 68 and 70.	..	89, 90 and 92	87 and 89
My. 9-R.—Comparative table showing the effect on the quantity and incidence of the flow at the Cauvery dam.						
My. 12-S.—Statement showing the area irrigated under the channels above the Upper Anicut.	..	..	32	..	..	..
My. 12-T.—Revised working tables as per table III of Appendix P for the years 1899.	..	..	71	..	..	..
My. 12-W.—Abstract of discharges at the Lower Anicut.	..	..	71	..	..	..

Exhibit Ma.-24.

MADRAS NOTE ON THIRD ISSUE AS AFFECTED BY FINDING ON SECOND ISSUE.

Third issue, 1st clause (a).

The systems which have been proposed for computation of the supplies to be passed at Kannambadi in order to protect Madras rights have already been dealt with and analysed in the arguments already presented, and the arguments now put forward are limited to those which are the direct result of the award given with regard to the second issue.

2. As regards the alternative offered Madras for selection under the above, the Government of Madras wish here to record that they elect the alternative involving passing to Madras all water up to a natural flow limit of 22,750 cusecs, measured at the Upper Anicut, between 1st June and 31st January inclusive.

The Government of Madras, however, wish to guard themselves against the assumption that they accept this limit as sufficient to secure their existing interests. They desire to state that they elect this alternative without prejudice to their right to lay their views on this subject before the Government of India.

3. As regards the supplies to be passed at Kannambadi, the systems of measurement proposed area—

(1) The Madras system proposes the simultaneous measurement of the inflow to the reservoir, and of the flow of the Kabbani, and that Mysore should be allowed to impound whenever this combined flow exceeds the "limit flow" at the Upper Anicut plus percentages to cover risk of loss in transmission.

(2) The Mysore system involves forecasting, from the quantity of measured inflow into the reservoir, when the flow at the Upper Anicut is likely to be, by means of proportion factors fixed for the south-west and north-east monsoons and impounding any available surplus over this, making allowance for loss in transmission.

Combined with this, is provision for passing compensation water from Mysore reservoir to make up for deficiencies in the supplies received by Madras on days when the proportion factor applied failed to give the supplies due.

(3) The third system has some of the characteristics of both the above, and is simpler and more easily applied than either.

This consists of fixing for the north-west and north-east monsoons the proportions which the measured daily inflow into the reservoir will bear to the probable corresponding flow at the Upper Anicut, and multiplying these proportions factors by the limit flow allowed to Madras. Mysore is under this system to be allowed to impound all water coming into the reservoir in excess of that due to the resulting figure.

This system is in many respects similar to the Madras system but is decidedly simpler of application. It is also in some respect similar to that of Mysore, and again is much simpler of application, and does not entail the provisions for measuring at the Upper Anicut and for compensation water to which the Madras Government take the greatest exception on grounds already detailed.

4. The examination of the third system leads to the recognition that while materially simpler in application than either of the other systems, subject to fixing of suitable proportions for south-west and north-west monsoons it can be made to secure Madras interests.

5. As regards Madras interests the essential principle of the third system is that it allows Madras a share of any yield of the catchment in excess of the limit. This is most clearly demonstrated by the Assessor in his *examination of evidence*, paragraphs 96 to 104, when dealing with the matter of floods. In this he recognised the justice of the importance attributed by Madras to the beneficial effects of occasional floods on the Madras irrigation, and proceeds to demonstrate how a certain proportion of all yield of the catchment above the Upper Anicut when in excess of "limit flow" will still be available for Madras. This is a very important consideration, and the passing on to Madras of some proportion of flow over the limit would possibly have the effect of giving in sufficient quantities those extra occasional supplies which have been in the past the real source of supply of the Lower Coleroon system, as well as of occasional help of the Cauvery Delta irrigation. The Assessor clearly shows in his tables (paragraph 102) that while under the system examined by him, which is the third system, the greatest part of the surplus water would be impoundable by Mysore still a small share of every flood would pass to Madras. This matter of getting a little extra with all the frequency of natural flow is of the utmost importance to Coleroon irrigation, to which no other supply whatever except water passing over the 150 yards calingulah within the limit gauge which is a supply subject to a maximum of 1,030 cusecs is allowed in the award on the second issue, and it is believed that the facts set out in the tables, paragraph 102 of the Assessor's examination of evidence have materially influenced him in forming his opinion that no specific supply is required for Coleroon system.

6. This opinion receives confirmation in the summing up of the Assessor, paragraph 88, having reference to his expressed opinion that no specific supplies are required for the Coleroon under the new conditions resultant on the award of a limit gauge of 6½ feet, having shown that the irrigation did not suffer in the past under the rules of 1905 of Upper Anicut. He here says "there is nothing in evidence to show that the irrigation will suffer in any way if the supplies to the Coleroon available in the past under the operation of the 1905 rules are secured in the future" (the italics are ours).

He proceeds immediately after to show in paragraph 102 that Madras must continue to get a share of all floods above the limits of supplies though the amount of this share will vary with any variation of the proportions which may be ultimately determined.

These two together show that while the Assessor recognised that the amount of extra water to be passed on such occasions would be reduced, a certain material proportion of this extra water would always be passed on every day on which it was under the previous conditions of the rules of 1905 available.

7. The above view of this matter is most strongly supported by the Arbitrator's finding (page 17, lines 29 to 33) which runs "that standard being fixed it has still to be decided what surplus is available after Madras requirements have been met, what proportions of that surplus

may reasonably be claimed by Mysore. It is clear that the impression in the minds of both Assessor and Arbitrator in making the award is that a system of measurement should be adopted which conforms in system, although not in actual quantities, with the conclusions defined in the Assessor's paragraph 102 and accompanying table.

8. Under the system contemplated in paragraph 102 of the Assessor's examination of evidence while the supplies available to pass to the Coleroon extra to those passed under the 6½ feet limit award will be much reduced in quantity he shows that the number of occasions of passing those supplies and the dates of such occasions will not be altered as compared with what would occur under a continuance of the rules of 1905, and this is a vitally important consideration in estimating the effect of the award given under the second issue on the Coleroon system, and as stated above it has evidently been carefully considered by both Assessor and Arbitrator.

9. The Government of Madras put forward for adoption either the first system of measurement which was originally put forward by them coupled with a suitable percentage for loss in transmission or in alternative the third system with such proportion fixed as will secure to them the limit flow at the Upper Anicut to which they are entitled whenever available under conditions of natural flow.

Both the above systems provide for a proportion of all excess flow passing to Madras.

10. The computations made by the Assessor are admitted to correctly represent what would happen under the third system of regulation under the assumption that the proportions adopted for south-west and north-east monsoons correctly represented day by day the yield of the whole catchment. This, of course, is far from strictly correct, but is a reasonable assumption for the purpose of illustrating the general effect of the system.

The material difference between this system and the Mysore system under a similar assumption is that while the third system allows to Madras on every day on which yield of the whole catchment exceeds the limit flow a certain proportion of the extra yield, the Mysore system allows to Madras extra flow only on those days when the run off of the lower catchment alone gives a yield in excess of the limit flow, 22,750 cusecs allowed to Madras.

In the case of both systems, the days when Mysore reservoir is surplusing are days on which a large proportion of any extra yield of the whole catchment would pass down to Madras.

This cause operates frequently in a year of abundant flow, but seldom in a year of deficient natural flow.

It will be clear that there will be under the Mysore system many days on which Madras would not get a proportion of the extra yield of the catchment which would be passed to her under the system illustrated by the Assessor in paragraph 102 of his examination of evidence about which he says in paragraph 103 referring to Madras "She would still enjoy in addition increments over and above those necessary supplies on every day in the year in which she would have enjoyed them under the old conditions, i.e., without the Kannambadi reservoir though in diminished quantities."

In the north-east monsoons the yield of the lower catchment is considerable and at this time the essential difference between the two systems is not calculated to greatly injure Madras, but in the south-west monsoon the adoption of Mysore system would seriously injure Madras under an award which gives no specific supply for the Lower Anicut system, to compensate for the occasions on which natural flow to that system will be withdrawn.

11. It is true as pointed out by the assessor, paragraph 89, that by altering the Lower Anicut, supplies equal to those now passed on to the fields, can be obtained from smaller total quantities of water than are passed into the Coleroon under existing conditions, but this is only true so long as the occasions of passing supplies are not materially reduced in frequency or the intervals between such occurrences materially altered.

12. Madras therefore contend that either the first or third system of measurement should be adopted, as only one of these systems can, under the award, give any prospect of adequate protection of the lower Coleroon system.

The material difference between the Mysore system leaving out the compensation clauses and the third system has been stated above and it is submitted that the adoption of the Mysore system threatens the prospects and propriety of the Lower Anicut system of irrigation. While this system is small as compared with immense areas comprising Cauvery Delta system, it is quite large considered by itself 112,000 acres, or compared with the area proposed to be irrigated by Mysore 150,000 acres.

13. The system of measurement put forward by Madras is either—

(a) The first system (the Madras system) allowing for 25 per cent. in the south-west monsoon to cover possible losses in transmission. This percentage to be a tentative figure. This would allow Mysore to impound any excess over the combined measured inflow to the reservoir plus the flow of the Kabbani—

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June to September	..	..	..	..	..	..	..	28,800
October to January	..	..	..	..	..	..	..	22,750

Or in the alternative—

(b) The third system with proportions as a tentative figure—

South-west monsoon	..	..	..	..	..	..	..	0.650
North-east	..	..	..	..	..	..	..	0.425

14. Madras have, as promised, examined the Mysore system by means of tables drawn up with proportion figures—

South-west monsoon	..	..	..	..	..	0.70	} Table IX.
North-east	..	..	..	..	..	0.45	
South-west	..	..	..	..	..	0.60	} " XI.
North-east	..	..	..	..	..	0.40	

The Government of Madras are satisfied for the reasons already given in their recorded evidence and arguments, and for the additional reasons now put forward based on the new matter embodied in the findings and award under the first two issues, that the adoption of the Mysore system cannot be compatible with the protection of the rights of Madras and object to the system on these grounds.

The remarks on the examination of the tables drawn up to show the working of this system in its effect on Madras are not to be construed as being any admission that the principles embodied in this system cannot, under the award given on the second issue, be other than disastrous to the Madras irrigation systems and especially to the Coleroon irrigation.

15. No tables have been drawn to show the working of the Madras system (first system) as the discharges at Sivasamudram are not sufficiently accurate to enable tables to be based on them.

The way in which the tentative 25 per cent. has been arrived at has been described in Ma.-10, paragraphs 48 to 56. The figures are unreliable and all that can be claimed for this is that the figures are the best available.

16. As regards the third system which is the only alternative system which can adequately protect Madras interests, tables have been drawn on this system with proportioned figures:—

South-west monsoon	..	..	..	..	..	..	0.650	} Table X.
North-east	..	..	..	..	..	..	0.425	
South-west	..	..	..	..	..	..	0.60	} " XII.
North-east	..	..	..	..	..	..	0.40	

From these tables can be seen what deficiencies below natural flow limited to 22,750 cusecs (6½ feet gauge) at the Upper Anicut would under these proportions have been suffered by Madras, had the proposed reservoir conditions existed from 1896 to 1908.

The fluctuating and varying conditions of natural flow involve fluctuating and varying proportions of flow and thus the results of applying proportions must vary. The Madras Government have a title to be protected under the operation of this or any other system in the most unfavourable years and therefore it is to the years in which losses are most serious that attention is specially to be directed.

17. The statement following abstracts results from the detailed tables. The Government of Madras claim that the losses realised with proportions {0.650, 0.425} are the maximum which under reasonable consideration of the immense interests can be suitable as tentative figures. It is to be realised that a reduction of one per cent. water-supply on an area of over one million acres represents a very large reduction, although in the form of a percentage it appears small.

The award on the second issue has cut down Madras supplies far below what has ever been received in the past, and it is claimed that really efficient protection of these reduced supplies is absolutely necessary.

Statement showing percentages of total supplies lost by Madras under proportions examined.

Months.	1896.		1897.		1898.		1899.		1900.		1901.		1902.		1903.		1904.		1905.		1906.		1907.		1908.			
	.6	.4	.65	.425	.6	.4	.65	.425	.6	.4	.65	.425	.6	.4	.65	.425	.6	.4	.65	.425	.6	.4	.65	.425	.6	.4	.65	.425
June—	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
First half	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
Second "	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
July—	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
First half	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
Second "	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
August—	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
First half	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
Second "	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
September—	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
First half	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
Second "	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
October—	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
First half	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
Second "	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
November—	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
First half	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
Second "	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
December—	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
First half	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
Second "	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..

18. It is represented that the figures in the above abstract show that the Madras suggestion for a suitable proportion, viz.—

South-west monsoon	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
North-east "	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..

are the best which can be considered to protect to a reasonable extent the passing without interruption or diminution the natural limit flow to which under the second issue it is ruled that Madras is entitled whenever it occurs. It will be seen under these proportions interference and reduction of flow occurs to some extent almost every year.

Excluding June 1906 as abnormal, the percentage losses suffered by such interference in the south-west monsoon vary from 5.17 in the half month's supply downwards. In the north-east monsoon the percentage in second half of October is 5.12 per cent. It is submitted that as a tentative figure .65 and .425 may be fixed as the proportions for south-west and north-east monsoon respectively. It is added in explanation that the Government of Madras propose so low a limit in view of the recognized advantage which this system confers of giving to Madras a proportion of each yield of the catchment over the limit flow.

19. As regards the Mysore system, the working of the tables are best seen from diagrams of flow drawn from the resulting figures.

The objections to the system have already been described in the Madras case and in the previous paragraphs of this note in so far as it treats of its bearing on subject matter of the award on the first two issues.

Examining the diagrams for the years 1898, 1902, 1904, 1905 and 1908 it will be seen that the natural incidence of flow within the 6½-feet limit is materially affected and the already fluctuating flow made materially more fluctuating.

This is the effect of the system of compensation water to which Madras have objected for already stated reasons which, it is agreed, are not to be restated in this note and to which reference is invited.

The Government of Madras consider that if, in opposition to their contentions, this system is adopted such proportions should be adopted as will reduce the "compensation water" with the resulting interference with flow and necessary errors in computation to a small total as regards both quantity and occasions on which passing becomes necessary. The proportions—

South-west monsoon	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
North-east "	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..

applied to this system are put forward as the smallest which can be said to fulfil this condition.

20. As regards the system generally as the award on the second issue has recognised and considered the necessity to Madras of what has been called by Mysore "useful surplus," and as the Government of Madras recognise that it is only the surplus over the 6½-feet limit given under the award that can, in a bad year, save them from very heavy losses, it can no longer be contended that surplus over the limit flow is not useful, for the "limit flow" apart from a proportion of surplus is certainly not sufficient to protect Madras.

21. Tables for thirteen years and diagrams for five years have also been drawn to illustrate the proportions—

South-west monsoon	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
North-east "	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..

in accordance with the suggestions of the Assessor.

It will be seen that with these proportions the occasional losses of Madras are materially greater and the fluctuations of flow more marked than with the proportions proposed for tentative adoption.

It is submitted that the diagrams show material interference with natural flow and material increase in incidence of fluctuations even for the proportions suggested by Madras and that no lower proportions should be adopted.

18th March 1914.

W. M. ELLIS, Col., R.E.,
Madras Representative.

Exhibit Ma. 24e.

Abstract Results—Table X.

Proportion { .65 S.W.
.425 N.E.

Year and half month.	Half-monthly total of natural discharge, Aganda Cau- very, limited to 1,966 million cubic feet in any day.	Half-monthly total of column 10 limited to 1,966 million cubic feet in any day.	Half- monthly total of the quantity by which Madras is deprived.	Percentage of diminution, column 2 to column 4.	
				Proportion. .60 .40	Proportion. .65 .425
1	2	3	4	5	6

1896-1897.

June ..	First half	4,250	4,250	..	..	..
	Second "	20,413	20,413	..	..	..
July ..	First "	28,019	28,019	..	..	..
	Second "	31,114	31,114	..	..	28
August ..	First "	29,490	29,490	..	..	..
	Second "	31,466	31,466	..	..	..
September ..	First "	26,381	26,381	..	..	..
	Second "	18,347	18,347	..	..	..
October ..	First "	23,994	23,994	..	..	02
	Second "	11,568	11,568	..	..	..
November ..	First "	6,324	6,324	..	..	..
	Second "	18,321	18,089	232	1.26	1.68
December ..	First "	16,321	16,321	..	..	..
	Second "	15,304	15,304	..	..	..
January ..	First "	5,690	5,690	..	..	..
	Second "	4,394	4,394	..	..	..

1897-1898.

June ..	First half	5,662	5,662	..	..	..
	Second "	23,105	22,876	229	0.99	1.25
July ..	First "	17,506	17,506	..	..	..
	Second "	30,192	30,192	..	..	..
August ..	First "	29,490	29,490	..	..	..
	Second "	31,466	31,466	..	..	..
September ..	First "	28,681	28,681	..	..	..
	Second "	25,124	25,124	..	..	..
October ..	First "	28,476	28,476	..	..	..
	Second "	21,739	21,739	..	..	..
November ..	First "	11,412	11,412	..	..	..
	Second "	6,724	6,724	..	..	..
December ..	First "	5,724	5,724	..	..	..
	Second "	3,972	3,972	..	..	..
January ..	First "	2,700	2,700	..	..	..
	Second "	2,206	2,206	..	..	..

1898-1899.

June ..	First half	4,030	4,030	..	..	..
	Second "	22,955	22,955	..	..	..
July ..	First "	14,340	14,340	..	..	..
	Second "	19,152	19,152	..	..	..
August ..	First "	28,321	27,683	658	2.30	3.40
	Second "	15,876	15,876	..	..	..
September ..	First "	19,088	19,088	..	..	..
	Second "	27,175	26,873	302	1.11	1.4
October ..	First "	29,490	29,490	..	..	..
	Second "	27,392	25,714	1,678	6.12	6.30
November ..	First "	27,921	27,921	..	..	..
	Second "	23,467	23,467	..	..	..
December ..	First "	17,924	17,924	..	..	..
	Second "	11,008	11,008	..	..	..
January ..	First "	9,065	9,065	..	..	..
	Second "	5,486	5,486	..	..	..

1899-1900.

June ..	First half	4,698	4,698	..	..	..
	Second "	19,248	19,106	142	0.74	1.00
July ..	First "	26,612	26,612	..	..	..
	Second "	16,380	16,380	..	..	..
August ..	First "	7,141	7,016	126	1.76	3.80
	Second "	10,588	10,588	..	..	..
September ..	First "	18,511	18,511	..	..	..
	Second "	20,691	20,691	..	..	..
October ..	First "	7,340	7,340	..	..	..
	Second "	10,315	10,315	..	..	..
November ..	First "	5,830	5,830	..	..	..
	Second "	1,504	1,504	..	..	..
December ..	First "	933	933	..	..	..
	Second "	482	482	..	..	..
January ..	First "	782	782	..	..	..
	Second "	552	552	..	..	..

Abstract Results—Table X—cont.

Proportion { .65 S.W.
.425 N.E.

Year and half month.	Half-monthly total of natural discharge, Aganda Cau- very, limited to 1,966 million cubic feet in any day.	Half-monthly total of column 10 limited to 1,966 million cubic feet in any day.	Half- monthly total of the quantity by which Madras is deprived.	Percentage of diminution, column 2 to column 4.	
				Proportion. .60 .40	Proportion. .65 .425
1	2	3	4	5	6

1900-1901.

June ..	First half	3,979	3,979	..	..	..
	Second "	19,061	18,687	374	1.96	2.30
July ..	First "	29,490	29,490	..	..	..
	Second "	31,466	31,466	..	..	..
August ..	First "	29,490	29,490	..	..	..
	Second "	30,185	30,005	180	0.60	0.80
September ..	First "	25,867	25,867	..	..	..
	Second "	18,786	18,786	..	..	..
October ..	First "	15,251	15,153	98	0.64	1.06
	Second "	19,265	19,265	..	..	..
November ..	First "	7,954	7,954	..	..	0.13
	Second "	5,452	5,452	..	..	..
December ..	First "	3,244	3,244	..	..	..
	Second "	4,116	4,116	..	..	..
January ..	First "	2,990	2,990	..	..	..
	Second "	2,816	2,816	..	..	..

1901-1902.

June ..	First half	4,910	4,910	..	..	..
	Second "	19,381	19,381	..	..	..
July ..	First "	21,864	21,864	..	..	..
	Second "	30,171	30,171	..	..	..
August ..	First "	29,276	29,068	208	0.71	1.74
	Second "	27,920	27,715	205	0.73	1.41
September ..	First "	13,292	13,292	..	..	..
	Second "	21,472	21,472	..	..	..
October ..	First "	28,142	28,142	..	..	..
	Second "	21,435	21,435	..	..	..
November ..	First "	23,184	23,127	57	0.25	0.41
	Second "	18,772	18,551	221	1.18	1.57
December ..	First "	8,679	8,679	..	..	..
	Second "	6,064	6,064	..	..	..
January ..	First "	6,831	6,832	..	..	..
	Second "	5,000	5,000	..	..	..

1902-1903.

June ..	First half	3,568	3,568	..	..	..
	Second "	8,544	8,471	73	0.85	1.56
July ..	First "	12,130	12,064	66	0.55	1.70
	Second "	31,017	30,696	321	1.04	1.52
August ..	First "	21,749	21,749	..	..	..
	Second "	10,876	10,876	..	..	..
September ..	First "	23,688	23,173	515	2.17	3.30
	Second "	22,289	22,289	..	..	..
October ..	First "	15,956	15,956	..	..	..
	Second "	23,367	23,367	..	..	..
November ..	First "	23,353	23,353	..	..	0.40
	Second "	14,328	14,328	..	..	..
December ..	First "	23,394	23,394	..	..	..
	Second "	18,463	18,463	..	..	..
January ..	First "	6,550	6,550	..	..	..
	Second "	5,536	5,536	..	..	..

1903-1904.

June ..	First half	5,786	5,786	..	..	..
	Second "	9,558	9,558	..	..	..
July ..	First "	7,502	7,502	..	..	..
	Second "	31,456	31,456	..	..	..
August ..	First "	29,490	29,490	..	..	..
	Second "	30,577	30,577	..	..	..
September ..	First "	27,994	27,994	..	..	0.13
	Second "	27,918	27,918	..	..	..
October ..	First "	27,892	27,889	3	0.01	0.14
	Second "	29,962	29,962	..	..	..
November ..	First "	24,228	24,228	..	..	..
	Second "	26,399	26,399	..	..	..
December ..	First "	26,497	26,339	158	0.59	0.74
	Second "	11,492	11,492	..	..	..
January ..	First "	10,308	10,308	..	..	..
	Second "	3,808	3,808	..	..	..

Abstract Results—Table X—cont.

Proportion { .65 S. W.
.425 N. E.

Year and half month.		Half monthly total of natural discharge, Aganda Cauvery, limited to 1,966 million cubic feet in any day.	Half monthly total of column 10 limited to 1,966 million cubic feet in any day.	Half monthly totals of the quantity by which Madras is deprived.	Percentage of diminution, column 2 to column 4.	
					Proportion .60 .40	Proportion .65 .425
1		2	3	4	5	6

1904-1905.

June	First half ..	15,178	15,178	..	..	..
	Second ..	28,274	21,274	..	..	..
July	First ..	29,490	29,490	..	..	..
	Second ..	81,349	81,349	..	..	..
August	First ..	26,491	29,491	..	..	..
	Second ..	21,212	21,212	..	..	..
September	First ..	5,940	5,940	757	5.18	6.80
	Second ..	14,637	13,880	..	..	..
October	First ..	6,674	6,674	649	4.60	5.10
	Second ..	11,102	13,463	..	..	..
November	First ..	5,002	5,002	..	..	..
	Second ..	1,424	1,424	..	..	..
December	First ..	322	322	..	..	..
	Second ..	282	282	..	..	..
January	First ..	240	240	..	..	..
	Second ..	292	292	..	..	..

1905-1906.

June	First half ..	4,336	4,336	..	..	..
	Second ..	8,216	8,216	..	..	..
July	First ..	24,853	24,716	137	0.55	0.90
	Second ..	22,638	22,337	271	1.20	..
August	First ..	20,598	20,558	40	0.20	0.80
	Second ..	14,509	14,509	..	..	0.40
September	First ..	21,031	21,031	..	..	0.10
	Second ..	10,600	10,600	..	..	..
October	First ..	14,823	14,823	..	..	..
	Second ..	19,656	19,656	..	..	..
November	First ..	4,338	4,338	..	..	..
	Second ..	5,142	5,142	..	..	..
December	First ..	4,876	4,876	..	..	..
	Second ..	1,974	1,974	..	..	..
January	First ..	280	280	..	..	..
	Second ..	1,376	1,376	..	..	..

1906-1907.

June	First half ..	692	692	..	..	..
	Second ..	4,733	2,863	1,870	39.5	48.90
July	First ..	5,479	5,479	..	..	..
	Second ..	23,392	23,398	..	..	..
August	First ..	27,782	27,782	..	..	..
	Second ..	30,799	30,799	..	..	0.06
September	First ..	26,492	26,492	..	..	..
	Second ..	16,807	16,807	..	..	..
October	First ..	19,402	19,402	..	..	..
	Second ..	23,598	23,598	..	..	..
November	First ..	7,693	7,693	..	..	..
	Second ..	10,022	10,022	..	..	..
December	First ..	6,098	6,098	..	..	..
	Second ..	8,190	8,190	..	..	..
January	First ..	5,216	5,216	..	..	..
	Second ..	3,238	3,238	..	..	..

1907-1908.

June	First half ..	5,060	5,060	..	..	0.16
	Second ..	14,703	14,703	..	..	..
July	First ..	20,001	20,001	..	..	..
	Second ..	19,512	19,512	..	..	..
August	First ..	29,490	29,490	..	..	..
	Second ..	81,456	81,456	..	..	..
September	First ..	26,080	26,080	..	..	..
	Second ..	13,690	13,690	..	..	..
October	First ..	19,566	19,566	..	..	..
	Second ..	12,806	12,806	..	..	..
November	First ..	12,362	12,180	182	1.47	2.08
	Second ..	9,133	9,133	..	..	..
December	First ..	5,070	5,070	..	..	..
	Second ..	5,856	5,856	..	..	..
January	First ..	3,332	3,332	..	..	..
	Second ..	3,462	3,462	..	..	..

Abstract Results—Table X—cont.

Proportion { .65 S. W.
.425 N. E.

Year and half month.		Half-monthly total of natural discharge, Aganda Cauvery, limited to 1,966 millions cubic feet in any day.	Half-monthly total of column 10 limited to 1,966 millions cubic feet in any day.	Half- monthly totals of the quantity by which Madras is deprived.	Percentage of diminution, column 2 to column 4.	
					Proportion .60 .40	Proportion .65 .425
1		2	3	4	5	6

1908-1909.

June	First half ..	2,382	2,382	..	..	..
	Second ..	5,270	5,270	..	..	..
July	First ..	30,967	20,692	275	1.31	1.88
	Second ..	30,204	29,915	289	0.96	1.97
August	First ..	29,490	29,490	..	..	..
	Second ..	26,444	26,444	..	..	0.15
September	First ..	17,757	17,757	..	..	..
	Second ..	5,964	5,964	..	..	..
October	First ..	6,874	6,874	..	..	..
	Second ..	14,252	14,252	..	..	..
November	First ..	12,233	12,233	..	..	..
	Second ..	2,546	2,546	..	..	..
December	First ..	1,334	1,334	..	..	..
	Second ..	1,696	1,696	..	..	..
January	First ..	..	..	..	..	..
	Second ..	..	..	..	..	..

Exhibit Ma. 24f.

Abstract Results—Table XII.

Proportion { .6
.4

Year and half month.		Half-monthly total of natural discharge, Aganda Cauvery, limited to 1,966 millions cubic feet in any day.	Half-monthly total of column 10 limited to 1,966 millions cubic feet in any day.	Half- monthly totals of the quantity by which Madras is deprived.	Percentage of diminution, column 2 to column 4.	
					Proportion .60 .40	Proportion .65 .425
1		2	3	4	5	6

1896-1897.

June	First half ..	4,250	4,250	..	..	..
	Second ..	20,413	20,413	..	..	..
July	First ..	28,019	28,019	..	..	..
	Second ..	31,114	31,031	83	.26	..
August	First ..	29,490	29,490	..	..	..
	Second ..	31,456	31,456	..	..	..
September	First ..	26,381	26,381	..	..	..
	Second ..	18,347	18,347	..	..	..
October	First ..	23,994	23,987	7	.02	..
	Second ..	11,568	11,568	..	..	..
November	First ..	6,324	6,324	..	..	..
	Second ..	18,321	18,013	308	1.68	1.26
December	First ..	16,321	16,321	..	..	..
	Second ..	15,304	15,304	..	..	..
January	First ..	5,690	5,690	..	..	..
	Second ..	4,394	4,394	..	..	..

Abstract Results—Table XII—cont.

Proportion $\left\{ \begin{array}{l} .6 \\ .4 \end{array} \right.$

Year and half month.				Half-monthly total of natural discharge Aganda Cauvery limited to 1,966 millions cubic feet. in any day.	Half-monthly total of column 10 limited to 1,936 millions cubic feet in any day.	Half-monthly totals of the quantity by which Madras is deprived.	Percentage of diminution, column 2 to column 4.	
							Proportion .60 .40	Proportion .65 .425
1				2	3	4	5	6
1897-1898.								
June	First half	..	..	5,682	5,682	289	1.25	.99
	Second	..	..	23,105	22,816	..	..	..
July	First	..	..	17,506	17,506	..	..	..
	Second	..	..	30,192	30,192	..	..	..
August	First	..	..	29,490	29,490	..	..	..
	Second	..	..	31,456	31,456	..	..	..
September	First	..	..	28,681	28,681	..	..	..
	Second	..	..	25,124	25,124	..	..	..
October	First	..	..	28,476	28,476	..	..	..
	Second	..	..	21,739	21,739	..	..	..
November	First	..	..	11,412	11,412	..	..	..
	Second	..	..	6,724	6,724	..	..	..
December	First	..	..	5,724	5,724	..	..	..
	Second	..	..	3,972	3,972	..	..	..
January	First	..	..	2,700	2,700	..	..	..
	Second	..	..	2,206	2,206	..	..	..
February	First	..	..	..	..	..	..	..
	Second	..	..	..	..	..	..	..
March	First	..	..	..	..	..	..	..
	Second	..	..	..	..	..	..	..
April	First	..	..	..	..	..	..	..
	Second	..	..	..	..	..	..	..
May	First	..	..	..	..	..	..	..
	Second	..	..	..	..	..	..	..
1898-1899.								
June	First half	..	..	4,030	4,030	..	..	..
	Second	..	..	22,955	22,955	..	..	..
July	First	..	..	14,840	14,840	..	..	..
	Second	..	..	19,152	19,152	..	..	..
August	First	..	..	28,321	27,351	970	3.4	2.8
	Second	..	..	15,876	15,876	..	..	..
September	First	..	..	19,086	19,086	..	..	..
	Second	..	..	27,175	26,796	379	1.4	1.11
October	First	..	..	29,490	29,490	..	..	..
	Second	..	..	27,892	25,876	1,716	6.3	6.12
November	First	..	..	27,921	27,921	..	..	..
	Second	..	..	23,467	23,467	..	..	..
December	First	..	..	17,924	17,924	..	..	..
	Second	..	..	11,003	11,003	..	..	..
January	First	..	..	9,065	9,065	..	..	..
	Second	..	..	5,486	5,486	..	..	..
1899-1900.								
June	First half	..	..	4,696	4,696	202	1.0	.74
	Second	..	..	19,248	19,046	..	..	..
July	First	..	..	26,612	26,612	..	..	..
	Second	..	..	16,330	16,330	273	3.8	1.76
August	First	..	..	7,141	6,868	..	..	..
	Second	..	..	10,588	10,588	..	..	..
September	First	..	..	18,511	18,511	..	..	..
	Second	..	..	20,691	20,991	..	..	..
October	First	..	..	7,340	7,340	..	..	..
	Second	..	..	10,315	10,315	..	..	..
November	First	..	..	5,830	5,830	..	..	..
	Second	..	..	1,504	1,504	..	..	..
December	First	..	..	988	988	..	..	..
	Second	..	..	482	482	..	..	..
January	First	..	..	782	782	..	..	..
	Second	..	..	552	552	..	..	..
1900-1901.								
June	First half	..	..	3,979	3,979	434	2.3	1.96
	Second	..	..	19,061	18,627	..	..	..
July	First	..	..	29,490	29,490	..	..	..
	Second	..	..	31,456	31,456	..	..	..
August	First	..	..	29,490	29,490	243	.8	.6
	Second	..	..	30,185	29,942	..	..	..
September	First	..	..	25,867	25,867	..	..	..
	Second	..	..	18,786	18,786	..	..	..
October	First	..	..	15,251	15,089	162	1.06	.64
	Second	..	..	19,265	19,240	25	.18	..
November	First	..	..	7,954	7,954	..	..	..
	Second	..	..	5,452	5,452	..	..	..
December	First	..	..	3,244	3,244	..	..	..
	Second	..	..	4,116	4,116	..	..	..
January	First	..	..	2,990	2,990	..	..	..
	Second	..	..	2,846	2,846	..	..	..

Abstract Results—Table XII—cont.

Proportion $\left\{ \begin{array}{l} .6 \\ .4 \end{array} \right.$

Year and half month.				Half-monthly total of natural discharge Aganda Cauvery limited to 1,966 millions cubic feet. in any day.	Half-monthly total of column 10 limited to 1,966 millions cubic feet. in any day.	Half-monthly totals of the quantity by which Madras is deprived.	Percentage of diminution, column 2 to column 4.	
							Proportion .60 .40	Proportion .65 .425
1				2	3	4	5	6
1901-1902.								
June	First half	..	..	4,910	4,910	..	..	..
	Second	..	..	19,381	19,381	..	..	..
July	First	..	..	21,864	21,864	..	..	..
	Second	..	..	30,171	30,171	..	..	..
August	First	..	..	29,276	28,768	508	1.7	.71
	Second	..	..	27,920	27,526	394	1.4	.73
September	First	..	..	13,292	13,292	..	..	..
	Second	..	..	21,472	21,472	..	..	..
October	First	..	..	28,142	28,142	..	..	..
	Second	..	..	21,435	21,435	..	..	..
November	First	..	..	23,184	23,089	95	.9	.25
	Second	..	..	18,772	18,477	295	1.6	1.18
December	First	..	..	8,679	8,679	..	..	..
	Second	..	..	6,064	6,064	..	..	..
January	First	..	..	6,832	6,832	..	..	..
	Second	..	..	5,000	5,000	..	..	..
February	First	..	..	..	..	..	..	..
	Second	..	..	..	..	..	..	..
March	First	..	..	..	..	..	..	..
	Second	..	..	..	..	..	..	..
April	First	..	..	..	..	..	..	..
	Second	..	..	..	..	..	..	..
May	First	..	..	..	..	..	..	..
	Second	..	..	..	..	..	..	..
1902-1903.								
June	First half	..	..	3,568	3,568	..	..	..
	Second	..	..	8,544	8,411	133	1.56	.85
July	First	..	..	12,180	11,919	261	1.7	.55
	Second	..	..	31,017	30,542	475	1.52	1.04
August	First	..	..	21,749	21,749	..	..	..
	Second	..	..	10,876	10,876	..	..	..
September	First	..	..	23,688	22,895	793	3.3	2.17
	Second	..	..	22,289	22,289	..	..	..
October	First	..	..	15,956	15,956	..	..	..
	Second	..	..	23,367	23,367	..	..	..
November	First	..	..	23,353	23,262	91	0.4	..
	Second	..	..	14,328	14,328	..	..	..
December	First	..	..	23,394	23,393	1	..	..
	Second	..	..	18,483	18,483	..	..	..
January	First	..	..	6,550	6,550	..	..	..
	Second	..	..	5,586	5,586	..	..	..
1903-1904.								
June	First half	..	..	5,786	5,786	..	..	..
	Second	..	..	9,558	9,558	..	..	..
July	First	..	..	7,502	7,502	..	..	..
	Second	..	..	31,456	31,456	..	..	..
August	First	..	..	29,490	29,490	..	..	..
	Second	..	..	30,577	30,577	..	..	..
September	First	..	..	27,994	27,957	37	.13	..
	Second	..	..	27,918	27,918	..	..	..
October	First	..	..	27,892	27,851	41	.14	.01
	Second	..	..	29,962	29,962	..	..	..
November	First	..	..	24,228	24,228	..	..	..
	Second	..	..	26,399	26,399	..	..	..
December	First	..	..	26,497	26,301	196	.74	.59
	Second	..	..	11,492	11,492	..	..	..
January	First	..	..	10,308	10,308	..	..	..
	Second	..	..	3,808	3,808	..	..	..
1904-1905.								
June	First half	..	..	15,178	15,178	..	..	..
	Second	..	..	28,274	28,274	..	..	..
July	First	..	..	29,490	29,490	..	..	..
	Second	..	..	31,349	31,349	..	..	..
August	First	..	..	26,491	26,491	..	..	..
	Second	..	..	21,212	21,212	..	..	..
September	First	..	..	5,940	5,940	..	..	..
	Second	..	..	14,637	13,649	988	6.8	5.18
October	First	..	..	6,674	6,674	..	..	..
	Second	..	..	14,102	13,377	725	5.1	4.6
November	First	..	..	5,002	5,002	..	..	..
	Second	..	..	1,424	1,424	..	..	..
December	First	..	..	322	322	..	..	..
	Second	..	..	282	282	..	..	..
January	First	..	..	240	240	..	..	..
	Second	..	..	292	292	..	..	..

Proportion $\begin{cases} .6 \\ .4 \end{cases}$

Abstract Results—Table XII—cont.

Year and half-month.				Half-monthly total of natural discharge Agenda Canvery limited to 1,966 millions cubic feet. in any day.	Half-monthly total of column 10 limited to 1,966 millions cubic feet. in any day.	Half- monthly totals of the quantity by which Madras is deprived.	Percentage of diminution, column 2 to column 4.	
							Proportion .60 .40	Proportion .65 .425
1				2	3	4	5	6

1905-1906.

June	First	half	..	..	4,386	4,386	..	..
	Second	..	..	..	8,246	8,246	..	..55
July	First	..	..	..	24,853	24,689	214	1.5
	Second	..	..	..	22,608	22,260	348	1.5
August	First	..	..	..	20,598	20,437	161	.8
	Second	..	..	..	14,509	14,449	60	.4
September	First	..	..	..	21,091	21,009	22	.1
	Second	..	..	..	10,600	10,600	..	..
October	First	..	..	..	14,823	14,823	..	..
	Second	..	..	..	19,656	19,656	..	..
November	First	..	..	..	4,338	4,338	..	..
	Second	..	..	..	5,142	5,142	..	..
December	First	..	..	..	4,376	4,376	..	..
	Second	..	..	..	1,974	1,974	..	..
January	First	..	..	..	230	230	..	..
	Second	..	..	..	1,376	1,376	..	..

1906-1907.

