6.11.07 / 16 ✓
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20-1-96 II ✓
19-10-39 III ✓

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Revenue (1897) Department.

MISCELLANEOUS SERIES.

G.O., No. 297

DATED 19th January 97

[Despatch Abstract.]

Communicating to the Board of Revenue &c. Public Works Department, passing orders on note by the chief Engineer for Irrigation submitting reports on the recent Floods in the South Arcot Dt.

BACK PAPERS.

G.O.	No.	Department.	Date.	G.O.	No.	Department.	Date.

FURTHER PAPERS.

G.O.	No.	Department.	Date.	G.O.	No.	Department.	Date.

Revenue (1899) Dept.

P 4485-8/17-1-99

IRRIGATION.

Government {1899} of Madras.

PUBLIC WORKS.

Current No. 270

Recd. 12th January 1899.
Regd.

Enclosures

Spare copies

G.O., No. 38 I., 6th January 1899.

P/194

JANUARY.

G.O. Mis. No. 297 dt. 19th Jan. 1899.
Communicated to the Board of Revenue.

17 To the Board of Rev (Rev. cell)
Secs. 21-1-99

Floods in the South Arcot District 16-1-99 18-1-99

Passing orders on note by the Chief Engineer for Irrigation submitting reports on the recent —.

24/1/99

GOVERNMENT OF MADRAS.

PUBLIC WORKS DEPARTMENT.

Irrigation.

READ—the following papers :—

Memorandum to the Supg. Engineer, V Circle, dated 3rd December 1898, No. 105 S.A.
From the Superintending " V " " 11th " " " 4 E.I./C.

From Colonel C. C. RAWSON, R.E., Superintending Engineer, V Circle, to the Chief Engineer for Irrigation, dated Chepâk, 21st December 1898, No. 484 E.I.

In continuation of this office No. 4 E.I./C., dated 11th December 1898, I have the honour to forward in original, with enclosures (to be returned when done with), letter No. 850 S.E., dated 15th December 1898, from the Executive Engineer, South Arcot division, reporting on the floods of October and November 1898.

The chief lesson to be learned by these floods is apparently that the length of the Vriddhachalam anicut is quite inadequate and that it ought to be lengthened.

ENCLOSURES.

From C. A. SMITH, Esq., Executive Engineer, South Arcot Division, to the Superintending Engineer, V Circle, dated Camp Cuddalore, 15th December 1898, No. 850 S.E.

[Reference—Your No. 35 S.A./C., dated 8th December 1898.]

I have the honour to state that, having reported demi-officially the safety of the most important anicuts and the most serious damages elsewhere, I thought there would be little use in sending in an incomplete official report and that it would be better to wait till I had received full information from the Sub-divisional officers. Owing to the second flood which followed the other so closely and to the Sub-divisional officers and subordinates as well as myself having been fully occupied in outdoor work in connection with the floods, there has been some delay in collecting information and compiling reports.

However, I now submit the following report, which, for the above reasons, is necessarily still incomplete.

2. From the enclosed rainfall statement for October and November it will be seen that the rains have been exceptionally heavy, and the falls on 4th and 5th November caused heavy floods on the 6th idem in all the rivers except Coleroon which fortunately was not affected though there was a heavy flood in that river also very shortly afterwards.

3. The Vellar at Pelandorai rose to 11⅓ feet over the new crest level, which is probably rather less than the flood of 1884, but not nearly as high as that of 1880. I inspected this anicut on 11th December and found that, as far as could be seen, no damage of importance has occurred. There are, however, some points in connection with the effect of the new shutters which I will report on in detail separately.

4. The Manimukthanady rose to 14⅓ feet at Vriddhachalam bridge, which is said to be a maximum flood for this river.

It caused serious damage to the Mehmatur anicut system as stated in Sub-divisional officer's report.

5. At Vriddhachalam anicut 10⅓ feet was gauged on crest, but no damage appears to have been done to the anicut.

The spill over right bank where Kamangudi odai joins about a mile above anicut swept over a strip of country about ¾ mile wide and breached across the south main channel and joined the river just below anicut the cross current thus developed caused the left margin to be eroded within 20 feet of the rest-house.

I inspected this on 10th December and it is being protected by horses and modassal work. It is necessary to consider the question of this spill carefully as it must either be stopped and the waterway of anicut increased or it must be recognized and proper works provided to pass it over south main channel.

6. *Kattumylore anicut.*—The flood gauged 8·50 feet on crest but except for the washing away of some coping stones the anicut does not appear to have been damaged.

(i) The flood bank above anicut was breached in three places but not seriously and there were several breaches in the main channel.

7. The simultaneous high floods in both Vellar and Manimuktanady caused a flood of 11⅓ feet on Shatiatope anicut crest which from an examination of the old registers before the bridge was cut back appears to have been equivalent to about 13⅓ feet before the alteration or within 6 inches of the 1884 flood when 14 feet was gauged. (M.F.L. of 1880 was 15 feet.) I inspected this anicut on 8th November and 9th December, but as it was not possible to examine the aprons. It is believed, however, that no serious damage has occurred.

Proper soundings will be taken as soon as water permits. The river margin above anicut has eroded badly on left bank and some groynes will probably be necessary.

The Vellar as usual overflowed both its banks above and below anicut, the spill on the right bank filling Veeranam tank to a dangerous extent and causing much damage along the Khansaib's canal to banks of irrigation channels, roads and crops, &c.

The left bank spill similarly caused heavy floods in Wallajah and Perumal tanks.

In the former tank a bad scour has been formed between upstream wing of No. 1 weir and the wing of the new supply vent to Perumal tank. This will be examined and reported on when water permits.

