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G.O. No. <u>2380</u>	Press Mis.
<u>149-5</u>	
Dated <u>9-11</u>	18 <u>1948</u>

Not to be folded or roughly handled

*Proceedings of the Madras Government, Public Works Department,
9th November 1870.*

Read the following papers :—

No. 149. From R. SMITH, Esq., Executive Engineer on special duty, Madura, to the Acting Chief Engineer for Irrigation, dated Madura, 12th October 1870, No. 168.

I HAVE the honour to submit the subjoined report showing the progress made, during September 1870, with the investigation and preparation of the Perryaur project.

2. The setting out of the main channel on the north of the Vigay has been completed, and the general arrangements connected with the branch lines of irrigation in this section of the scheme have been decided on.

3. The principal channels on the south of the Vigay have been staked out and surveyed, and I expect the whole of the field-work on this bank of the river will be finished about the 20th of the current month.

4. Annexed is an abstract of the surveying and levelling operations executed during the past month.

Where engaged.	Bank and Names.	MILES OF CHANNEL SET OUT.		Square miles of country surveyed.	Lineal miles of country surveyed.	LEVELLING OPERATIONS. Aggregate length of longitudinal and transverse Sections in miles.	Miles plotted.	Number of permanent bench marks fixed.	Number of trial pits sunk to the full depth.	Remarks.
		Main lines.	Branch lines.							
North of the Vigay.	Lieutenant C. H. P. Christie, R.E.	14½	...	...	...	41	...	10	69	Engaged going over ground two days; office duties eight days; delayed by rain one day.
	Surveyor Walter ...	...	...	9½	...	26	9½	...	...	Office duties three days; delayed by rain one day; sick in camp two days. Two days sick.
South of the Vigay.	Lieutenant M. Greer, R.E.	18	24	...	...	9	43	10	65	
	Surveyor C. Sashachellum Moodelliar	15	21	6	...	24	21	8	30	One day sick.
	Surveyor Chinniah Pillay.	...	1½	9	8½	55	56	5	...	
	Do. Kristna Row.	...	...	...	75	...	...	...	...	
	Total...	47½	46½	24½	83½	155	134½	33	164	Principally round tanks, and along roads.

No. 203.

No. 150. *Note by the Acting Chief Engineer for Irrigation.*

MR. R. SMITH having reported that the surveys of the distribution works from the Vigay in connection with the Perryaur project would be completed by about the end of September, I went to Madura for the purpose of discussing with Mr. Smith any points which it might be advisable to consider and settle before the designs for the works and the estimates were drawn up, and I beg now to submit, for the information of Government, a few remarks on this part of the project.

2. On the north of the Vigay it is proposed to have 96,000 acres of irrigation, of which 18,000 acres are at present irrigated, and 78,000 are intended to be supplied by Perryaur water. The project presents some difficulties which have not generally to be encountered, or at least not to the same extent as in the present case. It appears that, except perhaps in extraordinary floods, the freshes of the Vigay are entirely absorbed by existing works of irrigation, and that no water finds its way to the sea. Moreover, in the lower part of its course this river runs through Zemindary lands, and the extremely variable character of the water-supply renders it very difficult to estimate what the water shares of the successive channels, which take off from the Vigay, may be. These channels have open heads, and there is little or no information on record as to the supply actually received. This supply is dependent upon the character of the season; if the freshes are moderate and protracted for instance, the channels under the Perany and Chittany, anicuts at the heads of the Vadakara and Tenkara (north and south banks) channels, respectively, get a large quantity of water and comparatively little passes to the eastward; while if the freshes are short and heavy, those channels obtain but a poor supply, and the great bulk of the water goes on and is taken up successively by the lower channels.

3. If the freshes of the Perryaur be diverted into the Madura District, this additional supply will be thrown first into the Sooroolyaur, and thence will flow into the Vigay. Although across the former river there are numerous anicuts, under which a considerable area of land is highly irrigated, this circumstance will not create any material difficulty, because the irrigated lands all drain back into the river and, provided the area of irrigation be not extended, even should more water be taken off by the anicut channels than at present, the excess will find its way back, without any diminution of importance, to the natural and only line of drainage.