June	First	half	..	..	692	692	2,081	48.9	39.5
	Second	..	..	..	4,783	2,662	..	..	..
July	First	..	..	..	5,479	5,479	..	..	..
	Second	..	..	..	28,398	28,398	..	..	..
August	First	..	..	..	27,783	27,783	..	..	..
	Second	..	..	..	30,799	30,799	14	0.05	..
September	First	..	..	..	26,492	26,478	..	..	..
	Second	..	..	..	16,787	16,787	..	..	..
October	First	..	..	..	19,402	19,402	..	..	..
	Second	..	..	..	28,598	28,598	..	..	..
November	First	..	..	..	7,693	7,693	..	..	..
	Second	..	..	..	10,023	10,023	..	..	..
December	First	..	..	..	6,098	6,098	..	..	..
	Second	..	..	..	8,190	8,190	..	..	..
January	First	..	..	..	5,216	5,216	..	..	..
	Second	..	..	..	3,238	3,238	..	..	..

1907-1908.

June	First	half	..	..	5,066	5,066	23	.16	..
	Second	..	..	..	14,708	14,680	..	..	..
July	First	..	..	..	20,001	20,001	..	..	..
	Second	..	..	..	19,512	19,512	..	..	..
August	First	..	..	..	29,490	29,490	..	..	..
	Second	..	..	..	31,456	31,456	..	..	..
September	First	..	..	..	26,080	26,080	..	..	..
	Second	..	..	..	13,690	13,690	..	..	..
October	First	..	..	..	19,666	19,666	..	..	..
	Second	..	..	..	12,806	12,806	258	2.08	1.47
November	First	..	..	..	12,862	12,104	..	..	..
	Second	..	..	..	9,138	9,138	..	..	..
December	First	..	..	..	5,070	5,070	..	..	..
	Second	..	..	..	5,856	5,856	..	..	..
January	First	..	..	..	3,332	3,332	..	..	..
	Second	..	..	..	3,462	3,462	..	..	..

1908-1909.

June	First	half	..	..	2,382	2,382	..	..	..
	Second	..	..	..	5,270	5,270	393	1.88	1.31
July	First	..	..	..	20,967	20,574	596	1.97	0.96
	Second	..	..	..	30,204	29,808	..	..	..
August	First	..	..	..	29,490	29,490	40	15	..
	Second	..	..	..	26,444	26,404	..	..	..
September	First	..	..	..	17,757	17,757	..	..	..
	Second	..	..	..	5,964	5,964	..	..	..
October	First	..	..	..	6,374	6,374	..	..	..
	Second	..	..	..	14,252	14,252	..	..	..
November	First	..	..	..	12,233	12,233	..	..	..
	Second	..	..	..	2,546	2,546	..	..	..
December	First	..	..	..	1,334	1,334	..	..	..
	Second	..	..	..	1,696	1,696	..	..	..
January	First	..	..	..	..	..	..	..	..
	Second	..	..	..	..	..	..	..	..

Exhibit Ma.-25.

MADRAS NOTE ON THIRD ISSUE.

The systems of measurement under consideration have been described in the evidence and arguments and a brief recapitulation is given in Ma.-24, paragraphs 1 to 3.

2. The Madras claims are for the adoption of either—

(a) The Madras system.

This system would fully ensure to Madras the "natural flow" up to the "limit flow" of the award on the Second Issue.

(b) The "Third System" which is named by Mysore "the Proportionate System."

This system while not so advantageous to Madras as the "Madras System," is admittedly simpler of application.

3. Madras oppose the adoption of the "Mysore System" on the ground that it cannot with reasonable proportion factors safeguard Madras interests under the award on the Second Issue.

4. The form in which the Second Issue was stated was understood to imply an award which would allow Madras an uninterrupted "limit natural flow" measured at the Upper Anicut which would fully preserve unimpaired all the existing rights of Madras.

The award however specifies the limit volume of water at the Upper Anicut which assisted and supplemented by a proportion of all excess flow over this limit will fully protect Madras interests.

5. This statement is, it is submitted, borne out by paragraphs 99 to 103 of the Assessor's "Examination of evidence."

The Assessor's paragraph 165-A, last clause, suggests that if water up to the seven-foot limit of rules of 1905 should still be passed to the delta under the award, whenever it is available, by means of the proportion of all extra flow it will be still at the disposal of Madras.

Again, in paragraphs 173 and 174, stress is laid on the element of doubt as to what proportion of the flood supplies has been and will in future actually be useful for irrigation and upon the value of a proportionate share of floods as a safeguard against error in the matter of fixing the limit gauge. A proportionate share of all floods is indeed an essential feature of the award on the Second Issue.

6. In the Madras arguments, Ma. 14, paragraphs 115 and 116, and Ma. 22, paragraphs 56 and 63, the expression "useful surplus" was altogether repudiated on the ground that if natural flow up to a limit which fully protected all Madras rights were granted, additional flow applied to the purpose of such protection could not be useful. These arguments were obviously based on the belief and assumption that the award on the Second Issue must, under the terms of that issue, fix as the "limit flow," a limit which would in itself and without any extra or supplementary supplies protect Madras rights, and supply water for this purpose to protect Madras to the same extent as they would be protected under the incidence of unobstructed natural flow.

Under this understanding, the view was expressed that "useful surplus" was a contradiction in terms, and could not be required to protect Madras interests, and under this assumption Madras recognised (Ma. 22, paragraphs 55 and 65) that the Mysore System, apart from compensation clauses, was a reasonable proposal and the above are only applicable to conditions under which surplus flow is unnecessary to protect Madras irrigation.

7. As the award under the second issue specifically counts on surplus over the 6½ feet limit in order to secure Madras, the Madras contention as regards "useful surplus" was withdrawn as soon as the conditions of the award were declared (Ma.-24, paragraph 20).

8. The essential difference as regards the "proportionate (third) system" and the "Mysore system" as it affects Madras, is that the former as explained by the Assessor (paragraph 103, Examination of Evidence) gives to Madras on every day in which the total natural river flow exceeds the "limit flow" a certain proportion of that extra flow, and only allows Mysore to impound the balance; while under the Mysore system, that State impounds all this extra proportion whenever it is physically possible to do so. (Vide Ma. 24, paragraph 10).

This makes a great difference to Madras under conditions in which the extra natural flow is useful and this is clearly shown in the statements A, B, C and D, which will be dealt with later.

9. In the opinion of the Madras Government, the passing of a certain proportion of the extra yield of the catchment above limit flow to Madras day by day whenever it occurs under conditions of "natural flow" is essential, under the award given, for the protection of Madras, and as the Mysore system provides for passing extra water only after Mysore reservoir is full, or when physical conditions make it impossible to impound the operation of the latter system must prove seriously detrimental to Madras irrigation in bad years.

10. In the years when the Mysore reservoir fills under both systems, it is no assistance to Mysore to be full in July rather than in August or September and early filling does not assist Mysore while materially affecting Madras.

11. While the differences between total quantities of water passed to Madras on certain years on either system will be small, on bad years it will be very material. What is of equal, if not of greater, importance is that the "Mysore system" allows impounding in the earlier months, in July for instance to the great detriment of Madras supplies, but gives out in August or September when the Mysore reservoir becomes full, supplies in excess of what would be passed down in these later months under the proportionate system. This makes it appear by reference to *total extra quantities of water passed down in the year* as if the Mysore system affected Madras little, as compared with the proportionate system, but, if the matter is considered in the light of *distribution of flow*, it will be seen, that Madras is far more adequately served by getting a proportion of the natural distribution of extra flow *as it occurs throughout July and August* than by having most of the extra water shut off in the earlier part of the season and being given back in larger quantities later.

12. In the years when the Mysore reservoir does not fill under the proportionate system, that is, in the bad years, and fills under the Mysore system, this is only effected by depriving Madras of the proportions of flow day by day, which affords in a bad year the only reasonable prospect which remains, under the award under the second issue, of protecting their interests (*vide* Ma.-24, paragraphs 6 to 8, and Assessor's examination of evidence, paragraphs 103, 165-A, 173 and 174).

13. Prior to the award on the second issue which was expected to fully conserve Madras interests *within the limit quantity of flow forming the award under that issue* the objections of Madras to the Mysore system were mainly directed to the very grave drawbacks of the compensation clauses of that system, and it was pointed out that while this was a material part of the Mysore system, it was not, subject to the fixing of suitable proportion factors, an essential part of that system.

14. The objections to the Mysore system which are formulated in the Madras case are summed up in Ma. 14, paragraph 126, as below:—

- (a) That it does not preserve their prescriptive rights as regards quantity of flow;
- (b) that it fails in a similar manner as regards incidence of flow;
- (c) that it will impair existing rights to full control and development of works in the basin of the Cauvery below Mysore and above the Upper anicut;
- (d) that it is impossible under the system proposed to make an accurate measurement of the compensation water due to Madras.

15. As regards (a) the matter will be treated of further, as the arguments of Madras are materially affected by the nature of the award under the second issue, an essential feature of which is the receipt by Madras day by day of a proportion of any extra flow.

16. As regards (b), the extent to which incidence of flow is affected during the years when the injury is at a maximum is shown in the diagrams put in by Madras (Ma.-24 g. 1-5 and Ma.-24. h. 1-5), for the co-efficients examined.

A further set of diagrams for the co-efficients proposed by Mysore, viz.—

- 55 south-west monsoon.
- 25 north-east "

are now produced for the same years.

These show a still more fluctuating incidence of flow and consequently still more interference with the rights of Madras.

It is to be recognised that total quantity of flow in a period is only one factor in the securing of these rights, and that Madras is materially injured by any interference which alters the incidence of flow in such a way as to make it more fluctuating than it is under natural conditions.

The Mysore system has this grave inherent defect and this is clearly shown in the diagrams (also see Ma.-14, paragraphs 117 and 118).

17. As regards (c) the arguments and explanations are shown in Ma.-14, paragraph 112, Ma.-22, paragraph 65.

18. As regards (d) Mysore have suggested in My.-21, paragraph 2, that the occasions when computation of compensation water would be impossible under the Mysore system are limited to the occasions when the working tables show *minus* discharges at the Cauvery dam and they have applied this suggestion in their contention in paragraph 8. Paragraph 2 wrongly represents their suggestions as being the Madras view of the matter. This is not so.

The Madras contentions are that the measurement of flow at the Cauvery dam under the Mysore system will never give the true amount of compensation water due to Madras, and that this will be inaccurate on account of varying absorption and seepage with different stages of the river and also with the variation of draw-off from the Upper Madras channels.

The latter cause will entail a loss to Madras on every day when natural flow is reduced by Mysore impounding to below 6½ feet. The matter is treated of in Ma.-14, paragraph 124, Ma.-22, paragraphs 62, and 66 to 68.

19. In the Mysore statements, My.-21, paragraph 13, it is suggested that compensation water is probably overestimated because there is some reason to believe Madras discharges in considerable floods may be under-estimated.

My.-21, paragraph 13.

There is no basis for this contention which is only applicable to discharges in stages of river flow much below any affected by such consideration.

20. It is clear that Mysore recognise the defects of the compensation system, and they have made a suggestion for eliminating this (My.-21, paragraphs 14, 18 and 24) and proposed factors for this purpose which are larger, and on the whole more reasonable, than those they suggest in combination with the *compensation clauses*. Of the two alternatives suggested by Mysore (My.-21) that with the higher factors* and without compensation water is in the view of the Madras Government decidedly the one to be preferred. The factors suggested are,

- * The factors they suggest are —
- 625 south-west monsoon.
- 33 north-east "

however, altogether too low to protect Madras, even if it is assumed for purposes of illustration that the "limit flow", exclusive of all extra flow, would leave Madras fully protected.

21. The reason which Mysore give in My.-21, paragraph 17, in favour of their system is one main reason why Madras object to it—*vide* paragraph 9 above. It is not a recommendation of the system that it is calculated to deprive Madras of their share of excess flow early in the season and give the water so taken back later if not required by Mysore.

22. The Mysore system cannot give to Madras a proportion of all excess flow which they would have enjoyed under the old conditions though in diminished quantities as formulated in paragraph 103 of the Assessor's examination of evidence. That paragraph concludes with the sentence "there is nothing whatever in the evidence to show that, *provided the essential principles underlying this examination of the case are observed*, there will be any risk whatever to the vested rights of Madras" (the italics are ours).

The proportionate system provides for these principles being observed, but the Mysore system does not. It is quite clear from the above paragraph and the computations given in the Assessor's paragraph 174 that these principles are an essential feature of the award and the Madras Government believe that, unless these principles are observed, the operation of the award would, in a bad year, be disastrous to their existing interests.

23. It is significant that Mysore in urging the adoption of the Mysore system as compared with the proportionate system only consider the effect of such application on Mysore.

My.-21, paragraphs 20 and 21.

In the tables drawn showing the results under the proportionate system, Mysore have even omitted all figures relating to Madras and showing how it affects Madras. For this reason it has been impossible to compare in relation to Madras supplies the Mysore proportion factors under this system with those under the Mysore system.

It is submitted that the issue is, what is the method of regulation which will secure to Madras, the quantities of water to which, under the award on the second issue, they are entitled, and that of the two systems now compared the proportionate system is the one considered in making the award and the only one which can fulfil the intention of that award.

24. The results of the comparison of the two systems made in appendix V and referred to in My.-21, paragraph 22 (a) and (b), only prove that the amounts impounded under the two systems are different and have not been examined with reference to the respective shares in floods (*vide* Assessor's paragraphs 173 and 174). The following examination in this respect is therefore made.

Taking the same proportion of •625 in both systems as in the specific case referred to in paragraph 22 (b), the share of Madras in the flow from the Kannambadi catchment for stages up to 8,000 millions cubic feet per diem for the south-west monsoon are given in the table below:—

Flow at Kannambadi. Millions cubic feet per diem.	Passed on to Madras.		Share of Madras in flow from Kannambadi catchment.	
	Mysore system, •625.	Proportionate system, •625.	Mysore system, •625.	Proportionate system, •625.
	MILL. C. FT.	MILL. C. FT.	PER CENT.	PER CENT.
1,219	1,219	1,219	100	100
2,000	887	1,219	19.4	61.0
2,884	NIL.	1,219	0.0	51.6
3,000	"	1,219	0.0	40.6
4,000	"	1,219	0.0	30.5
5,000	"	1,219	0.0	24.4
6,000	"	1,219	0.0	20.3
7,000	"	1,219	0.0	17.4
8,000	"	1,219	0.0	15.2

NOTE.—The limit flow of 1,950 millions cubic feet at Cauvery dam taken in My.-22, paragraph 22 (b), has been adopted here to agree with the Mysore figure. It ought to be 1,956 millions cubic feet.

From this table, it will be seen that for the proportion examined Madras is given the whole flow up to 1,219 millions cubic feet per diem under both systems and under the Mysore system, a gradually diminishing portion of the flow between 1,219 and 2,368 millions cubic feet and at and above a stage indicated by the latter figure, is excluded from all share in the flow from the catchment above Kannambadi.

The proportionate system on the other hand gives to Madras a share in the flood water of Kannambadi catchment at all stages of the river the percentage which would be passed on to Madras decreasing from 100 per cent. at 1,219 millions cubic feet per diem to 15.2 per cent. at 8,000 millions cubic feet per diem.

The passing of such proportion is, it is submitted, altogether reasonable, and it is clear that the Assessor adopted the passing of such a proportion as an integral part of the recommendations on which the award and computations on the second issue were based (*vide* Assessor's paragraphs 99 to 103 and 173 and 174).

25. A proportion of total flow may be a reasonable way of fixing trial proportions for making trial calculations, but it is only on the incidence of daily, and half-monthly recorded flow, and the effect of the application to these of rules and trial proportions that the actual effect, on Madras, of any rules and proportions selected for trial can be estimated.

It is therefore urged that it is only from tables recording incidence of daily flow under the operation of rules and trial factors that the matter should be judged.

Further it is altogether incorrect to argue that the total quantity of flow for an irrigation season can by itself be a measure of the effect on Madras of any rules of regulation; and incidence of flow and the extent to which natural flow within certain limits is interfered with, must be examined half-monthly and not by lumping up the flow of a whole season.

For instance, to get a disproportionate, although possibly not useless, flow in October does not make up for a deprivation in September. It is by consideration of incidence of daily and half-monthly flow and of the effect, half-month by half-month, of the application of rules that the Madras Government look to have their interests considered.

26. Mysore propose to fix factors in consideration of total recorded flow of south-west and north-east monsoon (My.-21, paragraphs 5 and 6). This method of fixing a trial figure, at any rate as regards north-east monsoon is misleading, because the proportion of October flow is absolutely different from that of November and December. As would be expected, the results of tables show considerable losses in October.

So long however as the award figures are fixed in consideration of daily and half-monthly incidence of interference or non-interference, it is not very material how the original trial figures are arrived at; but it is claimed that the factors of the award should only be fixed in consideration of the daily or half-monthly distribution and interference with the natural flow.

27. The principle enunbiated above is that it is only by reference to tables of daily and half-monthly flow and by considering incidence of flow in each half-monthly period that the effect on Madras of any system or proportion factor which may be taken for trial can be effectively examined; following this principle, the Government of Madras adduce in evidence the working tables IX, X, XI, XII put in at the last meeting of the Arbitration Committee, and the abstracts of flow, Ma. 24-e and 24-f made to show by half-monthly periods the percentages of reduction of flow at the Cauvery dam, realized under the conditions of the tables, within certain limits, as compared with the recorded natural flow within the same limits. In the abstracts originally put in, this was worked out only for the 6½ feet limit (1,966 millions cubic feet per day) of the award. The Assessor has however pointed out that under the conditions of this award as specially noted in his paragraphs 173 and 174 constant replenishment must be received by Madras over and above this, and he has asked that further abstracts be prepared, and the following abstracts have accordingly been prepared:—

- (a) Abstracts on basis of total flow.
- (b) " " flow limited to 2,944 million cubic feet daily.
- (c) " " " 2,300 " "

The original abstracts are also available, viz.,

- (d) Abstracts on basis of flow limited to 1,966 million cubic feet daily.

28. The percentages shown in these abstracts are tabulated in the attached statements (a), (b), (c), (d), for the five years, out of the 13 years examined, in which Madras is most affected.

In each of these statements, the results of the two systems are compared, viz.—

	Co-efficients.
Mysore system without compensation water on basis of My.-21, paragraph 24 (ii).	.625 south-west monsoon. .38 north-east "
Proportionate system, two separate portions.	.65 south-west monsoon. .425 north-east " .60 south-west " .40 north-east "

29. An examination of these statements shows as regards these systems:—

That for all limits in the south-west monsoon, the Mysore system, with a proportion factor of .625 entails much more loss on Madras as compared with natural flow, than the proportionate system, even with a proportion of 0.6.

Within the limit of (7 feet on the Cauvery dam) 2,300 million cubic feet the losses go up to 14.3 per cent. in the first half of July 1908 as against a loss of only 3.5 per cent. under the proportionate system.

Other comparisons are tabulated below:—

	Proportionate system.	Mysore system.
First half August 1898	5.7 per cent.	10 per cent.
Do. 1899	3.8 "	6.1 "
Do. 1905	1.6 "	6.6 "
Second half September 1904	7.4 "	13.3 "

The whole of the statements for all limits follow the same lines.

30. In the north-east monsoon, the Mysore tables for the Mysore system, are unfortunately for a lower co-efficient than any for which there are figures available under the proportionate system and the comparison is between a co-efficient of .33 under the Mysore system and .40 under the proportionate system.

The differences as regards the effect on Madras are again very striking and are attributable to the system rather than the co-efficients; the losses in October under all limits are very considerable.

31. The tables (a), (b), (c) show that with one exception the effect of the Mysore system as regards flow for limits larger than the award limit, 1,966 million cubic feet per day, is to deprive Madras of much larger percentages of total flow than they would be deprived of under the proportionate system.

The only exception is October 1898 when, under the Mysore system, the Mysore reservoir surpluses but does not surplus under the proportionate system.

Special attention is invited to tables (b) and (c) for limits 2,944 and 2,300 million cubic feet per day.

32. It is submitted that the abstracts and the statements prepared from them clearly indicate the great losses which Madras will be liable to suffer in bad years under the Mysore system.

It is brought to notice that the five years selected for examination, are those in which the Mysore system most greatly injures Madras; of these five years, four are the worst years in the whole 13 years examined, and that these are years in which very material losses were actually incurred under the incidence of natural flow and under rules prescribing a 7 feet minimum being passed over the Cauvery dam whenever available. It is contended that under a system which reduces this flow very materially involving reductions amounting to over 14 per cent. in the south-west, and 18 per cent. in the north-east, monsoon on a seven feet limit over a whole half month, Madras rights cannot but suffer very materially.

33. For this reason, the Government of Madras urge that the proportionate system should be adopted in preference to the Mysore system.

34. Coming to the question of the proportion to be tentatively fixed the Madras Government's suggestions and remarks are to be found in Ma.-24, paragraphs 13 and 14.

The tables and abstracts then examined are now supplemented by the statements (a), (b), (c), (d), and the connected abstracts. A comparison of the figures showing losses within different limits of flow will, it is contended, support the Madras proposal for an award of tentative proportion factors of—

- .65 south-west monsoon
- .425 north-east "

in connection with the proportionate (third) system of regulation.

35. It is found that there are some mistakes in the Mysore working tables, Mysore system, and these have been corrected.

The mistakes have been due to three causes—

- (a) Erroneous computation of water surplused.
- (b) Erroneous computation of draw-off for irrigation.
- (c) Omission of the extra draw-off for filling Mysore tanks when Mysore reservoir is surplusing.

The resulting corrected figures do not very materially affect results, but a statement of them is put in.

The details of corrections can, it is suggested, be checked with the Mysore representative. It is believed that this will be found to be non-contentious matter.

31st March 1914.

W. M. ELLIS, Col., R.E.,
Madras Representative.

STATEMENT (a).

Comparative Statement compiled from Abstract (a).

TOTAL flow without limit at Canvery dam comparing Mysore and proportionate systems in terms of percentage of diminution of natural flow received by Madras half-monthly under each system to that received by natural flow and for the proportionate factors shown.

Year			1898.			1899.			1904.			1905.			1908.		
Month.			Proportionate.		Mysore.	Proportionate.		Mysore.	Proportionate.		Mysore.	Proportionate.		Mysore.	Proportionate.		Mysore.
			.60 .40	.650 .425		.60 .40	.65 .425		.60 .40	.650 .425		.60 .40	.65 .425		.60 .40	.65 .425	
June	First half	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
	Second "	..	6.6	5.4	15.7	18.5	15.5	27.4	10.3	9.6	12.9	..	..	..	..	..	..
July	First "	..	..	..	..	11.9	10.6	16.3	4.7	5.6	3.3	5.9	5.3	11.8	30.4	28.7	42.4
	Second "	..	14.8	11.8	18.8	0.1	..	..	1.3	1.0	1.5	24.2	23.0	35.7	19.3	20.4	18.4
August	First "	..	21.8	19.3	28.8	3.8	1.8	6.1	5.6	4.1	3.6	7.0	5.1	12.9	3.5	8.5	3.5
	Second "	..	..	..	..	..	..	..	3.2	1.9	3.25	0.4	..	0.4	1.3	0.7	1.4
September	First "	..	..	..	..	..	..	..	..	..	..	0.3	..	0.2	..	..	..
	Second "	..	3.7	3.1	7.1	1.3	1.0	2.4	7.4	5.8	13.3	..	..	..	..	..	..
October	First "	..	7.5	6.6	15.1	..	..	..	..	..	..	..	..	..	..	..	..
	Second "	..	9.3	9.1	3.0	..	..	..	5.1	4.6	18.2	8.4	7.8	18.7	..	..	0.9
November	First "	..	0.05	..	1.1	..	..	..	..	..	..	..	..	..	..	..	0.9
	Second "	..	5.3	5.0	7.1	..	..	..	..	..	..	..	..	..	..	..	..
December	First "	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
	Second "	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..

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STATEMENT (b).

Comparative Statement compiled from Abstract (b).

SUBJECT to limit flow 2,944 million cubic feet per day at Canvery dam comparing "Mysore" and "proportionate" systems in term of percentage of deficiency under each which within this limit is received by Madras as compared with natural flow within the same limit.

Year			1898.			1899.			1904.			1905.			1908.		
Month.			Proportionate.		Mysore.	Proportionate.		Mysore.	Proportionate.		Mysore.	Proportionate.		Mysore.	Proportionate.		Mysore.
			.6 .4	.65 .425		.6 .4	.65 .425		.6 .4	.65 .425		.6 .4	.65 .425		.6 .4	.65 .425	
June	First half	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
	Second "	..	2.5	1.6	10.6	1.0	0.6	2.3	..	..	..	..	..	..	..	..	..
July	First "	..	..	..	..	1.3	0.9	0.5	0.5	1.6	..	3.3	2.8	9.1	9.7	8.1	22.3
	Second "	..	..	..	..	..	..	..	0.7	0.5	0.8	4.2	4.0	14.3	2.7	1.6	4.7
August	First "	..	7.0	5.5	16.2	3.8	1.8	6.1	..	..	0.2	6.6	4.6	12.6	..	..	..
	Second "	..	..	..	..	..	..	..	2.5	1.5	2.4	0.4	..	0.4	1.1	0.5	1.2
September	First "	..	..	..	..	..	..	..	..	..	..	0.3	..	0.2	..	..	..
	Second "	..	4.5	3.7	8.6	0.5	..	1.7	7.4	5.8	13.3	..	..	..	..	..	..
October	First "	..	3.5	3.3	7.0	..	..	..	..	..	..	..	..	..	..	..	..
	Second "	..	8.0	7.9	0.6	..	..	..	5.1	4.6	18.2	1.4	0.9	10.0	..	..	0.9
November	First "	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
	Second "	..	1.6	1.5	0.7	..	..	..	..	..	..	..	..	..	..	..	..

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STATEMENT (c).

Comparative Statement compiled from Abstract (c).

SUBJECT to "limit flow" 2,300 million cubic feet per day at Cauvery dam comparing "Mysore" and "proportionate" systems in terms of percentage of deficiency under each which within limit is received by Madras as compared with natural flow within the same limit.

Year		1898.			1899.			1904.			1905.			1908.		
Month.		Proportion.		Mysore.	Proportion.		Mysore.	Proportion.		Mysore.	Proportion.		Mysore.	Proportion.		Mysore.
		.6 .4	.65 .425		.6 .4	.65 .425		.60 .40	.65 .425		.60 .40	.65 .425		.6 .4	.65 .425	
June	First half	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
	Second "	..	..	2.3	0.95	0.7	2.2	..	..	..	..	..	..	..	..	..
July	First "	..	..	..	..	..	..	..	..	..	1.5	1.2	6.0	3.6	2.3	14.3
	Second "	..	..	..	..	..	..	..	..	..	2.7	2.4	7.2	3.0	1.8	5.2
August	First "	5.7	4.2	10.0	3.8	1.8	6.1	..	..	..	1.6	0.6	6.8	..	..	..
	Second "	..	..	..	..	..	..	0.9	0.2	1.3	0.4	..	0.4	0.1	..	0.1
September.	First "	..	..	..	..	..	..	..	..	..	0.3	..	0.2	..	..	..
	Second "	2.4	1.4	6.8	..	..	..	7.4	5.8	13.3	..	..	..	..	..	..
October	First "	0.4	0.2	2.3	..	..	..	..	..	..	..	..	..	..	..	..
	Second "	6.8	6.6	0.7	..	..	..	5.1	4.6	18.2	0.1	..	4.2	..	..	1.0
November.	First "	..	..	..	..	..	..	..	..	..	..	..	..	..	..	0.9
	Second "	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..

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STATEMENT (d).

COMPARATIVE Statement compiled from abstracts subject to "limit flow" 1,936 million cubic feet at Cauvery dam comparing "Mysore" and "proportionate" systems in terms of percentage of deficiency under each which within this limit is received by Madras as compared with natural flow within the same limit.

Year		1898.			1899.			1904.			1905.			1908.		
Month.		Proportion.		Mysore.	Proportion.		Mysore.	Proportion.		Mysore.	Proportion.		Mysore.	Proportion.		Mysore.
		.60 .40	.65 .425		.6 .4	.65 .425		.6 .4	.65 .425		.6 .4	.65 .425		.6 .4	.65 .425	
June	First half	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
	Second "	..	..	..	1.0	0.7	..	..	..	..	..	..	..	..	..	..
July	First "	..	..	..	..	..	..	..	..	..	0.9	0.5	4.5	1.9	1.3	9.8
	Second "	..	..	..	..	..	..	..	..	..	1.5	1.2	5.6	2.0	1.0	4.3
August	First "	3.4	2.3	6.85	3.8	1.7	6.1	..	..	..	0.8	0.2	1.6	..	..	..
	Second "	..	..	..	..	..	..	..	..	..	0.4	..	0.4	0.15	..	0.1
September.	First "	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
	Second "	1.4	1.1	4.9	..	..	..	6.8	5.8	12.7	..	..	..	..	..	..
October	First "	..	..	0.91	..	..	..	..	..	..	..	..	..	..	..	..
	Second "	6.3	6.1	..	..	..	..	6.1	4.6	18.2	..	..	1.7	..	..	..
November.	First "	..	..	..	..	..	..	..	..	..	..	..	..	..	..	0.7
	Second "	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..

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TABLE XII.

1896-1897.

(a)

Co-efficients { 0.6
0.4

Year and half-month.				Percentage of column 4 to column 2.	
				0.6 0.4	0.65 0.425
1	2	3	4	5	6
June .. First half	4,250	4,250	..	..	..
June .. Second	81,248	60,257	20,991	25.83	25.83
July .. First	68,855	66,558	2,297	3.34	3.24
July .. Second	133,826	130,309	3,517	2.63	2.57
August .. First	164,067	161,268	2,799	1.71	1.84
August .. Second	71,385	69,714	1,671	2.34	2.01
September .. First	28,712	28,649	43	0.15	..
September .. Second	19,428	19,428	..	..	..
October .. First	31,715	30,595	1,120	3.53	3.17
October .. Second	11,568	11,568	..	..	..
November .. First	6,324	6,324	..	..	..
November .. Second	18,369	18,018	350	1.94	1.82
December .. First	17,344	17,344	..	..	..
December .. Second	15,703	15,703	..	..	..
January .. First	5,690	5,690	..	..	..
January .. Second	4,394	4,394	..	..	..

1896-1897.

(b)

Year and half-month.				Percentage of column 4 to column 2.	
				0.6 0.4	0.65 0.425
1	2	3	4	5	6
June .. First half	4,250	4,250	..	..	..
June .. Second	29,215	29,215	..	..	..
July .. First	37,830	37,408	422	1.12	0.94
July .. Second	43,732	42,284	1,448	1.14	0.96
August .. First	44,160	42,254	1,906	1.48	0.93
August .. Second	42,890	42,254	636	1.48	0.93
September .. First	28,712	28,649	43	0.15	..
September .. Second	19,428	19,428	..	..	..
October .. First	29,190	28,970	220	0.75	0.63
October .. Second	11,568	11,568	..	..	..
November .. First	6,324	6,324	..	..	..
November .. Second	18,369	18,018	350	1.93	1.81
December .. First	17,299	17,299	..	..	..
December .. Second	15,703	15,703	..	..	..
January .. First	5,690	5,690	..	..	..
January .. Second	4,394	4,394	..	..	..

1896-1897.

(2)

Year and half-month.				Percentage of column 4 to column 2.	
				0.6 0.4	0.65 0.425
1	2	3	4	5	6
June .. First half	4,250	4,250	..	..	..
June .. Second	23,419	23,419	..	..	..
July .. First	31,693	31,550	143	0.45	0.24
July .. Second	35,731	35,444	287	0.81	0.59
August .. First	34,500	34,500	..	..	..
August .. Second	36,445	36,127	318	0.84	0.54
September .. First	28,386	28,348	48	0.16	..
September .. Second	19,015	19,015	..	..	..
October .. First	25,970	25,750	220	1.87	0.70
October .. Second	11,568	11,568	..	..	..
November .. First	6,324	6,324	..	..	..
November .. Second	18,369	18,018	350	1.83	1.52
December .. First	16,655	16,655	..	..	..
December .. Second	15,703	15,703	..	..	..
January .. First	5,690	5,690	..	..	..
January .. Second	4,394	4,394	..	..	..

Ma.-25-A.

TABLE XII.

1897-1898.

(a)

Year and half-month.				Percentage of column 4 to column 2.	
				0.6 0.4	0.65 0.425
1	2	3	4	5	6
June .. First half	5,662	5,662	..	..	..
June .. Second	63,308	56,084	7,224	11.41	10.46
July .. First	54,461	45,719	8,742	16.05	15.49
July .. Second	49,714	41,376	8,338	16.77	15.09
August .. First	143,694	138,086	5,608	3.9	3.24
August .. Second	77,675	75,412	2,263	2.91	2.71
September .. First	48,905	42,747	1,158	2.63	2.60
September .. Second	56,988	53,284	704	1.23	0.93
October .. First	65,552	65,286	266	0.43	0.26
October .. Second	36,348	35,214	1,134	3.1	2.8
November .. First	11,412	11,412	..	..	..
November .. Second	6,724	6,724	..	..	..
December .. First	5,724	5,724	..	..	..
December .. Second	3,972	3,972	..	..	..
January .. First	2,700	2,700	..	..	..
January .. Second	2,206	2,206	..	..	..

1897-1898.

(b)

Year and half-month.			Half-monthly total of natural discharge, Agenda Cauvery, limited to 2,944 m.c.ft. on any day.	Half-monthly totals of computed discharge, Agenda Cauvery, column 9 of table XII, limited to 2,944 m.c.ft. on any day.	Half- monthly diminution, column 2— column 3 -6 -4	Percentage of column 4 to column 2.	
						-6 -4	-65 -425
1			2	3	4	5	6
June ..	First half	.. .. .	5,662	5,662	..	1.50	1.10
	Second "	.. .. .	31,516	31,049	467	..	..
July ..	First "	.. .. .	22,396	22,396	..	..	..
	Second "	.. .. .	36,512	36,294	218	.60	.19
August ..	First "	.. .. .	43,140	42,880	260	.60	.41
	Second "	.. .. .	44,261	44,261	..	..	..
September.	First "	.. .. .	36,155	35,933	222	.61	.19
	Second "	.. .. .	33,695	33,695	..	..	..
October ..	First "	.. .. .	37,924	39,924	..	..	..
	Second "	.. .. .	26,722	26,168	554	2.06	1.93
November.	First "	.. .. .	11,412	11,412	..	..	..
	Second "	.. .. .	6,724	6,724	..	..	..
December.	First "	.. .. .	5,724	5,724	..	..	..
	Second "	.. .. .	3,972	3,972	..	..	..
January ..	First "	.. .. .	2,700	2,700	..	..	..
	Second "	.. .. .	2,206	2,206	..	..	..

1897-1898.

(c)

Year and half-month.			Half-monthly total of natural dis- charge, Agenda Cauvery, limited to 2,300 m.c.ft. on any day.	Half-monthly totals of com- puted dis- charge, Agenda Cauvery, column 9 of table XII, limited to 2,300 m.c.ft. on any day.	Half-month- ly dimina- tion, column 2—column 3. -6 -4	Percentage of column 4 to column 2.	
						-6 -4	-65 -425
1			2	3	4	5	6
June ..	First half	.. .. .	5,662	5,662	289	1.11	.87
	Second "	.. .. .	26,111	25,822	..	..	..
July ..	First "	.. .. .	19,176	19,176	..	..	..
	Second "	.. .. .	33,187	32,939	198	0.60	.15
August ..	First "	.. .. .	34,495	34,445	50	.15	..
	Second "	.. .. .	36,800	36,800	..	..	..
September.	First "	.. .. .	32,088	31,983	105	.32	.09
	Second "	.. .. .	28,130	28,130	..	..	..
October ..	First "	.. .. .	32,245	32,245	..	..	..
	Second "	.. .. .	23,502	23,502	..	..	..
November.	First "	.. .. .	11,412	11,412	..	..	..
	Second "	.. .. .	6,724	6,724	..	..	..
December.	First "	.. .. .	5,724	5,724	..	..	..
	Second "	.. .. .	3,972	3,972	..	..	..
January ..	First "	.. .. .	2,700	2,700	..	..	..
	Second "	.. .. .	2,206	2,206	..	..	..

Ma.-25-A3.

TABLE XII.

1898-1899.

(a)

Year and half-month.			Half-monthly total of natural discharge, Agenda Cauvery.	Half-monthly totals of computed discharge, Agenda Cauvery, column 9 of table XII.	Half- monthly diminution, column 2— column 3. -6 -4	Percentage of column 4 to column 2.	
						-6 -4	-65 -425
1			2	3	4	5	6
June ..	First half	.. .. .	4,030	4,0	..	..	..
	Second "	.. .. .	30,482	28,479	2,003	6.57	5.4
July ..	First "	.. .. .	14,340	14,340	..	..	..
	Second "	.. .. .	47,470	40,461	7,009	14.78	11.85
August ..	First "	.. .. .	43,542	34,361	9,181	21.80	19.34
	Second "	.. .. .	15,876	15,876	..	..	..
September.	First "	.. .. .	21,181	21,181	..	..	..
	Second "	.. .. .	39,863	38,396	1,467	3.68	3.10
October ..	First "	.. .. .	57,823	53,483	4,340	7.5	6.66
	Second "	.. .. .	37,643	34,132	3,511	9.32	9.12
November.	First "	.. .. .	60,450	59,417	33	.05	..
	Second "	.. .. .	43,488	41,189	2,299	5.28	5.04
December.	First "	.. .. .	18,881	18,881	..	..	..
	Second "	.. .. .	11,142	11,142	..	..	..
January ..	First "	.. .. .	9,065	9,065	..	..	..
	Second "	.. .. .	5,486	5,486	..	..	..

1898-1899.

(b)

Year and half-month.			Half-monthly total of natural dis- charge, Agenda Cauvery, limited to 2,944 m.c.ft. on any day.	Half-monthly totals of computed discharge, Agenda Cauvery, column 9 of table XII, limited to 2,944 m.c.ft. on any day.	Half- monthly diminution, column 2— column 3. -6 -4	Percentage of column 4 to column 2.	
						-6 -4	-65 -425
1			2	3	4	5	6
June ..	First half	.. .. .	4,030	4,030	..	..	..
	Second "	.. .. .	28,743	28,031	712	2.48	1.64
July ..	First "	.. .. .	14,340	14,340	..	..	..
	Second "	.. .. .	24,511	24,511	..	..	..
August ..	First "	.. .. .	34,154	31,755	2,399	7.02	5.47
	Second "	.. .. .	15,876	15,876	..	..	..
September.	First "	.. .. .	20,370	20,370	..	..	..
	Second "	.. .. .	32,912	31,445	1,467	4.46	3.75
October ..	First "	.. .. .	43,148	41,885	1,533	3.53	3.27
	Second "	.. .. .	33,534	30,840	2,694	8.03	7.92
November.	First "	.. .. .	35,651	35,651	..	..	..
	Second "	.. .. .	28,140	27,688	452	1.60	1.50
December.	First "	.. .. .	18,881	18,881	..	..	..
	Second "	.. .. .	11,108	11,108	..	..	..
January ..	First "	.. .. .	9,065	9,065	..	..	..
	Second "	.. .. .	5,486	5,486	..	..	..

1898-1899.