In Perumal tank serious breaches are reported at south end, where the Paravanar enters the tank, but these occur in all large floods and cannot be avoided though it is hoped that something may be done to minimise the damage in future.

It is thought that if lift shutters are fitted to Shatiatope anicut, the reduction in afflux will be of great benefit in decreasing the spill above anicut which in itself would justify considerable expenditure.

8. The Sub-divisional officer's report gives details of damages done in Chidambaram taluk which will be reported on hereafter in connection with the drainage scheme.

9. The Gaddilam rose to 7·10 feet, 7 feet and 10 feet on Tiruvady, Vanamadevi and Tiruvandipuram anicuts, respectively, but owing to the position of the gauges these do not represent the true readings.

I inspected these anicuts on the 7th December and as far as can be ascertained no damage has been done. At Vanamadevi the right flood bank breached between anicut and head sluice, but has since been closed. At Tiruvandipuram the road breached just above the head sluice and to save the latter a ring bund was put up in continuation of the existing flood bank. It is advisable to permanently extend this flood bank to the high ground as flood water passing down this channel causes damage in Cuddalore Old Town as well as to the channel.

10. The most serious damage of all in the division has been caused by the Ponniar which breached its south bank in three places above railway bridge and its north bank in two places.

Also there were two breaches in Malattar right bank and as the water from these breaches damaged the railway, steps were taken to close them as early as possible.

The Malattar breaches and those on the south bank of Ponniar over 1,000 feet long were all closed by about the 25th November and fair progress had been made with that in north bank. This, however, was rather a troublesome one to close as it was about 2,000 feet long and as all the country round was submerged it was only possible to close a good part of it by means of sand bags and stakes, &c. However, as the river fell material became available and by the end of the month a strong bank within about 3 feet of top of old bank had been raised and its toe protected in front with palmyra stakes and sand bags for its whole length.

The slope was also protected with cocoanut keeths. On the 30th night, however, the river again rose suddenly and in spite of all the efforts of the Sub-divisional officer and overseer to save the bund, it was topped at 2-0 A.M. and as like the rest of the old bank it was made of more or less pure sand it breached at once and within 3 hours all but about 250 feet at lower end which was rather higher had been completely washed away and about 200 feet more of the old bank at upper end also went.

11. The second flood caused considerable erosion at the remaining breaches and gave much trouble to protect them, but none of them went again except that at the Wallajah channel head sluice in south bank which again went on one side of the sluice.

12. I had left for Shatiatope on November 7th, as I had had no report from there owing to breaches in roads and was anxious for its safety.

I could only get there on 8th morning, and after inspecting Veeranam and Wallajah tanks and finding all safe returned to Chidambaram on 10th so as to be on the railway and within reach of reports from other parts of the district. I received intimation that afternoon by wire of the Ponniar breaches and arrived there on 11th morning and remained there till 19th, when I left the Sub-Divisional officer who had also been there for some days to complete the strengthening of the north breach.

I again went there on the 1st December and remained till the 6th evening, by which time a strong ring bund nowhere less than 6 feet high had been raised and protected with stakes and sand bags, and on this day about 2,000 coolies were at work and my latest report, dated 11th December, from the Sub-Divisional officer whom I left in charge shows that the bank at breach has now been raised to full height and 6 feet top width throughout and that 1,050 coolies are at work.

13. The second flood was nearly if not quite as high as the first at site of breach, and had it come a week later the ring bund might possibly have been saved. The first flood was, I believe, higher than that of 1884 at the railway bridge, but of this I am not quite sure at present.

The estimates for closing these breaches the first time came to Rs. 13,500, including nanal planting, &c., and had been sent to the Superintending Engineer, but they have now to be increased by probably Rs. 5,000.

A good deal of the work had to be done in water, but the chief trouble was the length of the breach, the first ring bund being 2,350 feet and the present one 2,550 feet.

14. In connection with these breaches, I beg to bring to your notice that temporary Upper Subordinate Harihara Subbier did very good work and showed that he possesses considerable experience in this kind of work.

Great assistance was given by the Revenue officials in procuring labour, &c., and the railway officials also assisted very materially in several ways.

15. The experience of these breaches shows that great care will have to be exercised in future to keep this river to a proper course by judicious planting and conservancy, and it will, I fear, take some years to repair the damages of these floods and make the banks safe even against ordinary floods.

I doubt if it will ever be possible to make them safe against extraordinary floods, and I think that the Railway Department should be distinctly informed of this so that they may take steps to protect themselves from damages in future.

The banks before the floods were in very fair order and the breaches were caused by erosions, the banks being everywhere sufficiently high.

16. The Ponniar also caused a good deal of damage in Kuttiankuppam village, Cuddalore taluk, including the breaching of Malaiparumal Agaram tank, principally by the breaching of the bank on both sides of the Bangaru channel head sluice (French) assisted by similar breaches at the head sluice of the Malaiperumal Agaram tank supply channel (English). The Bangaru channel breached its banks in several places. The flood of December 1st caused fresh damage as the French had not closed their breaches at the head, but as the breaches at head of the English channel had been closed the tank ring bund was safe.

I have since heard that these breaches again went but not the tank.
15th Dec. 1898. (Intld.) C.A.S.

17. The Sub-Divisional officers' reports show that a considerable number of Imperial tanks have breached all over the district, but as far as my information goes at present, I believe that all the breaches have been either closed or ring bunded and that sufficient water has been stored to save the crops.

The majority of the tanks breached or were cut at the flanks and not many important ones have gone. Also I am glad to be able to state that, on the whole, not much damage appears to have been done to masonry works.