4. The circumstances of the Vigay render it necessary, that the quantity of water received from the Perryaur should be at all times known, and that so much, and only so much, should be taken off to supply the lands which it is proposed to irrigate newly. There appears to be no other way of meeting or preventing the objections which would inevitably be raised to the opening of new channels from the Vigay, or to any radical improvement of the existing channels belonging to the Government.

5. There are some additional complications, which will need careful treatment, arising from the claims of Zemindary and Covil villages to the surplus from Government irrigation works. These claims make it by no means an easy task to arrange, on the one hand, for no material diminution of the customary supply which, it will be readily understood, is not capable of accurate estimation, and, on the other hand, for preventing the Perryaur water from finding its way to villages or lands which might not be entitled to use it.

6. On the north side of the Vigay it would seem that the difficulties of all kinds to be surmounted are, on the whole, less formidable than is the case on the south, but they are nevertheless such as to indicate a particular treatment of the project as being highly desirable, and probably also absolutely necessary. As before noticed, the water taken off from the Vigay must correspond with that

thrown into it from the Perryaur. This latter river has a discharge fluctuating between wide limits, and its minimum discharge would suffice for but a very small portion of the area to be irrigated. Water, therefore, must be stored, so that a regular supply to the fields may be ensured. In the tract of country to the north of the Vigay there are no facilities for the storage of Perryaur water. There are indeed very many small tanks, from which the 18,000 acres of existing irrigation, referred to in paragraph 2 above, are supplied, but most of them are mere ponds, which could not economically be used for storage purposes even were their enlargement feasible, and this is generally not the case, because the extension of the water spread would submerge valuable lands, besides rendering it difficult to deal with existing interests.

7. On the south side of the Vigay there is a chain of hills running parallel to the river for a distance of about 16 miles from the Chittany, and the area of land commanded by the channel from that anicut is in that length only about 4,000 acres. Mr. Smith, as far as he can judge at present, thinks that it would cost less to build another anicut across the Vigay about 6 miles west of Madura than to undertake the improvement and enlargement of the Chittany and Nelayaur channels. Comparative estimates will, however, be prepared, so as to show what arrangements would be the most economical. The Nelayaur channel supplies the Nelayaur tank, which is the largest in this part of the country, and is estimated to hold 24 millions of cubic yards. Any scheme for the extension of irrigation on this side would necessarily, in the absence of storage on the sources of supply, include the use of this tank as a reservoir, and Mr. Smith's channels for the greater part of the area to be watered to the south of the Vigay accordingly take off from or are connected with it. It is certain nevertheless that this arrangement would be attended with very considerable difficulties, owing to the number of interests in Covil and Zemindary villages which are involved, and I am disposed to think that, both on account of the limited character of the Perryaur water-supply, and of the greater need of water on the north side of the Vigay, it will probably be found better, at least in the first instance, to arrange for confining the distribution of the additional water to the north bank. It will also be more economical to do this than to divide the supply, which may be available, between the lands on the two sides of the river, and, so far as the information as yet obtained will enable an opinion to be formed, there is land on the north side available for the utilization of much more water than the Perryaur is likely to afford.

8. So much work has been done, however, in ascertaining the circumstances of the country on the south side, that it will be well to put this part of the project on paper, and I have asked Mr. Smith therefore to prepare estimates for the alternative methods of conveying the main supply from the Vigay, and also to divide the proposed irrigation under the Nelayaur reservoir into three groups:—

1st.—that at or under the east end of the tank, which should also be capable of being supplied direct from the river channel, instead of through the tank;

2nd.—that to be supplied from the west end of the tank;

all or nearly all the above irrigation would be in villages which have at present a claim to tank water, and there would probably be comparatively little difficulty in arranging for the extension of the irrigated area.