(c)

Year and half-month.						Percentage of column 4 to column 2.	
						.6 .4	.65 .425
1	2	3	4	5	6		
June .. First half	4,030	4,030	..	..	..		
Second	25,306	25,306	..	..	..		
July .. First	14,840	14,840	..	..	..		
Second	21,156	21,156	..	..	..		
August .. First	31,076	29,317	1,759	5.66	4.35		
Second	15,876	15,876	..	..	..		
September. First	19,726	19,726	..	..	..		
Second	29,601	28,894	707	2.38	1.88		
October .. First	34,600	34,356	244	.71	.24		
Second	30,280	28,230	2,050	6.77	6.64		
November. First	30,953	30,953	..	..	..		
Second	25,291	25,291	..	..	..		
December. First	18,623	18,623	..	..	..		
Second	11,142	11,142	..	..	..		
January .. First	9,065	9,065	..	..	..		
Second	5,486	5,486	..	..	..		

Ma.-25-A4.

TABLE XII.

1899-1900.

(a)

Year and half-month.						Percentage of column 4 to column 2.	
						.6 .4	.65 .425
1	2	3	4	5	6		
June .. First half	4,696	4,696	..	..	..		
Second	36,063	30,096	5,967	16.55	15.55		
July .. First	52,999	46,684	6,315	11.92	10.66		
Second	16,885	16,870	15	.09	..		
August .. First	7,141	6,868	273	3.82	1.76		
Second	10,588	10,588	..	..	..		
September. First	19,576	19,576	..	..	..		
Second	28,053	27,696	357	1.27	1.00		
October .. First	7,340	7,340	..	..	..		
Second	10,315	10,315	..	..	..		
November. First	5,830	5,830	..	..	..		
Second	1,504	1,504	..	..	..		
December. First	938	938	..	..	..		
Second	482	482	..	..	..		
January .. First	782	782	..	..	..		
Second	552	552	..	..	..		

1899-1900.

(b)

Year and half-month.						Percentage of column 4 to column 2.	
						.6 .4	.65 .425
1	2	3	4	5	6		
June .. First half	4,696	4,696	..	..	..		
Second	24,467	24,227	240	.98	.58		
July .. First	37,753	37,258	495	1.31	.91		
Second	16,885	16,885	..	..	..		
August .. First	7,141	6,868	273	3.82	1.76		
Second	10,588	10,588	..	..	..		
September. First	19,576	19,576	..	..	..		
Second	25,563	25,444	119	.46	.02		
October .. First	7,340	7,340	..	..	..		
Second	10,315	10,315	..	..	..		
November. First	5,830	5,830	..	..	..		
Second	1,504	1,504	..	..	..		
December. First	938	938	..	..	..		
Second	482	482	..	..	..		
January .. First	782	782	..	..	..		
Second	552	552	..	..	..		

1899-1900.

(c)

Year and half-month.						Percentage of column 4 to column 2.	
						.6 .4	.65 .425
1	2	3	4	5	6		
June .. First half	4,696	4,696	..	..	..		
Second	21,247	21,045	202	.95	.67		
July .. First	30,949	30,949	..	..	..		
Second	16,895	16,895	..	..	..		
August .. First	7,141	6,868	273	3.82	1.76		
Second	10,588	10,588	..	..	..		
September. First	19,246	19,246	..	..	..		
Second	22,574	22,574	..	..	..		
October .. First	7,340	7,340	..	..	..		
Second	10,315	10,315	..	..	..		
November. First	5,830	5,830	..	..	..		
Second	1,504	1,504	..	..	..		
December. First	938	938	..	..	..		
Second	482	482	..	..	..		
January .. First	782	782	..	..	..		
Second	552	552	..	..	..		

Ma.-25-A.

TABLE XII.

1900-1901.

(a)

Year and half-month.				Half-monthly total natural discharge, Aganda Cauvery.	Half-monthly total computed discharge, Aganda Cauvery, column 9 of table XII.	Half- monthly diminution, column 2— column 3. ·6 ·4	Percentage of column 4 to column 2.	
							·6 ·4	·65 ·425
1				2	3	4	5	6
June	First half	..	..	8,979	8,979	..	..	..
	Second	..	..	27,103	24,857	2·746	10·13	9·25
July	First	..	..	114,971	100,789	14·232	12·88	11·38
	Second	..	..	100,955	91,626	9·829	9·24	8·60
August	First	..	..	186,986	178,958	8·028	4·80	5·80
	Second	..	..	91,090	88,710	2·380	2·61	2·54
September.	First	..	..	31,229	31,024	205	·65	·22
	Second	..	..	22,236	22,236	..	..	..
October	First	..	..	17,927	17,765	162	·90	·54
	Second	..	..	26,685	25,833	852	3·20	2·81
November.	First	..	..	7,954	7,954	..	..	..
	Second	..	..	5,452	5,452	..	..	..
December.	First	..	..	3,244	3,244	..	..	..
	Second	..	..	4,116	4,116	..	..	..
January	First	..	..	2,990	2,990	..	..	..
	Second	..	..	2,846	2,846	..	..	..

1900-1901.

(b)

Year and half-month.				Half-monthly total of natural discharge, Aganda Cauvery, limited to 2,944 m.o.ft. on any day.	Half-monthly total of computed discharge, Aganda Cauvery, column 9 of table XII limited to 2,944 m.o.ft. on any day.	Half- monthly diminution, column 2— column 3. ·6 ·4	Percentage of column 4 to column 2.	
							·6 ·4	·65 ·425
1				2	3	4	5	6
June	First half	..	..	8,979	8,979	..	..	..
	Second	..	..	23,272	21,801	1,471	6·32	5·55
July	First	..	..	44,160	44,160	..	..	..
	Second	..	..	45,501	45,501	..	..	..
August	First	..	..	44,160	44,160	..	..	..
	Second	..	..	38,926	38,019	907	2·33	2·17
September	First	..	..	29,410	29,350	60	·20	..
	Second	..	..	20,840	20,840	..	..	..
October	First	..	..	17,116	16,954	162	·95	·57
	Second	..	..	23,086	22,554	232	1·00	·57
November	First	..	..	7,954	7,954	..	..	..
	Second	..	..	5,452	5,452	..	..	..
December	First	..	..	3,244	3,244	..	..	..
	Second	..	..	4,116	4,116	..	..	..
January	First	..	..	2,990	2,990	..	..	..
	Second	..	..	2,846	2,846	..	..	..

1900-1901.

(c)

Year and half-month.				Half-monthly total of natural discharge, Aganda Cauvery, limited to 2,300 m.o.ft. on any day.	Half-monthly total of computed discharge, Aganda Cauvery, column 9 of table XII, limited to 2,300 m.o.ft. on any day.	Half- monthly diminution, column 2— column 3. ·6 ·4	Percentage of column 4 to column 2.	
							·6 ·4	·65 ·425
1				2	3	4	5	6
June	First half	..	..	8,979	8,979	..	..	..
	Second	..	..	20,696	20,030	666	3·22	2·60
July	First	..	..	34,500	34,500	..	..	..
	Second	..	..	36,741	36,741	..	..	..
August	First	..	..	34,500	34,500	..	..	..
	Second	..	..	33,556	33,240	316	·94	·76
September	First	..	..	27,296	27,296	..	..	..
	Second	..	..	19,788	19,788	..	..	..
October	First	..	..	15,919	15,757	162	1·02	·61
	Second	..	..	20,601	20,576	25	·12	..
November	First	..	..	7,954	7,954	..	..	..
	Second	..	..	5,452	5,452	..	..	..
December	First	..	..	3,244	3,244	..	..	..
	Second	..	..	4,116	4,116	..	..	..
January	First	..	..	2,990	2,990	..	..	..
	Second	..	..	2,846	2,846	..	..	..

Ma.-25-A.

TABLE XII.

1901-1902.

(a)

Year and half-month.				Half-monthly total of natural discharge, Aganda Cauvery.	Half-monthly total of computed dis- charge, Aganda Cauvery, column 9 of table XII.	Half- monthly diminution, column 2— column 3. ·6 ·4	Percentage of column 4 to column 2.	
							·6 ·4	·65 ·425
1				2	3	4	5	6
June	First half	..	..	4,910	4,910	..	..	..
	Second	..	..	25,544	24,416	1,128	4·41	3·38
July	First	..	..	76,627	56,256	20,371	26·58	25·68
	Second	..	..	55,071	45,834	9,237	16·77	16·13
August	First	..	..	43,341	40,697	2,644	6·09	5·25
	Second	..	..	38,126	36,205	1,921	5·03	4·51
September	First	..	..	13,292	13,292	..	..	..
	Second	..	..	26,210	26,210	..	..	..
October	First	..	..	47,301	45,879	1,422	2·80	2·56
	Second	..	..	34,887	31,506	2,381	8·37	7·65
November	First	..	..	38,896	32,456	1,440	4·25	3·70
	Second	..	..	25,624	25,201	423	1·65	1·21
December	First	..	..	8,679	8,679	..	..	..
	Second	..	..	6,064	6,064	..	..	..
January	First	..	..	6,832	6,832	..	..	..
	Second	..	..	5,000	5,000	..	..	..

1901-1902.

(b)

Year and half-month.				Half-monthly diminution, column 2— column 3. -6 -4	Percentage of column 4 to column 2.	
					-6 -4	-65 -425
1				2	3	4
June	First half	..	..	4,910	4,910	..
	Second "	..	..	22,524	22,972	552
July	First "	..	..	30,827	30,827	..
	Second "	..	..	40,777	40,898	879
August	First "	..	..	37,086	35,664	1,682
	Second "	..	..	38,841	32,058	1,283
September	First "	..	..	13,292	13,292	..
	Second "	..	..	24,700	24,700	..
October	First "	..	..	38,768	38,191	565
	Second "	..	..	27,731	27,438	298
November	First "	..	..	27,690	27,359	331
	Second "	..	..	22,134	21,711	423
December	First "	..	..	8,679	8,679	..
	Second "	..	..	6,064	6,064	..
January	First "	..	..	6,832	6,832	..
	Second "	..	..	5,000	5,000	..

1901-1902.

(c)

Year and half-month.				Half-monthly diminution, column 2— column 3. -6 -4	Percentage of column 4 to column 2.	
					-6 -4	-65 -425
1				2	3	4
June	First half	..	..	4,910	4,910	..
	Second "	..	..	21,081	20,783	299
July	First "	..	..	26,031	25,031	..
	Second "	..	..	34,179	34,164	15
August	First "	..	..	32,711	31,536	1,135
	Second "	..	..	30,299	29,527	772
September	First "	..	..	13,292	13,292	..
	Second "	..	..	22,768	24,768	..
October	First "	..	..	32,150	32,150	..
	Second "	..	..	23,773	23,686	87
November	First "	..	..	24,881	24,788	93
	Second "	..	..	20,108	19,779	329
December	First "	..	..	8,679	8,679	..
	Second "	..	..	6,064	6,064	..
January	First "	..	..	6,832	6,832	..
	Second "	..	..	5,000	5,000	..

Ma.-25-A7.

TABLE XII.

1902-1903.

(a)

Year and half-month.				Half-monthly diminution, column 2— column 3. -6 -4	Percentage of column 4 to column 2.	
					-6 -4	-65 -425
1				2	3	4
June	First half	..	..	3,568	3,568	..
	Second "	..	..	8,544	8,411	133
July	First "	..	..	17,993	15,886	2,107
	Second "	..	..	98,076	75,330	22,696
August	First "	..	..	24,928	24,767	161
	Second "	..	..	10,876	10,876	..
September	First "	..	..	41,881	35,516	6,165
	Second "	..	..	24,895	24,106	789
October	First "	..	..	21,903	20,925	978
	Second "	..	..	34,244	33,904	340
November	First "	..	..	26,978	26,860	118
	Second "	..	..	14,475	14,475	..
December	First "	..	..	52,705	45,316	7,189
	Second "	..	..	19,679	19,679	..
January	First "	..	..	6,550	6,550	..
	Second "	..	..	5,536	5,536	..

1902-1903.

(b)

Year and half-month.				Half-monthly diminution, column 2— column 3. -6 -4	Percentage of column 4 to column 2.	
					-6 -4	-65 -425
1				2	3	4
June	First half	..	..	3,568	3,568	..
	Second "	..	..	8,544	8,411	133
July	First "	..	..	16,347	15,366	991
	Second "	..	..	41,978	39,261	2,717
August	First "	..	..	24,615	24,546	69
	Second "	..	..	10,876	10,876	..
September	First "	..	..	39,863	27,603	12,259
	Second "	..	..	24,895	24,106	789
October	First "	..	..	20,490	19,466	1,024
	Second "	..	..	29,250	29,250	..
November	First "	..	..	26,776	26,658	118
	Second "	..	..	14,475	14,475	..
December	First "	..	..	33,174	32,195	979
	Second "	..	..	19,679	19,679	..
January	First "	..	..	6,550	6,550	..
	Second "	..	..	5,536	5,536	..

1902-1903.

(c)

Year and half-month.				Half-monthly diminution, column 2— column 3. ·6 ·4	Percentage of column 4 to column 2.	
					·6 ·4	·65 ·425
1				2	3	4
June	First half	..	..	2,568	2,568	..
	Second "	..	..	8,544	8,411	123
July	First "	..	..	18,800	18,255	545
	Second "	..	..	35,551	34,406	1,145
August	First "	..	..	23,048	23,048	..
	Second "	..	..	10,876	10,876	..
September	First "	..	..	26,360	24,953	1,407
	Second "	..	..	23,672	23,416	256
October	First "	..	..	17,626	17,526	..
	Second "	..	..	25,675	25,675	..
November	First "	..	..	25,281	25,190	91
	Second "	..	..	14,475	14,475	..
December	First "	..	..	26,734	26,399	335
	Second "	..	..	19,014	19,014	..
January	First "	..	..	6,550	6,550	..
	Second "	..	..	5,536	5,536	..

Ma.-25-Aa.

TABLE XII.

1903-1904.

(a)

Year and half-month.				Half-monthly diminution, column 2— column 3. ·6 ·4	Percentage of column 4 to column 2.	
					·6 ·4	·65 ·425
1				2	3	4
June	First half	..	..	5,786	5,786	..
	Second "	..	..	9,558	9,558	..
July	First "	..	..	8,337	8,337	..
	Second "	..	..	135,323	115,599	19,634
August	First "	..	..	103,488	101,195	2,293
	Second "	..	..	38,347	36,424	2,413
September	First "	..	..	31,158	30,739	319
	Second "	..	..	45,862	45,862	..
October	First "	..	..	65,007	62,163	2,844
	Second "	..	..	56,746	54,995	1,751
November	First "	..	..	65,966	65,143	823
	Second "	..	..	62,037	57,326	4,711
December	First "	..	..	46,941	45,019	1,922
	Second "	..	..	11,492	11,492	..
January	First "	..	..	10,308	10,308	..
	Second "	..	..	3,808	3,808	..

1903-1904.

(b)

Year and half-month.				Half-monthly diminution, column 2— column 3. ·6 ·4	Percentage of column 4 to column 2.	
					·6 ·4	·65 ·425
1				2	3	4
June	First half	..	..	5,786	5,786	..
	Second "	..	..	9,558	9,558	..
July	First "	..	..	8,337	8,337	..
	Second "	..	..	46,904	46,696	208
August	First "	..	..	43,372	43,208	164
	Second "	..	..	37,899	36,146	1,753
September	First "	..	..	31,158	30,739	319
	Second "	..	..	36,673	36,673	..
October	First "	..	..	38,136	37,749	387
	Second "	..	..	39,890	39,644	246
November	First "	..	..	30,096	30,096	..
	Second "	..	..	33,561	33,561	..
December	First "	..	..	33,824	32,947	677
	Second "	..	..	11,492	11,492	..
January	First "	..	..	10,308	10,308	..
	Second "	..	..	3,808	3,808	..

1903-1904.

(c)

Year and half-month.				Half-monthly diminution, column 2— column 3. ·6 ·4	Percentage of column 4 to column 2.	
					·6 ·4	·65 ·425
1				2	3	4
June	First half	..	..	5,786	5,786	..
	Second "	..	..	9,558	9,558	..
July	First "	..	..	7,836	7,836	..
	Second "	..	..	36,800	36,800	..
August	First "	..	..	34,356	34,356	..
	Second "	..	..	33,740	34,400	340
September	First "	..	..	30,331	30,052	179
	Second "	..	..	31,094	31,094	..
October	First "	..	..	31,566	31,309	257
	Second "	..	..	33,554	33,554	..
November	First "	..	..	26,282	26,282	..
	Second "	..	..	29,053	29,053	..
December	First "	..	..	29,160	28,964	196
	Second "	..	..	11,492	11,492	..
January	First "	..	..	10,308	10,308	..
	Second "	..	..	3,808	3,808	..

Ma-25-Aa

TABLE XII.

1904-1905.

(a)

Year and half-month.				Percentage of column 4 to column 2.	
				.6 .4	.65 .425
1	2	3	4	5	6
June .. First half	15,178	15,178	..	..	..
June .. Second	58,874	52,791	6,083	10.33	9.43
July .. First	94,906	90,416	4,490	4.73	5.64
July .. Second	45,613	45,033	610	1.33	1.00
August .. First	41,880	39,548	2,332	5.57	4.10
August .. Second	24,155	23,377	778	3.23	1.89
September. First	5,940	5,940	..	..	..
September. Second	14,741	13,649	1,092	7.40	5.84
October .. First	6,674	6,674	..	..	..
October .. Second	14,102	13,377	725	5.14	4.60
November. First	5,002	5,002	..	..	..
November. Second	1,424	1,424	..	..	..
December. First	323	323	..	..	..
December. Second	282	282	..	..	..
January .. First	240	240	..	..	..
January .. Second	292	292	..	..	..

1904-1905.

(b)

Year and half-month.				Percentage of column 4 to column 2.	
				.6 .4	.65 .425
1	2	3	4	5	6
June .. First half	15,178	15,178	..	..	..
June .. Second	39,241	39,241	..	..	..
July .. First	44,160	43,920	240	.54	1.56
July .. Second	42,495	42,184	311	.73	0.55
August .. First	35,329	35,329	..	..	..
August .. Second	23,814	23,220	594	2.49	1.47
September. First	5,940	5,940	..	..	..
September. Second	14,741	13,649	1,092	7.40	5.8
October .. First	6,674	6,674	..	..	..
October .. Second	14,102	13,377	725	5.14	4.60
November. First	5,002	5,002	..	..	..
November. Second	1,424	1,424	..	..	..
December. First	323	323	..	..	..
December. Second	282	282	..	..	..
January .. First	240	240	..	..	..
January .. Second	292	292	..	..	..

1904-1905.

(c)

Year and half-month.				Percentage of column 4 to column 2.	
				.6 .4	.65 .425
1	2	3	4	5	6
June .. First half	15,178	15,178	..	..	..
June .. Second	32,249	32,249	..	..	..
July .. First	34,500	34,500	..	..	..
July .. Second	36,800	36,800	..	..	..
August .. First	29,533	29,533	..	..	..
August .. Second	22,517	22,805	212	.94	.20
September. First	5,940	5,940	..	..	..
September. Second	14,741	13,649	1,092	7.40	5.84
October .. First	6,674	6,674	..	..	..
October .. Second	14,102	13,377	725	5.14	4.60
November. First	5,002	5,002	..	..	..
November. Second	1,424	1,424	..	..	..
December. First	323	323	..	..	..
December. Second	282	282	..	..	..
January .. First	240	240	..	..	..
January .. Second	292	292	..	..	..

Ma-25-A-10.

TABLE XII.

1905-1906.

(a)

Year and half-month.				Percentage of column 4 to column 2.	
				.6 .4	.65 .425
1	2	3	4	5	6
June .. First half	4,326	4,326	..	..	..
June .. Second	8,246	8,246	..	..	..
July .. First	36,228	34,071	2,157	5.95	5.31
July .. Second	55,980	42,485	13,495	24.16	23.01
August .. First	23,982	22,262	1,720	6.97	5.06
August .. Second	14,509	14,449	60	.41	..
September. First	21,508	21,486	22	.33	..
September. Second	10,600	10,600	..	..	..
October .. First	18,185	18,185	..	..	..
October .. Second	30,384	27,818	2,566	8.44	7.32
November. First	4,326	4,326	..	..	..
November. Second	5,142	5,142	..	..	..
December. First	4,376	4,376	..	..	..
December. Second	1,974	1,974	..	..	..
January .. First	230	230	..	..	..
January .. Second	1,376	1,376	..	..	..

1905-1906.

(b)

Year and half-month.				Percentage of column 4 to column 2.	
				.6 .4	.65 .425
1	2	3	4	5	6
June .. First half	4,386	4,386	..	..	..
June .. Second	8,246	8,246	..	..	..
July .. First	81,537	80,774	1,068	3.23	2.86
July .. Second	81,410	80,084	1,826	4.23	3.97
August .. First	28,880	22,362	1,668	6.58	4.65
August .. Second	14,509	14,449	60	.41	..
September .. First	21,508	21,486	72	.33	..
September .. Second	10,600	10,600	..	..	..
October .. First	17,597	17,597	..	..	..
October .. Second	25,272	24,928	349	1.28	.93
November .. First	4,838	4,838	..	..	..
November .. Second	5,142	5,142	..	..	..
December .. First	4,376	4,376	..	..	..
December .. Second	1,974	1,974	..	..	..
January .. First	230	230	..	..	..
January .. Second	1,376	1,376	..	..	..

1905-1906.

(c)

Year and half-month.				Percentage of column 4 to column 2.	
				.6 .4	.65 .425
1	2	3	4	5	6
June .. First half	4,386	4,386	..	..	..
June .. Second	8,246	8,246	..	..	..
July .. First	27,439	27,030	419	1.52	1.20
July .. Second	25,614	24,932	682	2.66	2.26
August .. First	22,298	21,937	361	1.61	.69
August .. Second	14,509	14,449	60	.41	..
September .. First	21,488	21,416	72	.33	..
September .. Second	10,600	10,600	..	..	..
October .. First	16,263	16,263	..	..	..
October .. Second	21,994	21,963	31	.1	..
November .. First	4,338	4,338	..	..	..
November .. Second	5,142	5,142	..	..	..
December .. First	4,376	4,376	..	..	..
December .. Second	1,974	1,974	..	..	..
January .. First	230	230	..	..	..
January .. Second	1,376	1,376	..	..	..

M₂-25-A11.

TABLE XII.

1906-1907.

(a)

Year and half month.				Percentage of column 4 to column 2.	
				.6 .4	.65 .425
1	2	3	4	5	6
June .. First half	692	692	..	..	..
June .. Second	4,733	2,652	2,081	43.97	39.51
July .. First	5,479	5,479	..	..	..
July .. Second	68,677	42,668	25,999	37.86	36.74
August .. First	40,356	38,234	2,122	5.26	7.35
August .. Second	81,884	78,497	3,387	4.14	4.53
September .. First	40,368	38,978	1,390	3.20	2.82
September .. Second	16,737	16,737	..	..	..
October .. First	31,000	30,943	57	.18	.06
October .. Second	41,837	40,745	1,092	2.61	2.25
November .. First	7,693	7,693	..	..	..
November .. Second	13,963	13,963	..	..	..
December .. First	6,098	6,098	..	..	..
December .. Second	8,190	8,190	..	..	..
January .. First	5,216	5,216	..	..	..
January .. Second	3,238	3,238	..	..	..

1906-1907.

(b)

Year and half month.				Percentage of column 4 to column 2.	
				.6 .4	.65 .425
1	2	3	4	5	6
June .. First half	692	692	..	..	..
June .. Second	4,733	2,652	2,081	43.97	39.51
July .. First	5,479	5,479	..	..	..
July .. Second	33,178	33,098	80	.24	.01
August .. First	34,413	34,135	278	.81	.81
August .. Second	43,898	43,898	..	..	..
September .. First	32,142	31,846	296	.92	.44
September .. Second	16,737	16,737	..	..	..
October .. First	25,340	25,340	..	..	..
October .. Second	33,348	33,348	..	..	..
November .. First	7,693	7,693	..	..	..
November .. Second	11,762	11,762	..	..	..
December .. First	6,098	6,098	..	..	..
December .. Second	8,190	8,190	..	..	..
January .. First	5,216	5,216	..	..	..
January .. Second	3,238	3,238	..	..	..

1906-1907.

(c)

Year and half month.		Half-monthly total of natural discharge, Aganda Cauvery, limited to 2,300 m. c. ft. on any day.	Half-monthly totals of computed discharge, Aganda Cauvery, column 9 of table XII, limited to 2,300 m. c. ft. on any day.	Half-monthly diminution, column 2 - column 3.	Percentage of column 4 to column 2.	
					.6	.65
1		2	3	4	5	6
June ..	First half ..	692	692	..	..	..
	Second ..	4,783	2,652	2,081	43.97	39.51
July ..	First ..	5,479	5,479	..	..	..
	Second ..	26,738	26,738	..	..	..
August ..	First ..	30,499	30,338	161	.53	.53
	Second ..	35,475	35,475	..	..	..
September ..	First ..	28,922	28,683	239	.83	.29
	Second ..	16,737	16,737	..	..	..
October ..	First ..	21,670	21,670	..	..	..
	Second ..	26,938	26,938	..	..	..
November ..	First ..	7,693	7,693	..	..	..
	Second ..	10,690	10,690	..	..	..
December ..	First ..	6,098	6,098	..	..	..
	Second ..	8,190	8,190	..	..	..
January ..	First ..	5,216	5,216	..	..	..
	Second ..	3,238	3,238	..	..	..

Ma.-25-A12.

TABLE XII.

1907-1908.

(a)

Year and half month.		Half-monthly total of natural discharge of Aganda Cauvery.	Half-monthly totals of computed discharge, Aganda Cauvery, column 9 of table XII.	Half-monthly diminution, column 2 - column 3.	Percentage of column 4 to column 2.	
					.6	.65
1		2	3	4	5	6
June ..	First half ..	5,066	5,066	..	..	..
	Second ..	14,807	14,719	88	.59	..
July ..	First ..	30,291	26,003	4,288	14.15	13.90
	Second ..	59,735	38,614	21,121	35.35	36.78
August ..	First ..	118,925	115,080	3,146	2.66	2.66
	Second ..	81,831	78,455	3,376	4.12	4.12
September ..	First ..	32,559	32,003	556	1.77	1.42
	Second ..	14,531	14,531	..	..	..
October ..	First ..	25,074	24,280	794	3.16	2.25
	Second ..	14,550	14,493	57	.39	.13
November ..	First ..	15,768	15,510	258	1.63	1.15
	Second ..	9,132	9,132	..	..	..
December ..	First ..	5,070	5,070	..	..	..
	Second ..	5,856	5,856	..	..	..
January ..	First ..	3,332	3,332	..	..	..
	Second ..	3,462	3,462	..	..	..

1907-1908.

(b)

Year and half month.		Half-monthly total of natural discharge of Aganda Cauvery, limited to 2,944 m. c. ft. on any day.	Half-monthly totals of computed discharge, Aganda Cauvery, column 9 of table XII, limited to 2,944 m. c. ft. on any day.	Half-monthly diminution, column 2 - column 3.	Percentage of column 4 to column 2.	
					.6	.65
1		2	3	4	5	6
June ..	First half ..	5,066	5,066	..	..	..
	Second ..	14,807	14,719	88	.59	..
July ..	First ..	24,332	23,470	862	3.54	.14
	Second ..	27,336	27,336	..	..	..
August ..	First ..	44,160	44,160	..	..	..
	Second ..	47,104	47,104	..	..	..
September ..	First ..	80,060	30,042	18	.05	..
	Second ..	14,531	14,531	..	..	..
October ..	First ..	24,718	24,167	551	2.22	1.45
	Second ..	14,420	14,363	57	.39	.13
November ..	First ..	14,318	14,060	258	1.80	1.27
	Second ..	9,133	9,133	..	..	..
December ..	First ..	5,070	5,070	..	..	..
	Second ..	5,856	5,856	..	..	..
January ..	First ..	3,332	3,332	..	..	..
	Second ..	3,462	3,462	..	..	..

1907-1908.

(c)

Year and half month.		Half-monthly total of natural discharge, Aganda Cauvery, limited to 2,300 m. c. ft. on any day.	Half-monthly totals of computed discharge, Aganda Cauvery, column 9 of table XII, limited to 2,300 m. c. ft. on any day.	Half-monthly diminution, column 2 - column 3.	Percentage of column 4 to column 2.	
					.6	.65
1		2	3	4	5	6
June ..	First half ..	5,066	5,066	..	..	..
	Second ..	14,807	14,719	88	.59	..
July ..	First ..	21,671	21,560	111	.51	.16
	Second ..	22,184	22,184	..	..	..
August ..	First ..	34,500	34,500	..	..	..
	Second ..	36,800	36,800	..	..	..
September ..	First ..	27,821	27,821	..	..	..
	Second ..	14,024	14,024	..	..	..
October ..	First ..	24,004	23,870	134	.55	.24
	Second ..	13,474	13,474	..	..	..
November ..	First ..	13,030	12,773	258	1.98	1.49
	Second ..	9,133	9,133	..	..	..
December ..	First ..	5,070	5,070	..	..	..
	Second ..	5,856	5,856	..	..	..
January ..	First ..	3,332	3,332	..	..	..
	Second ..	3,462	3,462	..	..	..

Ma.-25-A13.

TABLE XII.

1908-1909.

(a)

Year and half month.		Half-monthly total natural discharge of Aganda Cauvery.	Half-monthly totals of computed discharge, Aganda Cauvery, column 9 of table XII.	Half-monthly diminution, column 2 - column 3.	Percentage of column 4 to column 2.	
					.6 .4	.65 .425
1		2	3	4	5	6
June	First half	2,382	2,382	..	..	..
	Second "	5,270	5,270	..	..	..
July	First "	25,159	24,472	10,687	..	..
	Second "	78,224	63,088	15,136	30.39	28.75
August	First "	89,273	86,120	3,153	3.53	20.38
	Second "	28,368	28,002	366	1.29	3.68
September	First "	17,757	17,757	..	..	0.73
	Second "	5,964	5,964	..	..	..
October	First "	6,374	6,374	..	..	..
	Second "	15,851	15,851	..	..	..
November	First "	12,382	12,382	..	..	..
	Second "	2,546	2,546	..	..	..
December	First "	1,334	1,334	..	..	..
	Second "	1,696	1,696	..	..	..
January	First "	14,903	..	..	..	..
	Second "	..	..	..	..	..

1908-1909.

(b)

Year and half month.		Half-monthly total of natural discharge, Aganda Cauvery, limited to 2,944 m.c.ft. on any day.	Half-monthly totals of computed discharge, Aganda Cauvery, column 9 of table XII, limited to 2,944 m. c. ft. on any day.	Half-monthly diminution, column 2 - column 3.	Percentage of column 4 to column 2.	
					.6 .4	.65 .425
1		2	3	4	5	6
June	First half	2,382	2,382	..	..	..
	Second "	5,270	5,270	..	..	..
July	First "	26,079	23,537	2,542	9.74	8.13
	Second "	41,400	40,265	1,135	2.74	1.62
August	First "	44,160	44,160	..	..	..
	Second "	28,314	28,002	312	1.10	0.54
September	First "	17,757	17,757	..	..	..
	Second "	5,964	5,964	..	..	..
October	First "	6,374	6,374	..	..	..
	Second "	15,848	15,848	..	..	..
November	First "	12,382	12,382	..	..	..
	Second "	2,546	2,546	..	..	..
December	First "	1,334	1,334	..	..	..
	Second "	1,696	1,696	..	..	..
January	First "	..	..	..	..	..
	Second "	..	..	..	..	..

1908-1909.

(c)

Year and half month.		Half-monthly total of natural discharge, Aganda Cauvery, limited to 2,800 m. c. ft. on any day.	Half-monthly totals of computed discharge, Aganda Cauvery, column 9 of table XII, limited to 2,800 m. c. ft. on any day.	Half-monthly diminution, column 2 - column 3.	Percentage of column 4 to column 2.	
					.6 .4	.65 .425
1		2	3	4	5	6
June	First half	2,382	2,382	..	..	..
	Second "	5,270	5,270	..	..	..
July	First "	23,033	22,218	815	3.53	2.83
	Second "	34,460	33,437	1,023	2.96	1.85
August	First "	34,500	34,500	..	..	..
	Second "	27,440	27,440	40	0.14	..
September	First "	17,757	17,757	..	..	..
	Second "	5,964	5,964	..	..	..
October	First "	6,374	6,374	..	..	..
	Second "	14,904	14,904	..	..	..
November	First "	12,382	12,382	..	..	..
	Second "	2,546	2,546	..	..	..
December	First "	1,334	1,334	..	..	..
	Second "	1,696	1,696	..	..	..
January	First "	..	..	..	..	..
	Second "	..	..	..	..	..

Ma.-25-B1.

TABLE X.

1896-1897.

(a)

Year and half month.		Half-monthly total natural discharge of Aganda Cauvery.	Half-monthly totals computed discharge, Aganda Cauvery, column 9 of table X.	Half monthly diminution, column 2 - column 3.	Percentage of column 4 to column 2.	
					.65 .425	.6 .4
1		2	3	4	5	6
June	First half	4,250	4,250	..	..	..
	Second "	81,248	80,259	20,989	25.83	25.83
July	First "	68,855	66,624	2,231	3.24	3.24
	Second "	133,826	130,876	3,450	2.57	2.68
August	First "	164,067	161,051	3,016	1.84	1.71
	Second "	71,885	69,947	1,438	2.01	2.34
September	First "	28,712	28,712	..	..	..
	Second "	19,428	19,428	..	..	..
October	First "	31,715	30,708	1,007	3.17	3.53
	Second "	11,568	11,568	..	..	..
November	First "	6,324	6,324	..	..	..
	Second "	18,389	18,089	280	1.52	1.94
December	First "	17,344	17,344	..	..	..
	Second "	15,703	15,703	..	..	..
January	First "	5,690	5,690	..	..	..
	Second "	4,394	4,394	..	..	..

1896-1897.

(b)

Year and half month.	Half-monthly total of natural discharge, Aganda Cauvery, limited to 2,944 m. c. ft. on any day.	Half-monthly totals of computed discharge, Aganda Cauvery, column 9 of table X, limited to 2,944 m. c. ft. on any day.	Half-monthly diminution, column 2 - column 3.	Percentage of column 4 to column 2.	
				.65 .425	.6 .4
1	2	3	4	5	6
June .. First half	4,250	4,250	..	..	..
Second	29,215	29,215	..	..	..
July .. First	37,830	37,474	356	0.94	1.19
Second	43,782	43,810	422	0.96	1.14
August .. First	44,160	44,160	..	..	..
Second	42,890	42,487	403	0.93	1.48
September. First	28,712	28,712	..	..	..
Second	19,423	19,423	..	..	..
October .. First	29,190	29,007	183	0.63	0.75
Second	11,568	11,568	..	..	..
November. First	6,324	6,324	..	..	..
Second	18,869	18,089	280	1.52	1.98
December. First	17,299	17,299	..	..	..
Second	15,703	15,703	..	..	..
January .. First	5,690	5,690	..	..	..
Second	4,894	4,894	..	..	..

1896-1897.

(c)

Year and half month.	Half-monthly total of natural discharge, Aganda Cauvery, limited to 2,800 m. c. ft. on any day.	Half-monthly totals of computed discharge, Aganda Cauvery, column 9 of table X, limited to 2,800 m. c. ft. on any day.	Half-monthly diminution, column 2 - column 3.	Percentage of column 4 to column 2.	
				.65 .425	.6 .4
1	2	3	4	5	6
June .. First half	4,250	4,250	..	..	..
Second	23,419	23,419	..	..	..
July .. First	31,693	31,616	77	0.24	0.45
Second	35,781	35,520	261	0.59	0.81
August .. First	34,500	34,500	..	..	..
Second	36,443	36,245	198	0.54	0.84
September. First	28,386	28,386	..	..	..
Second	19,015	19,015	..	..	..
October .. First	25,970	25,787	183	0.70	1.37
Second	11,568	11,568	..	..	..
November. First	6,324	6,324	..	..	..
Second	18,369	18,089	280	1.52	1.98
December. First	16,655	16,655	..	..	..
Second	15,703	15,703	..	..	..
January .. First	5,690	5,690	..	..	..
Second	4,894	4,894	..	..	..

Ma-25-B2

TABLE X.

1897-1898.

(a)

Year and half month.	Half-monthly total natural discharge of Aganda Cauvery.	Half-monthly totals of computed discharge, Aganda Cauvery, column 9 of table X.	Half-monthly diminution, column 2 - column 3.	Percentage of column 4 to column 2.	
				.65 .425	.6 .4
1	2	3	4	5	6
June .. First half	5,662	5,662	..	..	..
Second	63,308	56,680	6,628	10.46	11.41
July .. First	54,461	46,026	8,435	15.49	16.05
Second	49,714	42,213	7,501	15.09	16.77
August .. First	143,694	136,163	7,531	5.24	3.90
Second	77,675	75,566	2,109	2.71	2.91
September. First	43,905	42,809	1,096	2.50	2.63
Second	55,988	55,430	558	0.98	1.23
October .. First	65,549	65,310	239	0.36	0.48
Second	36,348	35,328	1,020	0.28	0.31
November. First	11,412	11,412	..	..	..
Second	6,724	6,724	..	..	..
December. First	5,724	5,724	..	..	..
Second	3,972	3,972	..	..	..
January .. First	2,700	2,700	..	..	..
Second	2,206	2,206	..	..	..

1897-1898.

(b)

Year and half month.	Half-monthly totals of natural discharge, Aganda Cauvery, limited to 2,944 m. c. ft. on any day.	Half-monthly totals of computed discharge, Aganda Cauvery, column 9 of table X, limited to 2,944 m. c. ft. on any day.	Half-monthly diminution, column 2 - column 3.	Percentage of column 4 to column 2.	
				.65 .425	.6 .4
1	2	3	4	5	6
June .. First half	5,662	5,662	..	..	..
Second	31,516	31,169	347	1.10	1.50
July .. First	22,396	22,396	..	..	..
Second	36,512	36,443	69	0.19	0.60
August .. First	43,140	42,963	177	0.41	0.60
Second	44,261	44,261	..	..	..
September. First	36,155	36,088	67	0.19	0.61
Second	33,695	33,695	..	..	..
October .. First	37,924	37,924	..	..	..
Second	26,722	26,206	516	1.93	2.06
November. First	11,412	11,41	..	..	..
Second	6,724	6,724	..	..	..
December. First	5,724	5,724	..	..	..
Second	3,972	3,972	..	..	..
January .. First	2,700	2,700	..	..	..
Second	2,206	2,206	..	..	..

1897-1898.

(c)

Year and half month.		Half-monthly totals of natural discharge, Aganda Cauvery, limited to 2,300 m. c. ft. on any day.	Half-monthly totals of computed discharge, Aganda Cauvery, column 9 of table X, limited to 2,300 m. c. ft. on any day.	Half-monthly diminution, column 2 - column 3.	Percentage of column 4 to column 2.	
					.65 .425	.6 .4
1		2	3	4	5	6
June ..	First half ..	5,662	5,662	..	..	1.11
	Second ..	26,111	26,882	229	0.87	..
July ..	First ..	19,176	19,176	..	..	..
	Second ..	33,187	33,088	49	0.15	0.60
August ..	First ..	34,495	34,495	..	..	0.15
	Second ..	36,800	36,800	..	..	..
September.	First ..	32,088	32,060	28	0.09	0.82
	Second ..	28,130	28,130	..	..	..
October ..	First ..	32,245	32,245	..	..	..
	Second ..	23,502	23,502	..	..	..
November.	First ..	11,412	11,412	..	..	..
	Second ..	6,724	6,724	..	..	..
December.	First ..	5,724	5,724	..	..	..
	Second ..	3,972	3,972	..	..	..
January ..	First ..	2,700	2,700	..	..	..
	Second ..	6,206	2,206	..	..	..