1. Report from Sub-Divisional officer, Vriddhachalam, dated 9th November 1898.
2. Report from Overseer, Villupuram, bearing Sub-Divisional officer, Tindivanam, No. 583, dated 11th November 1898.
3. Progress report of Sub-Divisional officer, Vriddhachalam, for 1st to 12th November 1898.
4. List of tanks damaged in Kallakurchi taluk.
5. Report from Overseer, Tirukkóyilúr, No. 188, dated 1st December 1898, with one enclosure.
6. Report from Overseer, Kallakurchi, No. 403, dated 2nd December 1898.
7. List of tanks damaged in Vriddhachalam sub-division.
8. Report from Sub-Divisional officer, Tindivanam, No. 648, dated 11th December 1898, with one enclosure.
9. Report from Sub-Divisional officer, Chidambaram, dated 10th December 1898, with one enclosure.
10. Report from Sub-Divisional officer, Cuddalore, dated 11th November 1898.

18. I enclose the marginally-noted original reports for your perusal and request that they may be returned to me as soon as possible as they will be required for reference.

A separate application has been made for the additional funds required for the current year.

Progress Report of Works in charge of M.R.Ry. L. A. Rungasawmy Aiyar, Sub-division officer, Vriddhachalam, from 1st to 12th November 1898.

1st to 5th.—Engaged in monthly accounts and office work. Preparing plan and estimate for the following works:—

(1) Improvements to Nedinathum and Kanavai anicut (minor irrigation work).
(2) Valayamadhevi tank weir plan and estimate, &c.

6th, 7th and 12th.—Inspected the following works to ascertain the extent of damages caused by the unusual high floods of 6th November 1898 down the Manimukthanady river:—

On the 6th and 7th—

(1) Vriddhachalam cusbah tank.
(2) Mehmatur main channel and its dams from the 3rd mile down to 6th mile.

On the 12th—

(3) Vriddhachalam anicut road and its road dam.
(4) Vriddachalam anicut and its bungalow.

The following is a brief report of the floods:—

Rain.—From 1st to 4th November there was incessant rain of 1 to 3 inches. On the 5th, there was an extraordinary rainfall everywhere, 5 to 7 inches of rain having been recorded on that day at all the rain-gauge stations in the sub-division. Besides the rains in the hill basin, there was apparently one uniform downpour of heavy rainfall in the basins supplying all the tributaries of the Manimukthanady river, including the Karmangudi odai that joins it, just above the Vriddhachalam anicut.

Floods.—The effect of such a simultaneous heavy rainfall on the 5th November 1898 after the incessant rains of the previous days swelled the Manimukthanady river to maximum flood level which exceeded in the lower reaches the level of all the previous floods on record. Also owing to further rains, the high floods in this river continued more or less steady for a week this year which is said to be very unusual. The following is the maximum height of floods reached:—

No.	Name of anicut.	Height over crest.	Date in November.
1	Kathumylore anicut 16 miles above Vriddhachalam town	8.50	6th & 11th.
2	Mehmatur anicut 8 miles above Vriddhachalam town ..	10·50	8th.
3	Vriddhachalam town bridge over its floor level ..	14·50	6th.
4	Vriddhachalam anicut 5 miles below Vriddhachalam town	10·75	6th.

Effect of floods.—In the course of 8 miles between Mehmatur anicut and Vriddhachalam town, two tributaries or large odais join the river from the left and the country on this side is high with a fall towards the river. The right margin of the river for the said 8 miles is not sufficiently high and it falls towards the south, or Karmangudi odai, on a low level. Hence the floods freely overflowed the right margin for a length of 7 miles commencing from the 2nd mile of the main channel and down half a mile below the Vriddhachalam town and burst all the important tanks under the Mehmatur anicut system. The breached tanks are—

Thoravalur tank.	Manavalanallore tank.	Elamangalam tank.
Paravalur tank.	Alachugudi tank.	Vriddhachalam cusba tank.
Sathacodal tank.		

These tanks as well as the general direction of the overflow of floods are noted in the accompanying sketch No. 1. The Salem frontier road from the first 7 miles is furrowed and breached by a flow of ½ to 3 feet of water across it, and as the Karmangudi odai brought down simultaneous floods, the first 3 miles of Vriddhachalam-Thittugudi road with its numerous road dams is similarly damaged and rendered unfit for traffic. The breaches in the weak flood banks just above and opposite to Vriddhachalam town flooded greater portion of the town 1 to 3 feet of water flowing through the streets. The floods surrounded the Munsif's court and hospital, the water being flush with the top level of Munsif court verandah.

Steps taken after flood.—The taking of longitudinal section of the first 4 or 5 miles of the Salem frontier road and the first 3½ miles of the Vriddhachalam-Thittugudi road has been arranged for to ascertain quantity of flood water that passed across them. Flood levels are being marked

along the river margin by means of pegs and cuts in trees, &c., and pegs are also driven for a mile above and below anicuts to find out the surface fall and afflux. The breaches in the several tanks will be stopped at once by putting up ring bunds in front and the work of closing them sending emergent estimates will be attended to at the earliest possible date.

Proposals to minimise damages in case of such floods in future.—(1) The proposal of a general and complete embankment on the right side of the river above Vriddhachalam seems to be inadvisable unless it was accompanied by a proposal of providing additional vents or bridge at the aft end of the existing bridge.

I have inspected since the flood and quite agree with this.

(2) However, the town may be protected from the direct attack of the river floods by a short embankment for one mile above ½ mile below the Vriddhachalam town.

This might be done, but it does not concern this department except as professional advisers to the union.