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9th November 1870.*

3rd.—That to be supplied by a new channel to the Orepanur and other tanks, which are now unconnected with either the Vigay or the Nelayaur tank. This area should be considered entitled to surplus water only, and the sill of the sluice to be built at the head of the channel in the Nelayaur tank bund should be placed six or seven feet higher than those of the sluices for the supply of villages now under this tank.

9. At present there is detailed information of the discharge of the Perryaur for a part of one year only, namely, from July 1869 to February 1870. Owing to some misconception, arrangements were not made at the commencement of the present healthy season (July) for continuing the observations, and it did not occur to me, when Mr. Smith proposed to retain both his Assistants in the plains for pushing on the distribution surveys, that this was likely to involve the omission of a daily record of the state of the river. I have requested that arrangements may immediately be made for putting up gauges and registering the water level, and that this should be done is the more important, because, in 1869, the November discharge of the Perryaur appears to have been abnormal, and it will be of great advantage to see whether the north-east monsoon freshes are usually as considerable as they were last year. The registers of 1869-70 give the discharge of the Perryaur in each month as follows:—

July	89.672	millions of cubic yards.
August	102.066	" "
September	67.424	" "
October	70.829	" "
November	496.396	" "
December	100.160	" "
January	56.184	" "
February	25.566	" "

The additional area to be irrigated north of the Vigay has been already mentioned as being 78,000 acres; that on the south side is estimated at 23,000.

For the former the average monthly supply required at the rate of 2 cubic yards per acre per hour would be...

And for the latter ... 112.32 millions of cubic yards.

Total ... 145.44 "

The principal or five months' crop would require the full supply for 4½ months, which, for 101,000 acres, would amount to 654.48 millions of cubic yards. On the two

North of the Vigay area commanded, exclusive of 20 square miles of hilly ground, 280 square miles or Acres... 179,200

At present irrigated ... 18,000
Proposed to be irrigated ... 78,000

Total Acres ... 96,000

The particulars for the south of the Vigay will probably give nearly similar results.

sides of the river also, if water be available, there might perhaps ultimately be 40,000 acres of second crop needing water for three months, and this cultivation would not necessarily be on the same lands as the first crop, as the irrigated area for the latter is only about one-half the area commanded. The water for the 40,000 acres would be 172.80 millions of cubic yards. For the—

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First crop the quantity required in the fields would be	654.48
Second crop	172.80
	827.28

The total discharge of the river as above given is 1,008.30 millions, but probably 300 millions out of the 496.39 of November 1869 would have been discharged to waste, and 708.30 would then have remained available. March to June, for which there are no records, may be supposed capable of providing, under arrangements which will be noticed presently, 150 millions, making the total water-supply in round numbers 860 millions of cubic yards. From the tables of discharge, however, it will be seen that a considerable quantity of water must be stored in order to maintain a regular supply, and therefore, while the quantity used for irrigation would be 827.28 millions, that to be provided I would estimate as follows:—

Required on the lands	827.28
Allowance for wastage en route one-fifteenth	55.15
Wastage on 160 millions stored at one-third	53.33

Total supply required from Perryaur ... 935.76

10. These figures afford the best information, on the subject of the water-supply and what can be done with it, which I can at present give. They indicate that it will be prudent in the first instance, until more is known of the irrigating capabilities of the Perryaur, not to carry out too extensive a system of distribution in the plains of Madura, and for the reasons already noticed I would recommend that distribution be confined at starting to the north side of the Vigay. In the next place it will be seen that all the water of the upper part of the Perryaur, except a part of the discharge in extreme freshes, can be made use of, provided arrangements can be made for its storage, and these, I think, will be found to be practicable. In the plains of Madura there are no facilities for the construction of reservoirs, and land is valuable: similarly in the Cumbum valley I am not sanguine that any good site will be found. Moreover, were either of these localities used for storage, the channels for conveying Perryaur water to the reservoirs would be costly. I think, therefore, the basin of the Perryaur itself should be looked to to afford the storage, required. The area of the water surface at the 174 feet level, which is that for which Lieutenant Pennycuik is working out the details of the head works, is about 3½ square miles, or, in round numbers, 10½ millions of square yards. The sill

* Area at 174, 10½ millions square yards.
" 155, 5½ do.