Ma.-25-Ba.

TABLE X.

1898-1899.

(a)

Year and half month.		Half-monthly total of natural discharge of Aganda Cauvery.	Half-monthly totals of computed discharge, Aganda Cauvery, column 9 of table X.	Half-monthly diminution, column 2 - column 3.	Percentage of column 4 to column 2.	
					.65 .425	.6 .4
1		2	3	4	5	6
June ..	First half ..	4,030	4,030	..	..	..
	Second ..	30,482	28,836	1,646	5.4	6.57
July ..	First ..	14,340	14,340	..	..	..
	Second ..	47,470	41,844	5,626	11.85	14.76
August ..	First ..	43,562	35,119	8,423	19.34	21.80
	Second ..	15,876	15,876	..	..	..
September.	First ..	21,181	21,181	..	..	..
	Second ..	39,863	38,626	1,237	3.10	3.68
October ..	First ..	57,823	53,968	3,855	6.66	7.5
	Second ..	37,643	34,208	3,435	9.12	9.39
November.	First ..	60,450	60,450	..	..	0.05
	Second ..	43,488	41,293	2,195	5.04	5.28
December.	First ..	18,881	18,881	..	..	..
	Second ..	11,142	11,142	..	..	..
January ..	First ..	9,065	9,065	..	..	..
	Second ..	5,486	5,486	..	..	..

1898-1899.

(b)

Year and half month.		Half monthly total of natural discharge, Aganda Cauvery, limited to 2,944 m. c. ft. on any day.	Half-monthly totals of computed discharge, Aganda Cauvery, column 9 of table X limited to 2,944 m.c.ft. on any day.	Half-monthly diminution column 2 - column 3.	Percentage of column 4 to column 2.	
					.65 .425	.6 .4
1		2	3	4	5	6
June ..	First half ..	4,030	4,030	..	..	2.48
	Second ..	28,743	28,269	474	1.64	..
July ..	First ..	14,340	14,340	..	..	..
	Second ..	24,511	24,511	..	..	7.02
August ..	First ..	34,154	32,383	1,871	5.47	..
	Second ..	15,876	15,876	..	..	..
September.	First ..	20,370	20,370	..	..	4.46
	Second ..	33,912	31,675	1,237	3.75	3.63
October ..	First ..	43,418	41,998	1,420	3.27	8.03
	Second ..	33,534	30,878	2,656	7.92	..
November.	First ..	35,651	35,651	..	..	1.60
	Second ..	28,140	27,716	424	1.5	..
December.	First ..	18,881	18,881	..	..	..
	Second ..	11,142	11,142	..	..	..
January ..	First ..	9,065	9,065	..	..	..
	Second ..	5,486	5,486	..	..	..

1898-1899.

(c)

Year and half month.		Half-monthly total of natural discharge, Aganda Cauvery, limited to 2,300 m. c. ft. on any day.	Half-monthly totals of computed discharge, Aganda Cauvery, column 9 of table X limited to 2,300 m. c. ft. on any day.	Half-monthly diminution, column 2 - column 3.	Percentage of column 4 to column 2.	
					.65 .425	.6 .4
1		2	3	4	5	6
June ..	First half ..	4,030	4,030	..	..	..
	Second ..	25,306	25,306	..	..	..
July ..	First ..	14,340	14,340	..	..	..
	Second ..	21,156	21,156	..	..	5.66
August ..	First ..	31,076	29,755	1,321	4.25	..
	Second ..	15,876	15,876	..	..	..
September.	First ..	19,726	19,726	..	..	2.38
	Second ..	29,601	29,190	411	1.38	4.1
October ..	First ..	34,500	34,416	84	0.24	6.77
	Second ..	30,280	28,268	2,012	6.64	..
November.	First ..	30,953	30,953	..	..	..
	Second ..	25,291	25,291	..	..	..
December.	First ..	18,623	18,623	..	..	..
	Second ..	11,142	11,142	..	..	..
January ..	First ..	9,065	9,065	..	..	..
	Second ..	5,486	5,486	..	..	..

Ma-25-B-4.

TABLE X.

1899-1900.

(a)

Year and half month.		Half-monthly total natural discharge of Aganda Canvery.	Half-monthly totals of computed discharge, Aganda Canvery, column 9 of table X.	Half-monthly diminution, column 2 - column 3 .65 .425	Percentage of column 4 to column 2.	
					.65 .425	.6 .4
1		2	3	4	5	6
June	First half	4,696	4,696	..	..	..
	Second	26,063	20,454	5,609	15.85	16.55
July	First	52,999	47,849	5,150	10.66	11.92
	Second	16,885	16,885	..	..	0.00
August	First	7,141	7,015	126	1.76	3.82
	Second	10,588	10,588	..	..	..
September	First	19,576	19,576	..	..	..
	Second	26,053	27,772	231	1.00	1.27
October	First	7,340	7,340	..	..	..
	Second	10,315	10,315	..	..	..
November	First	5,830	5,830	..	..	..
	Second	1,504	1,504	..	..	..
December	First	938	938	..	..	..
	Second	482	482	..	..	..
January	First	782	782	..	..	..
	Second	552	552	..	..	..

1899-1900.

(b)

Year and half month.		Half-monthly total of natural discharge, Aganda Canvery, limited to 2,944 m. c. ft. on any day.	Half-monthly totals of computed discharge, Aganda Canvery, column 9 of table X limited to 2,944 m. c. ft. on any day.	Half-monthly diminution, column 2 - column 3 .65 .425	Percentage of column 4 to column 2.	
					.65 .425	.6 .4
1		2	3	4	5	6
June	First half	4,696	4,696	..	..	..
	Second	24,407	24,325	142	0.58	0.98
July	First	37,753	37,411	342	0.91	1.31
	Second	16,885	16,885	..	..	..
August	First	7,141	7,015	126	1.76	3.82
	Second	10,588	10,588	..	..	..
September	First	19,576	19,576	..	..	..
	Second	26,563	26,520	43	.02	.46
October	First	7,340	7,340	..	..	..
	Second	10,315	10,315	..	..	..
November	First	5,830	5,830	..	..	..
	Second	1,504	1,504	..	..	..
December	First	938	938	..	..	..
	Second	482	482	..	..	..
January	First	782	782	..	..	..
	Second	552	552	..	..	..

1899-1900.

(c)

Year and half month.		Half-monthly total of natural discharge, Aganda Canvery, limited to 2,800 m. c. ft. on any day.	Half-monthly total of computed discharge, Aganda Canvery, column 9 of Table X, limited to 2,800 m. c. ft. on any day.	Half-monthly diminution, column 2 - column 3 .65 .425	Percentage of column 4 to column 2.	
					.65 .425	.6 .4
1		2	3	4	5	6
June	First half	4,696	4,696	..	..	..
	Second	21,247	21,105	142	.67	.95
July	First	30,949	30,949	..	..	..
	Second	16,695	16,695	..	..	..
August	First	7,141	7,015	126	1.76	3.82
	Second	10,588	10,588	..	..	..
September	First	19,246	19,246	..	..	..
	Second	22,574	22,574	..	..	..
October	First	7,340	7,340	..	..	..
	Second	10,315	10,315	..	..	..
November	First	5,830	5,830	..	..	..
	Second	1,504	1,504	..	..	..
December	First	938	938	..	..	..
	Second	482	482	..	..	..
January	First	782	782	..	..	..
	Second	552	552	..	..	..

Ma-25-B-5.

TABLE X.

1900-1901.

(a)

Year and half month.		Half-monthly total of natural discharge of Aganda Canvery.	Half-monthly total computed discharge of Aganda Canvery - column 9 of table X.	Half-monthly diminution, column 2 - column 3 .65 .425	Percentage of column 4 to column 2.	
					.65 .425	.6 .4
1		2	3	4	5	6
June	First half	3,979	3,979	..	..	..
	Second	27,103	24,594	2,509	9.26	10.13
July	First	114,971	101,888	13,083	11.38	12.38
	Second	100,955	92,272	8,683	8.60	9.24
August	First	186,986	177,077	9,909	5.3	4.3
	Second	91,090	88,777	2,313	2.54	2.61
September	First	31,229	31,161	68	.22	.65
	Second	22,236	22,236	..	..	..
October	First	17,927	17,829	98	.54	0.90
	Second	20,685	20,934	751	2.81	3.20
November	First	7,954	7,954	..	..	..
	Second	5,452	5,452	..	..	..
December	First	3,244	3,244	..	..	..
	Second	4,116	4,116	..	..	..
January	First	2,990	2,990	..	..	..
	Second	2,846	2,846	..	..	..

1900-1901.

(b)

Year and half month.		Half-monthly total of natural discharge of Aganda Cauvery, limited to 2,944 m. c. ft. on any day.	Half-monthly total of computed discharge of Aganda Cauvery, column 9 of table X, limited to 2,944 m. c. ft. on any day.	Half-monthly diminution, column 2—column 3. ·65 ·425	Percentage of column 4 to column 2.	
					·65 ·425	·6 ·4
1		2	3	4	5	6
June ..	First half ..	3,979	3,979			
July ..	First ..	23,372	21,979	1,393	5·65	6·22
August ..	Second ..	44,160	44,160			
September ..	First ..	46,501	46,501			
October ..	Second ..	44,160	44,160			
November ..	First ..	38,926	38,926	844	2·17	2·28
December ..	Second ..	29,410	29,410			
January ..	First ..	20,840	20,840			
June ..	Second ..	17,116	17,018	98	·57	·95
July ..	First ..	23,086	22,955	131	·57	1·00
August ..	Second ..	7,954	7,954			
September ..	First ..	5,452	5,452			
October ..	Second ..	3,244	3,244			
November ..	First ..	4,116	4,116			
December ..	Second ..	2,990	2,990			
January ..	First ..	2,846	2,846			

1900-1901.

(c)

Year and half month.		Half-monthly total of natural discharge of Aganda Cauvery, limited to 2,300 m. c. ft. on any day.	Half-monthly total of computed discharge of Aganda Cauvery, column 9 of table X, limited to 2,300 m. c. ft. on any day.	Half-monthly diminution, column 2—column 3. ·65 ·425	Percentage of column 4 to column 2.	
					·65 ·425	·6 ·4
1		2	3	4	5	6
June ..	First half ..	3,979	3,979			
July ..	Second ..	20,696	20,149	547	2·60	3·22
August ..	First ..	34,500	34,500			
September ..	Second ..	36,741	36,741			
October ..	First ..	34,500	34,500			
November ..	Second ..	33,556	33,303	253	·76	·94
December ..	First ..	27,296	27,296			
January ..	Second ..	19,783	19,783			
June ..	First ..	15,919	15,821	98	·61	1·02
July ..	Second ..	20,601	20,601			
August ..	First ..	7,954	7,954			
September ..	Second ..	5,452	5,452			
October ..	First ..	3,244	3,244			
November ..	Second ..	4,116	4,116			
December ..	First ..	2,990	2,990			
January ..	Second ..	2,846	2,846			

Ma.-25-Bc.

TABLE X.

1901-1902.

(a)

Year and half-month.		Half-monthly total of natural discharge of Aganda Cauvery.	Half-monthly total of computed discharge of Aganda Cauvery, column 9 of table X.	Half-monthly diminution, column 2—column 3. ·65 ·425	Percentage of column 4 to column 2.	
					·65 ·425	·6 ·4
1		2	3	4	5	6
June ..	First half ..	4,910	4,910			
July ..	Second ..	25,524	24,681	863	3·38	4·41
August ..	First ..	76,627	56,946	19,681	25·68	26·58
September ..	Second ..	55,071	46,203	8,868	16·12	16·77
October ..	First ..	43,341	41,055	2,286	5·25	6·09
November ..	Second ..	38,126	36,408	1,718	4·51	5·03
December ..	First ..	13,292	13,292			
January ..	Second ..	28,210	26,210			
June ..	First ..	47,201	45,993	1,208	2·56	2·80
July ..	Second ..	34,387	31,756	2,631	7·65	8·37
August ..	First ..	33,896	32,646	1,250	3·70	4·25
September ..	Second ..	25,624	25,313	311	1·21	1·65
October ..	First ..	8,679	8,679			
November ..	Second ..	6,064	6,064			
December ..	First ..	6,832	6,832			
January ..	Second ..	5,000	5,000			

1901-1902.

(b)

Year and half-month.		Half-monthly total of natural discharge of Aganda Cauvery, limited to 2,944 m. c. ft. on any day.	Half-monthly total of computed discharge of Aganda Cauvery, column 9 of table X, limited to 2,944 m. c. ft. on any day.	Half-monthly diminution, column 2—column 3. ·65 ·425	Percentage of column 4 to column 2.	
					·65 ·425	·6 ·4
1		2	3	4	5	6
June ..	First half ..	4,910	4,910			
July ..	Second ..	23,524	23,118	406	1·72	2·34
August ..	First ..	30,827	30,427			
September ..	Second ..	40,777	40,490	287	·70	0·92
October ..	First ..	37,086	36,074	1,012	2·73	4·13
November ..	Second ..	33,341	32,261	1,080	3·24	3·84
December ..	First ..	13,292	13,292			
January ..	Second ..	24,700	24,700			
June ..	First ..	38,756	38,267	489	1·26	1·45
July ..	Second ..	27,731	27,281	450	1·63	1·07
August ..	First ..	27,690	27,435	255	·92	1·10
September ..	Second ..	22,134	21,823	311	1·40	1·91
October ..	First ..	8,679	8,679			
November ..	Second ..	6,064	6,064			
December ..	First ..	6,832	6,832			
January ..	Second ..	5,000	5,000			

1901-1903.

(c)

Year and half-month.				Percentage of column 4 to column 2.	
				.65 .425	.6 .4
1	2	3	4	5	6
June .. First half	4,910	4,910	..	..	..
.. Second	21,051	20,842	209	..	1.27
July .. First	25,031	25,031	..	..	..
.. Second	24,179	24,179	..	..	0.04
August .. First	22,711	22,116	595	1.82	2.44
.. Second	20,299	20,793	506	1.67	2.54
September .. First	13,292	13,292	..	..	..
.. Second	22,768	22,768	..	..	..
October .. First	22,160	22,160	..	..	..
.. Second	23,773	23,724	49	.20	0.36
November .. First	24,881	24,824	57	.23	0.38
.. Second	20,108	19,837	271	1.09	1.63
December .. First	8,679	8,679	..	..	..
.. Second	6,064	6,064	..	..	..
January .. First	6,822	6,822	..	..	..
.. Second	5,000	5,000	..	..	..

Ma.-25-Br.

TABLE X.

1902-1903.

(a)

Year and half-month.				Percentage of column 4 to column 2.	
				.65 .425	.6 .4
1	2	3	4	5	6
June .. First half	3,568	3,568	0	..	..
.. Second	8,544	8,471	73	.85	1.56
July .. First	17,993	16,184	1,809	10.65	11.16
.. Second	28,076	27,215	861	3.1	2.14
August .. First	24,824	24,844	84	0.34	0.65
.. Second	10,876	10,876	0	..	..
September .. First	41,681	35,395	6,286	15.08	14.78
.. Second	24,895	24,256	639	2.59	3.17
October .. First	21,903	21,033	870	3.97	4.47
.. Second	34,244	33,980	264	0.77	0.99
November .. First	26,978	26,978	0	..	..
.. Second	14,475	14,475	0	..	..
December .. First	52,705	45,743	6,962	13.21	13.64
.. Second	19,579	19,579	0	..	..
January .. First	6,550	6,550	0	..	..
.. Second	5,536	5,536	0	..	..

1902-1903.

(b)

Year and half-month.				Percentage of column 4 to column 2.	
				.65 .425	.6 .4
1	2	3	4	5	6
June .. First half	3,568	3,568	0	0	0
.. Second	8,544	8,471	73	.85	1.56
July .. First	18,347	15,654	2,693	4.94	6.06
.. Second	41,979	39,596	2,382	5.67	6.47
August .. First	24,615	24,615	0	0	0.28
.. Second	10,876	10,876	0	0	0
September .. First	29,882	27,670	2,212	7.34	7.56
.. Second	24,895	24,256	639	2.57	3.17
October .. First	20,490	19,574	916	4.47	5.00
.. Second	29,250	29,250	0	0	0
November .. First	26,776	26,776	0	0	0.44
.. Second	14,475	14,475	0	0	0
December .. First	33,174	32,353	821	2.44	2.95
.. Second	19,579	19,579	0	0	0
January .. First	6,550	6,550	0	0	0
.. Second	5,536	5,536	0	0	0

1902-1903.

(c)

Year and half-month.				Percentage of column 4 to column 2.	
				.65 .425	.6 .4
1	2	3	4	5	6
June .. First half	3,568	3,568	0	0	0
.. Second	8,544	8,471	73	0.85	1.56
July .. First	13,800	13,400	400	2.90	3.95
.. Second	35,551	31,563	3,988	2.78	3.22
August .. First	23,046	23,046	0	0	0
.. Second	10,876	10,876	0	0	0
September .. First	26,360	25,460	900	3.41	5.24
.. Second	23,672	23,566	106	0.45	1.08
October .. First	17,626	17,626	0	0	0
.. Second	25,075	25,675	0	0	0
November .. First	25,281	25,281	0	0	0.36
.. Second	14,475	14,475	0	0	0
December .. First	26,734	26,437	297	1.11	1.25
.. Second	19,014	19,014	0	0	0
January .. First	6,550	6,550	0	0	0
.. Second	5,536	5,536	0	0	0

Ma.-25-Ba.

TABLE X.

1903-1904.

(a)

Year and half-month.		Half-monthly total natural discharge of Aganda Cauvery.	Half-monthly total of computed discharge of Aganda Cauvery, column 9 of table X.	Half- monthly diminution (column 2 - column 3). -65 -425	Percentage of column 4 to column 2.	
					-65 -425	-6 -4
1		2	3	4	5	6
June ..	First half ..	5,786	5,786	..	..	..
	Second ..	9,558	9,558	..	..	..
July ..	First ..	8,337	8,337	..	..	..
	Second ..	135,228	115,095	20,128	14.88	14.52
August ..	First ..	103,483	101,849	2,139	2.07	2.21
	Second ..	38,847	38,351	2,496	6.43	6.21
September ..	First ..	31,158	31,029	129	.41	1.02
	Second ..	45,862	45,862	..	..	..
October ..	First ..	65,007	62,544	2,463	3.78	4.37
	Second ..	56,746	55,109	1,637	2.88	3.08
November ..	First ..	65,966	65,257	709	1.07	1.24
	Second ..	62,037	60,571	5,466	8.81	7.59
December ..	First ..	46,941	45,209	1,732	3.70	4.09
	Second ..	11,492	11,492	..	..	..
January ..	First ..	10,308	10,308	..	..	..
	Second ..	3,808	3,808	..	..	..

1903-1904.

(b)

Year and half-month.		Half-monthly total natural discharge of Aganda Cauvery limited to 2,944 m.c.ft. on any day.	Half-monthly total of computed discharge of Aganda Cauvery, column 9 of table X, limited to 2,944 m.c.ft. on any day.	Half- monthly diminution (column 2 - column 3). -65 -425	Percentage of column 4 to column 2.	
					-65 -425	-6 -4
1		2	3	4	5	6
June ..	First half ..	5,786	5,786	..	..	..
	Second ..	9,558	9,558	..	..	..
July ..	First ..	8,337	8,337	..	..	..
	Second ..	43,904	46,696	208	.44	.44
August ..	First ..	43,372	43,208	164	.38	.38
	Second ..	37,899	36,063	1,836	4.84	4.62
September ..	First ..	31,158	31,029	129	0.41	1.02
	Second ..	36,678	36,678	..	..	..
October ..	First ..	33,136	37,325	811	.81	1.01
	Second ..	39,890	39,682	208	.52	.61
November ..	First ..	30,096	30,096	..	..	..
	Second ..	33,561	32,551	..	..	..
December ..	First ..	33,624	33,023	601	1.80	2.01
	Second ..	11,492	11,492	..	..	..
January ..	First ..	10,308	10,308	..	..	..
	Second ..	3,808	3,808	..	..	..

1903-1904.

(c)

Year and half-month.		Half-monthly total natural discharge of Aganda Cauvery limited to 2,300 m.c.ft. on any day.	Half-monthly total of computed discharge of Aganda Cauvery, column 9 of table X, limited to 2,300 m.c.ft. on any day.	Half- monthly diminution, column 2 - column 3. -65 -425.	Percentage of column 4 to column 2.	
					-65 -425	-6 -4
1		2	3	4	5	6
June ..	First half ..	5,786	5,786	..	..	..
	Second ..	9,558	9,558	..	..	..
July ..	First ..	7,836	7,836	..	..	..
	Second ..	36,800	36,800	..	..	..
August ..	First ..	34,356	34,356	..	..	..
	Second ..	33,740	33,483	257	.76	1.00
September ..	First ..	30,231	30,185	46	.15	.59
	Second ..	31,094	31,094	..	..	..
October ..	First ..	31,556	31,485	81	.25	.81
	Second ..	33,654	33,654	..	..	..
November ..	First ..	26,232	26,232	..	..	..
	Second ..	29,053	29,053	..	..	..
December ..	First ..	29,160	29,002	158	.54	.67
	Second ..	11,492	11,492	..	..	..
January ..	First ..	10,308	10,308	..	..	..
	Second ..	3,808	3,808	..	..	..

Ma.-25-Ba.

TABLE X.

1904-1905.

(a)

Year and half-month.		Half-monthly total of natural discharge of Aganda Cauvery.	Half-monthly total of computed discharge, Aganda Cauvery, column 9 of table X.	Half- monthly diminution, column 2 - column 3. -65 -425.	Percentage of column 4 to column 2.	
					-65 -425	-65 -425
1		2	3	4	5	6
June ..	First half ..	15,178	15,178	..	..	..
	Second ..	58,874	58,207	6,667	9.62	10.83
July ..	First ..	94,906	89,553	5,353	5.64	4.73
	Second ..	45,643	45,185	458	1.00	1.33
August ..	First ..	41,880	40,159	1,721	4.10	5.57
	Second ..	24,155	23,697	458	1.89	3.22
September ..	First ..	6,940	5,940	..	..	..
	Second ..	14,741	13,880	861	5.84	7.40
October ..	First ..	6,674	6,674	..	..	..
	Second ..	14,102	13,453	649	4.6	5.14
November ..	First ..	5,002	5,002	..	..	..
	Second ..	1,424	1,424	..	..	..
December ..	First ..	322	322	..	..	..
	Second ..	282	282	..	..	..
January ..	First ..	240	240	..	..	..
	Second ..	292	292	..	..	..

1904-1905.

(b)

Year and half-month.		Half-monthly total of natural discharge of Aganda Cauvery limited to 2,944 m.c.ft. on any day.	Half-monthly total of computed discharge, Aganda Cauvery, column 9 of table X limited to 2,944 m.c.ft. on any day.	Half- monthly diminution, column 2— column 3. .65 .425.	Percentage of column 4 to column 2.	
					.65 .425	.6 .4
1		2	3	4	5	6
June ..	First half ..	15,178	15,178	..	..	..
	Second ..	39,241	39,241	..	..	..
July ..	First ..	44,160	43,487	693	1.56	0.54
	Second ..	42,495	42,260	235	0.55	0.78
August ..	First ..	35,329	35,329	..	..	..
	Second ..	23,814	23,463	351	1.47	2.49
September ..	First ..	5,940	5,940	..	..	..
	Second ..	14,741	13,880	861	5.84	7.40
October ..	First ..	6,674	6,674	..	..	..
	Second ..	14,102	1,345	649	4.60	5.14
November ..	First ..	5,002	5,002	..	..	..
	Second ..	1,424	1,424	..	..	..
December ..	First ..	322	322	..	..	..
	Second ..	282	282	..	..	..
January ..	First ..	240	240	..	..	..
	Second ..	292	292	..	..	..

1904-1905.

(c)

Year and half-month.		Half-monthly total of natural discharge of Aganda Cauvery limited to 2,300 m.c.ft. on any day.	Half-monthly total of computed discharge of Aganda Cauvery, column 9 of table X limited to 2,300 m.c.ft. on any day.	Half- monthly diminution, column 2— column 3. .65 .425	Percentage of column 4 to column 2.	
					.65 .425	.6 .4
1		2	3	4	5	6
June ..	First half ..	15,178	15,178	..	..	..
	Second ..	32,249	32,249	..	..	..
July ..	First ..	34,500	34,500	..	..	..
	Second ..	36,800	36,800	..	..	..
August ..	First ..	29,538	9,538	..	..	..
	Second ..	22,517	22,471	46	0.20	0.24
September ..	First ..	5,940	5,940	..	..	..
	Second ..	14,741	13,880	861	5.84	7.40
October ..	First ..	6,674	6,674	..	..	..
	Second ..	14,102	13,453	649	4.6	5.14
November ..	First ..	5,002	5,002	..	..	..
	Second ..	1,424	1,424	..	..	..
December ..	First ..	322	322	..	..	..
	Second ..	282	282	..	..	..
January ..	First ..	240	240	..	..	..
	Second ..	292	292	..	..	..

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Ma.-25-B10.

TABLE X.

1905-1906.

(a)

Year and half-month.		Half-monthly total of natural discharge of Aganda Cauvery.	Half-monthly total of computed discharge of Aganda Cauvery, column 9 of table X.	Half- monthly diminution, column 2— column 3. .65 .425	Percentage of column 4 to column 2.	
					.65 .425	.6 .4
1		2	3	4	5	6
June ..	First half ..	4,336	4,336	..	..	..
	Second ..	8,246	8,246	..	..	..
July ..	First ..	36,228	34,301	1,927	5.31	5.95
	Second ..	55,980	43,098	12,882	23.01	24.16
August ..	First ..	23,932	22,721	1,211	5.06	6.97
	Second ..	14,509	14,509	..	..	0.41
September ..	First ..	21,508	21,508	..	..	0.33
	Second ..	10,600	10,600	..	..	..
October ..	First ..	13,185	18,185	..	..	..
	Second ..	30,384	28,005	2,379	7.82	8.44
November ..	First ..	4,338	4,338	..	..	..
	Second ..	5,142	5,142	..	..	..
December ..	First ..	4,376	4,376	..	..	..
	Second ..	1,974	1,974	..	..	..
January ..	First ..	230	230	..	..	..
	Second ..	1,376	1,376	..	..	..

1905-1906.

(b)

Year and half-month.		Half-monthly total of natural discharge of Aganda Cauvery, limited to 2,944 m.c.ft. on any day.	Half-monthly total of computed discharge of Aganda Cauvery, column 9 of table X, limited to 2,944 m.c.ft. on any day.	Half- monthly diminution, column 2— column 3. .65 .425	Percentage of column 4 to column 2.	
					.65 .425	.6 .4
1		2	3	4	5	6
June ..	First half ..	4,336	4,336	..	..	..
	Second ..	8,246	8,246	..	..	..
July ..	First ..	31,837	30,928	909	2.85	3.33
	Second ..	31,410	30,161	1,249	3.97	4.22
August ..	First ..	23,830	22,721	1,109	4.65	6.58
	Second ..	14,509	14,509	..	..	0.41
September ..	First ..	21,508	21,508	..	..	0.33
	Second ..	10,600	10,600	..	..	..
October ..	First ..	17,597	17,597	..	..	..
	Second ..	25,272	25,035	237	0.93	1.38
November ..	First ..	4,338	4,338	..	..	..
	Second ..	5,142	5,142	..	..	..
December ..	First ..	4,376	4,376	..	..	..
	Second ..	1,974	1,974	..	..	..
January ..	First ..	230	230	..	..	..
	Second ..	1,376	1,376	..	..	..

1905-1906.

(c)

Year and half-month.	Half-monthly total of natural discharge of Aganda Cauvery, limited to 2,300 m.c.ft. on any day.	Half-monthly total of computed discharge of Aganda Cauvery, column 9 of table X, limited to 2,300 m.c.ft. on any day.	Half-monthly diminution, column 2— column 3. ·65 ·425	Percentage of column 4 to column 2.	
				·65 ·425	·6 ·4
1	2	3	4	5	6
June .. First half	4,336	4,336	..	..	..
Second	8,246	8,246	..	..	..
July .. First	27,439	27,108	331	1·90	1·52
Second	25,614	25,009	605	2·36	2·66
August .. First	22,298	22,166	132	0·59	1·61
Second	14,509	14,509	..	..	·41
September. First	21,488	21,488	..	..	·83
Second	10,600	10,600	..	..	..
October .. First	16,263	16,263	..	..	..
Second	21,994	21,994	..	..	·14
November. First	4,336	4,336	..	..	..
Second	5,142	5,142	..	..	..
December. First	4,376	4,376	..	..	..
Second	1,974	1,974	..	..	..
January .. First	230	230	..	..	..
Second	1,876	1,876	..	..	..

1906-1907.

(b)

Year and half-month.	Half-monthly total of natural discharge, Aganda Cauvery, limited to 2,944 m.c.ft. on any day.	Half-monthly totals of computed discharge, Aganda Cauvery, column 9 of table X, limited to 2,944 m.c.ft. on any day.	Half-monthly diminution, column 2— column 3. ·65 ·425	Percentage of column 4 to column 2.	
				·65 ·425	·6 ·4
1	2	3	4	5	6
June .. First half	692	692	..	..	..
Second	4,733	2,863	1,870	39·51	43·97
July .. First	5,479	5,479	..	..	..
Second	33,178	33,175	3	·01	0·24
August .. First	34,418	34,135	278	·81	0·81
Second	43,898	43,898	..	..	..
September. First	32,142	31,999	143	0·44	0·92
Second	16,737	16,737	..	..	..
October .. First	25,340	25,340	..	..	..
Second	33,348	33,348	..	..	..
November. First	7,693	7,693	..	..	..
Second	11,762	11,762	..	..	..
December. First	6,098	6,098	..	..	..
Second	8,190	8,190	..	..	..
January .. First	5,216	5,216	..	..	..
Second	3,238	3,238	..	..	..

Ma.-25-B11.

TABLE X.

1906-1907.

(a)

Year and half-month.	Half-monthly total of natural discharge of Aganda Cauvery.	Half-monthly total of computed discharge, Aganda Cauvery, column 9 of table X.	Half-monthly diminution, column 2— column 3. ·65 ·425	Percentage of column 4 to column 2.	
				·65 ·425	·6 ·4
1	2	3	4	5	6
June .. First half	692	692	..	..	..
Second	4,733	2,863	1,870	39·51	43·97
July .. First	5,479	5,479	..	..	..
Second	68,667	43,437	25,230	36·74	37·86
August .. First	40,356	37,390	2,966	7·36	5·36
Second	81,384	78,176	3,208	4·53	4·14
September. First	40,268	39,132	1,136	2·82	3·2
Second	16,737	16,737	..	..	..
October .. First	31,000	30,981	19	·06	0·18
Second	41,887	40,997	890	2·36	2·61
November. First	7,693	7,693	..	..	..
Second	13,968	13,968	..	..	..
December. First	6,098	6,098	..	..	..
Second	8,190	8,190	..	..	..
January .. First	5,216	5,216	..	..	..
Second	3,238	3,238	..	..	..

1906-1907.

(c)

Year and half-month.	Half-monthly total of natural discharge, Aganda Cauvery, limited to 2,300 m.c.ft. on any day.	Half-monthly totals of computed discharge, Aganda Cauvery, column 9 of table X, limited to 2,300 m.c.ft. on any day.	Half-monthly, column 2— column 3. ·65 ·425	Percentage of column 4 to column 2.	
				·65 ·425	·6 ·4
1	2	3	4	5	6
June .. First half	692	692	..	..	..
Second	4,733	2,863	1,870	39·51	43·97
July .. First	5,479	5,479	..	..	..
Second	26,738	26,738	..	..	..
August .. First	30,499	30,338	161	·53	·53
Second	35,475	35,475	..	..	..
September. First	28,922	28,837	85	·29	·83
Second	16,737	16,737	..	..	..
October .. First	21,670	21,670	..	..	..
Second	26,938	26,938	..	..	..
November. First	7,693	7,693	..	..	..
Second	10,690	10,690	..	..	..
December. First	6,098	6,098	..	..	..
Second	8,190	8,190	..	..	..
January .. First	5,216	5,216	..	..	..
Second	3,238	3,238	..	..	..

Ma.-25-B12.

TABLE X.

1907-1908.

(a)

Year and half-month.		Half-monthly total natural discharge of Aganda Cauvery.	Half-monthly total of computed discharge of Aganda Cauvery, column 9 of table X.	Half- monthly diminution, column 2 - column 3. 65 425	Percentage of column 4 to column 2.	
					65 425	6 4
1		2	3	4	5	6
June	First half ..	5,066	5,066	..	..	..
	Second ..	14,807	14,802	5	..	0.59
July	First ..	30,291	26,386	3,905	12.90	14.15
	Second ..	59,735	87,762	21,973	36.78	35.35
August	First ..	118,225	115,084	3,141	2.66	2.66
	Second ..	81,831	78,455	3,376	4.12	4.12
September	First ..	32,559	32,097	462	1.42	1.72
	Second ..	14,531	14,531	..	..	..
October	First ..	25,074	24,510	564	2.25	3.18
	Second ..	14,550	14,531	19	0.13	0.39
November	First ..	15,768	15,586	182	1.15	1.63
	Second ..	9,133	9,133	..	..	..
December	First ..	5,070	5,070	..	..	..
	Second ..	5,856	5,856	..	..	..
January	First ..	3,332	3,332	..	..	..
	Second ..	3,462	3,462	..	..	..

1907-1908.

(b)

Year and half-month.		Half-monthly total of natural discharge, Aganda Cauvery, limited to 2,944 m.c.ft. on any day.	Half-monthly totals of computed dis- charge, Aganda Cauvery, column 9 of table X, limited to 2,944 m.c.ft. on any day.	Half- monthly diminution, column 2 - column 3. 65 425	Percentage of column 4 to column 2.	
					65 425	6 4
1		2	3	4	5	6
June	First half ..	5,066	5,066	..	..	..
	Second ..	14,807	14,802	5	..	0.59
July	First ..	24,332	23,810	522	2.14	3.54
	Second ..	27,836	27,336	..	..	..
August	First ..	44,160	44,160	..	..	..
	Second ..	47,104	47,104	..	..	..
September	First ..	30,060	30,060	..	..	0.05
	Second ..	14,531	14,531	..	..	..
October	First ..	24,718	24,359	359	1.45	3.32
	Second ..	14,420	14,401	19	0.13	0.39
November	First ..	14,318	14,136	182	1.27	1.80
	Second ..	9,138	9,138	..	..	..
December	First ..	5,070	5,070	..	..	..
	Second ..	5,856	5,856	..	..	..
January	First ..	3,332	3,332	..	..	..
	Second ..	3,462	3,462	..	..	..

1907-1908.

(c)

Year and half-month.		Half-monthly total of natural discharge, Aganda Cauvery, limited to 2,300 m.c.ft. on any day.	Half-monthly totals of computed dis- charge, Aganda Cauvery, column 9 of table X, limited to 2,300 m.c.ft. on any day.	Half- monthly diminution, column 2 - column 3. 65 425	Percentage of column 4 to column 2.	
					65 425	6 4
1		2	3	4	5	6
June	First half ..	5,066	5,066	..	..	..
	Second ..	14,807	14,802	5	..	0.59
July	First ..	21,671	21,637	34	0.16	0.51
	Second ..	22,184	22,184	..	..	..
August	First ..	34,500	34,500	..	..	..
	Second ..	36,800	36,800	..	..	..
September	First ..	27,321	27,321	..	..	..
	Second ..	14,024	14,024	..	..	..
October	First ..	24,004	23,947	57	0.24	0.55
	Second ..	13,474	13,474	..	..	..
November	First ..	13,030	12,848	182	1.40	1.98
	Second ..	9,133	9,133	..	..	..
December	First ..	5,070	5,070	..	..	..
	Second ..	5,856	5,856	..	..	..
January	First ..	3,332	3,332	..	..	..
	Second ..	3,462	3,462	..	..	..

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TABLE X.

1908-1909.

(a)

Year and half-month.		Half-monthly total natural discharge of Aganda Cauvery.	Half-monthly totals of computed discharge of Aganda Cauvery, column 9 of table X.	Half- monthly diminution column 2 - column 3 65 425	Percentage of column 4 to column 2.	
					65 425	6 4
1		2	3	4	5	6
June	First half ..	2,382	2,382	Nil.	..	..
	Second ..	5,270	5,270	..	..	..
July	First ..	35,159	25,049	10,110	28.75	30.39
	Second ..	78,224	62,276	15,948	20.38	19.34
August	First ..	89,273	86,120	3,153	3.53	3.53
	Second ..	28,368	28,159	209	0.73	1.29
September	First ..	17,757	17,757	Nil.	..	..
	Second ..	5,964	5,964	..	..	..
October	First ..	6,374	6,374	..	..	..
	Second ..	15,851	15,851	..	..	..
November	First ..	13,382	12,382	..	..	..
	Second ..	2,546	2,546	..	..	..
December	First ..	1,334	1,334	..	..	..
	Second ..	1,696	1,696	..	..	..
January	First ..	..	..	..	..	..
	Second ..	..	..	..	..	..

1908-1909.

(b)

Year and half-month.				Percentage of column 4 to column 2.	
				.65 .425	.6 .4
1	2	3	4	5	6
June .. First half	2,382	2,382	Nil.	..	..
Second	5,270	5,270	"	..	..
July .. First	28,079	23,960	2,119	8.12	9.74
Second	41,400	40,726	674	1.62	2.74
August .. First	44,160	44,160	Nil.	..	..
Second	28,314	28,159	155	.54	1.10
September. First	17,757	17,757	Nil.	..	..
Second	5,964	5,964	"	..	..
October .. First	6,374	6,374	"	..	..
Second	15,548	15,548	"	..	..
November. First	12,382	12,382	"	..	..
Second	2,546	2,546	"	..	..
December. First	1,334	1,334	"	..	..
Second	1,696	1,696	"	..	..
January .. First	..	..	..	..	..
Second	..	..	..	..	..

1908-1909.

(c)

Year and half-month.				Percentage of column 4 to column 2.	
				.65 .425	.6 .4
1	2	3	4	5	6
June .. First half	2,382	2,382	Nil.	..	..
Second	5,270	5,270	"	..	..
July .. First	28,083	22,495	558	2.33	3.59
Second	34,460	33,821	639	1.85	2.96
August .. First	34,500	34,500	Nil.	..	..
Second	27,440	27,440	"	..	..
September. First	17,757	17,757	"	..	0.14
Second	5,964	5,964	"	..	..
October .. First	6,374	6,374	"	..	..
Second	14,904	14,904	"	..	..
November. First	12,382	12,382	"	..	..
Second	2,546	2,546	"	..	..
December. First	1,334	1,334	"	..	..
Second	1,696	1,696	"	..	..
January .. First	..	..	..	..	..
Second	..	..	..	..	..

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MYSORE SYSTEM.

1898-1899.