(3) The strengthening of the right bank of Sathucodul branch channel and of widening the bunds of Manavalanallore and Sathucodal tanks to carry a road and continuing a flood bank towards Sathucodul village as shown in burnt semna pencil on the sketch No. 1 will protect the Komangalem, Manavanallore, Sathucodul, Elamangalam and Alachigudi tanks from recurring breaches.

(4) The abandoning of the Vriddhachalam-Sathucodul road and utilizing a portion of it as a sort of byewash of ¼ mile in length at south end of the Vriddhachalam-Kusbah tank will relieve this tank from breaching during the high floods in the river periodically occurring.

Vriddhalam anicut and its road.—The river floods that escaped on the left side below Vriddhachalam town breached the Korgodal Imperial tank and caused four or five breaches in the Vriddhachalam anicut road, the left wing of the existing road dam being overturned. The road was surplusing for a length of ¾ mile between this road dam and the anicut and with the breaches now occurred it is impossible for carts or traffic. The Vriddhachalam anicut measures 330 feet long, while the upper anicut at Mehmatur is 411 feet in length. Such a narrow anicut with a large affluent like Karmangudi odai joining the river just above it could not pass off all the flood. But as the right flood bank for nearly 2 miles above the anicut lies washed off too low, the Karmangudi floods escaped directly round the right end of the anicut overflooding and breaching the banks of the south main channel at Thyanddappu and at 100 feet below the head sluice and reswelled the river floods below anicut to such an extent that hardly any afflux was noticeable at the time when 10¾ feet floods passed over the crest of the anicut. The anicut is still discharging 5 feet head, but to all appearance no damage has occurred. The state of the south main channel and the breach in the left bank below head sluice cannot be inspected till the floods subside.

This requires further investigation.

The floods submerged the bungalow and there was 6 inches of water over the flooring of the main room. Owing to the Karmangudi odai floods joining the river just below the anicut and as the anicut itself is placed slightly oblique to the river course, the main current of floods turned against the left bank and caused serious erosions to the unrevetted margin of the bangalow compound washing away the whole of the padugay and a portion of the compound, 40 feet to 60 feet wide, to a length of 200 feet (*vide* sketch No. 2 accompanying). A few of the mango trees have been carried away and some are on the point of falling. The edge of erosion is only 25 to 30 feet from the verandah of the bungalow and it has become unavoidably necessary to protect the bangalow from danger by extending the existing left revetment for some distance more and regain the lost margin of the compound in front of the bangalow. As soon as floods subside temporary protections to the eroded portions will be made and estimate for permanently extending the revetment will be submitted.

8th to 11th—Pelondorai anicut.—Inspected this after the high floods of 6th November 1898 and marked out by pegs flood levels for one mile above and below the anicut to ascertain the surface fall and afflux by subsequent taking of levels. The following is a brief account of the recent floods :—

The Pelondorai channel was re-opened for irrigation, the fixing of shutters to the anicut being fully completed on the 1st August 1898. During the three months from that date there was no flood in the river worth mentioning, though a sufficient supply was being maintained for irrigation purposes by adjusting the lift of shutters. Since the 1st November rains were incessant and on the 5th instant nearly 6″ of rainfall was registered at Tittagudi and Pelondorai. Floods in the river rapidly rose on the 5th night and at 4 A.M. of the 6th a maximum of 11½ feet over crest with an afflux of 4·80 feet was recorded on the gauges by overseer who was at the anicut. This was the very first high floods after the counterweighted girder shutters were provided for the anicut and considering that the flood came down sudden and in night time the timely action taken by the overseer in lifting the shutters and keeping a keen watch of the rising floods during the night are indeed very commendable. On the 8th, 9 A.M., I was inspecting the eroded right margin of the river below anicut with the overseer. The water while crossing the sand

N. Krishnasamy Iyer, who though quite a young overseer, has worked very well throughout at Pelondorai and show himself to be capable and deserving of encouragement.

sluices was only 4½ feet over crest. But all on a sudden and in less than 5 minutes' time a sudden rush of floods in the shape of travelling waves came down the river making it impossible for us to return to the platform till 3 P.M. The maximum reached on the said day was 10½ feet over crest with more than 4 feet afflux. The accompanying longitudinal section given in sketch No. 4 show the surface level of the highest flood of the 6th November. The recorded gauge reading should make the flood levels above and below anicut to be + 132·50 and + 127·70 respectively, but the actual drift marks are 9″ lower on the upstream side of the anicut. The afflux varied from 3 feet to nearly 5 feet according to gradual or sudden rise of floods and according to rapidity or slowness in subsiding. The accute bends in the river from 3 miles above anicut induce one-sided current during high floods which striking against the resisting rock bordering on the right edge of the river one mile above the anicut creates high rolling waves directed chiefly against piers Nos. 6 to 10 of the anicut (*vide* sketch No. 3 accompanying). The level of floodwater opposite to these piers is thus much higher than that represented by the side gauges and the rise sometimes is 3 to 4 feet in height. When the gauge reading was only 11½ feet over crest, the waves have freely dashed over the said piers of 14½ feet height as seen from the deposit of drifted sand on the tops of these piers. I took down the elevation of the exposed parts of the piers Nos. 1, 2 and 7 when a head of 8½ feet was passing over the anicut crest as indicated by the head sluice gauge, which elevations are shown in the sketch No. 4 (accompanying) for reference. The water level in front of pier No. 7 showed much difference from that in front of the end piers, and the direction of the main current that passed through each vent can be seen from what is represented on enlarged scale in sketch No. 3. The question of increased afflux noticed in the case of this anicut as the floods suddenly rise requires serious consideration.