2) 16

Average area 8 millions square yards.

Depth ... 6½ yards.

Contents ... 50½ millions cubic yards.

of the cutting through the water-shed is intended to be at 155, and the storage below 174 may therefore be considered to be about, 50* millions of cubic yards. I propose to raise the lake surface to about 213, thereby increasing the depth 39 feet or 13 yards, and the average area for this increased depth may be taken at

4 square miles or 12 millions of square yards, and the storage would be 156 millions of cubic yards which, added to the storage below 174, would give a total storage above the sill of the water-shed channel of 206 millions of cubic yards. With this

arrangement no Perryaur water would pass over the waste weir back into the river below the dam, except in extraordinary freshes, for the lake would absorb all the water under ordinary conditions of the river. At the water-shed channel there should be regulating sluices, and by their means the discharge from the lake would be accurately limited to the wants of the irrigation in Madura, and, moreover, there would be no difficulty whatever in ascertaining exactly the quantity discharged, and in arranging for the withdrawal of a similar quantity at the heads of the new channels: consequently it would be easy to prevent any interference with the present supply of the Vigay, and the project would in this important respect be free from objection.

11. Another advantage of this arrangement will be that a good many of the small shallow tanks in Madura will be rendered unnecessary. The beds of these tanks will, it is expected, sell for Rupees 100 an acre, and it is estimated that at least 5,000 acres will be available for disposal in this way. I was informed that in three villages, near the lower end of the northern channels, there are upwards of 180 small tanks, and to dispense with these for storage purposes cannot but be an advantage, if better storage can be provided on the waste lands in the basin of the Perryaur. Mr. Smith has been asked to have comparative estimates of the cost of the head works for the 174 and about* 213 levels respectively made out. The main bund or dam will be considerably increased in cost; there will also be a considerable addition to the quantity of work to be done at the water-shed for, in addition to the greater elevation of the regulating sluices, there will be a considerable length of earthen bund required, though I think nearly the whole of it may be silted. On the other hand, the cost of the escape weir will probably be much reduced, the distribution works on the north of the Vigay will be reduced by several lacs, and some five lacs of rupees will be obtainable by the sale of tank beds.

12. Mr. Smith has been requested to design the main northern channel to carry 1,500 cubic feet a second with a depth of 6 feet. The maximum velocity in ordinary soil has been fixed at 3 feet a second. The discharge above given allows a maximum of 2.63 cubic yards per acre per hour, and I have thought it better to give this margin of about one-third in excess, in order to admit of compensation, should the supply in the Perryaur be much below the average for a few days at a time; but for this, 1,140 cubic feet a second would have sufficed. For the southern main channel a like proportion of water will be allowed, only there, in addition to the water for the extension of irrigation, the channel, or a part of it, must be capable of carrying the supply for the present area, for whether the offtake be retained at the Chittany, or be placed at a new anicut lower down the river, in the one case the whole length, and in the other some part, of the present channel to the Nelayaur tank will have to be made use of. In either case 455 cubic feet a second of Perryaur water, in addition to the supply now derived from the Vigay by the Tenkarai and Nelayaur channels, will be provided for.

13. In concluding these observations, I have much pleasure in bringing to the notice of Government the favourable account which Mr. Smith has given me

of the way in which Lieutenants Christie and Greer have done their work. I was myself glad to find that they had given attention, while carrying on survey operations, to the collection of information regarding revenue details bearing on the project, and to the circumstances of the land tenure, water claims, etc., all of which must influence the details of the scheme, which has to be worked out so as to realize the wishes of the Government, and at the same time to interfere as little as possible with existing rights and interests.