(a)

Year and half-month.				Percentage of column 4 to column 2.	
				.625 .33	—
1	2	3	4	5	6
June .. First half	4,030	4,030	..	..	..
Second	30,482	25,697	4,785	15.69	..
July .. First	14,340	14,340	..	..	..
Second	47,470	38,540	8,930	18.81	..
August .. First	43,542	31,009	12,533	28.78	..
Second	15,876	15,876	..	..	..
September. First	21,181	21,181	..	..	..
Second	39,868	37,024	2,839	7.12	..
October .. First	57,893	49,079	8,744	15.12	..
Second	37,643	36,520	1,123	2.98	..
November. First	60,450	59,798	652	1.08	..
Second	43,480	40,377	3,103	7.13	..
December. First	18,881	18,881	..	..	..
Second	11,142	11,142	..	..	..
January .. First	9,065	9,065	..	..	..
Second	5,486	5,486	..	..	..

1898-1899.

(b)

Year and half-month.				Percentage of column 4 to column 2.	
				.625 .33	—
1	2	3	4	5	6
June .. First half	4,030	4,030	..	..	..
Second	28,743	25,697	3,046	10.59	..
July .. First	14,340	14,340	..	..	..
Second	24,511	24,511	..	..	..
August .. First	34,154	28,612	5,542	16.23	..
Second	15,876	15,876	..	..	..
September. First	20,370	20,370	..	..	..
Second	32,912	30,073	2,839	8.62	..
October .. First	43,418	40,374	3,044	7.01	..
Second	33,534	33,324	210	.62	..
November. First	35,651	35,651	..	..	..
Second	28,140	27,929	211	.75	..
December. First	18,881	18,881	..	..	..
Second	11,142	11,142	..	..	..
January .. First	9,065	9,065	..	..	..
Second	5,486	5,486	..	..	..

1898-1899.

(c)

Year and half-month.		Half-monthly total of natural discharge of Aganda Cauvery, limited to 2,300 m.c.ft. on any day.	Half-monthly totals of com- puted dis- charge, Aganda Cauvery, column 5 of table III limit- ed to 2,300 m.c.ft. on any day.	Half- monthly diminution, column 2— column 3. 625 33	Percentage of column 4 to column 2.	
					625 33	—
1		2	3	4	5	6
June ..	First half ..	4,030	4,030	..	..	..
	Second ..	25,306	24,715	591	2.34	..
July ..	First ..	14,340	14,340	..	..	..
	Second ..	21,156	21,156	..	..	..
August ..	First ..	31,076	27,968	3,108	10.00	..
	Second ..	15,876	15,876	..	..	..
September.	First ..	19,726	19,726	..	..	..
	Second ..	29,601	27,588	2,013	6.80	..
October ..	First ..	34,500	33,704	796	2.31	..
	Second ..	30,240	30,070	210	.69	..
November.	First ..	30,953	30,953	..	..	..
	Second ..	25,291	25,291	..	..	..
December.	First ..	18,623	18,623	..	..	..
	Second ..	11,142	11,142	..	..	..
January ..	First ..	9,065	9,065	..	..	..
	Second ..	5,486	5,486	..	..	..

1898-1899.

(d)

Year and half-month.		Half-monthly total of natural discharge, Aganda Cauvery, limited to 1,966 m.c.ft. on any day.	Half-monthly totals of computed discharge, Aganda Cauvery, column 5 of table III limit- ed to 1,966 m.c.ft. on any day.	Half- monthly diminution, column 2— column 3.	Percentage of column 4 to column 2.	
					625 33	—
1		2	3	4	5	6
June ..	First half ..	4,030	4,030	..	..	..
	Second ..	22,955	22,955	..	..	..
July ..	First ..	14,340	14,340	..	..	..
	Second ..	19,152	19,152	..	..	..
August ..	First ..	28,321	26,480	1,941	6.85	..
	Second ..	15,876	15,876	..	..	..
September.	First ..	19,086	19,086	..	..	..
	Second ..	27,175	25,830	1,345	4.95	..
October ..	First ..	29,490	29,223	267	.91	..
	Second ..	27,892	27,892	..	..	..
November.	First ..	27,921	27,921	..	..	..
	Second ..	28,467	28,467	..	..	..
December.	First ..	17,924	17,924	..	..	..
	Second ..	11,008	11,008	..	..	..
January ..	First ..	9,065	9,065	..	..	..
	Second ..	5,486	5,486	..	..	..

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MYSORE SYSTEM.

1899-1900.

(a)

Year and half-month.		Half-monthly total of natural discharge of Aganda Cauvery.	Half-monthly totals of computed discharge, Aganda Cauvery, column 5 of table III.	Half- monthly diminution, column 2— column 3. 625 33	Percentage of column 4 to column 2.	
					625 33	—
1		2	3	4	5	6
June ..	First half ..	4,696	4,696	..	..	..
	Second ..	26,063	26,171	9,892	27.43	..
July ..	First ..	52,999	44,359	8,640	16.30	..
	Second ..	16,885	16,885	..	..	..
August ..	First ..	7,141	6,705	436	6.10	..
	Second ..	10,588	10,588	..	..	..
September.	First ..	19,576	19,576	..	..	..
	Second ..	28,053	27,379	674	2.40	..
October ..	First ..	7,340	7,340	..	..	..
	Second ..	10,315	10,315	..	..	..
November.	First ..	5,830	5,830	..	..	..
	Second ..	1,504	1,504	..	..	..
December.	First ..	938	938	..	..	..
	Second ..	482	482	..	..	..
January ..	First ..	782	782	..	..	..
	Second ..	552	552	..	..	..

1899-1900.

(b)

Year and half-month.		Half-monthly total of natural discharge, Aganda Cauvery, limited to 2,944 m.c.ft. on any day.	Half-monthly totals of computed discharge, Aganda Cauvery, column 5 of table III limit- ed to 2,944 m.c.ft. on any day.	Half- monthly diminution, column 2— column 3. 625 33	Percentage of column 4 to column 2.	
					625 33	—
1		2	3	4	5	6
June ..	First half ..	4,696	4,696	..	..	..
	Second ..	24,467	23,836	631	2.58	..
July ..	First ..	37,753	37,544	209	.55	..
	Second ..	16,885	16,885	..	..	..
August ..	First ..	7,141	6,705	436	6.10	..
	Second ..	10,588	10,588	..	..	..
September.	First ..	19,576	19,576	..	..	..
	Second ..	25,563	25,127	436	1.70	..
October ..	First ..	7,340	7,340	..	..	..
	Second ..	10,315	10,315	..	..	..
November.	First ..	5,830	5,830	..	..	..
	Second ..	1,504	1,504	..	..	..
December.	First ..	938	938	..	..	..
	Second ..	482	482	..	..	..
January ..	First ..	782	782	..	..	..
	Second ..	552	552	..	..	..

1899-1900.

(c)

Year and half-month.		Half-monthly total of natural discharge, Aganda Cauvery, limited to 2,300 m.o.ft. on any day.	Half-monthly totals of computed discharge, Aganda Cauvery, column 5 of table III limited to 2,300 m.o.ft. on any day.	Half-monthly diminution, column 2—column 3. 625 33	Percentage of column 4 to column 2.	
					625 33	—
1		2	3	4	5	6
June ..	First half ..	4,696	4,696	..	..	..
	Second ..	21,247	20,773	474	2.23	..
July ..	First ..	30,949	30,949	..	..	..
	Second ..	16,695	16,695	..	..	..
August ..	First ..	7,141	6,705	436	6.10	..
	Second ..	10,588	10,588	..	..	..
September ..	First ..	19,246	19,246	..	..	..
	Second ..	22,574	22,574	..	..	..
October ..	First ..	7,340	7,340	..	..	..
	Second ..	10,315	10,315	..	..	..
November ..	First ..	5,830	5,830	..	..	..
	Second ..	1,504	1,504	..	..	..
December ..	First ..	938	938	..	..	..
	Second ..	482	482	..	..	..
January ..	First ..	782	782	..	..	..
	Second ..	552	552	..	..	..

1899-1900.

(d)

Year and half-month.		Half-monthly total of natural discharge, Aganda Cauvery, limited to 1,966 m.o.ft. on any day.	Half-monthly totals of computed discharge, Aganda Cauvery, column 5 of table III limited to 1,966 m.o.ft. on any day.	Half-monthly diminution, column 2—column 3. 625 33	Percentage of column 4 to column 2.	
					625 33	—
1		2	3	4	5	6
June ..	First half ..	4,696	4,696	..	..	..
	Second ..	19,248	19,248	..	..	..
July ..	First ..	26,612	26,612	..	..	..
	Second ..	16,330	16,330	..	..	..
August ..	First ..	7,141	6,705	436	6.10	..
	Second ..	10,588	10,588	..	..	..
September ..	First ..	18,511	18,511	..	..	..
	Second ..	20,691	20,691	..	..	..
October ..	First ..	7,340	7,340	..	..	..
	Second ..	10,315	10,315	..	..	..
November ..	First ..	5,830	5,830	..	..	..
	Second ..	1,504	1,504	..	..	..
December ..	First ..	938	938	..	..	..
	Second ..	482	482	..	..	..
January ..	First ..	782	782	..	..	..
	Second ..	552	552	..	..	..

Ma.-25-Ca.

MYSORE SYSTEM.

1904-1905.

(a)

Year and half-month.		Half-monthly total of natural discharge of Aganda Cauvery.	Half-monthly total of computed discharge of Aganda Cauvery, column 5 of table III.	Half-monthly diminution, column 2—column 3. 625 33	Percentage of column 4 to column 2.	
					625 33	—
1		2	3	4	5	6
June ..	First half ..	15,178	15,178	..	..	..
	Second ..	58,874	51,261	7,613	12.93	..
July ..	First ..	94,906	91,737	3,169	3.34	..
	Second ..	45,643	44,959	684	1.50	..
August ..	First ..	41,880	38,260	3,620	8.64	..
	Second ..	24,155	23,370	785	3.25	..
September ..	First ..	5,940	5,940	..	..	..
	Second ..	14,741	12,777	1,964	13.32	..
October ..	First ..	6,674	6,674	..	..	..
	Second ..	14,102	11,539	2,563	18.17	..
November ..	First ..	5,002	5,002	..	..	..
	Second ..	1,424	1,424	..	..	..
December ..	First ..	322	322	..	..	..
	Second ..	282	282	..	..	..
January ..	First ..	240	240	..	..	..
	Second ..	292	292	..	..	..

1904-1905.

(b)

Year and half-month.		Half-monthly total of natural discharge of Aganda Cauvery, limited to 2,944 m.o.ft. on any day.	Half-monthly totals of computed discharge of Aganda Cauvery, column 5 of table III limited to 2,944 m.o.ft. on any day.	Half-monthly diminution, column 2—column 3. 625 33	Percentage of column 4 to column 2.	
					625 33	—
1		2	3	4	5	6
June ..	First half ..	15,178	15,178	..	..	..
	Second ..	39,241	38,241	..	..	..
July ..	First ..	44,160	44,160	..	..	..
	Second ..	42,495	42,141	354	.83	..
August ..	First ..	35,329	35,250	79	.22	..
	Second ..	23,814	23,240	574	2.41	..
September ..	First ..	5,940	5,940	..	..	..
	Second ..	14,741	12,777	1,964	13.32	..
October ..	First ..	6,674	6,674	..	..	..
	Second ..	14,102	11,539	2,563	18.17	..
November ..	First ..	5,002	5,002	..	..	..
	Second ..	1,424	1,424	..	..	..
December ..	First ..	322	322	..	..	..
	Second ..	282	282	..	..	..
January ..	First ..	240	240	..	..	..
	Second ..	292	292	..	..	..

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1904-1905.

(c)

Year and half-month.		Half-monthly total of natural discharge of Aganda Cauvery, limited to 2,300 m.c.ft. on any day.	Half-monthly total of com- puted discharge of Aganda Cauvery, column 5 of table III limited to 2,300 m.c.ft. on any day.	Half- monthly diminution, column 2— column 3. ·625 ·33	Percentage of column 4 to column 2.	
					·625 ·33	—
1		2	3	4	5	6
June ..	First half ..	15,178	15,178	..	..	..
	Second ..	32,249	32,249	..	..	..
July ..	First ..	34,500	34,500	..	..	..
	Second ..	36,800	36,800	..	..	..
August ..	First ..	29,533	29,533	..	..	..
	Second ..	22,517	22,517	293	1·30	..
September ..	First ..	5,940	5,940	..	..	..
	Second ..	14,741	12,777	1,964	13·32	..
October ..	First ..	6,674	6,674	..	..	..
	Second ..	14,102	11,539	2,563	18·17	..
November ..	First ..	5,002	5,002	..	..	..
	Second ..	1,424	1,424	..	..	..
December ..	First ..	322	322	..	..	..
	Second ..	282	282	..	..	..
January ..	First ..	240	240	..	..	..
	Second ..	292	292	..	..	..

1904-1905.

(d)

Year and half-month.		Half-monthly total of natural discharge of Aganda Cauvery, limited to 1,966 m.c.ft. on any day.	Half-monthly total of com- puted discharge of Aganda Cauvery, column 5 of table III limited to 1,966 m.c.ft. on any day.	Half- monthly diminution, column 2— column 3. ·625 ·33	Percentage of column 4 to column 2.	
					·625 ·33	—
1		2	3	4	5	6
June ..	First half ..	15,178	15,178	..	..	..
	Second ..	28,274	28,274	..	..	..
July ..	First ..	29,490	29,490	..	..	..
	Second ..	31,349	31,349	..	..	..
August ..	First ..	26,401	26,401	..	..	..
	Second ..	21,313	21,184	28	·13	..
September ..	First ..	5,940	5,940	..	..	..
	Second ..	14,637	12,777	1,860	13·71	..
October ..	First ..	6,674	6,674	..	..	..
	Second ..	14,102	11,539	2,563	18·17	..
November ..	First ..	5,002	5,002	..	..	..
	Second ..	1,424	1,424	..	..	..
December ..	First ..	322	322	..	..	..
	Second ..	282	282	..	..	..
January ..	First ..	240	240	..	..	..
	Second ..	292	292	..	..	..

Ma.-25-C4.
MYSORE SYSTEM.
1905-1906.

(a)

Year and half-month.		Half-monthly total of natural discharge of Aganda Cauvery.	Half-monthly total of computed discharge of Aganda Cauvery, column 5 of table III.	Half- monthly diminution, column 2— column 3. ·625 ·33	Percentage of column 4 to column 2.	
					·625 ·33	—
1		2	3	4	5	6
June ..	First half ..	4,336	4,336	..	..	..
	Second ..	8,246	8,246	..	..	..
July ..	First ..	26,228	31,966	4,262	11·76	..
	Second ..	56,980	36,003	19,977	35·69	..
August ..	First ..	23,932	20,835	3,097	12·94	..
	Second ..	14,509	14,449	60	·41	..
September ..	First ..	21,508	21,469	39	·18	..
	Second ..	10,600	10,600	..	..	..
October ..	First ..	18,185	18,185	..	..	..
	Second ..	30,384	24,694	5,690	18·73	..
November ..	First ..	4,338	4,338	..	..	..
	Second ..	5,142	5,142	..	..	..
December ..	First ..	4,376	4,376	..	..	..
	Second ..	1,974	1,974	..	..	..
January ..	First ..	230	230	..	..	..
	Second ..	1,376	1,376	..	..	..

1905-1906.

(b)

Year and half-month.		Half-monthly total of natural discharge of Aganda Cauvery, limited to 2,944 m.c.ft. on any day.	Half-monthly total of computed discharge of Aganda Cauvery, column 5 of table III limited to 2,944 m.c.ft. on any day.	Half- monthly diminution, column 2— column 3. ·625 ·33	Percentage of column 4 to column 2.	
					·625 ·33	—
1		2	3	4	5	6
June ..	First half ..	4,336	4,336	..	..	..
	Second ..	8,246	8,246	..	..	..
July ..	First ..	31,837	26,925	2,912	9·14	..
	Second ..	31,410	26,928	4,482	14·27	..
August ..	First ..	23,830	20,835	2,995	12·57	..
	Second ..	14,509	14,449	60	·41	..
September ..	First ..	21,508	21,469	39	·18	..
	Second ..	10,600	10,600	..	..	..
October ..	First ..	17,597	17,597	..	..	..
	Second ..	25,272	22,746	2,526	9·99	..
November ..	First ..	4,338	4,338	..	..	..
	Second ..	5,142	5,142	..	..	..
December ..	First ..	4,376	4,376	..	..	..
	Second ..	1,974	1,974	..	..	..
January ..	First ..	230	230	..	..	..
	Second ..	1,376	1,376	..	..	..

1905-1906.

(c)

Year and half-month.		Half-monthly total of natural discharge, Aganda Cauvery, limited to 2,300 m.c.ft. on any day.	Half monthly totals of computed discharge, Aganda Cauvery, column 5 of table III limited to 2,300 m.c.ft. on any day.	Half-monthly diminution, column 2 - column 3. -625 -33	Percentage of column 4 to column 3.	
					-625 -33	—
1		2	3	4	5	6
June	First half	4,336	4,336	..	..	..
	Second	8,346	8,346	..	..	..
July	First	27,439	25,786	1,653	6.02	..
	Second	25,614	23,781	1,833	7.16	..
August	First	22,298	20,835	1,463	6.56	..
	Second	14,509	14,449	60	.41	..
September	First	21,488	21,449	39	.18	..
	Second	10,600	10,600	..	..	..
October	First	16,363	16,363	..	..	..
	Second	21,994	21,080	914	4.16	..
November	First	4,338	4,338	..	..	..
	Second	5,142	5,142	..	..	..
December	First	4,376	4,376	..	..	..
	Second	1,974	1,974	..	..	..
January	First	230	230	..	..	..
	Second	1,376	1,376	..	..	..

1905-1906.

(d)

Year and half-month.		Half-monthly total of natural discharge, Aganda Cauvery limited to 1,996 m.c.ft. on any day.	Half monthly totals of computed discharge, Aganda Cauvery, column 5 of table III limited to 1,996 m.c.ft. on any day.	Half-monthly diminution, column 2 - column 3. -625 -33	Percentage of column 4 to column 3.	
					-625 -33	—
1		2	3	4	5	6
June	First half	4,336	4,336	..	..	..
	Second	8,346	8,346	..	..	..
July	First	24,853	23,728	1,125	4.52	..
	Second	22,608	21,347	1,261	5.58	..
August	First	20,598	20,277	321	1.56	..
	Second	14,509	14,449	60	.41	..
September	First	21,031	21,031	..	..	..
	Second	10,600	10,600	..	..	..
October	First	14,833	14,833	..	..	..
	Second	19,656	19,320	336	1.71	..
November	First	4,338	4,338	..	..	..
	Second	5,142	5,142	..	..	..
December	First	4,376	4,376	..	..	..
	Second	1,974	1,974	..	..	..
January	First	230	230	..	..	..
	Second	1,376	1,376	..	..	..

Ma-25-Cs.

MYSORE SYSTEM.

1908-1909.

(a)

Year and half-month.		Half-monthly total of natural discharge, Aganda Cauvery.	Half-monthly total of computed discharge, Aganda Cauvery, column 5 of table III.	Half-monthly diminution, column 2 - column 3. -625 -33	Percentage of column 4 to column 3.	
					-625 -33	—
1		2	3	4	5	6
June	First half	2,382	2,382	..	..	..
	Second	5,270	5,270	..	..	..
July	First	35,159	20,252	14,907	42.40	..
	Second	78,224	63,809	14,415	18.43	..
August	First	89,273	86,120	3,153	3.53	..
	Second	28,369	27,966	402	1.42	..
September	First	17,757	17,757	..	..	..
	Second	5,964	5,964	..	..	..
October	First	6,374	6,374	..	..	..
	Second	15,851	15,708	143	.90	..
November	First	12,382	12,269	113	.91	..
	Second	2,546	2,546	..	..	..
December	First	1,334	1,334	..	..	..
	Second	1,696	1,696	..	..	..
January	First	..	..	..	..	..
	Second	..	..	..	..	..

1908-1909.

(b)

Year and half-month.		Half-monthly total of natural discharge, Aganda Cauvery, limited to 2,944 m.c.ft. on any day.	Half-monthly totals of computed discharge, Aganda Cauvery, column 5 of table III limited to 2,944 m.c.ft. on any day.	Half-monthly diminution, column 2 - column 3. -625 -33	Percentage of column 4 to column 3.	
					-625 -33	—
1		2	3	4	5	6
June	First half	2,382	2,382	..	..	..
	Second	5,270	5,270	..	..	..
July	First	26,079	20,252	5,827	22.34	..
	Second	41,400	39,441	1,959	4.73	..
August	First	44,169	44,169	..	..	..
	Second	28,314	27,966	348	1.23	..
September	First	17,757	17,757	..	..	..
	Second	5,964	5,964	..	..	..
October	First	6,374	6,374	..	..	..
	Second	15,848	15,405	143	.92	..
November	First	12,382	12,269	113	.91	..
	Second	2,546	2,546	..	..	..
December	First	1,334	1,334	..	..	..
	Second	1,696	1,696	..	..	..
January	First	..	..	..	..	..
	Second	..	..	..	..	..

1908-1909.

(c)

Year and half-month.				Half-monthly totals of computed discharge, Aganda Cauvery, column 6 of table III limited to 2,300 m.o.ft. on any day.	Half-monthly diminution, column 3. —column 5.	Percentage of column 4 to column 2.	
						625 83	—
1				2	3	4	5
June	First half	..	..	2,382	2,382	..	..
	Second	..	..	5,270	5,270	..	..
July	First	..	..	23,033	19,747	3,286	14.27
	Second	..	..	34,460	32,668	1,792	5.20
August	First	..	..	34,500	34,500	..	..
	Second	..	..	27,440	27,422	18	.07
September	First	..	..	17,757	17,757	..	..
	Second	..	..	5,964	5,964	..	..
October	First	..	..	6,374	6,374	..	..
	Second	..	..	14,904	14,761	143	.96
November	First	..	..	12,382	12,269	113	.91
	Second	..	..	2,546	2,546	..	..
December	First	..	..	1,334	1,334	..	..
	Second	..	..	1,696	1,696	..	..
January	First	..	..	..	..	..	..
	Second	..	..	..	..	..	..

1908-1909.

(d)

Year and half-month.				Half-monthly total of natural discharge, Aganda Cauvery, limited to 1,966 m.o.ft. on any day.	Half-monthly totals of computed discharge, Aganda Cauvery, column 6 of table III limited to 1,966 m.o.ft. on any day.	Half-monthly diminution, column 3. —column 5.	Percentage of column 4 to column 2.	
							625 83	—
1				2	3	4	5	6
June	First half	..	..	2,382	2,382	..	..	..
	Second	..	..	5,270	5,270	..	..	..
July	First	..	..	20,967	18,916	2,052	9.79	..
	Second	..	..	30,204	28,892	1,312	4.34	..
August	First	..	..	29,490	29,490	..	..	..
	Second	..	..	26,444	26,426	18	.07	..
September	First	..	..	17,757	17,757	..	..	..
	Second	..	..	5,964	5,964	..	..	..
October	First	..	..	6,374	6,374	..	..	..
	Second	..	..	14,252	14,252	..	..	..
November	First	..	..	12,233	12,160	83	.68	..
	Second	..	..	2,546	2,546	..	..	..
December	First	..	..	1,334	1,334	..	..	..
	Second	..	..	1,696	1,696	..	..	..
January	First	..	..	..	..	..	..	..
	Second	..	..	..	..	..	..	..

Exhibit Ma. 26.

THIRD ISSUE.

Notes on the yield of the combined Kannambadi and Kabbani catchments, dated 9th April 1914.

This note gives additional data supplementing those given by Mysore My. 22, paragraphs 10 to 13, and data which, it is submitted, are far more reliable.

2. The Mysore data are based on percentages of yield obtained from assumed run off factors from average rainfall recorded in various areas and even if the assumptions made could be regarded as correct only give an average.

As the percentage of run off realised is by no means in proportion to the rainfall but diminishes much more in proportion than the rainfall as this decreases, the yield is proportionately larger in years of good rainfall and vice versa.

3. In the plains part of the catchment rainfall is very precarious especially in the south-west monsoon and in bad years such as 1899, 1904 and 1905, the whole yield of the catchment in the south-west monsoon comes from the hill catchments.

Calculations on a percentage basis between the yield of the plains and the hills is altogether misleading and faulty and figures based on average rainfall and resulting "run off" are of no value compared with even the roughest gaugings and resulting computations.

4. The yield of the Arkavati and Shimsha is suggested by Mysore My. 22, paragraph 11, to be in the south-west monsoon one-fifth of the yield of the whole catchment between Kannambadi and the Metur site and this is taken from a computation which assumes a run off factor and applies that to average rainfall. In years such as 1899, 1904 and 1905 the yield of such catchments is quite insufficient to replace the losses in transmission from evaporation and percolation only.

5. The statement is fully proved by the result of the actual gauging of last August and September at Danakere when during the south-west monsoon of 1913 the flow at Sivasamudram was gauged and is compared with the corresponding flow at Bhavani bridge—vide Madras Appendix X. This shows not only that there was no inflow gain from the catchment between Sivasamudram and Bhavani, but that throughout the period of 21 consecutive days, 29th August to 18th September, there was a total loss of 15.2 per cent. and between Sivasamudram and the Upper Anicut a loss of 14.4 per cent. The latter includes draw off for the Cauvery channels.

This is typical of the bad years during the south-west monsoon and absolutely proves that the yield of the plains catchment is negligible under such conditions.

6. In the north-east monsoon the precipitation of rainfall in the plains gradually increases from Mysore downwards to the sea and is a more material factor to the river flow than in the south-west monsoon, especially in the lower part of the catchment.

In years of failure of the monsoon, however, the rainfall from this source is fitful and frequently for a month together will be so small as to give no run off affecting the Cauvery.

7. The computations based on assumed factors and percentages applied to rainfall over catchment areas to give totals of monsoon run off are useless for purposes of studying the half-monthly yields in bad years, and this is what is required. Even applied to total monsoon yield such computations can only be considered where no more reliable data are available and even then only regarded with great suspicion and used with the admission that they are likely to prove altogether fallacious and misleading.

8. In this case there is no reason whatever to resort to such a method of computation as daily gauge-readings are available at Sivasamudram for the years 1902 to 1908 and while the graduation of the Sivasamudram gauge is admitted to be faulty, the discharges obtained from the daily gauge-readings by applying suitable corrections will give a measure within reasonable limits of the actual half-monthly flow recorded in the years 1902 to 1908. Not only are the results so obtained infinitely more accurate than those on the basis of rainfall and run off factors applied to catchment areas, but the results give half-monthly yields and it is half-monthly yields in bad years which vitally affect the interests of Madras irrigation.

9. To proceed to examine by the method indicated above, the yield of the Kabbani, this may, when considering bad years, be considered to be equivalent to the yield at Sivasamudram less the yield of the Kannambadi catchment.

10. On this basis a calculation of the yield of the Kabbani has been made half-monthly by means of the available daily flow at Kannambadi and at Sivasamudram.

For the latter, gauge-readings are available for the years 1902 to 1908 and the calculation has been made for these years on the basis of these. To correct the flow at Sivasamudram from the flow recorded by Mysore the following corrections have been applied :—

(a) The flow on any day within the limits of the approved curve drawn from the Danakere gangings of last August and September between limits $\frac{1}{4}$ a foot and $3\frac{1}{4}$ feet over Sivasamudram main anicut has been taken from this curve.

(b) Flow below this, that is, from 0.5 foot over the anicut downwards from the tables already agreed on as being a fair measure of flow for very low stages.

(c) For flow above the stage of (1), either the recorded flow at Sivasamudram on Mysore figures less 10 per cent. or the flow one day later at Bhavani bridge whichever is less.

(d) The time of transmission from Kannambadi to Sivasamudram is taken as one day and from Sivasamudram to Cauvery dam is three days.

The curve of discharges from the Danakere observations is roughly 10 per cent. less than the record of Mysore discharges and this is the basis of the above 10 per cent. less. The high stages at Bhavani bridge are possibly somewhat under-estimated, while those at Sivasamudram are over-estimated. The alternatives given under this avoid chances of any very great error. By means of these figures we can obtain a fair estimate of the half-monthly yield of the Kabbani.

11. From these half-monthly total discharges, tables have been drawn showing—

(1) The flow of Agunda Cauvery every half-month and the corresponding flow of the Cauvery at Kannambadi and of the Kabbani and catchment intercepted between Kannambadi and Sivasamudram (columns 1, 2 and 4).

(2) The proportions half-monthly represented by the following :—

	Column.
(a) Flow at Kannambadi	...
Flow at Cauvery dam	...
(b) Flow of the Kabbani and intermediate catchment above Sivasamudram	...
Flow at Cauvery dam	...
(c) Flow at Sivasamudram	...
Flow at Cauvery dam	...

It will be evident that the proportions in column 6 are the essentials to be considered in fixing the proportion figure for the proportionate system applied to the Kabbani catchment in combination with the catchment above Kannambadi.

12. As emphasised in the Madras representation Ma. 24, it is to the distribution of flow half-month by half-month rather than to the total flow of a year or of a whole monsoon that reference must be made in order to judge what proportion factor is required to protect Madras and it is with reference to the bad years 1904-05, 1905-06 and 1908-09 that special attention must be given.

This is so, first because the bad years are those in which any deprivation of water is most felt and secondly because it is in these bad years that the lower catchments in the plains fail to give anything like their normal yield. Attention is therefore specially invited to the half-monthly variations in column 6 of the attached statements in the years 1904-05, 1905-06 and 1908-09.

To make the statements more complete totals have been made for the south-west and north-east monsoons, but it is urged that it is rather on the half-monthly proportions required to protect Madras that attention should be concentrated especially for the months of July to November which are the most crucial and important months of the Madras irrigation season.

13. First taking the south-west monsoon months of July, August and September—

For the year 1904 the proportion for the second half of August is 1.02 and for all September 1.20 or over.

For the year 1905, for four successive half-months, 1st August to 30th September, the proportion exceeds 1.1 throughout the period and rises as high as 1.21 in the second half of August.

For the year 1908, the proportions are smaller, but are as high as .93 and .94 for two half-months, and average 0.89 for the whole south-west monsoon.

In the face of this, the factor proposed by Mysore 0.75 (Ma. 22, paragraph 37) cannot be seriously considered. It will be seen that in only one year, 1902-04, which was a year of superabundant river discharge, does the proportion for the whole south-west monsoon fall as low as .75, while the proportion of the three bad years is :—

Year.	Proportion.
1904-1905	0.83
1905-1906	1.00
1908-1909	0.89

It is not, however, to the total flow of the whole monsoon that attention is to be given, but to incidence of half-monthly distribution of flow, and to secure Madras as regards half-monthly flow a materially higher factor would obviously be necessary.

A consideration of the actual gaugings at Danakere of last September is alone ample proof of the above contention.

14. Considering the north-east monsoon.—The months of October and November are the important months of this period in considering the effect on Madras supplies of the Mysore proposed works.

Concentrating attention on these months in the bad years, it will be seen

1904-05. The proportion never falls below 0.73 and it is 1.18 for the first half of October and 0.90 for the second half of November. It is 0.95 for the whole north-east monsoon.

1905-06. The proportion falls as low as .32 and .33 in two half-months, but for the consecutive months, 16th October to 15th November, it is 0.66 and 0.59. For the whole north-east monsoon it is 0.58.

1908-09. The proportion for the first half of October is 0.79 and the second half of November 0.64. For the whole north-east monsoon the proportion is low, viz., 0.325.

It will be seen from the above that the factor proposed by Mysore, My. 22, paragraph 37 (iii), viz., of 0.38 for the north-east monsoon, is still further astray than that proposed for the south-west monsoon.

15. With regard to Mysore statement P My. 22 (7) check has been made and it is found that the figures in columns 3 and 4 for the south-west monsoon differ from the figures computed by Madras to a material extent in the bad year 1905-06 for the month of July. The Madras computations make these figures—

	Percentage.
Column 3 (Mysore system)	6.28
in place of Mysore figures	4.33
Column 4	5.03
in place of Mysore figures	3.82
The totals for the south-west monsoon this year—	
Column 3 comes to	2.89
in place of Mysore	2.1
Column 4 comes to	2.18
in place of Mysore	1.71

For other years some errors have been found, but they are not material in bad years.

If the Assessor or Arbitrator is basing conclusions on statement P, the matter should, it is submitted, be further examined; but if it is considered immaterial, no further examination of this is asked for.

16. With regard to the Mysore replies to the Madras Note, Ma. 25, two replies have been received :—

My. 23.—The first on the date on which it was promised, viz., 6th April 1914, received with letter No. 165 of 5th April 1914.

My. 24.—The second on the following day received with letter No. 3279 of 6th April 1914.

17. The Government of Madras do not propose to repeat their arguments and contentions and are content to leave the Mysore representations to the consideration of the Arbitration Committee.

18. With regard to the table accompanying My. 23, it is pointed out that the figures as regards the flow at Cauvery dam are purely hypothetical and are not borne out by the actual record of flow.

The proportions of yield of the lower catchment in high floods is small in the south-west monsoon as compared with that of the Kannambadi catchment and an examination of the working tables for periods of floods giving flow at Kannambadi from 5,000 to 8,000 million cubic feet per day will show that the corresponding yield at the Cauvery dam is far smaller in the south-west monsoon than is computed by Mysore.

On the other hand, the figures in the Madras statement Ma. 25, paragraph 24, are not hypothetical, but represent and compare actual conditions which must occur under the application of the Mysore and the proportionate systems.

19. With regard to the second note (My. 24) received a day late with letter No. 3279, dated 6th April 1914, the full examination of tables and analysis of this mass of figures received so late has been found impossible in the time available.

The tables are elaborate and require careful check and this is proceeding.

If Madras find it necessary to comment on these tables after time to permit examination is allowed, the right to do so is claimed, but at this stage it is not proposed to offer any remarks on these tables.

20. As regards the rest of the note, Mysore suggest that the tables (a), (b) and (c) accompanying Madras Ma. 25 are on a wrong principle and do not require further notice. The tables and abstracts were prepared at the express request of the Assessor in amplification of those previously prepared and put in with Ma. 24 and it is submitted they are worthy of full consideration.

The statements do not review the effect on Mysore of the application of the systems which are under consideration as the Government of Madras hold that the issue is by what system of measurement and regulation can the prescriptive rights of Madras under the award on the second issue be fully protected.

It is submitted that it is after, and only after, this condition is complied with that the rights of Mysore to impound water come into existence.

21. Finally it is put on record that the Madras Government recognise that at this stage of proceedings long discussions, repetitions of arguments and contentions are not called for and that what is required is to place before the Arbitration Committee the best available facts and tables as regards water-supplies and yield of catchments, and they have therefore confined themselves to this.

• They do not repeat, but do adhere to their already recorded assertions to which they refer the Arbitration Committee.

22. The fact that Madras do not reply to the contentions advanced by Mysore My. 23 and My. 24 is not to be taken as any admission that these are accepted, but merely that they adhere to their previous attitude and leave the matter in the hands of the Arbitrator.

9th April 1914.

W. M. ELLIS, Col., R.E.,
Madras Representative.

ENCLOSURES.

Exhibit Ma. 26 (a).

STATEMENT of half-monthly yield of catchments.

Half month.	Aganda Cauvery half-monthly yield at Upper Anicut.	Yield of Kannambadi catchment.	Column 2. Column 1.	Yield of catchment below Kannambadi and above Sivasamudram.	Column 4. Column 1.	Column 3 + column 5.
	1	2	3	4	5	6

1902-03.

June, I	3,568	1,260	0.35	Nil.	..	.35
" II	8,544	9,030	1.06	2,597	.30	1.36
July, I	17,993	11,092	0.62	4,744	.27	.89
" II	98,076	70,784	0.72	16,419	.16	.88
August, I	24,929	11,343	0.45	8,062	.32	.77
" II	10,876	8,450	0.78	497	.05	.83
September, I	41,681	27,055	0.65	3,064	.07	.72
" II	24,895	14,424	0.58	7,496	.30	.88
Total	230,562	153,443	67	41,879	.18	.85
October, I	21,903	4,605	0.21	1,709	.08	.29
" II	34,244	6,203	0.18	3,372	.09	.27
November, I	26,978	6,024	0.22	3,713	.14	.36
" II	14,475	1,516	0.10	1,238	.09	.19
December, I	52,705	15,290	0.29	Nil.	..	.29
" II	19,579	4,396	0.22	2,497	.13	.35
January, I	6,550	1,687	0.25	Nil.	..	.25
" II	5,566	987	0.18	Nil.	..	.18
Total	181,970	40,658	0.22	12,579	.07	.29

1903-04.

June, I	5,786	4,337	.75	Nil.	..	.75
" II	9,558	4,169	.43	3,240	.54	.77
July, I	8,337	2,739	.33	Nil.	..	.33
" II	135,223	58,583	.43	12,761	.09	.52
August, I	103,488	61,486	.59	51,270	.49	1.08
" II	38,847	21,918	.56	7,733	.20	.76
September, I	31,158	13,446	.43	5,178	.17	.60
" II	45,862	10,791	.23	8,381	.18	.41
Total	376,259	177,469	.47	88,563	.23	.70
October, I	65,067	15,839	.24	12,827	.19	.43
" II	56,746	11,858	.21	9,928	.18	.39
November, I	65,966	7,798	.12	3,478	.05	.17
" II	62,037	15,104	.24	27,628	.44	.68
December, I	46,941	10,766	.23	2,291	.05	.28
" II	11,492	3,061	.27	2,401	.02	.29
January, I	10,308	2,039	.20	914	.09	.29
" II	3,808	1,175	.31	897	.24	.55
Total	322,305	67,640	.21	60,364	.19	.40

STATEMENT comparing the yield of Aganda Cauvery on the yield of the Kannambadi and that of the catchment between Kannambadi and Sivasamudram.

Half month.	Aganda Cauvery half-monthly flow.	Yield of Kannambadi catchment.	Column 2. Column 1.	Yield of catchment below Kannambadi and above Sivasamudram.	Column 4. Column 1.	Column 3 + column 5.
	1	2	3	4	5	6

1904-1905.

June, I	15,207	2,897	.19	..	..	.19
" II	58,848	24,828	.42	17,210	.29	.71
July, I	94,437	65,362	.69	22,408	.24	.93
" II	45,643	19,167	.42	16,645	.36	.78
August, I	41,880	17,878	.43	13,314	.31	.74
" II	24,155	13,579	.56	11,143	.46	1.02
September, I	5,940	5,448	.92	2,107	.36	1.28
" II	14,821	13,414	.90	4,490	.30	1.20
Total	300,931	162,573	.54	87,317	.29	.83
October, I	6,674	3,903	.59	3,993	.59	1.18
" II	14,102	6,695	.47	3,904	.27	.74
November, I	5,002	1,389	.28	2,238	.45	.73
" II	1,424	98	.07	1,183	.83	.90
December, I	322	29	.09	209	.65	.74
" II	252	442	1.57	Nil.	..	1.57
January, I	240	580	2.42	Nil.	..	2.42
" II	292	568	1.93	Nil.	..	1.93
Total	28,338	13,704	0.48	11,530	0.47	0.95

1905-1906.