From J. B. HENDRICK, Esq., Sub-Divisional officer, Tindivanam Sub-division, to the Executive Engineer, South Arcot division, dated Camp Sendanur, 11th December 1898, No. 648.

Owing to the heavy rains from the beginning of November, particularly that of the 5th and 6th, the Ponniar river came down in high flood, the maximum gauging 11 feet on the railway girder bridge across the Ponniar which is higher than any on record even that of 1884, when the right and left flood banks of the Ponniar breached; the right bank on both sides of Tiruvadi head sluice and in two other places below it, the 2nd breach being the largest the water from this breach scoured out the bank in rear very badly for a length of 300 feet about a furlong below it. On the left bank it breached at the Malattar offtake, and at about ½ a mile above the railway line. This was the largest breach which extended for 2,350 feet.

2. The right bank of the Malattar river was also breached at the head, again at about 2 furlongs above the railway line and by the side of it where there was a spring channel with an open head.

3. The rains being extraordinarily heavy, the total quantity gauged in October and November being 7·1 and 24·3 inches, all the channels and tanks in the three taluks discharged with a higher head than the maximum provided for, and there being a high wind on the night of the 5th the channels breached their banks and the tank bunds had to be cut open at the ends if they had not already breached to lower the water in the tanks which was eroding the front slopes. The channels and tanks as per enclosed list have been mostly damaged and would cost the amounts noted against each for repairing the damages, for which estimates are being submitted in routine of their urgency.

4. The Ponniar and Malattar breaches being the most important as they affected the railway line were taken in hand at once, but as the floods continued at a high level till the 15th November very little progress could have been made, but by the 29th instant all the breaches in both the rivers were closed and the erosions repaired except the large breach in left bank of Ponniar which was three-fourths completed when the rains set in again and the Ponniar river came down in high flood on the night of the 30th and carried away the bank put across the big breach in the Ponniar left bank about 2 A.M. on the 1st instant, notwithstanding every endeavour being made all the previous day and night to protect it.

5. All the other newly closed breaches were also badly damaged.

6. The big breach in the Ponniar has been reclosed and the damages done to the others are being attended to.

7. The cause of the above breaches is chiefly due to the soil the banks are made up of, being nothing but pure sand.

Report on the Floods of 6th November 1898.

During the month of November last there have been three high floods—two high floods in the Vellár on the 6th and 30th November and a flood in the Coleroon on the 16th. These following closely on one another have caused a great deal of damage to works and to standing crops and property generally.

Rainfall.—The floods were preceded by a period of continuous rainfall, the rains commencing on the 22nd of October and continuing almost without intermission till the 6th November. The rainfall registered during this period at the following stations is :—

Stations.	Maximum on 6th November 1898.	Total rainfall from 22nd October to 6th November.
Mannárgudi	6·44	24·02
Shatiatope	5·63	24·26
Chidambaram	7·00	31 39
Bhuvanigiri	5·02	28·56
Manantoddy	8·68	34·82

As will be shown below, this is probably the highest on record in point of intensity so far as the Veeranam basin is concerned. The rain continued without a break from the 22nd October to the 6th November, and although the total quantities registered during the two months may be below similar quantities for 1884, the rainfall within a similar period of sixteen days in 1884 would not probably be more than that noted above.

Progress and duration of flood.—During the first Vellár flood water commenced to rise on the night of the 5th November, and, on the morning of the 6th, the reading on the crest of Shatiatope anicut was 11·00. As usual, during high floods water spilled on both banks above and below anicut. The lines of spill taken by the flood are of the greatest interest and importance. On the right bank above anicut the spill enters the Veeranam tank and forms—as is well-known—one of the chief uncertain factors in the Chidambaram drainage scheme. The spill commences when there is 10·00 feet of water going over anicut, and during the present floods, excepting isolated bits of high ground near villages, there was about 1·50 feet of water going over the Madras trunk road from the old northern surplus sluice (Veeranam tank) up to Solatharam on the Pallayamkuttai bridge. On the left bank above anicut the spill commences when there is over 6 feet on anicut crest. The line followed is the old supply channel taking off from the Vellár (left bank) opposite Adanur village. This channel, which is no more used as an irrigation channel since the construction of the Shatiatope anicut, flowed in a north-easterly direction from Adanur crossed the Madras road at the site of the present Komaraoduppa road dam and crossing the Ariaghosty Manambatham and Morratta channels (as a surplus channel) entered the Sathapady tank through the Naindodai and Thalaborai odai and emptied itself finally by the Sathapady odai into the Paravanur. The spill on the left bank at Adanur above anicut and at Miralur below anicut even now takes this course, and following this line the floods of the Vellár have done a large amount of damage all the way from Shatiatope to Alapakkam. The spill on the right bank below anicut entered into the Boothangudy channel and through it into the Passunathan odai and the parallel or Sivakamasundaripuram drainage channel. The surplus from the Thillaiamman calingula together with the spill over the right bank of Passunathan odai above the Keerapallayam road inundated the western portion of Chidambaram and crossing the Cuddalore road—topping it very largely—entered the Khan Saib's canal, a portion of the flood water passing through some of the streets on the north side of Chidambaram town.