14. A sketch map of the channels, as laid out, accompanies this Note.

FORT SAINT GEORGE,
18th October 1870.

(Signed) J. MULLINS, Major, R.E.,
Acting Chief Engineer for Irrigation.

No. 151.

ORDER THEREON, 9th November 1870, No. 2,680.

IRRIGATION, No. 8.

THE Government are glad to learn that the surveys which are being made in connection with the project for turning the Perryaur into the Vigay, with a view to the extension of irrigation in the Madura District, show that 78,000 acres to the north of the latter river and 23,000 acres to the south are suitably situated for conversion into wet cultivation in addition to the land already watered, and may be irrigated if certain arrangements which the Chief Engineer describes, having for their object not only the storage of the waters of the Perryaur in their own basin, but the regulation of their admission into the Vigay and their distribution, be adopted. From the information as yet collected of the monthly discharge of the Perryaur at the site where it is proposed to turn it from its course, Major Mullins calculates that, although the flow is not regular enough to maintain a proper supply to any thing like the area of land capable of irrigation from it, the aggregate quantity of water that may be made available amounts in round numbers to 860 millions of cubic yards. Allowing 2 cubic yards per acre per hour for the 4½ months during which a first crop requires a full supply, and for the three months which suffice for maturing a second crop, this would afford an ample supply for a first crop on the whole of the 101,000 additional acres ascertained to be irrigable, and on 40,000 acres of second crop. Wastage will, however, in the opinion of Major Mullins, considerably diminish the quantity of water to be always relied on, and, taking this into consideration as well as the difficulties which, owing to complications arising from the claims of Inamdars and Covil villages, he anticipates will be experienced in dealing with the customary supply of the Vigay, on the one hand, and of preventing Perryaur water being used by villages not entitled to it on the other, he would in the first place confine the distribution to the north of the Vigay, where it seems water is more needed than on the south and the difficulties of arranging its supply comparatively less. To this point the Government will be prepared to give their fullest consideration when the plans, which Major Mullins states will show the scheme in its entirety on both sides of the river, come before them, and with respect to the arrangements by which Major Mullins thinks it will be possible to store the whole or nearly the whole of the waters of the Perryaur at the site selected for the dam on the hills, His Excellency, the Governor in

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Council, recognizing the great advantage of having at command the whole supply of that river and of being able to regulate its discharge to the eastward as occasion may require, will be happy to give his most favourable attention to any scheme by which so desirable an object may appear to be made feasible.

(True Extract.)

Colonel, R.E.,
Secretary to Government.

To the Chief Engineer for Irrigation.
" Superintending Engineer, 8th Division.
" Revenue Department.
To Mr. R. Smith, Executive Engineer, on special duty, Madura.

Exd. S. T. Augustin:

N. 168. Special Executive Engineer, Office
Madura 12th October 1870.

96
To,
R. Smith Esq.
Executive Engineer, Office
Madura District.

Major J. Mullins R.E.
Acting Chief Engineer for Irrigation
Madras.

Sir,
I have the honor to submit
the subjoined report showing the progress
made, during September 1870, with the
investigation and preparation of the
Perruau project.

2. After getting out of the main
Channel, on the North of the Vigar,
has been completed, and the general
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lines of irrigation in this section of
the Scheme, have been decided on.

3. The principal Channels, on the
South.

It. Annexed is an abstract
of the Surrender and Bellona operations
executed during the past month. —

South of the
Columbia.

Yours most Obedient Servant
G. Smith

Smith

ms. B. 1. 1. 1. 1.

Off 1870 Acct.
 No. 168.
 From No. 4354
 U. S. Co. Engineer
 On a special duty
 Madrid, Spain
 U. S. Chief Eng.
 for irrigation

Dated 12th
 Oct. 12th } October 1890.
 Received 14th
 Recd. - 31st

Submits the report showing
 the progress made during
 the year 1890, with the
 investigations and preparation
 of the Peruvian Project. -

No 2680-9 Nov 5/90.