June, 1-15	4,336	166	0.04	1,304	.28	.32
" 16-30	8,246	4,773	0.58	2,583	.31	.89
July, 1-15	36,228	15,101	0.42	16,946	.47	.89
" 16-31	55,980	31,108	0.56	21,809	.38	.94
August, 7-15	23,932	12,116	0.51	15,859	.64	1.15
" 16-31	14,509	10,523	0.72	7,123	.49	1.21
September, 1-15	21,508	12,653	0.59	11,090	.52	1.11
" 16-30	10,600	5,038	0.47	6,959	.66	1.13
Total	175,339	91,473	0.52	82,572	.48	1.00
October, 1-15	18,185	2,322	0.13	3,584	0.19	.32
" 16-31	30,384	10,829	0.35	9,538	0.31	.66
November, 1-15	4,338	747	0.18	1,792	0.41	.59
" 16-31	5,142	284	0.05	1,470	0.26	.33
December, 1-15	4,376	670	0.15	2,504	0.57	.72
" 16-31	1,974	903	0.45	935	0.47	.92
January, 1-15	230	360	1.60	330	1.43	3.03
" 16-31	1,376	1,913	1.39	..	..	1.39
Total	66,005	18,028	0.27	20,153	0.31	.58

1906-1907.

June, 1-15	692	151	0.22	..	..	0.22
" 16-30	4,733	10,005	2.11	..	..	2.11
July, 1-15	5,479	3,857	0.70	1,741	0.32	1.02
" 16-31	68,667	47,971	0.69	18,864	0.28	0.97
August, 1-15	40,356	17,252	0.42	14,020	0.35	0.77
" 16-31	31,884	23,250	0.73	16,154	0.19	0.47
September, 1-15	40,268	23,995	0.59	16,955	0.42	1.01
" 16-30	16,737	8,732	0.52	7,528	0.45	0.97
Total	258,316	135,313	0.52	75,260	0.29	0.81
October, 1-15	30,946	6,836	0.22	7,438	0.24	0.46
" 16-31	41,837	9,389	0.22	9,811	0.23	0.45
November, 1-15	7,693	2,344	0.29	5,182	0.67	0.96
" 16-30	13,963	566	0.04	3,018	0.22	0.26
December, 1-15	6,098	363	0.06	2,525	0.41	0.47
" 16-31	8,190	1,407	0.17	3,399	0.41	0.58
January, 1-15	5,216	885	0.17	2,963	0.57	0.74
" 16-31	3,238	795	0.24	3,020	0.93	0.17
Total	117,181	22,485	0.19	37,356	0.32	0.61

STATEMENT showing half-monthly yield of catchments.

Half-monthly.	Flow at Agunda Cauvery.	Yield of Kannambadi catchment.	Column 2. Column 1.	Yield of catchment below Kannambadi and above Sivasamudram.	Column 4. Column 1.	Column 3 + Column 5.
	1	2	3	4	5	6
1907-1908.						
June 1-15 ..	5,066	854	0.17	1,564	0.30	0.47
16-30 ..	14,807	7,789	0.53	4,797	0.33	0.85
July 1-15 ..	30,291	15,755	0.52	10,556	0.34	0.86
16-31 ..	59,735	43,313	0.73	9,307	0.15	0.88
August 1-15 ..	118,225	77,278	0.65	43,344	0.36	1.01
16-31 ..	81,831	56,233	0.69	24,929	0.30	0.98
September 1-15 ..	32,559	15,235	0.47	11,262	0.34	0.81
16-30 ..	14,531	7,318	0.50	5,976	0.41	0.91
Total ..	357,045	223,765	0.63	100,635	0.33	0.90
October 1-15 ..	25,674	8,815	0.35	7,053	0.38	0.63
16-31 ..	14,550	4,343	0.30	4,574	0.31	0.61
November 1-15 ..	15,768	4,736	0.30	2,794	0.18	0.48
16-30 ..	9,133	1,892	0.21	5,543	0.61	0.82
December 1-15 ..	5,070	1,127	0.22	2,798	0.55	0.77
16-31 ..	5,856	1,863	0.32	1,994	0.34	0.66
January 1-15 ..	3,322	1,170	0.36	906	0.27	0.63
16-31 ..	3,462	673	0.19	1,487	0.43	0.62
Total ..	82,245	24,619	0.29	27,169	0.33	0.63
1908-1909.						
June 1-15 ..	2,380	576	0.24	642	0.27	0.51
16-30 ..	5,270	4,211	0.80	1,162	0.33	1.02
July 1-15 ..	35,159	27,681	0.78	5,881	0.16	0.94
16-31 ..	78,224	44,353	0.57	31,895	0.28	0.85
August 1-15 ..	69,273	56,744	0.83	26,990	0.30	0.93
16-31 ..	28,368	15,791	0.55	9,317	0.33	0.88
September 1-15 ..	17,757	7,728	0.43	6,466	0.36	0.79
16-30 ..	5,964	3,098	0.52	1,990	0.33	0.85
Total ..	262,395	160,182	0.61	74,372	0.28	0.89
October 1-15 ..	6,874	2,264	0.35	2,920	0.44	0.79
16-31 ..	15,851	3,368	0.21	1,452	0.09	0.30
November 1-15 ..	12,380	2,154	0.17	2,977	0.24	0.41
16-30 ..	2,548	529	0.20	1,228	0.44	0.64
December 1-15 ..	1,334	207	0.15	1,083	0.81	0.96
16-31 ..	1,696	304	0.18	472	0.28	0.46
January 1-15 ..	14,903	No discharge available for Kannambadi.				
16-31 ..	2,802					
Total ..	57,888	8,826	0.15	10,132	0.175	0.335

Exhibit Ma. 27.

Madras Further Repl. Third Issue.

1. The tables accompanying My. 24 which were received by Madras on the 7th April have now been checked and examined.

A few errors of which the more material are noted in the list of corrections noted below have been found on check, but these are not of so material a nature as to place a different aspect on the results displayed in the tables.

2 It has always been recognised that the operation of the Mysore system was materially more favourable to Mysore than the proportionate system, and under an award on the second issue which contemplated and provided for the full protection and safeguarding of Madras interests and rights within the limit flow, and without any dependence on surplus flow, the objections which Madras urge against the adoption of this system would be of much less vital importance than they are. It is denied that the character of the award on the second issue has no bearing on the consideration of the third.

3. It is not suggested that in giving the award on the second issue the Arbitrator had any intention of prejudging or forecasting the nature of the award on the third issue, but it is clear

from the considerations put forward in the "Examination of evidence" and on the finding that in framing the award that the principles enunciated in the Assessor's "Examination of evidence" (paragraphs 99 to 103, 165-A, 173 and 174) were in contemplation and such replenishments as were contemplated form an integral part of the water required to protect and preserve Madras rights and it is submitted that they can only be given in anything approaching sufficient quantities under the "Proportionate System".

That the 6½ feet limit is not intended as in itself sufficient to protect Madras rights is clear and it is also clear as stated in Ma. 25, paragraph 4, that the award "specifies a limit volume of water which assisted and supplemented by a proportion of all excess flow over this limit will fully protect Madras interests".

4. As stated in Ma. 26, paragraph 20, the first essential in considering the award on the third issue is what system will fully protect Madras and it is urged that this is the first point to be considered and not the selection of a system which to the detriment of Madras existing rights will enable Mysore to impound more water.

5. The figures of the Mysore statement are amplified by the figures given in the table below, also extracted from the same Madras and Mysore tables from which the Mysore statements are compiled. This table shows clearly that while even under the proportionate system the Madras interests under the award on the second issue suffer in comparison to the existing conditions, yet this loss is comparatively small as compared with the losses of useful water suffered under the Mysore system.

The table gives the losses in million of cubic feet suffered yearly in the four bad years under the proportionate and Mysore systems, respectively, as compared with actual recorded flow within the limits named.

Table showing in million cubic feet losses within named limits suffered by Madras under the Mysore and proportionate systems as compared with existing conditions of natural flow:—

Year.	Mysore system factors 0.625 0.30 Mysore Table.	Proportionate system.		Limit daily discharge.
		Factor 0.65 0.425 Table X.	Factor 0.60 0.40 Table XII.	
1899-1900 ..	436	268	475	1,966
1904-1905 ..	4,451	1,406	1,713	
1905-1906 ..	3,103	448	805	
1908-1909 ..	3,455	564	1,029	
1899-1900 ..	910	268	475	2,300
1904-1905 ..	4,820	1,556	2,029	
1905-1906 ..	5,962	1,088	1,625	
1908-1909 ..	5,352	1,177	1,878	
1899-1900 ..	1,712	653	1,127	2,944
1904-1905 ..	5,534	2,789	2,962	
1905-1906 ..	13,014	3,504	4,438	
1908-1909 ..	8,390	2,948	3,989	

6. It will be seen that even within the very restricted award limit, Madras suffer materially under the Mysore system in 1904-1905, 1905-1906 and 1908-1909.

Under the proportionate system the diminution as compared with natural flow is far less although with the factors examined it still exists; surely under the very low limit assigned to Madras full protection of that limit at least is Madras right.

7. Under the higher limit 2,944 million cubic feet, the losses under the Mysore system are very considerable in the years 1905-1906 and 1908-1909. In all the years except 1899 the losses under the Mysore system are materially greater than under the proportionate system.

The same remark applies to the limit 2,300 million cubic feet.

Thus of the four bad years the losses of useful water through adoption of the Mysore system is great as compared with the corresponding losses under the proportionate system.

8. The Madras title and right is to be fully protected, that is, that the Madras ryots should not incur more loss under the new conditions than under existing conditions.

In the four bad years under review, it is not open to question that much loss was incurred from deficient supply in 1899-1900.

9. The losses suffered from poor outturn of crop for the years 1904-1905, 1905-1906 and 1908-1909 are in evidence (Table III, Ma. 20).

These figures are abstracted from records compiled year by year and all on record prior to the commencement or contemplation of these proceedings and are the best evidence of outturn of crop.

This table shows clearly that in the ten years period for which records of crop outturn are available, the outturn of these years was very markedly below the outturn of any of the other years of the decennium.

This can best be gauged by comparing the outturn of area of crop of quality 12 annas and upwards in these years with those of the other years of the period. This will be found very markedly below the other years.

Again comparing the area producing outturn of 2 annas only for these three years the area is much above those of other years.

10. It is thus not open to question that these losses are due to deficient supply, suffered under natural flow under the rules giving a 7-foot limit gauge. Under the award 6½ only is the limit allowed with a proportion of all excess flow. This will not, in the opinion of the Madras Government, fully protect Madras even under the proportionate system. It is shown above that in the bad years the losses due to Mysore system within all limits are greater in these bad years than those due to the proportionate system and frequently much greater. How then can the latter system secure Madras rights? Madras have suffered losses in these years from deficient flow and the extra losses to be suffered in future in similar years under an award reducing this flow must be greater and greater the more the flow within useful limits previously available is reduced.

11. The Mysore system reduces the flow greatly as compared with the proportionate system and under this system Madras cannot possibly be protected to the extent contemplated in the award on the second issue, while even this extent of protection must leave Madras with added loss to some extent in the bad years.

12. It is therefore contended that the protection contemplated to be given Madras under the award on the second issue cannot possibly be given by the Mysore system and that the introduction of this system cannot but entail on Madras greatly enhanced losses as compared with those now suffered on account of deficient supplies in bad years. The only system which can give to Madras the supplies of water contemplated in the award under the second issue is the proportionate system and though even this system in the opinion of the Government of Madras will give insufficient supplies, they claim that this system should be adopted as the only one which can possibly give them that protection which was the intention of the award.

13. Finally, if in spite of the above contentions the Arbitrator considers that he is unable to accede to the above Madras claim, the Government of Madras while recording their opinion that no other system can possibly safeguard their existing irrigation elect to accept in alternative the offer made by the Mysore Durbar My. 22 (paragraphs 16 and 17) to accept the proportionate system with a measurement in four places so as to include the Kabbani river with the inflow into the Kannambadi reservoir. The proportion factors under this system would be tentatively fixed by the Arbitrator. The matter has already been discussed in Ma. 25.

This system is fully accepted by Mysore, paragraphs 16 and 17, and again paragraph 37 (iii) and is recognised as being somewhat less harmful to Madras than the Mysore system which under the award on the second issue cannot but fail in very material respects to protect Madras interests.

Correction sheet.

1904-1905—

Table IX, column 47 (h)—

9,638 should be 2,282.

1905-1906—

Table IX, column 17—

2,858 should be 5,706, and 1,896 should be 4,099.

It is not clearly understood what purpose the abstract statements at bottom of each sheet serve as apparently columns 1 to 3 refer to the period June to January, whereas columns 4 and 6 refer to June to May. It is also not understood how column 6 is arrived at with reference to the case applied.

11th April 1914.

W. M. ELLIS, Col., R.E.,
Madras Representative.

Exhibit Ma 28.

Note by the Madras Representative, dated 20th April 1914.

The fourth issue runs as follows :—

"Will the construction and working of the Kannambadi dam necessarily prevent the passing on to Madras of the quantity of water due to Madras?"

It appears clear that, if the above issue were to be literally construed, the answer must be in the negative, because the mere existence of the dam would not necessarily prevent the passing on to Madras of the quantity of water due to that Presidency, provided that the dam is worked in accordance with the decisions of the arbitration on the issues 2 and 3. At first sight, therefore, it might appear that no argument or inquiry is required with regard to this issue (4).

2. The Madras Representative, however, is instructed to invite attention to the record of the proceedings of the Arbitrator of the 7th August which were as follows :—

"Terms of reference discussed.

"As to the suggested terms of reference [item (4)] it is understood that the term of reference set out above will include a full examination of the project from its engineering aspects, including controlling agency and other matters relevant to the working of the project."

It is submitted that in view of this record it is not possible to answer the fourth issue by a mere negative. It is essential that in connection with this issue full examination should be made of the water supplies, draw-off and details of working of the project for the Mysore reservoir and the engineering considerations, controlling agency and other limitations which should be made conditions of giving assent for carrying out the project. It is presumed that in view of what was laid down by the Arbitrator on the 7th of August this contention cannot be questioned.

3. The Madras Government also contend that it is open to them, under this issue, to show that if the Mysore reservoir is worked in accordance with the findings of the Arbitration Commission under issues 2 and 3, it cannot be successful, that is to say, it cannot be free from liability to frequent failure to irrigate successfully the project areas; and they submit that, if it can be shown that the reservoir will fail to a material extent to irrigate the project areas successfully, the construction of the reservoir should not be permitted.

4. The view has, however, been orally expressed by the Assessor that so long as rules provide for the passing on to Madras the supplies to which they are entitled, the success or failure of the Mysore project is an immaterial consideration in dealing with this issue.

It seems desirable at this stage to ask the Arbitrator to give a definite ruling on this point.

5. If the Arbitrator holds that success or failure is a material consideration, Madras propose to prepare working tables to show the conditions of working in this respect.

6. If, however, the Arbitrator has doubts on the point or his views are that the point is immaterial, Madras ask that he will consider their further representation on the point and then give a definite ruling before proceeding further.

W. M. ELLIS, Col., R.E.,
Madras Representative.

20th April 1914.

Exhibit Ma 29.

Representations of Madras that the working conditions and prospects of Mysore reservoir are material to arbitration.

The fourth issue has been framed by the Arbitrator in such terms as to include the widest scope for examination of the conditions of regulation and working of the project including engineering aspects, controlling agency, and other matters relevant to the working of the project.

In the discussion which took place with reference to the suggested terms of reference put forward by Madras and by Mysore, the Arbitrator stated that he thought that there was too much detail in the terms put forward by both, and that the terms should be framed in such a way as to include the widest scope. When the terms of the fourth issue as finally settled were under discussion, the Arbitrator replied in the affirmative to the enquiry of the Madras Representative as to whether he was correct in understanding that this issue was intended to include examination and settlement of the specific items comprised in the suggested fourth issue put forward by Madras and in the representations of the Madras Government regarding the tentative issues first framed.

2. The terms regarding the fourth issue as suggested by Madras were stated as follows :—

"Does the decision as regards the foregoing and other points covered by the Agreement of 1893 justify the continued refusal of Madras to assent to the construction of the reservoir projected by the Mysore Durbar; and, if not, what rules and restrictions as regards measurement of flow, means to ensure and agency to supervise the passing of supplies to Madras, draw-off and area irrigated and other points should be made conditions of giving assent?"

Before fixing the issues the Arbitrator framed "tentative issues" and invited the representations of both Governments on these before finally fixing the issues. The representation of Madras Government read by the Madras Representative at the meeting of 7th August 1913 as regards the fourth issue ran as follows:—

"Item 4.—The Government of Madras prefer the more specific statement in item (3) of their suggested statement of issues. They are, however, prepared to accept the form suggested with the exception noted below, if they can be assured that they are correct in understanding that the issue as formulated is designed to cover and ensure a full examination of the water-supplies, draw-off and details of working of the project for a reservoir put forward by the Mysore Darbar, and decisions on the engineering considerations, controlling agency and other limitations which should be made conditions of giving assent to the proposed constructions if it is decided that assent should not be withheld.

The Government of Madras object to the last four words of the item."

The assurance asked was given by the Arbitrator and the last four words objected to by Madras were deleted, and the representation of the Government of Madras having been thus fully acceded to, the written statement read by the Madras Representative was not formally put in.

3. The object of the examination of the working conditions is to afford the Arbitrator means of judging whether under the conditions of regulating and impounding, which must be imposed on Mysore in order to fully safeguard Madras, the Mysore reservoir can be successfully worked, that is, whether the prospects of success of the project are reasonably assured.

4. The Madras Government have refused to assent to the proposed construction partly on the ground that the Mysore project would be subject to frequent minor failures and occasional serious failures, if the water required to fully ensure Madras were passed down to Madras through the Mysore reservoir.

The conditions and situation of the Mysore reservoir are such as to make it possible to lessen or altogether avert failures by omission to pass to Madras the full quantities of water to which they are entitled.

5. The Madras Government have no desire to hinder in any way legitimate expansion of irrigation by Mysore, and have actually assented to the construction of a reservoir on the Cauvery, and extension of irrigation within named limits, because, subject to restrictions as regards impounding which would safeguard the existing Madras rights, the prospects of success of such a project are well assured.

In the case of the larger reservoir project now under consideration, this is believed not to be the case, and that this project can only successfully pass in bad years the supplies for Mysore irrigation and power which constitute the project scheme of working if the supplies to which Madras have title are encroached upon and utilised for Mysore irrigation.

6. The state of affairs may be described in general terms as follows:—

The Mysore reservoir dam is proposed to be built across the Cauvery at a place which intercepts a large proportion of the water giving supply to existing Madras irrigation.

For the supply of this irrigation Madras has prior right to all natural flow up to a certain stage of flow, while any excess flow over this may legitimately be retained and impounded in Mysore reservoir and used for the supply of any irrigation in Mysore dependent, directly or indirectly, on the new reservoir.

The whole of the supplies of the river from above the dam site, to which Madras are entitled, must pass through the Mysore reservoir, and these supplies are dependent on the regulation of the water and issues through the dam sluices. If the conditions of working, as examined on the best available data in the form of working tables for a considerable series of years, show that, under such regulation as will give to Madras the supplies to which they are entitled, the Mysore reservoir can successfully and without serious failure supply the water to the new irrigation in Mysore which is required under the proposals constituting the project, the scheme would appear feasible and, so far as reasonable forecast can determine, would have assurance of being successfully operated. To such a project Madras has no opposition to offer. If, however, the working tables show that there is liability to occasional disastrous failure, and frequent minor failures occur, unless the supplies to which Madras is entitled are intercepted, then it is submitted that the Madras interests will be exposed to grave danger.

7. It is believed that the Mysore Darbar is not fully advised of the real prospects of this project which Madras believe to be most unfavourable.

There is good reason to believe that the Darbar's Engineers had not (up to the time of the arbitration commencing) prepared tables based on daily discharges past the dam site, which basis is the only one on which an accurate forecast of working conditions can be made, for in reply to a request for a statement of daily observed or computed flow past Kannambadi, the Mysore Representative stated that no such information is forthcoming and that only half-monthly flow has been computed. As working conditions must be regulated on a basis of daily (or more frequently measured) incidence of natural flow, it is obvious that this statement involves the admission that no working tables based on daily incidence of flow were prepared prior to the sitting of the Arbitration Committee.

8. It might be urged that the failure or success of Mysore project is not a matter with which Madras has concern. If the success or failure of any year were inevitable and beyond control this would be so, but when failure is altogether due to passing down to Madras water which might be impounded and run on to Mysore fields, the case assumes an altogether different aspect. Add to this, the belief which nothing will eradicate, of all the local population probably including the subordinates operating the sluices, that the water is passed to Madras through an unjust exercise of power by the Supreme Government and a critical condition of affairs is at once established. Picture the conditions of affairs when the Mysore fields are withering from want of water while large supplies, possibly full supplies, are being passed down to Madras. Consider that the operating staff are probably in sympathy with the suffering ryots and convinced that great injustice is being perpetrated in favour of Madras; realise further that this staff is likely to be subjected to great temptation to tamper with regulation in favour of the local authorities; consider also that control and regulation is to be effected by the manipulation of a large number of sluice gates twice, or oftener in each 24 hours, that a small alteration in the adjustment of these sluices may, under certain conditions, make very material difference in the water passed and it cannot but be recognised that without for a moment questioning the *bona fides* of the Mysore Government or their superior officers that there are grave risks to Madras interests involved whenever short supplies are being passed to Mysore ryots.

Consider further that by occasionally altering for a few hours at night the regulation of the sluices considerable extra supplies could be passed to Mysore ryots by connivance of the subordinate staff, while the risk of discovering of such proceeding is likely to be small.

9. Realise again that faulty regulation by not carrying out exactly orders as to the amount of opening of sluices is easy to effect, involves no risk and will probably not be detected if the controlling officers are other than *very* vigilant and *always* vigilant. Under the circumstances, can any one say that Madras is not subject to risk, and risk of a grave nature, on occasions when the Mysore lands are suffering badly from want of water? The risk is intensified in proportion as this condition is more or less frequent.

10. Even if the examination of working conditions showed that the Mysore project could be worked successfully within the limits of "draw-off" proposed, Madras would still be subjected to some risk, on account of the very natural sympathies of the local staff with the local ryots and cultivators in whose neighbourhood they live and tending towards taking minor advantages in favour of Mysore. Under conditions involving failure of supply, the risk always present becomes immensely intensified.

11. The refusal of assent of Madras to a project on the lines drawn up by Mysore, if such a project is shown to have no reasonable prospect of success, is thus "for protection of the prescriptive rights of Madras already acquired and actually existing."

12. The Government of Madras urge most strongly that the risk to their rights under conditions involving frequent minor, and occasional serious, failure to give adequate supplies to Mysore irrigation will be real and that Government represent that they are justified under such circumstances in refusing assent to the scheme.

In making this representation, the Government of Madras wish to be distinctly understood that they do not question the absolute *bona fides* of the Mysore Government in the matter and here state that similar opposition would be made to a similar project by Bombay, Bengal or any other Government.

13. It is represented that it is to just such a case as the present that the Agreement of Mysore and Madras has reference.

14. The implied intention of the Agreement is that Madras are justified in refusing assent to any reservoir project of Mysore which cannot be shown to have well assured prospects of success when accompanied with such restrictions on impounding as will fully safeguard Madras existing rights. Failing this intention, it is asked why is the power of refusal of assent given to Madras? It is clear that the construction of such a reservoir by itself unless coupled with the intention of impounding or diverting water cannot injure Madras and yet it is the construction, and not merely the regulation for impounding which is under the Agreement with Mysore, subject to veto by Madras. Were the considerations of the practical working conditions of any project intended to be eliminated, the Agreement would only have given the power of refusal of assent to the system and rules of regulation and left Mysore free to construct, subject to approved rules, any reservoir on however unsound a basis as regards prospect of material success.

15. Again, once it is admitted that the prospects of the Mysore project are far from well assured, this undoubtedly greatly increases the risk of injury to Madras while it diminishes, and indeed altogether removes, any reasonable cause of grievance from Mysore State.

It certainly is not the intention of Mysore Darbar to launch out into vast unproductive expenditure on such a project, and while refusal of assent to a project, of which success is well assured, on the ground of the ever present risk to Madras interests would entail a legitimate grievance, refusal of assent to an unsound project on such a ground cannot but be a benefit to both States.

16. It is not reasonable to suppose that the officers who are responsible for drawing up this project admit that its prospects are anything but assured, and it is believed that the Darbar

believe them to be so relying on the assurances of their Engineers; but contrary to the usual custom in the case of large Engineering projects of such a nature the project has not been subjected to criticism, or expert examination by any high authority, other than that of the officer responsible for drawing it up.

Every Engineer is likely to be unconsciously prejudiced in favour of his own projects and in the case of large irrigation projects the extent to which such bias may carry the most careful conscientious and able Engineers is a matter of common knowledge. In the Madras Presidency the necessity for submitting large projects for independent scrutiny has undoubtedly saved the unproductive expenditure of very large sums, and it is strange if conditions are very different in Mysore. This project is believed by the Mysore Government to have assured prospects of success, on the authority of the reports of the officers who prepared it, and these officers have certainly taken most optimistic views on flimsy evidence on vital points (*e.g.*, amount of yield of catchments, amount of silt deposited, effect of underdrains in removal of silt).

Under the circumstances, it is no wonder that the Mysore Darbar, believing that their proposals are altogether sound, should look on Madras opposition as unjustifiable and based on extravagant claims.

The fullest examination of the Mysore project water-supplies is pressed for and it is urged that assent should only be given to a project which has good prospect of success, after allowing for passing on whatever supplies of water are judged to be required to fully safeguard Madras.

17. Throughout the controversy preceding this arbitration the attitude of the Government of Madras in regard to the Mysore project has been the examination of the prospects of successful operation of the project, under such condition as involved passing to Madras of the water to which it was claimed Madras had prior right and under the assumption that success was an essential to procure Madras consent.

It was clear from the first that if successful operation of the Mysore project were not a consideration, this view was untenable, but the natural attitude was taken up that it was within the rights of Madras to refuse assent to any project proposed by Mysore which could only be successful if the supplies to which Madras had right were diverted from Madras to the use of Mysore.

This attitude has from the first been fully accepted by the Government of India and is a reasonable and logical one. It may be conceded that the information as regards supplies due to Madras, which were available for examination by Sir John Benton, was incomplete and that some of the figures were inaccurate, and that this may, as represented in the Assessor's examination of evidence, have affected his opinion on the matter of supplies due to Madras; but on the final issue as to whether Madras were justified in refusal of assent on the ground of failure of Mysore reservoir as demonstrated in the working tables this uncertainty does not operate. Not only did Sir John Benton take the view that failure of the Mysore project as regards prospect of well-secured success justified the Madras refusal, but the Government of India fully supported that opinion and recommended to that Government the enlargement of their proposed reservoir with a view of securing such assurance of success (*vide* Ma. 8, page 32, letter from the Deputy Secretary to the Government of India to Resident, Mysore, No. 1315 I.B. of 20th June 1911, page 62, letter No. 1824-I.B. of 25th August 1911).

be as: It is thus clear that in the opinion of the Government of India successful operation was to Government essential feature of Mysore project and that failure in this respect justified the Madras Government's action.

This has been throughout and is still the view of the Government of Madras.

argu18. To sum up, the Government of Madras represent, in consideration of all the above and elements, that if the working prospects of Mysore project are such as to indicate frequent minor involuational serious failure, the project cannot be operated except under conditions of regulation they ing to Madras rights constantly recurring risks and that in the protection of such rights condit are under the circumstances justified in refusing their assent and that the working propositions of the reservoir as regards prospects of material success in irrigating the areas ed, is a very material consideration in regard to the finding on the fourth issue.

W. M. ELLIS, Col., R.E.,
Madras Representative.

20th April 1914.

Exhibit Ma. 30.

Representation regarding the Arbitrator's finding and award on the issue 3 (a).

In the Arbitrator's finding and award on issue 3 (a)*, it is stated that the fourth or modified Madras system was proposed by Mysore "as an alternative in the event of their own system not being adopted."

* Page 3, lines 1 and 2.

2. The Government of Madras instruct me to represent that the Mysore Darbar proposed this system as a free and equal alternative to the adoption of the Mysore system and that the words "in the event of their own system not being adopted" convey that Mysore proposed that the modified Madras system for adoption only in the event of the Mysore system not being found acceptable.

This is not the case as the two systems were advanced by Mysore as acceptable alternatives without any such qualification.

3. The Government of Madras instruct me to request that the record may be so amended as to make this point which they regard as a very important one, free from any ambiguity or possibility of misunderstanding.

22nd April 1914.

W. M. ELLIS, Col., R.E.,
Madras Representative.

Exhibit Ma. 30-a.

Reference to paragraphs regarding the modified Madras system.

The offer of Mysore expressing willingness to accept the "modified Madras system" was made in My. 22, paragraphs 16, 17 and 37 (3). In the latter Mysore urge that "one of the three alternatives noted below may be finally accepted."

2. In Ma. 27, paragraph 13, the Madras Government state that, if the Arbitrator is unable to accept the third system, they elect in alternative to accept the offer of the modified Madras system with any proportion factors which may be fixed by the Arbitrator adding that the latter have already been dealt with in Ma. 25—this last should be Ma. 26, paragraphs 1 to 14.

3. It is represented that neither when the offer was made nor when Madras accepted this offer as an alternative in default of award of the third system did Mysore make any condition, reservation or qualification with regard to acceptance of this system.

22nd April 1914.

W. M. ELLIS, Col., R.E.,
Madras Representative.

To

The Arbitrator,

Mysore-Madras Cauvery Arbitration.

SIR,

I forward above as requested references to the material paragraphs and matter on which Madras base their statements put forward in Ma. 30 of 22nd April 1914.

I have the honour to be,

Sir,

Your most obedient servant,

22nd April 1914.

W. M. ELLIS, Col., R.E.

Exhibit Ma. 31.

Note on Duties Mysore Reservoir.

When the Mysore representative puts in his statement of "draw-off" proposed for the working tables My. 19 (a) it was stated on behalf of Madras that for the purpose of the third issue these "draw-offs" would be adopted for preparing working tables, but that Madras would have a representation to make on this subject with regard to the further issue to be decided.

2. The object of making working tables for the purpose of the fourth issue is to enable as accurate a forecast as possible to be made of the prospects of the Mysore project as regards success or failure and of the probable number of occasions in which the full supplies required for the areas to be irrigated under the project will be deficient and the probable extent of such deficiencies.

3. It is obvious that unless the "draw-offs" allowed in these tables are adequate and suitable for the irrigation of the areas which constitute the project proposals, the tables will become not only useless, but fallacious and misleading as they will present an altogether inaccurate forecast of the future prospects of the project.

4. The area which is to be irrigated under the Mysore (Kannambadi) project now the subject of this Arbitration is 150,000 acres (page 4, paragraph 20) and this area is sub-divided into—
120,000 acres monsoon crop }
80,000 acres perennial crop } page 31, note to statement (ii).

The "draw-off" proposed by Mysore for perennial crop and monsoon crop as given in My. 19 (a) is tabulated in the attached statement "X" for the different classes of years named in My. 19 (a).

5. Referring to the statement it will be seen that the normal duty in acres per cusec for the perennial crop is 59 acres per cusec day by day throughout the year.

In criticising this figure, it is represented that it is too small a duty to allow of the supply of the perennial crop during the dry months from February to June.

During such time the canals and channels will be carrying much smaller supplies than they are designed to carry with consequent waste, and in addition the rainless season and extreme heat entail great losses. On the other hand, it is considered that the duty is unnecessarily low for the rainy months of September and October and also probably for the months of July, August and November.

Taken as an all round allowance, the Government of Madras consider that it is reasonable and may be accepted as adequate so far as regards the "A" scale of duties.

6. With regard to the duties allowed for the monsoon crop the same cannot be said. The scale of duties allowed are altogether too high to give any prospect whatever of successful realisation and are far higher than any realised in Madras even in the modern systems in Kistna and Godavari deltas in which most of the area irrigated is of an almost impervious nature and the rainfall is materially higher and the air more charged with moisture than in the inland tracts in which the Mysore area is situated.

7. In making the above and the following remarks reference is only made to "A" scale of duties, that is to the Mysore proposed full supplies. These are very inadequate and this being so, the other scales cannot secure the area of crops proposed to be irrigated and in its application must result in deficiencies in area and outturn of crop according to the amount of the deficiency of supply.

8. Below is given a table showing (columns 1 to 4) half-monthly the Mysore "A" scale of supplies and duties for monsoon crop with the equivalent depths in inches on the area and also two-thirds of the average rainfall in the area to be irrigated. (Krishnarajpet has been taken as the representation station for rainfall.)

9. The same table shows (columns 6 and 7) the lowest duties which, in the opinion of the Madras Government, are safe to apply for the purpose of working tables for the monsoon crop.

10. It is submitted that it is for the Arbitration Committee to decide what under all considerations of the conditions of the Mysore project are to be the duties to be adopted for truly representing the prospects of the Mysore project in preparing working tables.

11. Table of duties—Monsoon crop—

Months.	Duties A scale My-19 (a).				Duties suggested by Madras.		
	Duty acres per cusec.	Equivalent depth in inches.	Two-thirds average rainfall (Krishnarajpet).	Total columns 3 and 4.	Duty acres per cusec.	Equivalent depth in inches.	Total depth columns 6 plus column 7
1	2	3	4	5	6	7	8
June, 2nd half	100	3.6	0.28	4.48	60	6.0	6.88
July, 1st half	100	3.6	0.66	4.26	60	6.0	6.66
July, 2nd "	100	3.85	0.66	4.51	60	6.0	6.66
August, 1st "	100	3.6	0.72	4.32	60	6.0	6.66
August, 2nd "	100	3.85	0.72	4.57	60	6.0	6.72
September, 1st "	100	3.6	2.01	5.61	70	6.2	7.21
September, 2nd "	100	3.6	2.01	5.61	70	6.2	7.21
October, 1st "	100	3.85	2.23	6.08	75	6.8	7.03
October, 2nd "	100	3.85	2.23	6.08	75	6.8	7.03
November, 1st "	100	3.6	0.72	4.32	75	6.8	6.87
November, 2nd "	100	3.6	0.72	4.32	75	6.8	6.87
December, 1st "	150	3.6	0.08	3.68	100	3.6	3.68
December, 2nd "	150	3.6	0.08	3.68	100	3.6	3.68
January, 1st half	200	1.8	0.04	1.84	120	2.4	2.44
Total ..	..	67.15	12.75	80.90	..	70.4	84.15

12. In considering this matter, it is most material to enquire what is the present general practice in Mysore as regards duties allowed for irrigation of rice crops under tanks. As regards this tank irrigation there is in Mysore a well-established and definite duty allowed for irrigating one acre of paddy and so generally is this quantity recognised that it is known as "a Mysore unit" and quantities of water are worked out in

"Mysore units" in the practice of the Mysore irrigation officers. A "Mysore unit" is the water required to be stored to irrigate one acre and amounts to a depth of 72 inches (6 feet) approximately 260,000 cubic feet.

13. It is to be recognised that the soil of Mysore in the tract to be irrigated is of a porous nature while the rainfall is scanty and precarious; the tract is fairly typical of the conditions generally obtainable throughout the "Maidan" project of Mysore and fairly typical of the conditions to which the "Mysore unit" is applicable.

14. It is now to be considered in what respect the conditions of the project irrigation will differ from the ordinary tank irrigation to which the Mysore unit is applied in ordinary practice as the recognised duty basis for one acre.

The differences are these—

The unit includes ordinary allowances for percolation and evaporation in tanks, while separate allowance is made for this in the Mysore project tables. On the other hand the area to be irrigated under the tanks is in the immediate vicinity of the tank and the carrying water many miles through canals and distributary channels running in porous soil through an arid country is not required in the case of the tank systems, but it will be in the Mysore project system. Further the areas irrigated under tanks are all concentrated and are generally low-lying lands on the margins of the streams across which the tank bund is constructed. These lands are of richer and less porous soil than the average of the lands to be irrigated under the large project. Also it is part of the project design to scatter the irrigation and only irrigate one-fourth of the area which is commanded and irrigable and by so doing to avoid the danger of water logging and the malaria resulting in other parts of Mysore from intensive irrigation (Mysore project page 7, paragraph 88).

This entails much expenditure of water and involves low duty figures.

Again the tanks raise their crops in five and a half months, whereas under the project paddy taking water for seven months is proposed and this entails extra water per acre than the five and a half months' crop.

15. It is material to bring to notice the allowances made by Captain Dawes for the monsoon rice crop under the first Kannambadi project (Part I, page 18 of Captain Dawes report).

He says "the total quantity of water which I have allowed for irrigation is as follows—

For rice one and half units.

For dry crops half unit.

The unit of this state is the amount of water required to cover an acre to a depth of six feet (viz., 72 inches) and is nearly 260,000 cubic feet."

16. Captain Dawes evidently recognised that there were conditions entailing great wastage inherent in the scheme, but he probably over-estimated the amount of this wastage. The scheme involves great losses through the net work of channels and the large area of very porous soil in a very dry country to which the irrigation is to be applied. It is believed that the lowest reasonable forecast of possible irrigating duty of water under the Mysore scheme will be found in the basis of the duty figures amounting to one "Mysore unit" for each acre to be irrigated.

This estimate is made setting off the losses from percolation, etc., on the one side against the porous soil scattered irrigation and long period of water-supply on the other.

17. The "Mysore unit" is the basis of the duty figures put forward by Madras which totals to 70.4 inches against 72 inches the standard of the Mysore unit and it is put forward as the absolute minimum on which reliance can be placed for forecasting the working of the project. The incidence of half monthly duties proposed varies with the requirements of the crop and the seasonal rainfall and the table shows the distribution suggested.

18. The duties proposed are as low as are at all likely to be realised in a well-designed modern system in the soil and under the conditions of this project.

They are believed to be higher than have been hitherto realised in any upland system in Southern India. In the Kistna and Godavari deltas in which the soil is mostly of an impervious nature (black soil) the country flat and the rainfall materially greater than the Mysore area the standard allowance on which canals and distributaries are designed is a duty of 70 acres per cusec for transplanation time and an ordinary duty of 90 acres per cusec.

It is submitted that examination of the matter will support the table of duties now put forward for consideration and decision of the Arbitration Committee.

W. M. ELLIS, Col., B.E.,
Madras Representative.

14th April 1914.

ENCLOSURE.

Mysore proposed duties.

STATEMENT of duties and discharge per second during a year for monsoon (120,000 acres)
and perennial crops 30,000 acres as per My. 19 a.