The duration of the flood in the Veeranam tank as represented by the discharge through the weirs corresponded exactly with that in the Vellár (rising with it and falling when it fell). The flood began to fall at Shatiatope anicut from the evening of the 6th November and the maximum reading on Saulpett weir was reached at the same time. The highest reading on weir No. I was 4·30 at 6 P.M. on the 6th November when there was 1·70 feet of water passing over the new 6·00 feet bye-wash. The Vellár flood under reference was, it will be seen, much below the highest on record, which is 15·00 feet on crest of anicut; and had the flood lasted longer or had it risen higher than it actually did, there is no doubt whatever that a reading of 5 feet or more on Saulpett weirs would have been reached. Even as it was the discharge through the Saulpett weirs and bye-wash alone was 13,178 cubic feet per second. Including the discharge through the new berth over surplus, the total discharge comes to 14,700 cubic feet per second as against 14,510 cubic feet in the flood of 1884. If the discharge through the Vaduwar into the Coleroon is added, the total discharge from the Veeranam tank during the height of the flood comes to 16,500 cubic feet per second.

Flood levels.—The following are the maximum readings recorded at the different masonry works, &c., during the height of the flood :—

Name of work.	Readings on 6th November 1898. Front.	Rear.
Shatiatope anicut.		
1. On crest	11·00	...
2. On rear gauge	16·00	...
Veeranam tank.		
1. Saulpett No. 1 weir	4·10	...
2. „ „ 2 „	4·30	...
3. „ „ 3 „	4·10	...
4. Bye-wash	1·70	...
6. New north surplus	8·20 on crest.	11·00 on flood in rear.
7. Old „ „	9·70	11·80
8. Vadavár bridge	10·20	10·30
Khán Sáhib's canal	Reduced levels datum Kapady weir crest + 20·00	
Tunnel No. 12	42·57	...
„ „ 11	41·62	...
„ „ 10	40·06	...
„ „ 9	34·70	...
„ „ 7	32·84	...
„ „ 6	32·14	...
„ „ 2	31·94	...
„ „ 1	31·59	...
Komaratchy bridge	31·44	31·24
„ regulator	30·55	30·35
Kapady weir No. 2	30·35	30·35
Komaratchy acqueduct	30·35	30·35
	Readings.	
Goverapett head sluice		...
Ammapett bridge		...
Muthia Pillay calingula		...
Thillavadangam bridge		...
Thirunakolan calingula		...
Magathuvalkai calingula		...
Porto Novo lock		...
Pomary and Passamuthan odai.		
Ponnen calingula		...
Thillaiaman calingula		...
Passamuthan odai calingula No. 1		...
Passumuthan odai calingula		...
„ „ „ No. 2		...
Old Coleroon bridge		...
Lower Coleroon anicut	3·30 on crest.	

Flood damages.—The damage done to houses, roads, cultivation and "works" by the flood in the Vellar has been very great, although the flood under reference was much below the maximum recorded. The first two items do not enter into this report. Information concerning loss to cultivation which would be very interesting and important is not available at present, but the chief villages where the damage has been greatest, are the villages on the left bank of Khán Sáhib's canal above the Komaratchy regulator, the lower villages on the old Coleroon, the villages under Passumuthan odai on the left bank of Khán Sáhib's canal including Chidambaram, and the villages along the line of Vellar spill from Bhuvanigiri to Alappákkam. Under damages to "works" the following are noted :—

(1) *Vadavár.*—The bank has been slightly eroded in 2nd and 3rd quarters of the 8th mile. In the 10th mile, 2nd quarter, there was a margin of 6 inches only above F.L. and in the 9th mile, 3rd quarter, only one foot. Amount of damage in rupees is *nil* (necessary work charged to maintenance).

(2) *Veeranam tank bund*—has been very badly eroded in the 4th, 5th, 6th and 7th miles and had to be protected with stakes and brushwood. The bund would have been in very serious danger of breaching, if the wind had been stronger or if the flood had risen higher. Amount of damage Rs. 50 charged to maintenance.

Bye-wash—has been badly scoured in rear and partly under mined. It has settled in several places and over a length of 117 feet, the last row of blocks has been washed away into the scour holes. Amount of damage, Rs. 310.

(3) *Laulpett road.*—From Laulpett lock up to Veeranatham lock, the floods may be said to have gone clear over the road, and in consequence the latter has been badly cut up all over and three large breaches have occurred, the first opposite Kangiruffu village, the second opposite Servarayanpettai and the third just below Komaratchu bridge. The breach opposite Servarayanpettai is a very large and deep one and took in a very large volume of water. The enclosed sketch gives all information concerning the flood. The road is in charge of the Local Fund Department.

(4) *Rajah Voikal.*—The whole of the right bank from Komaratchu village to the aqueduct and from the aqueduct to Sivagum has been topped all over and, besides eleven large breaches, the bank has been cut up in numerous places. Amount of damage, Rs. 460.

(5) *Khan Saib's Canal.*—Three large breaches have occurred in the right bank above Ammapett bridge. Between the latter and Palamena bridge, the bank has been topped and eroded in many places and in several places from Chidambaram to Port Novo lock the bank has been topped and eroded slightly. Amount of damage, Rs. 730.

(6) *Poner and Passumuthan Odai.*—The cracks in the wings and cushion wall of the Poner calingula widened and water getting in through these has washed away the earth behind the wings. In the Passumithan odai, two breaches have occurred on the left bank—one just below the Keerapallium road bridge and the other a deep one between calingulas Nos. 1 and 2. Amount of damage, Rs. 130.

(7) *Usuppur Channel.*—The banks have been cut up by the water that came down from the breaches in the right bank of Khán Saib's canal above Ammapett bridge. Amount of damage, Rs. 165.

(9) *Old Coleroon.*—Three large breaches have occurred—one in Agravellere, the second at Atherputtu and the third and largest at the site of the old Thirkumangudy drainage sluices. Amount of damage, Rs. 250.

Shatiatope Anicut System.

(1) *Anicut.*—The coping stones over crest of anicut have been knocked out for a length of 58½ feet in the 2nd, 11 and 12 bags.