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12 208
 • Vote by the Acting Chief Engineer for Irrigation

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 of the distribution works from the Vigan in connec-
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channels for the greater part of the area to be watered to the South of the Vigay accordingly take off from or are connected with it. It is certain, nevertheless, that this arrangement would be attended with very considerable difficulties, owing to the number of interests in Civil and Zemindary villages in which are involved, and I am disposed to think that, both in account of the limited character of the Peryan water supply, and of the great need of water on the North side of the Vigay, it will probably be found better, at least in the first instance, to arrange for confining the distribution of the additional water to the North Bank. It will also be more economical to do this than to divide the supply, which may be available, between the lands on the two sides of the river, and, so far as the information as yet obtained will enable an opinion to be formed, there is land on the North side available for the utilization of much more water than the Peryan is likely to afford.

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- 1st that at or under the East end of the Tank, which should also be capable of being supplied direct from the river channel, instead of through the Tank;
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 the absence of storage on the sources of supply, include
 the use of this Tank as a reservoir, and Mr Smith
 channels

North of the Vigar
 area commanded, ex-
 clusive of 20 square
 miles of hilly ground,
 280 square miles or
 acres — 172.80
 at present irrigated 18000
 proposed to be irrigated 78000
 Total acres 96000

The particulars for
 the South of the Vigar
 will probably give
 nearly similar
 results.

sides of the river also, if water be available, there
 might perhaps ultimately be 40000 acres of second
 crop needing water for 3 months, and this cul-
 tivation would not necessarily be on the same lands
 as the first crop, as the irrigated area for the latter
 is only about one half the area commanded. The
 water for the 40000 acres would be 172.80 millions
 of cubic yards. For the

1st Crop the quantity required in the
 fields would be 654.48
 2nd Crop 172.80
827.28

The total discharge of the river as above given is 1008.30
 millions, but probably 300 millions out of the 1096.39
 of November 1869 would have been discharged to waste,
 and 708.30 would then have remained available.
 March to June, for which there are no records, may
 be supposed capable of providing, under arrange-
 ments which will be noticed presently, 150 millions,
 making the total water supply in round numbers
 850 millions of cubic yards. From the tables of dis-
 charge however it will be seen that a considerable
 quantity

quantity of water must be stored in order to maintain a regular supply, and therefore, while the quantity used for irrigation would be 827.28 millions, that to be provided I would estimate as follows

Required on the lands	827.28
allowance for wastage enroute $\frac{1}{15}$	55.15
wastage on 160 millions stored at $\frac{1}{3}$	53.33
Total supply required for Peryaour	<u>935.76</u>

These figures afford the best information on the subject of the water supply and what can be done with it, which I can at present give. They indicate that it will be prudent in the first instance, until more is known of the irrigating capabilities of the Peryaour, not to carry out too expensive a system of distribution in the plains of Madura, and for the reasons already noticed I would recommend that distribution be confined at starting to the north side of the Vijay. In the next place it will be seen that all the water of the upper part of the Peryaour, except apart of the discharge

discharge in extreme freshes, can be made use of, provided arrangements can be made for its storage, and these I think will be found to be practicable. In the plains of Madura there are no facilities for the construction of reservoirs, and land is valuable; similarly in the Cumburn valley I am not sanguine that any good site will be found. Moreover were either of these localities used for storage the channels for conveying Peryaour water to the reservoirs would be costly. I think therefore the basin of the Peryaour itself should be looked to to afford the storage required. The area of the water surface at the 174 feet level, which is that for which Lt. Prinsep is working out the details of the head works, is about $3\frac{1}{2}$ square miles, or in round numbers $10\frac{1}{2}$ millions of square yards. The sill of the cutting through the water shed is intended to be at 155, and the storage below 174 may therefore be considered to be about 50 millions of cubic yards. I propose to have the lake surface to about 213 thereby increasing the

* Area at 174 - $10\frac{1}{2}$ millions of sq. yds.
 " " 155 - $5\frac{1}{2}$ do.