Case or classification.	A		B		C		D	
	Monsoon.		Perennial.		Monsoon.		Perennial.	
	Acres per sec.	Flow in cu. sec.	Acres per sec.	Flow in cu. sec.	Acres per sec.	Flow in cu. sec.	Acres per sec.	Flow in cu. sec.
Month.	1	2	3	4	5	6	7	8
June 1	100	1,182	59	509	100	1,182	59	509
" II	100	1,182	59	509	100	1,182	59	509
July to September	100	1,182	59	509	100	1,182	59	509
October	100	1,182	59	509	100	1,182	59	509
November	100	1,182	59	509	100	1,182	59	509
December	150	799	59	509	200	602	59	509
January I	200	602	59	509	300	393	59	509
" II	200	602	59	509	300	393	59	509
February	..	..	59	509	..	..	59	509
March	..	..	59	509	..	..	59	509
April	..	..	59	509	..	..	59	509
May	..	..	59	509	..	..	59	509

Case or classification.	E		F		G		H	
	Monsoon.		Perennial.		Monsoon.		Perennial.	
	Acres per sec.	Flow in cu. sec.	Acres per sec.	Flow in cu. sec.	Acres per sec.	Flow in cu. sec.	Acres per sec.	Flow in cu. sec.
Month.	18	19	20	21	22	23	24	25
June 1	..	..	59	509	..	..	59	509
" II	100	1,182	59	509	100	1,182	59	509
July to September	100	1,182	59	509	100	1,182	59	509
October	100	1,182	59	509	100	1,182	59	509
November	200	602	59	509	200	602	59	509
December	300	393	59	509	300	393	59	509
January I	400	301	118	255	400	301	118	255
" II	..	..	118	255	..	..	118	255
February	..	..	59	509	..	..	59	509
March	..	..	59	509	..	..	59	509
April	..	..	59	509	..	..	59	509
May	..	..	59	509	..	..	59	509

Exhibit Ma. 32.

Madras Reply to Mysore Note of 26th April 1914.

The Government of Madras consider it unnecessary to reply at length to the Mysore note of the 26th April 1914. With reference to the Mysore argument that because the Madras written statement read on the 7th August last was not formally filed and included in the proceedings, therefore the questions therein raised are not relevant to the fourth issue, the Madras Government would only invite attention once more to the express statement by the Arbitrator in the Proceedings of the 7th August that "it is understood that the fourth term of reference set out above will include a full examination of the project from its engineering aspects, including controlling agency and other matters relevant to the working of the project." Madras did not file their

written statement, because the Arbitrator accepted their contention and expressly recorded that the fourth term of reference would include these points which Madras now wish to be examined and the Mysore attempt now to exclude those points is obviously untenable.

2. The only other point on which Madras wish to reply is as regards the Marikanave reservoir. The conditions of that work differ fundamentally from the present case, as in the Marikanave reservoir there are no deep sluices in the dam capable of passing large quantities of water down to Madras and no arrangements have been come to for passing on any water to that Presidency. The Madras Government agreed to the construction of the Marikanave reservoir, because they recognised that the water intercepted by it could not injure Madras irrigation, no matter how the reservoir was worked.

In the case of the Marikanave reservoir there was never any question of passing on a flow to Madras and the reservoir is one which, on the forecast, was expected only to fill rarely and which has so far never surplused or passed to Madras any water at all.

3. Under these circumstances, it is submitted that Mysore paragraphs 7 and 8 are due to misconception and that the case of the Marikanave reservoir is not in any way parallel or analogous to that of the Kannambadi reservoir.

4. The Government of Madras, while not admitting the other contentions advanced by Mysore, do not consider it necessary to reply to them, but maintain their previous views and leave the matter to the consideration of Arbitrator.

W. M. ELLIS, Col., R.E.,
Madras Representative.

29th April 1914.

Exhibit Ma. 33.

Representations by the Madras Representative regarding the award on Issue 3 (a).

1. It is represented that under the rulings given as to the application of the award on the third issue to actual practice some alteration is called for in the terms of the last thirteen lines of the award commencing "Impounding in the south-west monsoon"

2. The following appears to be the award as stated in the above thirteen lines:—

AWARD.

In the south-west monsoon.

(a) Impounding should be allowed to commence under standard table I if at any time during the preceding four days the Cauvery dam gauge had exceeded 6 feet.

(b) If at any time during the preceding four days the Cauvery dam gauge had not exceeded 6 feet impounding should be restricted to standard table II until the Kannambadi inflow reaches the equivalent value in cubic feet per second corresponding to 1,330 millions cubic feet in twenty-four hours when this standard should be continued a further twelve hours.

(c) Hereafter impounding should continue under standard table I.

It appears to me that (c) above requires revision some what as under:—

(c) Hereafter impounding should continue under standard table I until the flow at Cauvery dam has not exceeded 6 feet in any of the four preceding days when a change should be made to standard table II. This is subject to the proviso that when under the operation of the above rules standard table I is introduced, it shall remain in operation for a minimum period of twelve hours.

W. M. ELLIS, Col., R.E.,
Madras Representative.

29th April 1914.

ENCLOSURE.

Demi-official—from the Hon'ble Col. W. M. ELLIS, R.E., Madras Representative.

To—M. NETHERSOLE, Esq., Assessor, Mysore-Madras Cauvery Arbitration.

Dated—the 28th April 1914.

I enclose a sample of the application of tables I and II in June 1906 as I read your answers to my queries on the award and I would be glad if you would let me know whether my interpretation is correct as there are several similar cases.

I may note that there is no proviso that table I shall remain in force for twelve hours as in the case of table II which, however, is probably intended and is so shown in our example.

June 1896.

Flow at Kannambadi. M.C.FT.	Gauge at Cauvery dam on same day. FEET.	Regulation.
162	1.9	
150	2.1	
626	4.0	
821	3.8	
1,971	3.8	Table II twelve hours.
5,957	3.8	" I do.
9,192	4.1	" II do.
6,053	7.4	" I do.
10,582	9.7	" I do.

Note.—Commencement of impounding under table II and change from table I to table II is made under I (a), change to table I is made under II (ii).

Reply.

Yes; this is correct.

M. NETHERSOLE,
Assessor.

23rd April 1914.

No. 227-Arb., dated 23rd April 1914.

Copy forwarded to the Mysore Representative, Mysore-Madras Cauvery Arbitration Committee, for information.

W. M. ELLIS, Col., R.E.,
Madras Representative.

Exhibit Ma. 34.

Representation by the Madras Representative.

Throughout these proceedings the south-west monsoon has been taken to be the months of June to September inclusive and the north-east monsoon October to January. When therefore the award gives rules for impounding during the south-west monsoon in the Mysore reservoir the period embraced by the award is from 1st June to 30th September inclusive.

W. M. ELLIS, Col., R.E.,
Madras Representative.

1st May 1914.

Exhibit Ma. 35.

Statement of case by the Government of Madras regarding Issues 3 (b) and 4, Mysore Madras Cauvery Arbitration.

PRELIMINARY REMARKS.

The issues still to be adjudicated on are issues 3 (b) and 4.

These have reference to:—

Issue 3 (b).—The rules of regulation and the currency of the tentative period as regard sluices and also whether the rules should be tentative for a certain period and if so, for how long.

Issue 4.—This issue comprises the consideration of and examination of the working conditions of the reservoir, the methods of operation, measurements and control of water and of giving effect to the rules of regulation. This includes examination of engineering details such as nature of sluices, measuring and controlling arrangements, controlling staff and generally the practical and material means by which the rules are in practice to be given effect to.

2. It is clear that the consideration under Issues 3 (b) and 4 are interdependent, as without a clear conception of the conditions of practical working, it is not possible to consider rules of regulation. In this statement, the several subjects, viz.—

(1) Rules of Regulation;

(2) Duration of tentative period;

(3) Operation and engineering details of the reservoir and the controlling agency;

are dealt with, as far as possible, *seriatim*; but as they unavoidably overlap, the matters in question should be considered as a whole, and it should be recognised that the control and engineering and regulation details of the reservoir are relevant to and have a bearing on the rules of regulation, methods of measurement, etc., and *vice versa*.

(1) RULES OF REGULATION.

3. Subject to this reservation, the Government of Madras suggest as suitable the following rules of regulation:—

Draft Rules of Regulation.

I. The operation and carrying out of the Rules of Regulation shall be the duty of a controlling officer and of a subordinate staff working under his control.

II. The water to be passed down the river from the dam must be passed through the scouring sluices of the dam or over the surplus weir or partly through one and partly over the other at the discretion of the controlling officer who will, however, exercise such discretion in general accordance with the instructions of the Mysore Government.

III. (a) The quantity of water to be passed to Madras will be computed every twelve hours from the records of inflow into the reservoir of the previous twelve hours and the record of gauge-readings at the Cauvery dam of the previous four days and computed under the operation of the terms of the award as finally confirmed.

The inflow into the reservoir to be the totals of the actual measured flow of the Cauvery, Hemavati and Lakshmanathirtha rivers plus the unmeasured inflow into the reservoir from the catchment between the three places of measurement and the Kannambadi dam. The allowance for this inflow to be computed as may be determined by the Government of India subject to the proviso in paragraph 4 below.

To the computed inflow into the reservoir the quantity of water required to supply any extensions of irrigation in excess of 8,000 acres above the area now irrigated by channels taking off above the places of measurement shall be added to arrive at the natural flow for purpose of computing the amount of water due to Madras.

(b) To arrive at the quantity of water to be passed through or over the reservoir dam, to the quantity of water to be passed to Madras computed under (a) above must be added any quantity of water required for the supply of any extension or change in character of irrigation under the Cauvery channels taking off below the reservoir in excess of the quantity required for the area and nature of irrigation now cultivated.

(c) The duty allowance to be made in cases (a) and (b) above should be those now actually realised in cultivation of similar irrigation under existing Mysore channels less 10 per cent. allowance for improvements due to the more modern character of the extended or new distribution arrangements.

These duties to be ascertained by actual measurement.

IV. The quantities of water passing through sluices and the regulation orders for the sluice shutters shall be computed by the application of ordinary sluice discharge formula $D = CA\sqrt{2gh}$.

The quantities of water actually being passed down will be verified from a gauging station, with a self-recording level and discharge recording instrument which will be installed between the dam and the Chick Devaray Sagar anicut. The discharges over this anicut which are deduced from gauge-readings may also be used as a check of this quantity.

V. The minor variations, deficits or excesses in quantity due to Madras which may be displayed by the record of each period between regulation to be allowed for in the next period of regulation.

VI. All regulation calculations and computations to be recorded in a register called the "Regulation register" and the orders for regulation which results from the computations to be also recorded under the signature of the controlling officer and a copy of such calculations and orders, with record of daily inflow and gauge-readings, to be mailed daily by the controlling officer to each Government.

The amount of inflow and issue daily from the reservoir to be wired daily to each Government.

VII. Under ordinary conditions regulation of sluices will take place twice daily, between 6 A.M. and 7 A.M. and between 6 P.M. and 7 P.M. and the controlling officer shall personally satisfy himself when the sluices are finally adjusted that the regulation has been accurately carried out in accordance with recorded orders and certify that he has done so in the "Regulation

register." Under extraordinary circumstances only shall sluices be manipulated other than at twelve hours intervals and in such case full information regarding the reasons and necessity for this and the nature of the intermediate regulation should be communicated by the controlling officer to each Government.

VIII. The controlling officer shall give every facility for inspection of his books, calculations, records of regulation, and actual methods of regulation, and gauge-reading, and discharge recording, etc., to any officer of either Government appointed and authorised by that Government to make inquiry and inspection on their behalf. The controlling officer and duly accredited inspecting officers shall have full use of telephones, telegraphs or other means of communication installed in connection with the works.

IX. The "draw-off" for all new irrigation whether under canals taking off direct from the reservoir or under existing or new channels taking off below the reservoir shall except when the reservoir is surplusing, be restricted within reasonable limits to the quantities advanced by Mysore as their proposed draw-offs for the purpose of examining the working conditions of their project (My. 25 and 27) and the daily draw off shall be measured and recorded by the controlling officer. The controlling officer shall give effect to any instructions as regards draw-off day by day which may be conveyed to him by the authorised Mysore officers, but the Government of Mysore shall be responsible that the total seasonal "draw-off" for the monsoon period (16th June to 15th January) and the dry weather period (16th January to 15th June) is restricted within the total limits referred to.

X. That these rules shall be subject to alteration and amendment from time to time as may be found desirable under the conditions and limitations described in paragraph 8 below.

4. The proviso suggested as regards the allowance for inflow of the catchment below the three places of measurement is that if either party are not satisfied with the allowances made, it shall be open to them to establish at their own cost on any of the streams falling into the reservoir below the three gauging sites further gauging stations for the purpose of actually measuring the daily inflow and to claim that such measurement shall be substituted for the computed allowance of the catchment so measured.

5. Referring to the last clause of the proposed rule III (a) relating to new irrigation taking off above the places of measurement of inflow into the reservoir a few words are called for. Under existing conditions the area of irrigation under the Mysore-Cauvery channels has reached the limit of reasonably secured cultivation under the incidence of natural flow apart from storage and cannot be extended, because such extensions would prejudice and cut off the supply to the channels below. Under the conditions introduced by the construction of the Kannambadi reservoir the existing irrigation below the reservoir can be secured by issue of water impounded in the reservoir and the supply to that irrigation being thus secured by the reservoir, it would be practicable for Mysore to extend irrigation under the upper channels up to the limit of the existing irrigation below the reservoir. It will be thus seen that any extension of the upper irrigation is really secured by and supplied through the instrumentality of the reservoir.

As the flow to supply such upper irrigation must be obtained by drawing off from the "natural flow" of the river, allowance for this must equitably be made in the computation of "inflow" into the reservoir which should be based on natural flow as it would be without such "draw-off" and not on what that flow is reduced to through the draw-off required to supply the draw extensions of upper irrigation such extensions being only rendered possible, as above shown, by the construction of the reservoir.

The construction of the reservoir involves submerging and throwing out of cultivation an area of 8,000 acres now irrigated under the Cauvery and to this extent the extension of cultivation above the points of measurement will only restore the existing state of affairs and thus no allowance for extending up to this area is due.

Mysore have admitted that they now propose to extend irrigation from channels taking off from the Kannambadi reservoir to an extent of 20,000 acres and it will be obvious that the interests of Madras require consideration and protection in this matter and that unrestricted extension cannot but imperil rights of Madras.

As regards rule IX above, if the final finding and award is to the effect that success or failure of Mysore project is in no way material to the protection of Madras rights the reason for this rule will disappear.

Some such rule restricting draw-off of Mysore is however essential under a finding which recognises that in considering the protection of Madras rights the extent of success or failure of Mysore project is a material consideration. The Madras and Mysore arguments on this matter have already been put in Ma. 28, 29 and 32 and My. 28, but the finding of the Arbitrator on the matter has not been given.

(2) DURATION OF TENTATIVE PERIOD.

7. As regards the question:—

"Whether the rules as first formulated should be tentative and, if so, for what period and to what extent?"

It is represented that the award on issue 3 (a) has enunciated the principles of regulation and also has fixed tentatively the "proportion factors" and "percentage factors for transmission losses" the former being:—

South-west monsoon, June to September	...	...	...	...	625
North-east monsoon, October to January	...	...	...	...	30

and the percentage taken on the flow at Kannambadi which is:—

					Per cent.
South-west monsoon	...	...	...	...	20
North-east	...	...	...	...	17

The above proportions and percentages are under the terms of the award to be tentative and thus the conditions of working of rule III would to this extent be tentative.

8. As regards actual Rules of Regulation, there is no reason why these, apart from the above, should be tentative in so far as general directions are concerned; on the other hand, it is recognised that absolute finality or infallibility cannot be looked for in human affairs, and that moreover, application of rules made years before a work is complete and intended to control the operation of such work after completion, is sure in some matters of detail to be found inconvenient or even unworkable.

It is therefore represented that whenever the application of rules is admitted by both parties to involve such inconvenience as to render change desirable:—

(a) the rules may be altered first tentatively for one year or two years by agreement of both parties or in default of agreement under the decision of the Government of India after hearing both parties.

(b) at the end of such period the amended rules may be confirmed similarly either by consent of both parties or if only one party wishes confirmation under the orders of the Government of India after hearing both parties.

(c) This proviso regarding rules, apart from proportion and percentages, to have unrestricted application as regards time.

9. As regards proportion and percentage factors it is desirable to fix factors and proportions as early as possible.

In considering how long the factors must be tentative before final decision on this point is made, it is desirable to pass in review the available reliable and relevant information.

10. First as regards the discharge at Kannambadi.—We have the daily yield of the most important part of this catchment in the form of daily gauge-readings at Chamraj anicut on the Cauvery since 1896 and at Sriramadivar anicut on the Hemavati since 1893. It is desirable to verify the discharges of these anicuts arrived at by calculation, by means of velocity observations and gaugings and the verification of results and any necessary corrections can be carried out within the next three or four years.

There would then be available daily discharges of both the Cauvery and Hemavati rivers for upwards of twenty years.

The yield of the Lakshmanathirtha and the yield of the plains (maidan) catchment below the anicuts and above Kannambadi has however never been observed nor any gauge-readings bearing on this taken up to 1913. It is considered that four years more observations are required to enable sufficiently reliable proportions to be applied for each half month to the known yield of the Cauvery and the Hemavati to get a reliable estimate of the yield of the Lakshmanathirtha.

For the yield of the plains catchment further observations of rainfall and run-off due to this is likely to enable a fair approximate estimate of the yield of this in terms of factors applied to daily rainfalls to be made; this however is likely to be the most doubtful item. Up to the end of July it is not likely to be a very material factor in the totals, but in September and October the yield may prove to be material at any rate in a year of good rainfall.

11. It is submitted that the matter of fixing permanently the tentative factors may be considered after four years' observation.

During these four years daily observations of the yield of the Cauvery at Kannambadi must be made. This may be done anywhere near Kannambadi for the present year, and possibly next year, but after that it must be done above the water-spread of the smaller Kannambadi reservoir by measuring and adding together the inflow on the three rivers.

Daily flow must this year and all succeeding years be taken of the Cauvery below the new dam and above the Chik Devaray Sagar anicut and daily readings of the gauges at the Chik Devaray Sagar and Devaray anicuts are also necessary. The above will give daily discharge below the dam, although after next year natural flow will be subject to some interference by the operation of the smaller reservoir.

12. The discharge of Sivaramudram.—From the year 1902 daily gauge-readings at the anicut built in connection with the power works are available.

From the calibration of the main gauge on this anicut by velocity observations which must be taken this year below Danakere anicut it is anticipated that reasonably accurate daily discharges from 1902 to 1914 will be made available (thirteen years).

The Sivasamudram anicut is to be raised next year and recalibration of gauge after this raising must ensue. At the end of four years however sixteen years' daily discharges at Sivasamudram will be available and this, giving as it will, a measure of the yield of the Kabbani and intermediate catchment between Kannambadi and Sivasamudram, be valuable in considering the matter of "factors" to be fixed.

13. Daily gauge-readings above and below the Halhalli anicut on the Kabbani should be taken during the same period as these are likely to be useful in estimating the yield of the intermediate catchment excluding the Kabbani, as also of the Kabbani itself. Whether velocity observations with a view to calibrating the gauge at this anicut will be necessary or not is a matter which need now be settled, but it is represented that the gauge-readings should be taken as these involve little expense and may prove valuable.

14. *Discharge at the Bhavani bridge over the Cauvery.*—The gauge here has already been calibrated and daily gauge-readings for thirty years are available. The daily gauge-readings will be continued.

15. *Upper Anicut.*—The same remark applies. A self-recording gauge will also be installed here as a check on the daily readings.

16. It will be seen that the doubtful item in the whole problem is the yield of the Lakshmanathirtha and plains (maidan) catchment between the Chamaraja and Sriramadevar anicuts and Kannambadi.

17. If at the end of four years, it is decided by the Government of India, after hearing both parties, that the yield of this catchment is sufficiently well based considering its relative importance, to enable permanent factors to be fixed, these will be fixed after four years at which time there will be available :—

- (a) Daily discharges from 1896 to 1917 (22 years) of the Cauvery and Hemavati.
- (b) Deduced and computed discharges of catchment of Lakshmanathirtha and of the plain catchment above Kannambadi.
- (c) Daily discharges at Sivasamudram from 1902 to 1917 (16 years).
- (d) Daily discharges at Upper Anicut and Bhavani bridge of the whole period.

18. Of the above items (b) is the only one based on assumption and the daily yield of the Lakshmanathirtha from actual observations will be known for five years in 1917.

In view of the minor importance of (b) it is considered that final factors could be fixed by the Government of India in 1917-18.

19. In any case review of the tentative factors should be made in that year and it must be left with the Government of India to decide whether these are to be then finally fixed or merely revised and left subject to further revision.

20. It is to be recognised that a final settlement is desirable as soon as possible in order to set at rest the contention between the two Governments and to enable both parties to know how they stand as regards their rights to the yield of the catchments above the Upper Anicut, all of which are involved in this question of "factors."

21. As regards the selection of suitable gauging stations, methods of gauging, sites for erection of gauges or gauge wells and of self-recording instruments, the matters are professional details which may, it is suggested, be left to the two Governments to settle together and on which in most cases, there will, it is believed and hoped, be little difference of opinion as the object of both Governments is to get the most reliable data possible. In cases of differences of opinion both Governments should, it is proposed, refer the case for final orders to the Government of India, the statement of each being communicated to the other.

22. It is suggested that if any observations, gauge-readings, velocities, etc., are desired by one Government which the Government of India and the other Government consider unnecessary that Government if it still desires it, shall be allowed to take such observations, etc., and shall be given all reasonable facilities and assistance in taking them, provided that the whole expense in connection therewith is defrayed by that Government.

23. It is hoped and believed that none of these proposals will be found to be contentious and that the object of both parties as regards these investigations being the same, the matter will be treated in a friendly and non-contentious spirit and these proposals are formulated with this view.

24. The proposal of the Madras Government as regards the duration of the tentative period is that it shall be four years at the end of which time the question shall be reviewed by the Government of India after hearing both parties and if found practicable, final factors will then be fixed.

(8) OPERATION AND ENGINEERING DETAILS OF THE RESERVOIR.

25. The view of the Government of Madras as regards the giving or withholding assent to the construction of the Mysore Cauvery project works has been throughout these Arbitration Proceedings and throughout the correspondence leading up to them that if it could be shown

that on well-based forecast of the prospects of the project, worked out on a basis of passing down to Madras the water which was required to protect their rights, the success of the project was well assured, that assent should not be withheld; but that if the prospect of success under such conditions as regards passing on water to Madras, was shown to be ill-secured and the working conditions indicated occasional severe failure or frequent minor failures, then assent should be withheld.

The arguments in support of this view have been given in Ma. 28, 29 and 32 and will not here be repeated.

26. If it is held that the measure of success or failure of the Mysore project is an immaterial consideration in dealing with protection and conservation of Madras rights, there can be no question that, apart from technical considerations as regards efficiency of the structures and modes of operating, the assent to the project should not be withheld.

27. If, on the other hand, the measure of success or failure is recognised as a material consideration, the working tables drawn up, on the basis agreed on, to give a forecast of the working of the project and the measure of success in passing the required quantities of water to the area to be irrigated must be material pieces of evidence and require the careful consideration of the Arbitrator.

28. Proceeding then to discuss the basis of these working tables (Ma. 35 1—13), the areas to be irrigated are those stated by Mysore as their project proposals (My. 25). The duties for the monsoon crop advanced by Mysore have been accepted by Madras as a basis for the working tables although in the opinion of Madras these duties are pitched somewhat high.

The duties for the perennial crop have after discussion been fixed by the Assessor in proceedings, dated 22nd April 1914.

The rules fixing incidence of draw-off half month by half month to be applied to years of different character, which rules form the basis of the "draw-offs" of the tables are those fixed by Mysore (My. 27 and My. 30) to which attention is invited. The years are under the above divided into classes A to K in accordance with the character of the seasons and water available in the reservoir and the measure of success or failure may be gauged by the classification in which under the working tables each year falls.

29. In the statement attached to this note details are given showing the duties worked to under each classification as compared with the accepted duties referred to in paragraph 28 above and also the proportion of total area of perennial crop irrigated under each classification.

Classification A represents the full measure of success as regards the supply of water, that is, supply of the whole area at the accepted duties. Successful operation is connoted by supply of water to :—

85,000 acres monsoon crop to be supplied with water June 16th to January 15th at the duties shown under classification.

40,000 acres perennial crop to be supplied throughout the year at a constant duty of 64 acres per cusec.

30. The years under classification A as a result of the examination made by working tables for the thirteen years 1896 to 1908 (Ma. 35 1—13) now presented are the fully successful years.

Years coming under any of the classifications B to K represents failure to a greater or less degree.

The degree of failure can be gauged in detail by reference to the statement attached and by considering to what extent under each classification failure to attain to class A standard is denoted.

For purposes of less detailed classification the following is suggested as a fair general classification. —

(a) Minor failure classes B & C	Years in which the whole area of perennial crop is cultivated with full supply, but in which the supply of water to monsoon crop is materially deficient for two and a half months at the end of the seven months season.
(b) Medium failure classes D & E	Years in which the area of perennial crop cultivated is reduced by amounts between 60 per cent. and 16 per cent. and in which all supply of water to monsoon crop is seriously deficient for two and a half months at the end of the season of seven months constituting the period of supply and in which the perennial or normal supply is also materially reduced for three months.
(c) Major failure classes F to K	Years in which area of perennial crop is reduced 66 per cent. upwards and in which the supply to monsoon crop is seriously deficient for not less than two and a half months at the end of the seven months season and in which the supply of perennial crop is also seriously deficient for not less than four months or stopped altogether for one and a half months.

31. It is represented that the class A duties agreed on as reasonable for purposes of examining the prospects of working the reservoir are on the whole high duties. They are duties which may possibly be realised, but not without most careful design of the distributary system and economical distribution of water. The failure to give such supplies connotes real deficiency such as must seriously affect outturn of crop.

32. The classification of the thirteen years examined by means of working tables give the following results year by year—

Year.	Class of year.
1896-97	O
1897-98	A
1898-99	A
1899-00	K
1900-01	B
1901-02	A
1902-03	A
1903-04	O
1904-05	O
1905-06	H & E
1906-07	A
1907-08	B
1908-09	F

Note.—The dual classification H and E signified that "H" duties were applied for the month of October only and subsequently the E class duties. The year would be slightly worse than an E year but is taken as included in E class.

The rough re-classification according to the scale of paragraph 30 gives the following results for the whole thirteen years :—

	Years.
Full success	6
Minor failure	4
Medium "	1
Major "	2
	18

The year 1899 class K represents a most disastrous failure.

Of the whole period of thirteen years, in only six years can an adequate supply of water be given, even working on economical and high pitched duties be attained, and failure to a greater or less extent is indicated in seven years out of thirteen.

33. It is perfectly clear that the working conditions of the Mysore project, as now for the first time displayed by the working tables, cannot be considered as reasonably secured, and it is also quite clear that the prospects of success of the project are not promising and the operation is likely to result in very frequent failure as regards the supply of water to the areas to be irrigated and not in frequent very serious failure. The measure of failure displayed in these working tables is far more serious than that shown in the original working tables made out by Madras in 1909 on the rough assumptions and data which then had to be used. In these original tables Madras showed failure in three years in twenty years. It is now shown that failure is likely to occur in seven years in thirteen years and that in two years the failure is very serious.

It is represented that as regards the earlier representations made, the Government of India took the view that well-assured prospect of success was necessary for the Mysore project and in the absence of such success, Madras were justified in refusing assent to the project. The Government of India, moreover, considered the extent of failure shown in the Madras original tables (three years in twenty) justified the Madras refusal of assent and the recommendations of the Supreme Government were that Mysore should so alter their project proposals as to ensure their project against such failure as was indicated in the working tables before them (*vide* Ma. 29, paragraph 17).

34. It is therefore represented by the Madras Government that if success or failure is found to be a material consideration in giving a finding on the fourth issue and it is urged that it is the most material one, that the working tables now presented show that undoubted failure is indicated. The project prospects are distinctly unfavourable and are such that if submitted as a productive object by the Government of Madras to the Supreme Government, would certainly not meet the approval of sanction.

35. It is here further contended that the correctness of the proposition of Madras (Ma. 29, paragraph 16) that the Mysore Darbar had not been advised correctly by their Engineers as regards the prospects of the project is fully borne out by these working tables and is now fully established. It is not suggested that the Mysore Engineers knowingly misrepresented the prospects of this project, but that they took optimistic views of its prospects and have not till now realised that the prospects of successful operation of the project are remote and that reasonable forecast of working prospects indicates material failure.

36. It is further to be considered that the Mysore project contemplates further extensions of area of 25,000 acres monsoon crop under existing tanks to be filled from the canal when the main reservoir is surplusing and when therefore it is safe to draw off from the Cauvery to the full extent of the carrying capacity of the canals. The total extra draw-off contemplated for this is stated by Mysore to be 4,000 millions cubic feet yearly [*vide* My. 19 (a) paragraph 4 (d)] and would take 39 days to fill the tanks to this extent. The working tables show that in the years 1899 and 1905 the reservoir never surpluses, while in the years 1898, 1902, 1906, the surplusing is less than 19 days, while 39 days surplusing is only realised in three years out of the thirteen. Thus this extra 25,000 acres also forming part of the project will be subject to constant minor, and not infrequent major, failures.

37. The Government of Madras represent that the conditions of working the Mysore project have been shown to be such as to indicate very frequent minor failure and not infrequent serious failure and that this fully justified their original refusal to assent to the project and that the finding on the fourth issue should uphold and confirm this refusal.

38. The further representations made are concerned with the conditions of working and controlling the working of the reservoir in the event of the assent to the project being eventually given.

39. The general outlines of the scheme and reservoir are given in the revised edition "Cauvery Reservoir Project in Mysore" generally referred to as the Kannambadi Reservoir Project. In this, however, but few of the engineering details are given, but only the broad lines of the project.

As regards the dam two typical profiles are given :—

- (1) Showing the dam where there are no sluices.
- (2) Showing the dam where one of the lowest undersluices is placed.

Also a cross section of the site showing a longitudinal small scale section of the dam and forecast of stepping of foundations is shown. On this section, the position of proposed scouring sluices and irrigation sluices is shown, but the spacing of the sluice is not given.

A contour plan scale 1" = 400 feet of the dam and its immediate vicinity is furnished which enables some idea to be formed of the conditions of run-off of the surplus passing through the sluices or over the waste weir in floods.

40. Generally Madras are concerned with the soundness and safety of the works and the operation of the provisions for passing water to Madras without risk of failure.

It may be said at once that so far as could be seen from the brief inspection made in August 1913 of the works in company with the Inspector-General of Irrigation, there was nothing to take exception to in the character of the work in progress, and the quality of work appeared quite satisfactory.

Details, plans and specification are, however, required regarding the sluices to be placed in the dam and their mode of working, their spacing and the limits within which the increased thickness of the dam at the sluices on each flank of each set of sluices is to extend. The pressure calculations for the piers of the sluices should be furnished with a memorandum showing on what data and assumptions these calculations were made.

41. As regards the sluices provided in the project which will pass supply to Madras, these are the scouring sluices and are :—

(a) Eight deep sluices in the centre of the dam each 6' x 12'. The project estimate only shows six, but by agreement made by the Chief Engineer for Irrigation, Madras, with the present Diwan, Mysore agreed to increase this number to eight in connection with the building of the small reservoir to which assent was given by Madras, but which does not form an item of the present enquiry.

These deep central sluices will presumably only be worked when the level of water in the reservoir is insufficient to give the supply to be passed to Madras through the flank sluices.

(b) Two sets of flank scouring sluices, viz. —

Right flank sluices, fifteen in number, each 6' x 12', with sills at level + 2394.

Right flank sluice, one in number, 4' x 8' with sill level + 2384.

Left flank sluice, three in number, each 6' x 12' with sill at + 2394.

Left flank sluice, one in number, 4' x 8' with sill at + 2384.

Thus we have eighteen flank sluices of 6' x 12' with sills at + 2394 and two flank sluices of 4' x 8' with sills at + 2384.

It is considered that for purposes of rapid and efficient regulation—

(a) All sluice gear should be connected with a recorder showing what height the shuttles are lifted off the sill.

(b) That the flank sluices of 6' x 12', which will be the ones most constantly worked should be geared together in sets of three or five sluices, so that the shutters are raised simultaneously and together to the same height by means of a shaft actuating each sluice lifting gear.

Each sluice or set of sluices should have a locking and sealing arrangement so that the regulation cannot be altered, except with the cognisance of the controlling officer who would be the keys and seal in his personal custody.

42. *Measurements of inflow and issue of water during the operation of the Reservoir project.*—The proposals put forward below on this subject have reference to the operation of the regulation of the project and not to the measurements to be made with a view to fixing proportion factors, but it is of course hoped that the arrangements made with regard to the latter will be suitable and applicable to use in respect to the former.

It is proposed that the sites be selected at which gauges are to be installed on the three rivers, Cauvery, Hemavati and Lakshmanathirtha.

These sites should be the nearest ones above the proposed waterspread level of the reservoir which will best fill the following qualifications:—

(1) They should not be liable to changes for different stages of river flow, that is, the bed should be hard and not likely to scour. They should be sites which are suitable or in the vicinity of the sites which are suitable for fixing gauges and for the calibration of the gauges by velocity observations of flow.

(2) They should be sites in which the level of water in the reservoir will not affect the levels of flow. That is, sites must be such that the same discharge will be denoted by the same gauge levels, irrespective of level of water in the reservoir.

(3) The off-takes between the sites and the reservoir should be as few as circumstances permit of.

(4) The sites should be, if possible, convenient of access for inspecting officers and the recording staff and should be the most suitable ones, having in view all the circumstances of the case.

43. At each of the selected sites standard gauges shall be erected and these gauges will be calibrated by a series of velocity and discharge observations taken by joint Madras and Mysore parties and such observations shall be continued till both parties are satisfied that the calibration is materially correct.

This calibration is to ascertain the discharge which each reading of the standard gauge connotes and to produce a curve showing the constant relation between gauge-reading and discharge.

At each site a permanent station for taking velocity and discharge observations should be established and such observations should be taken on a few days yearly as a check on the continued accuracy of the original calibration.

At each site the following self-recording water level recorders and instruments shall be installed in two separate wells near the river margin, each with a separate connection with the river, so that the water in each well will be the same level as the river water level.

Over one well will be installed an ordinary automatic water level recorder designed to run sixteen days. The records from this will be changed half-monthly.

Over the other well will be installed another recorder in electric connection with Kannambadi and designed so that the recording diagram of water levels shall be reproduced in the control room at Kannambadi. In this room also an automatic integrating drum specially made to record total discharge of every six hours at each station will be installed and the quantities so recorded shall be the standard for regulation.

Each station will also be in telephonic connection with the control room at Kannambadi.

44. It is proposed that at a suitable site below the dam and above Chick Devaraya Sagar about a gauging station similar to the above shall be established and the gauge here accurately calibrated.

The station should be sufficiently far below the dam to be free from the turmoil and turbulence caused by the water issuing from the sluices or from the surplus weir of the reservoir and sufficiently far above the anicut not to be materially influenced by the conditions of draw-off of the channels at that place. In connection with this station an automatic water level recorder shall be installed connected electrically with a discharge recording integrating machine in the control room at the dam.

45. The controlling officer would thus have recorded in his control room at the dam not only the total inflow every six hours, but the total water passed down each six hours and thus would have the necessary information before him to enable him to adjust and regulate for the succeeding period with the greatest practicable accuracy.

46. Automatic water level recorders and also gauges to be read three times daily shall also be installed:—

(a) in the reservoir at some convenient site clear of the draw of the sluice;

(b) in connection with the upper gauge at Chick Devaraya Sagar anicut.

For these sites, it is not considered necessary to have electrically actuated discharge recorders in the control room.

47. The originals of all the half-monthly diagrams of gauge-readings as well as records of individual gauge-readings will be recorded by the controlling officer and two photographic reproduction of the originals, diagrams and copies of the record of individual gauge-readings will be sent half-monthly to the representative of each Government.

Gauge-readers will be appointed to read three or more times daily the gauges at each station and telephone the results to the controlling officer, sending also daily or weekly written statement of the same.

This officer will check these results against the recorded levels transmitted electrically by the automatic recorders and will also, on receipt of half-monthly diagrams, compare these with the readings telephoned.

48. The various records will form a check on one another and discrepancies due to either the default of the gauge-readers or of the recording instruments or arrangements will be made subject of immediate enquiry and thus accurate work will be, as far as practicable, ensured.

CONTROLLING AGENCY.

49. In the event of the finding as regards the construction of the Kannambadi reservoir being in favour of such construction, Madras Government propose the following arrangements to ensure local control and regulation in accordance with the approved rules, namely:—

(1) That the control of regulation and of gauging and record of discharges at selected sites where such have to be measured shall be vested in a special officer of the rank of Executive Engineer unconnected either with Madras or Mysore who shall be appointed by the Government of India, the selection being referred to and accepted by both Governments. This officer shall have charge of all the gaugings and records of flow into the reservoir and of issues through or over the reservoir dams and he shall communicate daily by wire and letter to both parties the results of such observations and regulations.

(2) The special officer shall have under his orders and control a suitable establishment of subordinates to carry out orders as regards regulation, etc., and this staff shall also be independent of both Governments and shall be appointed by the Government of India or by the special officer himself. The special officer shall give all facilities for inspection of his work, records, etc., to any officer or officers appointed by either Government on this behalf and shall promptly furnish any information on this subject asked for by either Government or by such officers, but he shall be in no way subordinate to either, but be responsible to the Government of India. He will, however, be responsible to the Government of Mysore for the proper care and maintenance of the sluices, gear, measuring instruments, etc., furnished and installed by that Government.

(3) The cost of the special officer and his establishment shall be borne by the Madras and Mysore Governments in equal shares.

(4) It is considered that the cost of installing gauges, measuring instruments and building quarters necessary for the staff should be borne by Mysore as part of the necessities of the project.

The installation of an automatic water level recorder at the Upper Anicut to be paid for by Madras.

50. The Madras Government believe that the proposal that the control of regulation gauging, etc., shall be entrusted to an officer independent of both Governments will immediately commend itself to the Government of Mysore as fair and equitable. It will relieve the Darbar from the invidious and difficult position of being responsible for the fair distribution of supply between its own ryots and those of Madras, and it will be a guarantee to the public both in Madras and Mysore and to the Government of the French Establishments in India that the working of the reservoir is entirely unbiased and impartial. It is hoped, therefore, that this proposal will prove acceptable to the Government of Mysore and that they will be able to treat it as non-contentious.

51. Finally it is represented that the Mysore Government should furnish to Madras full details regarding their project, viz., working drawings and estimates and reports of all works directly connected with the reservoir, its sluices, the gauging sites and the gauges, instruments and arrangements there proposed. Further the alignment of canals and areas and distribution of irrigation should be communicated as soon as these are decided on. While the latter items are not matters in which the Government of Madras have title to intervene, they cannot be considered matters which do not affect Madras.

52. Under the Agreement of 1892, clause III, full details of the projects contemplated must be furnished by Mysore to the Madras Government and so long as this agreement remains in force, it is claimed that Madras have a right to require the strict observance of this clause.

These details are not asked for with any unfriendly object, but merely with a view to considering in all its aspects what the effect the Mysore project may have on Madras and this is under the agreement an undoubted right of Madras and it is claimed that full working details of their proposed larger project shall be furnished to the Government of Madras within two years.

53. In view of the controversy which has taken place over this work it is suggested that the question of suitability and safety of the works proposed so far as they affect Madras shall be decided by the Government of India.

The Madras Government would propose thus that they should on receipt from Mysore forward to the Government of India the working plans, specifications and full details of the project or part of the project with their remarks, a copy of which should be sent to the Mysore Government and that the Supreme Government should be the final authority as regards the necessity for any modification represented as necessary in the interests of Madras.

54. As regards any proposals for sluices, gauging stations and recording instruments to which the Government of Mysore may wish to have final decision at an early date and before their full proposals are ready so that they may not be committed to expenditure on proposals not subsequently approved, these, it is submitted, may be sent in separately at any time for acceptance by Madras.