In the rear apron, the concrete has been scooped out in patches; but as there is a large depth of water on the apron still, the exact amount of the damage done has not yet been correctly ascertained.

The river has eroded the padugay considerably; but the one just above the anicut and close to head-sluice requires immediate attention, as the current has washed off about 50 feet of padugay; a good hollow has been formed here and the current now strikes the anicut obliquely. Probable amount of damage, Rs. 400.

(2) *Komara Odappu.*—No damage. Only the road has been cut up badly. This is in charge of the Local Fund Department.

(3) *Wallaja Tank.*—The unrevetted portion of the front slope south of weir No. 1 and the bund above revetment level has been badly eroded and had to be protected with stakes and brushwood. The south front wing for the new scouring vests in weir No. 1 has been under mined by scour and has settled. This will have to be rebuilt. Amount of damage, Rs. 250.

(4) *Permaul Tank.*—In the southern bund beyond Kurrinjipadi road, five large breaches have occurred. The breaches are very deep and there is so little of the old bund left that it is considered advisable to run the new bund in rear of the breaches. The old cracks in the left wings of weirs Nos. 1 and 2 have widened and the wings are in a tottering state so that it is necessary to rebuild them. Amount of damage, including all works, Rs. 2,000. Amount directly due to the flood, Rs. 600.

(5) *Manambatham Channel.*—The banks have been washed and eroded, but the damage done is slight. Amount of damage, Rs. 200.

(6) *Morattu Channel.*—The banks have been badly breached and eroded all over; some of the largest breaches being close to the new aqueduct on the Nundodai. Amount of damage, Rs. 920.

(7) *Sathapady Tank.*—Two large breaches have occurred—one about 120 feet long to the west of the weir and another about 40 feet long in the southern bund in Thorkathattay village at the site of the ruined high level sluice. Amount of damage, Rs. 200.

Inspected on 13th December. The cracks in wing of No. 2 weir are serious and though there is apparently no immediate danger, the rear wing and return must certainly be rebuilt this working season.

(Intld.) C.A.S.

(8) *Chokankollay Tank*—The bund, which was very low and in a very neglected state, has breached all over; the largest breaches being situated in that portion of the bund which carries the road. Amount of damage, Rs. 320.

Second Vellaur flood.—During the second Vellaur flood which attained a maximum of 10·40 on crest of anicut on the morning of the 1st December, the damage caused was inconsiderable, as only the ring bunds formed were breached in some cases. In this case the water found an easy outlet through the breaches already formed during the previous flood.

Coleroon flood.—During the flood in the Vellaur, the Coleroon was very low. On the 6th the reading on crest of the anicut was only 3·30 and even this was due to the water discharged by the Vadavar and the Sengal odai. Water, however, commenced to rise on the 9th November and attained a maximum of 6·7 feet over anicut crest on the 16th November. The left flood bank which is almost uniformly low was in great danger in the 7th, 12th, 13th, 19th and 22nd miles, as in several places the bank was not more than 6 inches to 1 foot above water-level. A small bank, above 2 to 2½ feet high, was run up over the top of the flood bank in the 12th mile. No damages were caused by this flood, as it did not rise any further.

General.—The damages caused by the Vellaur flood are estimated as follows:—

		RS.
1.	Shatiatope anicut system, M. and R.	2,240
2.	Lower Coleroon anicut system, M. and R.	1,800

but for urgent work only the following extra allotments are required:—

		RS.
1.	Shatiatope anicut system, M. and R.	1,700
2.	Lower Coleroon anicut system, M. and R.	1,700
3.	Agricultural repairs	200

(Signed) R. N. AROKEASWAMI MUDALIAR,
10th December 1898. Assistant Engineer.

EXTRACT from the register of rainfall maintained in the South Arcot division for October and November 1898.