2 16
 Average area depth - $8\frac{1}{2}$ millions of cu. yds.
 Contents - $6\frac{2}{3}$ millions of cu. yds.

the depth 39 feet or 13 yards, and the average area
 for this increased depth may be taken at 4 square
 miles or 12 millions of square yards, & the storage
 would be 156 millions of cubic yards which, add-
 ed to the storage below 174, would give a total
 storage above the sill of the water shed channel of
 206 millions of cubic yards. With this arrange-
 ment no Peryaur water would pass over the waste
 weir back into the river below the dam, except in
 extraordinary freshes, for the lake would absorb
 all the water under ordinary conditions of the river.
 At the water shed channel there should be regu-
 lating sluices and by their means the discharge
 from the lake would be accurately limited to
 the wants of the irrigation in Madura, and more-
 over there would be no difficulty whatever in as-
 certaining exactly the quantity discharged, and in
 arranging for the withdrawal of a similar quantity
 at the heads of the new channels: consequently
 it would be easy to prevent any interference with
 the present supply of the Vijay, and the project
 would

would in this important respect be free from
 objection.

11. Another advantage of this arrangement
 will be that a good many of the small shallow
 tanks in Madura will be rendered unnecessary.
 The beds of these tanks will, it is expected, sell
 for Rupees 100 an acre, and it is estimated that
 at least 5000 acres will be available for disposal
 in this way. I was informed that in 3 villages
 near the lower end of the northern channels there
 are upwards of 180 small tanks, and to dispense
 with these for storage purposes cannot but be an
 advantage, if better storage can be provided in the
 waste lands in the basin of the Peryaur. Mr
 Smith has been asked to have comparative es-
 timates of the cost of the headworks for the 174 &
 about 213 levels respectively made out. The main
 bund or dam will be considerably increased in
 cost; there will also be a considerable addi-
 tion to the quantity of work to be done at the water-
 shed for in addition to the greater elevation of the
 regulating

† General level can
 be determined when
 the saddles available
 for smaller weirs have
 been fully examined.
 Any level between 200
 & 220 would probably
 answer.

regulating sluices, there will be a considerable
length of earthen bund required, though I think
nearly the whole of it may be silted. On the
other hand the cost of the escape water will pro-
bably be much reduced, the distribution works on
the north of the Vijay will be reduced by several
lacs, & some 5 lacs of Rupas will be obtainable
by the sale of tank beds.

12. Mr Smith has been requested to de-
sign the main northern channel to carry 1500
cubic feet a second with a depth of 6 feet. The
maximum velocity in ordinary soil has been fixed
at 3 feet a second. The discharge above given allows
a maximum of 2.639 ft per acre per hour, and I
have thought it better to give this margin of about
 $\frac{1}{3}$ in excess, in order to admit of compensation, &
should the supply in the Peryaur be much below
the average for a few days at a time: but for this,
1140 cubic feet a second would have sufficed. For
the Southern main channel a like proportion of
water

water will be allowed, only, there, in addition to
the water for the extension of irrigation, the channel, or
a part of it, must be capable of carrying the supply
for the present area, for whether the offtake be re-
tained at the Chittany, or be placed at a new
ancient lower down the river, in the one case the
whole length, & in the other some part, of the present
channel to the Delapur Tank will have to be main-
tained. In either case 455 cubic feet a second of
Peryaur water, in addition to the supply now de-
rived from the Vijay by the Tenkarai & Delapur
channels, will be provided for.

13. In concluding these observations, I
have much pleasure in bringing to the notice of
the Government the favorable account which
Mr Smith has given me of the way in which Mr
Christie & Greer have done their work. I was myself
glad to find that they had given attention, while
carrying on Survey operations, to the collection of
information regarding Revenue details bearing on
the

the project, & to the circumstances of the land tenure,
water claims, &c all of which must influence the
details of the scheme, which has to be worked out so
as to realize the wishes of the Government, and at
the same time to interfere as little as possible with
existing rights and interests.