As regards these matters reference to the Government of India shall, it is proposed, only be made if Madras cannot accept the proposals of Mysore.

55. It is further proposed that from the date of the dissolution of the Arbitration Committee that in case of disagreement between the two Governments in regard to measurements of water, sites for measurement or for recording instruments and generally as regards engineering or other matters in connection with the project and enquiry in which it is claimed by either party that it has a title to be consulted, that such disagreement shall be referred for decision by the Government of India.

56. Finally as the necessity for the gaugings necessary to finally fix "factors" are the outcome of the neglect of Mysore to take such gaugings before, and to their neglect to observe gauge-readings at enicuts or other suitable places which ordinary prudence and foresight would demand, the whole cost of the gaugings and observations of the next two years shall be borne by the Mysore Government.

After that the cost shall be divided between the two Governments.

In regard to any further gaugings at the Cauvery dam or Bhavani bridge which the Arbitrator may consider necessary the Madras Government engage to defray all the cost.

It is considered that this is a matter on which the Arbitration Committee should give an opinion.

5th May 1914.

W. M. ELLIS, Col., R.E.,
Madras Representative.

STATEMENT of duties and discharges per second for monsoon (85,000 acres) and perennial (40,000 acres) crops during a year.

Case or classification.	A			B			C			D			E			F			G			H			K		
	Monsoon crop.	Perennial crop.	Flow in cusecs.	Monsoon crop.	Perennial crop.	Flow in cusecs.	Monsoon crop.	Perennial crop.	Flow in cusecs.	Monsoon crop.	Perennial crop.	Flow in cusecs.	Monsoon crop.	Perennial crop.	Flow in cusecs.	Monsoon crop.	Perennial crop.	Flow in cusecs.	Monsoon crop.	Perennial crop.	Flow in cusecs.	Monsoon crop.	Perennial crop.	Flow in cusecs.	Monsoon crop.	Perennial crop.	Flow in cusecs.
June I	71	64	625	71	64	625	71	64	625	71	64	625	71	64	625	71	64	625	71	64	625	71	64	625	71	64	625
July	71	64	625	71	64	625	71	64	625	71	64	625	71	64	625	71	64	625	71	64	625	71	64	625	71	64	625
August	71	64	625	71	64	625	71	64	625	71	64	625	71	64	625	71	64	625	71	64	625	71	64	625	71	64	625
September	71	64	625	71	64	625	71	64	625	71	64	625	71	64	625	71	64	625	71	64	625	71	64	625	71	64	625
October	71	64	625	71	64	625	71	64	625	71	64	625	71	64	625	71	64	625	71	64	625	71	64	625	71	64	625
November	71	64	625	71	64	625	71	64	625	71	64	625	71	64	625	71	64	625	71	64	625	71	64	625	71	64	625
December	109	64	625	109	64	625	109	64	625	109	64	625	109	64	625	109	64	625	109	64	625	109	64	625	109	64	625
January I	594	64	625	594	64	625	594	64	625	594	64	625	594	64	625	594	64	625	594	64	625	594	64	625	594	64	625
January II	594	64	625	594	64	625	594	64	625	594	64	625	594	64	625	594	64	625	594	64	625	594	64	625	594	64	625
February	594	64	625	594	64	625	594	64	625	594	64	625	594	64	625	594	64	625	594	64	625	594	64	625	594	64	625
March	594	64	625	594	64	625	594	64	625	594	64	625	594	64	625	594	64	625	594	64	625	594	64	625	594	64	625
April	594	64	625	594	64	625	594	64	625	594	64	625	594	64	625	594	64	625	594	64	625	594	64	625	594	64	625
May	594	64	625	594	64	625	594	64	625	594	64	625	594	64	625	594	64	625	594	64	625	594	64	625	594	64	625

Note.—Duty figures higher than normal introduced on account of scarcity of water are indicated in the statement.
For monsoon crop by duty figures in italics.
" perennial crop by duty figure in black type.

Exhibit Ma. 36.

Remarks of Madras Government with reference to Mysore note on "Rules for working the Kannambadi Reservoir—My-32."

The rules to be framed with a view to give effect to the working of the principles of the award on the issue 8 (a) have, for purposes of convenience, been, by consent, transferred for consideration to issue 3 (b) and it is considered that the question of rainfall in the delta area in Tanjore is not a relevant consideration and the rules aim at merely the giving to Madras the full natural flow of the Cauvery from June to January up to a limit of 6½ feet on the Cauvery dam and nothing else.

Reference, Mysore paragraphs 1 to 3.

2. The Madras Government urge that, for the reasons given by them (Ma. 35), four years should be fixed subject to extension, if considered necessary by the Government of India and note that Mysore agree to this.

Reference, Mysore paragraph 4.

3. The Madras Government altogether object to the suggestion of Mysore that proportion factor figures should be fixed by adding up the total flow of the river above a certain stage in various seasons for six years and fixing factors in accordance with totals.

It is only by considering half-monthly and daily flow extending over all the periods for which gauge-readings will be available at the end of the tentative period, that proportion factors can equitably be fixed on a basis calculated to fully secure to Madras the full enjoyment of the natural flow of the Cauvery up to the limit of the award on issue 2 (b).

4. It is further represented that the high stage flow of the Cauvery has no material bearing on the matter of fixing proportion factors calculated to give to Madras undisturbed all natural flow up to the limit flow of the award.

Reference, Mysore paragraph 6.

5. The suggestions of Mysore as regards the means of ascertaining the factor for losses in transmission are not accepted, it is not considered that any reliable results could be obtained

Reference, Mysore paragraph 7.

from the measurement of discharges in the reaches proposed by Mysore.

The Government of Madras represent that it is by study and comparison of the discharges at various places notably at Kannambadi and Sivasamudram, Bhavani Bridge and the Upper Anicut that a suitable percentage factor can best be fixed, but that any determination of a percentage factor of loss in transmission on a basis of exact measurement is impracticable. The best method of fixing both proportion and percentage factors is by application of trial combinations of factors to ascertained conditions of discharges at the various places.

The three reaches regarding which measurements for losses in transmission are proposed by Mysore are:—

- (a) between Kannambadi and the confluence of the Kabbani,
- (b) between the confluence of the Bhavani and the confluence of the Noyel,
- (c) between the confluence of the Amaravati and the Upper Anicut.

There are large areas of irrigation fed by channels taking off from each and all of these reaches. If these reaches are gauged, deductions from the measured draw-off of each of these channels would have to be made.

The results of the measurements suggested would, it is submitted, be utterly unreliable and the cost and difficulties of taking the observations proposed will in no case be repaid in the value of the results.

6. It is not open to question that, under the conditions of arbitration, both parties have full right to make representations to the Government of India on the matter of the awards

Reference, Mysore paragraph 8.

given and the Madras Government proposals are put forward with similar reservations to those expressed by Mysore.

7. Remarks on tentative rules proposed by Mysore (My. 32).—The following rules are objected by Madras.

Paragraphs 6 and 7 (My. 32) of Mysore tentative rules renumbered III and IV at the Assessor's meeting of 7th May 1914. The matter of rainfall in Madras is irrelevant in these rules which are designed to meet issues 2 and 3 (a) which awards do not deal with such a matter—vide also paragraph 1 above.

The other rules of Mysore as amended at the above Assessor's meeting are accepted for incorporation in the award rules. The amendments made included striking out altogether paragraphs 1 to 3 of the Mysore tentative rules.

8. The contentious matter in Draft Rules of Madras (Ma. 35).—The draft rules of Madras (Ma. 35) as amended at the Assessor's meeting of 7th May 1914 are accepted by Mysore with the exception of the following:—

III (a) last clause, III (b), III (c) and IX.

Other minor modifications proposed by Mysore in rule III (a), first clause (and in rule VII to agree with the former) are accepted by Madras.

9. The contentious matter in the last clause of rule III (a) is already dealt with in the Madras Note Ma. 35, paragraph 5, and it is submitted that, under the explanation there given, the rule should be upheld.

10. As regards rule III (b), it is urged that the limit of extension of direct irrigation from channels taking off from the Cauvery in Mysore as well as in Madras has been already reached.

By this it is not implied that no minor extensions are possible by gradual improvement, but it is certain that no large extensions are practicable except by means and through the instrumentality of the Mysore reservoir.

11. The supply due to Madras is to be determined by fixing the factor showing the proportion which the flow at Kannambadi under existing conditions bears to that at the Cauvery dam. The factor will be fixed on the basis of existing draw-off and area irrigated in Mysore. Of the water passed through the dam under the application of the factor the existing irrigation has a title to supply and, so long as no additional water is used for supply of lower irrigation, the factor covers the supply of this. The existing channels were, however, constructed without any regard to economy and when flowing full, carry water at a very low duty and thus during the flow season June to October give superabundant supplies to the areas much of which supply returns to the river and is again utilised.

12. The irrigation duty of the Mysore Cauvery channels gauge by flow at the head is less than 80 acres to the cusec, while the actual duty is probably from 50 to 70 acres per cusec and the balance of water returns to the river.

It is proposed by Mysore to greatly extend these channels which can take in at the head much more water than is actually utilised for irrigation and to do this without any necessity for enlarging the head sluices or upper reaches, while the extended irrigation, late in the season, will be protected and supplied by the reservoir.

13. Such extensions, in so far as they utilize and permanently withdraw from the river more water than was previously withdrawn, must draw this extra water from the allowance due to Madras under the award unless this extra amount of water is added to the supplies passed through the sluices.

14. The Mysore contention is that, if they do not increase the size of their head sluices, they may extend to any area and that such extension will be merely due to natural extension and increased economy of distribution. While it may be admitted that natural extension, say, up to 5 or even 10 per cent., may be reasonable result of economy and improvement, it is submitted that this is the full limit of extensions due to such a cause and that all further extensions for which a definite supply of water is not passed in addition to what is due by the application of the proportion factor is passed at the expense of Madras supplies.

15. In proof of the low duties for which the old channels in Mysore are excavated reference is invited to Captain Dawes' Cauvery Project, Part II, page 11, where he says "the capacity of a tank is always reckoned in this State at 6 feet head over an acre of land, whereas the duty of channels is taken as 80 acres per cubic foot per second."

Can it be doubted that the narrow strip at marginal cultivation under channels supplied at such duties return considerable quantity of water to the river.

16. The area of irrigation in the Cauvery below Kannambadi is 39,000 acres and allowing for a natural increase of 10 per cent. 4,000 acres could be realised and to such an increase as a natural expansion Madras would not object. It is, however, contemplated to extend the lower channels under the protection afforded by the reservoir by 25,000 acres—vide Mysore project, paragraph 81, and it is urged that, if no allowance is to be made under the rules for water to supply this, the water must come from the Madras allowance.

17. This is the reason for the proviso in rule III (b) and it is claimed that in equity it should be upheld.

18. Rule III (c).—In this rule it is proposed that the duty allowances should be gauged at the actual measured duties realised in raising crops and diminished by 10 per cent. to allow for increased efficiency of distribution. If the duties now realised are low, as no doubt they are, such allowance should be raised in accordance with actuals when the duties are improved, but it is contended that actual measurement and not assumptions should be the basis of the allowances.

19. As regards rules IX, the reason and condition of its inclusion in the rules are given in Ma. 35, paragraph 6, and it is submitted that some such rule is absolutely called for if the Arbitrator rules that success or failure of Mysore project is a matter in which Madras interests are involved.

20. Apart from the actual draft rules and paragraphs of the Madras note (Ma. 35), the Mysore Representative has accepted as non-contentious all the matter in Ma. 35 except the following:—

(a) Ma. 35, paragraphs 25 to 37.—This relates to the working tables of Mysore Reservoir and is dealt with separately (Ma. 37).

(b) *Ma. 35, paragraph 41.*—The proposal of Madras for gearing several sluices together is objected to and is dropped by Madras. The rest of the proposal is accepted by Mysore.

(c) *Ma. 35, paragraph 49—Controlling agency.*—In this matter the Government of Madras cannot but consider that their reasonable proposition has not been received by Mysore with the consideration it deserves, and urge on the Arbitrator that in a matter of such extreme importance independent controlling agency is essential to the proper working of the scheme and the satisfaction of the very numerous interested parties.

If, however, the Mysore proposal is accepted, it is represented that it is essential it shall be open to any officer of the Madras Government at any time and without notice to inspect the reservoir sluices or gauging stations, recording instruments, etc., and to satisfy himself if he wishes by actual measurement of the accuracy of gaugings at any station and of the regulation of sluices and discharges and the accuracy of the record of the same maintained; and he shall be given every assistance by the Mysore Government in carrying out such duty.

Except as regards the controlling officer and staff being independent of both Governments, Mysore have accepted the proposals in Madras paragraph 49.

(d) *Ma. 35, paragraphs 51, last clause, and 52.*—The Government of Madras maintain their right under the Agreement of 1892 to be afforded full information regarding the Mysore project.

(e) *Ma. 35, paragraph 55.*—The Government of Madras withdraw the claim to the payment by Mysore of all the salaries or expenses of the staff of the gauging parties. Each party shall pay the salaries of their own servants. The expenses of installing gauging stations, furnishing boats and materials, etc., shall be paid by Mysore. It is understood this is not contentious.

8th May 1914.

W. M. ELLIS, Col., R.E.,
Madras Representative.

Exhibit Ma. 37.

Reply by the Government of Madras to Mysore Note on Working Tables (My. 33).

It is submitted that the conditions under which the working tables of the Mysore Reservoir were to be drawn with a view of showing the extent of success or failure of the project were the matter of full discussion and settlement prior to the drawing up of such tables. The areas to be irrigated and the duties and system of draw-off were all those proposed by Mysore with the exception of the duty for perennial crop which was after discussion fixed by the Assessor.

2. These duties were fixed on a scale which certainly connote economical management and good design of a distribution system and that failure to supply the full area at such duties indicates loss to a greater or less extent.

3. The classification of duties as arranged by Mysore on the basis of the supply actually impounded on the last day of October is a reasonable arrangement as it is almost certain that no further supply would be received after that date until February and by that time the area of perennial crop to be cultivated must be fixed and the issue of water to monsoon crop has closed.

The suggestion of Mysore that the man on the spot could effect material economies by abandoning the rules drawn for his guidance is not in accordance with fact or possibility and is unsupported by a single instance in which such could have been done, and it is denied that any material amelioration of the position could have been made in the bad years by the man on the spot.

4. In paragraph 4 (My. 33) Mysore suggest that the high duties which they have themselves put forward for supply of the monsoon crop during the last two and a half months of the seven months crop season can be reduced without inconvenience or loss of crop on the ground that the crop is really about a five months crop and seven months water is only allowed to provide for late sowings.

It is, however, to be noted that Mysore have already, in proposing their duties, explained and justified the quantities of water allowed in the full duties agreed to on this basis and it has already been admitted that the water is only allowed on the basis of a five and a half months crop and only under this explanation as regards late sowings and that the crop to be raised was a five and a half months crop and not a seven months crop, Madras accepted these duties—*vide* My 25.

It was on this basis that duties of the monsoon crop were accepted by Madras and this cannot again be accepted as a pretext for still further reducing the duties fixed on a basis of a 5½ months crop.

5. It is suggested that the failure might be mitigated by reducing the balance at the end of the season.

The proposals of Mysore for regulation are on a basis of leaving at the end of the season 4,000 millions cubic feet balance [My. 19 (a)] as it is not safe to commence the issue for the following year to monsoon crop with a balance of less than this and the Mysore rules provide for this. Further a balance is required as a working margin as there is an absolute necessity to

secure power supply against failure and it is on this recognised necessity that the working rules of Mysore are drawn. They are properly based on the recorded inflow, February to May of a bad year, as only this can give security and it is not safe for the officer on the spot to make any change at least until after the end of April by which time it would be too late to materially alter the situation. If Mysore had desired that in the event of the impounded balance being a certain quantity at the end of April different duties should be worked to, they should have provided for this in their rules. Such provision, however, could make no material alteration in the results displayed by the working tables.

6. The failures under scales B and C are classed by Madras as "minor failures," but it is submitted that although minor, they are quite material. The monsoon crop duties are reduced in these years after the end of October to one-half the scale that can be successfully worked to, and some loss of crop would be suffered and also material reduction in "outturn." These remarks apply to the four years of minor failures, viz., 1896, 1900, 1904, 1907. The statement by Mysore that there was good rainfall in all these years except 1904 in November is not borne out by the examination of the rain registers of Mandya and Krishnarajapettah.

The rainfall recorded is noted below:—

							November rain.	
							Mandya.	Krishnarajapettah.
							INCHES.	INCHES.
1896	...	...	...	...	...	...	2.62	5.05
1900	...	...	...	...	...	...	0.8	0.93
1904	...	...	...	...	...	...	1.06	Nil.
1907	...	...	...	...	...	...	1.65	2.55

The average November rainfall of Mandya is 3.3 inches.

7. Referring to the statement called for by the Assessor regarding the deficiencies in supplies passed to crops in comparison with supplies aimed at under full duties (class A duties). In these years the deficiencies on the whole year's supply and for the period after the full duties are reduced are, that is from 1st November, shown below.

The conditions of working entail on Mysore reducing duties from the end of October for the rest of the year if balance impounded at that time does not justify continuance of full duties.

							Percentage reduction of duty supplies, whole year.	Percentage reduction of duty supplies, 1st November to 15th June.
1896	...	...	...	...	...	...	9.6	21
1900	...	...	...	...	...	...	15.0	33
1904	...	...	...	...	...	...	9.6	21
1907	...	...	...	...	...	...	5.2	11

It is submitted that, in the face of these figures, it cannot reasonably be contended that failure in these years was negligible.

8. Coming to the year of "Medium failure", viz., 1905-1906, as regards the monsoon crop, the duties, 1st October to 15th January, are increased from normal scale A as below:—

							A scale acres per cuase.	Reduced scale acres per cuase.
October	...	...	...	...	...	...	71	142
November	...	...	...	...	...	...	71	142
December	...	...	...	...	...	...	109	216
January first half	...	...	...	...	...	...	142	282

That is for three and a half months out of a total of seven months the supplies are just one-half of what on an already high duty-scale they ought to be.

The rainfall for this year at Mandya was—

							Inches.	Average.
October	...	...	...	...	...	...	3.99	7.0
November	...	...	...	...	...	...	.18	3.3
December	...	...	...	...	...	...	Nil.	0.92

Coming to the perennial crop, the area is reduced by seven-twelfths, that is, by 58 per cent. from 1st February, while the normal supply of water to the area on the ground up to that date was reduced for three months, November to January, by 40 per cent. Under these conditions can it be considered the failure was other than serious?

9. Now examining the year 1908-1909, for the monsoon crop, the scale of water-supply given from 1st November to 15th January was, as in the year examined above, only one-half the normal duties accepted as necessary.

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	October	November	December	Total	Average	Percentage	Index
October	...	...	...	...	...	...	276
November	...	...	...	...	...	...	Nil.
December	...	...	...	...	...	...	Nil.

10. The year 1899-1900 is admitted by Mysore to be one of very disastrous failure and nothing more will be said about this.

11. It is submitted that the assumptions of duties for crops and daily flow have been settled prior to working out these tables on the best available data and it was agreed that the results as displayed in the tables should be the criterion and standard by which the success or failure of the reservoir should be gauged.

If, under this, the success of Mysore reservoir project had been shown to be reasonably well secured, the Government of Madras would not have attempted to contend that because the duties fixed were too high and it is believed they are too high, and because the daily discharges, although the best procurable, are not fully reliable, that the consent to construction of the reservoir should be withheld. The tables on the basis of working settled beforehand have been agreed on as the criterion of success or failure and the Government of Madras urge that the error, if any, is fully as likely to be on one side as the other and that the decision as regards failure or success should be judged from the standards agreed on before the tables were drawn.

12. In accordance with the Assessor's instructions the difference on the results which the tables would exhibit if the draw-off for power were reduced from 1,000 cusecs to 900 cusecs have been examined and they are found not to materially affect the matter.

There is, however, a discrepancy between the Madras results as regards this and those of Mysore and it is asked that after this is reconciled that the Madras table on this matter may be submitted with remarks.

13. A table has also been drawn out at the desire of the Assessor showing the closing balances in Mysore reservoir at the end of each irrigation year (15th June) the issues to irrigation and the deficiency of such issues from normal requirements of areas and duties (class A) and the percentage deficiency of issues each year to the class A standard.

A similar table is made having reference only to the water required at the normal (class A) duties from 1st October or 1st November to 15th June (this being the period of reduced supply) and the water issued year by year and the percentage deficiency.

In both cases the deficiency from the already high duties is very material and it is submitted shows failures of a nature fully justifying Madras contentions.

If there are discrepancies of a serious nature between these statements and those of Mysore the consideration of these statements may be postponed till these differences are reconciled or explained.

8th May 1914.

W. M. ELLIS, Col., R.E.
Madras Representative.

Exhibit Ma. 37-1.
STATEMENT showing balance in Mysore Reservoir on 1st June of every year with quantity received and issued during the year.
(Check of Mysore statement.)

Years.	Balances on 1st June.	Quantity actually stored in the irrigation season up to January.	Quantity stored from February to May.	Total of columns 2, 3 and 4.	Expenditure.				Total of columns 6, 7 and 8.	Balances.	Case.	Balance at the end of October.	Shortage in irrigation supply.
					Irrigation.	Evapora- tion.	Power.	9					
1	2	3	4	5	6	7	8	9	10	11	12	13	14
1906-07	4,000	50,697	1,830	56,527	25,281	4,126	6,642	46,049	10,478	O	29,372	3,835	
1907-08	19,435	47,994	567	58,996	39,936	4,093	7,920	51,939	6,957	A	34,495	..	
1908-09	7,069	57,062	2,777	64,848	39,936	4,072	8,375	52,373	14,475	A	34,870	..	
1909-1900	14,388	52,471	1,374	58,138	23,883	3,817	9,837	36,457	1,676	K	14,917	16,138	
1900-1901	5,101	59,061	689	64,851	33,166	3,761	12,285	49,105	5,155	B	38,871	6,890	
1901-1902	5,181	60,400	439	66,020	39,936	4,961	4,218	48,065	17,415	B	36,573	..	
1902-1903	17,416	51,833	3,593	72,843	39,936	4,716	6,423	51,767	21,767	A	34,328	..	
1903-1904	21,412	45,879	5,381	72,673	39,980	4,966	1,124	46,090	36,582	A	36,376	..	
1904-1905	26,312	26,096	2,412	56,432	36,076	4,167	5,597	45,847	9,681	C	28,637	3,650	
1905-1906	9,561	38,932	13	48,596	29,602	3,496	9,311	42,409	6,117	H & E	24,145	10,324	
1906-1907	6,064	52,816	908	59,808	38,376	3,924	6,337	47,637	12,231	F	34,376	1,550	
1907-1908	12,319	44,471	1,907	58,687	37,864	4,305	4,719	46,788	11,899	B	30,520	8,063	
1908-1909	11,964	36,718	..	48,672	26,723	2,156	1,109	39,937	14,685	F	23,986	4,377	

Years.	1896-1897.	1901-1902.	1902-1903.	1903-1904.	1904-1905.	1905-1906.	1906-1907.	1907-1908.	1908-1909.
	A	B	A	A	A	H E H D	A	B	F
July first-half	4,000	15,382	15,405	20,422	25,307	8,525	4,490	11,107	10,374
" second-half	37,080	16,567	16,765	21,876	25,910	9,889	3,972	11,658	11,835
August first-half	37,080	21,535	17,904	17,877	37,080	6,065	5,828	9,161	7,901
" second-half	37,080	22,810	14,369	18,841	36,899	7,114	4,810	9,713	9,045
September first-half	37,080	29,826	33,407	28,926	36,899	8,903	2,913	11,732	12,446
" second-half	37,080	31,086	34,772	37,980	24,683	9,952	3,395	12,283	22,690
October first-half	37,080	27,134	37,011	37,080	37,080	32,124	37,080	37,080	37,080
" second-half	37,080	28,408	33,461	35,820	37,080	33,173	34,700	37,080	36,740
November first-half	37,080	26,260	30,767	36,595	34,360	30,085	37,080	36,910	34,023
" second-half	37,080	22,198	30,767	36,595	34,360	31,134	37,080	34,360	31,473
December first-half	37,080	22,198	30,767	34,045	33,089	28,473	35,030	34,360	31,473
" second-half	37,080	20,983	37,066	32,505	30,534	26,967	32,480	32,480	28,638
January first-half	37,080	16,894	34,575	32,505	28,014	23,447	35,882	31,770	28,418
" second-half	37,080	16,309	36,948	36,235	28,014	25,920	35,882	30,520	23,986
February first-half	37,080	17,579	34,228	36,376	28,637	26,145	34,276	30,400	22,658
" second-half	37,080	14,917	33,461	37,080	25,141	24,667	31,726	28,375	21,375
March first-half	37,080	14,017	30,926	37,080	23,671	23,204	29,191	26,710	20,235
" second-half	37,080	13,117	36,544	33,424	22,103	23,004	27,338	24,950	20,235
April first-half	37,080	11,762	34,368	33,424	22,103	23,004	27,338	24,950	20,235
" second-half	37,080	10,664	32,606	31,661	21,165	23,004	27,338	24,950	20,235
May first-half	37,080	9,096	31,550	30,605	20,582	20,582	27,338	24,950	20,235
" second-half	37,080	8,079	30,337	30,254	19,586	19,586	27,338	24,950	20,235
June first-half	37,080	6,377	28,894	29,753	18,055	16,415	27,338	24,950	20,235
" second-half	37,080	5,377	27,178	28,568	18,055	16,415	27,338	24,950	20,235
July first-half	37,080	4,574	25,364	27,440	16,415	15,477	27,338	24,950	20,235
" second-half	37,080	3,672	22,647	27,019	15,477	14,848	27,338	24,950	20,235
August first-half	37,080	2,738	20,505	26,555	14,848	13,001	27,338	24,950	20,235
" second-half	37,080	1,833	19,618	25,158	13,001	11,092	27,338	24,950	20,235
September first-half	37,080	8,694	18,712	24,390	11,384	9,150	27,338	24,950	20,235
" second-half	37,080	6,694	18,712	24,390	11,384	9,150	27,338	24,950	20,235
October first-half	37,080	4,601	18,712	24,390	11,384	9,150	27,338	24,950	20,235
" second-half	37,080	1,510	18,712	24,390	11,384	9,150	27,338	24,950	20,235
November first-half	37,080	4,618	18,712	24,390	11,384	9,150	27,338	24,950	20,235
" second-half	37,080	3,495	18,712	24,390	11,384	9,150	27,338	24,950	20,235
December first-half	37,080	30,960	18,712	24,390	11,384	9,150	27,338	24,950	20,235
" second-half	37,080	28,426	18,712	24,390	11,384	9,150	27,338	24,950	20,235
January first-half	37,080	26,392	18,712	24,390	11,384	9,150	27,338	24,950	20,235
" second-half	37,080	24,264	18,712	24,390	11,384	9,150	27,338	24,950	20,235
February first-half	37,080	24,264	18,712	24,390	11,384	9,150	27,338	24,950	20,235
" second-half	37,080	23,514	18,712	24,390	11,384	9,150	27,338	24,950	20,235
March first-half	37,080	23,514	18,712	24,390	11,384	9,150	27,338	24,950	20,235
" second-half	37,080	23,061	18,712	24,390	11,384	9,150	27,338	24,950	20,235
April first-half	37,080	23,061	18,712	24,390	11,384	9,150	27,338	24,950	20,235
" second-half	37,080	22,434	18,712	24,390	11,384	9,150	27,338	24,950	20,235
May first-half	37,080	20,561	18,712	24,390	11,384	9,150	27,338	24,950	20,235
" second-half	37,080	18,748	18,712	24,390	11,384	9,150	27,338	24,950	20,235
June first-half	37,080	17,267	18,712	24,390	11,384	9,150	27,338	24,950	20,235
" second-half	37,080	15,066	18,712	24,390	11,384	9,150	27,338	24,950	20,235
July first-half	37,080	13,743	18,712	24,390	11,384	9,150	27,338	24,950	20,235
" second-half	37,080	12,450	18,712	24,390	11,384	9,150	27,338	24,950	20,235
August first-half	37,080	10,753	18,712	24,390	11,384	9,150	27,338	24,950	20,235
" second-half	37,080	9,363	18,712	24,390	11,384	9,150	27,338	24,950	20,235
September first-half	37,080	8,863	18,712	24,390	11,384	9,150	27,338	24,950	20,235
" second-half	37,080	7,009	18,712	24,390	11,384	9,150	27,338	24,950	20,235
October first-half	37,080	6,150	18,712	24,390	11,384	9,150	27,338	24,950	20,235
" second-half	37,080	4,618	18,712	24,390	11,384	9,150	27,338	24,950	20,235

F.N. - Figures in block type denote balance with power requirements 900 cusecs. Other figures with power requirements as 1,000 cusecs. Note. - All block type figures from December 1906 to June 1907 should be increased by 60.

Exhibit Ma. 37-3.

STATEMENT showing opening balances, receipts, issues and differences.

Year.	Class.	Opening balance on 15th June.	Receipt during year.	—	—	Percentage of deficiency.
1	2	3	4	5	6	7
1896-1897..	C	4,000	48,967	36,091	3,885	9.6
1897-1898..	A	8,872	48,113	39,926	..	..
1898-1899..	A	5,787	59,768	39,926	..	..
1899-1900..	K	15,282	23,745	23,158	16,768	42
1900-1901..	B	221	58,458	33,908	6,018	15
1901-1902..	A	4,168	60,281	39,926	..	..
1902-1903..	A	15,405	55,044	39,926	..	..
1903-1904..	A	20,422	51,808	39,980	..	..
1904-1905..	O	26,807	28,778	36,076	3,850	96
1905-1906..	H & F	8,525	38,945	28,830	11,096	27.7
1906-1907..	A	4,490	53,679	38,864	1,062	2.7
1907-1908..	B	11,107	45,043	37,084	2,068	5.2
1908	F	10,876	36,468	35,113	14,014	35

Issue for irrigation under normal condition, i.e., A = 39,926 millions cubic feet per year.

Exhibit Ma. 37-4.

STATEMENT showing closing balance in Mysore Reservoir at end of September or October classification, issue and deficiency for October or November to June 15th.

Year.	Balance at end of September or October.	Case.	Issue for irrigation from November 1st or October 1st or 15th June.	Total as per case A from November 1st or October 1st to 15th June.	Deficiency, column 5 - column 4.	Percentage of deficiency, column 6 to 5.
1	2	3	4	5	6	7
1896-1897..	29,372	C	14,425	18,260	3,835	21
1897-1898..	33,495	A	18,260	18,260	..	..
1898-1899..	34,870	K	18,260	18,260	..	..
1899-1900..	17,614 Sept.	B	6,359	22,127	16,768	73.5
1900-1901..	30,871	A	12,242	18,260	6,018	32.9
1901-1902..	36,573	A	18,260	18,260	..	..
1902-1903..	34,228	A	18,260	18,260	..	..
1903-1904..	36,376	A	18,314	18,314	..	..
1904-1905..	28,637	C	14,410	18,260	3,850	21.1
1905-1906..	22,413 Sept. 26,145 Oct.	H & E	7,164	18,260	11,096	60.8
1906-1907..	34,276	A	17,198	18,260	1,062	5.8
1907-1908..	30,520	B	16,198	18,260	2,062	11.3
1908	23,988	F	4,246	8,523	4,277	50.2

Exhibit Ma. 38.

Note by the Madras Representative in reply to My. 36.

With reference to Mysore note My. 36 and the table attached to it showing the result of substituting a 900 cusec power limit for the 1,000 cusecs provided for in their project.

The revised classification scale proposed by Mysore has been examined with reference to several years and is successfully applied except it fails in the case of the year 1905-1906 so far as the 4,000 millions cubic feet minimum balance which is aimed at on the 15th June each year.

2. The basis of the Mysore classification is designed to leave minimum balance surplus of 4,000 millions cubic feet on the 15th June yearly. In this year through the adoption of the new scale the balance from a balance of 4,490 realised under the working tables with the standard classification and a draw-off for power of 1,000 cusecs is reduced to 1,717 millions cubic feet under the new classification and the 900 cusecs draw-off.

3. This shows that the alteration of classification by deducting 1,644 millions cubic feet as represented by Mysore as the proper figure to give the same measure of security under the new conditions as under the standard classification with 1,000 cusecs power draw-off does not give the

same measure of security and that the reduction suggested by Madras, viz., 1,000 millions cubic feet, as suitable is a more suitable figure. It is represented that this indicates the allowance for the savings effected by reduction from 1,000 cusecs to 900 cusecs has been excessive and involves a risk of failure not involved in the original more carefully considered scale and that in practice the new scale would run things too fine to be safe on which criticism is not applicable to the standard classification. The balances half-monthly for the year 1905-1906 worked as a *C* class year are given in the statement enclosed.

4. Reviewing however the years worked on the above hazardous classification the thirteen years give a result.

Failures class *B* three years.

Such a failure involves giving duties to monsoon crop from 1st November to 15th January.

Month.	Duty acres per cusec.	
	Full duty.	Reduced scale.
November	71	109
December	109	160
January	142	282

The above represent material deficiency of supply especially in the two years 1900 and 1907 in which rain was very deficient in November and December.

5. The *C* class years are two in number. This represents still further reduced duties for the last two and a half months of the monsoon crop, the supplies of water given in these months being only one-half the normal duty requirement.

In addition only half supply is given for one month to perennial crop. This is a very material deficiency.

6. There is one "*H* and *O*" class year involving the same deficiencies as regards monsoon crop as a *C* class year and in addition reduction during October of supplies to the monsoon crop to one-half the normal. This is a very material failure.

7. There is one *E* class year which represents—

For the monsoon crop half supply for two and a half months as for *C* class.

For perennial crop reduction in area by over 56 per cent.

Reduction of water-supply for perennial crop for three months from November to January of 40 per cent. of normal duty.

This represents a serious failure.

8. As regards the year 1899, it still remains in the same class as before class *K* and represents a disastrous failure.

As before out of the thirteen years only six years are shown to be immune from failure.

W. M. ELLIS, Col., R.E.,
Madras Representative.

9th May 1914.

ENCLOSURE.

STATEMENT showing balance in Mysore reservoir from November 1905 to June 1906 under new classification and standard classification.

Half-months.	Classifications <i>H</i> and <i>O</i> balance in the reservoir. New classification 900 cusecs draw-off for power.	Classifications <i>H</i> and <i>B</i> balance in Mysore reservoir as per working table standard classification 1,000 cusecs draw-off for power.
1905—		
October second-half	27,168	26,145
November first-half	25,420	24,667
second-half	23,672	23,204
December first-half	22,202	22,004
second-half	20,620	20,680
1906—		
January first-half	19,342	19,252
second-half	18,723	18,623
February first-half	17,476	17,691
second-half	15,899	16,415
March first-half	14,010	14,848
second-half	11,819	13,001
April first-half	9,603	11,002
second-half	7,854	9,150
May first-half	5,145	7,267
second-half	3,584	6,054
June first-half	1,717	4,490

Exhibit Ma. 39.

Note by the Madras Representative on gauge-readings during the tentative period.

The Government of Madras instruct me to bring to notice that in the period of four years or more which must elapse between the dissolving of the Arbitration committee and the fixing of permanent proportion factors that a most accurate record of gauge-readings at various places in Mysore and Madras are necessary for the purpose of the further inquiry necessary for fixing permanent factors.

It is even more necessary to ensure the accuracy and admissibility of the gauge-readings on which the permanent factors must be fixed than of the gauge-readings on which water will be regulated under the rules of working the reservoir after the work comes into operation.

2. It is therefore desirable that the steps to be taken to secure the accuracy of such gauge-readings and their acceptance by both parties should now be arranged so that the necessary arrangements may at once be made to give effect to them as may be agreed on, so that time may not be lost in future correspondence as disagreements arise with regard to the necessities involved in procuring the data required for the future settlement of proportion factors and the acceptance by both parties of such data.

6. The Government of Madras therefore put forward the following proposals and hope that they may be acceptable to Mysore and may be treated as non-contentious.

It is asked that whatever may be now agreed on should be formally recorded in proceedings for the guidance of both parties during the four years' period of enquiry which is to follow:—

Proposed rules for gauge-readings and records during tentative period.

I. During the period of gauging and until the "tentative factors" are fixed, the following information as regards gauge-readings should be furnished between 1st June and the 31st January yearly.

(i) By Madras to Mysore Government—

Daily—Post cards showing for previous day, gauge-readings, morning and evening and shutter regulation at the Upper Anicut.

Weekly—Post card showing daily gauge-reading, Bhavani Bridge over the Cauvery, and gauge-readings of the last two anicuts on the Bhavani and the Pallipolliem anicut on the Amaravati.

(ii) By Mysore to Madras Government—

Daily—Post card with gauge-reading and detail of sluice regulation, Sivasamudram anicut.

Weekly—Post cards in approved form of gauge-readings above and below anicuts and of regulation of sluices at:—

- Sriramadevar anicut on the Hemavati.
- Alakatte anicut on the Cauvery.
- Ayerhalli anicut on the Lakshmanathirtha.
- Hulhalli anicut on the Kabbani.
- Chick Devaroy Sagar and Devaroy anicuts below Kannambadi.
- Also at any other anicuts on the Cauvery below Alakatte and on the Hemavati below Sriramadevar anicut and above Kannambadi where gauge-readings are being taken.
- Further when any new gauging stations and gauges are erected in connection with this enquiry, daily gauge-readings of each of these to be furnished weekly to the Madras Government.

(iii) Similarly for any new gauging stations which it may be agreed to establish in Madras the gaugings shall be furnished daily or weekly to Mysore as desired.

II. During this period the officers of either Government are authorised to visit without notice any of the gauging stations and to be given free access to the water and regulation registers kept by the staff of the other Government and to check generally the accuracy of the records and the method of maintenance of the same and that each Government should give the officers of the other Government every reasonable facilities and assistance in carrying out such inspections.

III. At least one automatic water level recorder to be installed within twelve months at or near each of the sites selected as standard gauging stations for the Cauvery, Hemavati and Lakshmanathirtha above the reservoir waterspread and at the standard gauging station between the dam and the Chick Devaroy Sagar anicut in Mysore and in Madras at the Cauvery dam in connection with the standard (north) gauge at that place.

That photo copies of the registers of these gauges should be made as soon as the records are removed from the recorders and copies should be at once furnished by each Government to the other during the tentative period as arranged for in the rules for regulation for the reservoir.

IV. That if either Government wish to establish a gauge station or instal an automatic water level recorder at any other stations than the above and the other Government do not agree to the necessity of the same, that the former be permitted and given facilities for carrying out such work at their own expense. The copies of gauge-readings or photos of records taken at such stations to be communicated to the other Government and facilities for inspection and verification afforded as regards such stations provided for regarding another gauging station.

V. That the discharges of the Cauvery dam shall be computed from level of the north gauge from the curve of 1909 as in the Madras Cauvery Project unless superseded by an accepted and more correct curve and method of computation.

VI. That further rules or any amendment of these rules for guidance during the "tentative period" may be made by agreement of both Governments or in case of disagreement by order of the Government of India after hearing both parties.

12th May 1914.

W. M. ELLIS, Col., R.E.,
Madras Representative.