Days in month.	Cuddalore.		Vanamadevi anicut.		Tirukkóyilúr anicut.		Porto Novo lock.		Shatiatope anicut.		Vriddhachalam anicut.		Kattumyloor anicut.		Mehmathur anicut.		Pelandorai anicut.		Tindivanam.	
	October 1898.	November.	October.	November.	October.	November.	October.	November.	October.	November.	October.	November.	October.	November.	October.	November.	October.	November.	October.	November.
	INCHES.	INCHES.	INCHES.	INCHES.	INCHES.	INCHES.	INCHES.	INCHES.	INCHES.	INCHES.	INCHES.	INCHES.	INCHES.	INCHES.	INCHES.	INCHES.	INCHES.	INCHES.	INCHES.	INCHES.
1	..	1·36	..	0·25	..	0·35	..	2·00	..	0·61	..	0·10	..	..	..	0·00	..	..	0·50	0·55
2	..	3·42	..	2·80	..	0·32	..	1·50	..	2·85	..	1·80	..	..	..	0·90	..	1·90	0·10	0·62
3	..	1·32	..	1·20	..	0·48	..	1·50	..	0·90	..	0·80	..	0·90	..	0·55	..	0·85	0·50	1·85
4	..	2·33	0·65	2·50	0·05	1·48	..	1·50	..	2·05	..	1·80	..	2·20	..	1·45	..	1·65	..	2·80
5	0·04	4·09	0·30	3·00	..	1·53	..	2·00	..	1·83	..	1·30	..	0·85	0·50	1·25	..	2·15	..	6·75
6	0·08	8·52	..	8·10	0·10	5·79	..	4·06	..	5·63	..	6·20	..	6·20	..	6·33	..	6·30	0·10	0·05
7	0·07	..	..	..	1·17	..	..	..	..	..	..	0·20	..	..	..	..	1·25	..	..	1·60
8	..	1·31	0·20	0·20	..	3·25	..	..	..	0·92	0·60	1·20	2·30	1·10	0·60	3·20	..	..	0·25	0·90
9	..	2·05	0·65	1·80	0·17	1·40	..	..	2·80	..	0·15	0·15	1·10	..	0·20	0·20	0·80	..	..	0·60
10	..	0·62	0·55	..	..	0·24	..	0·03	1·86	..	..	..	..	..	..	..	0·20	1·60	..	0·25
11	..	0·21	..	1·80	0·68	1·68	..	0·63	..	..	..	..	..	..	..	..	..	1·45	..	1·15
12	..	..	..	..	..	..	..	..	..	1·2 2	..	3·60	1·40	..	0·55	0·55	0·80	..	..	2·90
13	..	0·50	1·80	0·60	..	2·00	..	0·50	..	..	..	..	..	..	..	..	..	0·25	..	..
14	..	0·23	..	..	..	0·05	..	..	..	0·11	..	..	..	..	..	..	0·75	..	..	0·05
15	..	..	..	..	..	0·07	..	..	..	..	..	..	..	..	..	..	..	0·15	0·10	..
16	..	..	..	..	1·60	..	1·60	..	..	..	..	0·35	2·50	..	0·10	..	0·35	..	..	..
17	0·13	..	1·15	..	..	..	..	..	0·46	..	0·35	..	..	..	..	..	..	..	..	..
18	..	..	..	..	0·68	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
19	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
20	..	..	..	..	..	..	..	..	0·13	..	..	..	..	..	..	..	..	..	..	..
21	..	..	..	..	..	..	..	..	0·66	0·58	0·15	0·30	0·70	..	..	..	0·10	..	0·25	..
22	..	..	..	..	..	..	..	..	0·34	..	0·30	..	..	..	..	..	0·25	0·20	..	..
23	0·24	0·45	0·25	..	..	..	..	..	1·76	..	0·70	..	..	..	..	..	0·65	..	0·50	..
24	0·22	..	0·25	..	..	..	..	..	1·30	..	0·65	..	1·40	..	0·40	..	0·55	..	1·00	..
25	3·72	..	2·10	..	..	..	..	..	0·21	0·62	0·35	1·60	..	1·10	0·40	1·40	0·75	1·10	0·60	0·80
26	1·66	..	1·25	..	..	..	..	..	2·94	0·48	0·25	0·70	..	0·80	0·35	0·60	0·20	1·15	1·00	0·20
27	1·13	0·63	0·40	0·30	..	..	..	..	1·45	0·25	2·00	0·60	..	..	0·20	..	1·20	0·95	0·30	0·30
28	0·80	0·86	1·05	0·95	0·20	0·50	..	..	..	0·19	0·15	0·55	1·10	0·70	0·35	0·90	0·45	1·05	0·10	0·35
29	0·40	1·19	0·95	1·80	0·37	0·86	..	..	1·05	4·70	0·35	1·50	1·50	3·40	0·40	3·60	0·20	5·70	0·40	1·70
30	0·42	0·45	0·45	1·30	0·64	0·53	1·50	1·50	..	..	..	..	..	..	..	..	0·20	..	0·70	2·00
31	0·68	2·68	1·20	3·50	0·12	3·36	3·20	0·64	..	..	..	..	..	..	..	..	0·20	..	0·20	..
	0·63	..	0·35	..	0·18	..	0·05	0·05	0·08	..	..	..	..	..	..	..	..	..	..	..
Total ..	11·00	32·22	10·10	28·40	8·84	25·79	12·91	19·22	15·54	22·94	6·90	26·00	7·20	20·95	2·70	21·50	9·30	23·85	6·60	25·42

No. 3 I.

Note by the Chief Engineer for Irrigation.

Reports on the recent floods and the damage caused by them in the South Arcot district are herewith submitted to Government.

I intend to inspect some of the principal works in South Arcot shortly and will then examine some of the questions which these reports show to be of importance such as that of preventing spill from the Vellar into Veeranam tank, lengthening Vriddhachalam anicut, lowering Shatiatope anicut and fitting shutters on it, &c.

The Executive Engineer and his subordinates have been doing all that was possible to get the breaches closed quickly and prevent loss of crop, but the second flood unfortunately made matters difficult by re-opening many breaches closed after the first flood.

The Sub-Division officers' reports contain much information which will be of assistance when improvements to the works have to be designed. The Executive Engineer should have stated the probable cost of restoring the works. The following abstract list is compiled from the various reports but does not include the Chidambaram and Cuddalore taluks :—

	No. of works.	Probable cost of repair.
		RS.
Tirukkóyilúr taluk	20	4,465
Kallakurchi taluk	14	3,545
Vriddhachalam taluk	35	14,220
Tindivanam taluk	28	8,000
Villupuram taluk	44	36,000
Tiruvannámalai taluk	7	2,100
	148	68,330

(Signed) W. HUGHES,
Chief Engineer for Irrigation.

3rd January 1899.

ORDER—No. 38 I., dated 6th January 1899.

The Chief Engineer for Irrigation will report on the possibility of making the Ponniar embankments above the South Indian Railway permanently secure.

2. Government is pleased to hear of the activity of the Executive Engineer and his subordinates in closing the breaches and preventing loss of revenue as far as possible.

(True Extract.)

Under Secretary to Government,
Irrigation Branch.

To the Chief Engineer for Irrigation.
" Superintending Engineer, V Circle.
" Examiner, Public Works Accounts.
" Revenue Department.

Exd. S. A. S. Raghaviengar.