[14.] A sketch map of the channels as laid
out accompanies this note.

Fort St. George, Volundumins Major R.
October 1870 Acting Chief Engineer for Irrigation

The Secretary to Government
P. M. Dep. with one
enclosure -

the project, & to the circumstances of the land tenure.

1870
From the
The Acting Chief
Engineer for Irrigation
To
The Secretary Govt.
P.W. D.

Dated 18th
Sept 22nd } October 1870
Recd 25th

No. 208
Enclosure 11/2

Note on the distribution
works of the Vijay in con-
nection with the Peryour
project.

No. 208-9 Nov 70

No 150

No 150

6th Oct 1870 Dec 28

268 P.W.D.
Proceedings of the Madras Government
Under date the 9th Oct 70
Read the following
From the Ex. Engr on Special duty } (H.E. No. 168 of 12th October 70)
The Asst Chief Engineer }
for Irrigation } (H.E. No. 208 of 18th Oct 70)

The Government are
glad to learn that the surveys
which are being made in con-
nection with the Project for
turning the Peryour into
the Vijay, with a view to the
extension of irrigation in the
Madras District, show that
78,000 acres to the north of the
latter river and 23,000 acres
to the south are suitably
situated for conversion into
wet cultivation in addition
to the land already watered,
and may be irrigated, if
certain arrangements which
the

the Acting Chief Engineer describes, having for their object not only the storage of the waters of the Perryaur in their own basin, but the regulation of their admission into the Vijay and their distribution he adopted. From the information as yet collected of the monthly discharge of the Perryaur at the place where it is proposed to turn it from its course, Major Mullins calculates that although the flow is not regular enough to maintain a proper supply to anything like the area of land capable of irrigation from it, the aggregate quantity of water that may be made available amounts in round numbers to 80 millions of

358
Cubic yards. Allowing 3 cubic yards per acre per hour for the $4\frac{1}{2}$ months during which a first crop requires a full supply, and for the three months which suffice for maturing a second crop, ~~this~~ ^{the} would afford an ample supply for a first crop on the whole of the 1,01,000 additional acres ascertained to be irrigable, and on 40,000 acres of second crop. Washage will however, in the opinion of Major Mullins, considerably diminish the quantity of water to be always relied on, and taking this into consideration as well as the difficulties which owing to complications arising from the claims of Guandars and Cool Villages, he anticipates

will be experienced in dealing with the customary supply of the Vijay on the one hand and of preventing Perryaur water being used by villages not entitled to it, ^{on the other,} he would in the first place confine the distribution to the north of the Vijay, where it seems water is more needed than on the South and the difficulties of arranging its supply comparatively less. To this point the Govt. will be prepared to give their fullest consideration when the plans, which ^{Major} Mullins states will show the scheme in its entirety on both sides of the river, come before them, and with

respect to the arrangements by which Major Mullins thinks it will be possible to share the whole or nearly the whole of the waters of the Perryaur at the site selected for the dam on the hills, His Excellency the Governor in Council, recognizing the great advantage of having at command the whole supply of that river and of being able to regulate its discharge to the eastward as occasion may require, will be happy to give his most favorable attention to any scheme by which so desirable an object may appear to be made feasible.

46
5-
To
3 Chief Engineer for Irrigation
6 S. Engr. & Dn
21 Dec. 1890

[Signature]

12

14/12/1870

Order 239 1870

t. of 1870 Madras.

PUBLIC WORKS.

Chief Engineer for
Irrigation

Further No 1236 of 5-7

O. G. No. 2680.

Nos. 149 @ 151

Our object. Piping orders
in the State by the Chief Eng for
Irrigation in the distribution
works of the Tigris in con-
nection with the Perrygar
canal.