

(1) Number of pages 4

(2) Date of receipt 19-2-43

(3) Initials of the Referencer _____

MADRAS RECORD OFFICE.

Government of Madras.

Public Works DEPARTMENT.

G.O. No.	1360-43	Press
		Mis.
319-220		
Dated	17-5-	18

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5-5

No. 319. Read the following letter from the Consulting Engineer for Irrigation and Canal Company, to the Secretary to Government, Public Works Department, dated Madras, 24th April 1871, No. 10:—

I have the honour to submit the correspondence noted in the margin, relating to the distribution works in the 2nd Irrigation Range under the 9th Section of the Main Canal.

From Agent, No. 509, 6th December 1870.
To 276, 17th ..
From 139, 28th March 1871.
14 Pages.
& Estimates.

2. The schemes as originally designed were first received with the

Agent's letter No. 509, 6th December 1870, but as it was found that existing interests were injuriously affected by some of the arrangements proposed, and that the consent of the owners of tanks and channels had not been obtained, I felt it necessary to return the projects for re-consideration—my No. 276, 17th December 1870.

3. The schemes have now in a great measure been re-arranged, and, as recast, appear free from the objections noticed above. They are explained in detail in the Deputy Chief Engineer's report which accompanies the Agent's last named letter, No. 139, 28th March 1871, in the 10th paragraph of which he remarks that no existing irrigation or drainage is injuriously interfered with further than that, in some cases, channels pass through wet cultivation, which however was unavoidable, and the Revenue authorities will no doubt see that the ryots receive equitable compensation.

4. Mr. Gordon has so fully described the course taken by each channel and the site of each masonry work, it only remains for me briefly to notice the chief features of the schemes.

The irrigation consists of two plots, one on the right side of the Main Canal, called the Yaitoor district, and the other on the left side, called the Maidkoor district; the former extending from the 168th to the 177th mile, and the latter from the 168th to the 175th mile.

5. For the Yaitoor district the supply is taken off the Main Canal by a sluice of ten vents in the 169th mile, where one long channel, called the Yaitoor primary, carries water for 10,230 acres, the most of which is distributed direct from the channel, only 1,221 cubic yards an hour being parted with for the irrigation of 1,206 acres under a supplementary channel called Mootaloorpad. These channels are shown on Drawing No. 565 A, and their further extension on No. 2, 28th November 1870.

6. For the Maidkoor district the supply is taken off the Main Canal by a sluice of six vents in the 169th mile. The channels are designated Maidkoor primary and Maidkoor secondary, and their course is shown on Drawing No. 564 A. The area to be eventually irrigated is 6,500 acres, exclusive of 350 acres to be supplied from a branch of the Yaitoor works, on the opposite side of the Main Canal, by water carried under it in a culvert. Of the 6,500 acres it is proposed to construct channels for 4,000 only at present, though the head works and primary channels are designed and will be constructed to carry water for the larger area. On this point the Deputy Chief Engineer observes that there is more land commanded than there

is water available for, and that it is advisable to defer the construction of some of the channels until it is known where the demand for water will be, and with this object it is proposed that the estimated cost of the minor channels for 2,500 acres, namely, Rupees 2,925, of the amount for which sanction is now asked, shall for the present be retained unexpended.

ESTIMATE.

Maidloor ...	4,000 Acres.	
Sluices in Main Canal		Rs. 900
Channels, earthwork		5,530
Do. masonry works		3,470
Subsidiary channels at 6 As. per acre		1,500
Channels and masonry works for an additional 2,500 acres hereafter		2,925
		14,325

Yalloor ...	10,230 Acres.	
Sluices in Main Canal		Rs. 1,400
Channels, earthwork		10,754
Do. masonry works		2,810
Subsidiary channels, at 6 As. per acre		3,836
		18,800

Total Rs 33,125

for the irrigation of 16,740 acres, giving about Rupees 2 an acre, which is a fair average.

7. Looking to the comparatively large blocks of land to be watered from each length of channel, I distrusted the allowance of 6 Annas an acre, and requested the Chief Engineer's re-consideration. He replies that experience only can decide as to the sufficiency of the rate; but he is of opinion that 6 Annas an acre will enable the Company to do all that is required for the delivery of the water to each field commanded.

8. The masonry works, the sites of which are shown on the surveys, are:—

For Yalloor District.	Maidloor District.
1 Head Sluice.	1 Head Sluice.
1 Aqueduct.	2 Irrigation Sluices.
1 Sluice	2 Aqueducts.
1 1st class Bridge.	3 1st class Bridges.
4 2nd " "	2 Timber Troughs.
1 Masonry Channel.	1 Culvert.
2 Drainage Crossings.	2 2nd class Bridges.
60 Overfalls.	1 Drainage Crossing.
6 Paved Fords.	21 Overfalls.
	6 Paved Fords.
	Sites undetermined.

9. The rates are:—

Excavation	10 Cubic yards per rupee.
Rubble masonry	4 Rupees per cubic yard.
Concrete	3 " " "
Puddle	4 to 6 Annas " "
Concrete floor	Rs. 2-8-0 " "
Archwork	" 6 " "
Teakwood	" 6 " cubic foot.
Stone pitching	" 1 to 2 " "
Rubble apron	" 1 " "

which, excepting concrete which is high and teakwood which is enormous, are fair.

10. I recommend the estimates for sanction. The previous sanction for the distribution works of the 9th Section, as given in Government Order No. 2,786, of the 10th September 1867, is Rupees 15,125 for sluices, of which Rupees 3,600 were allotted in the estimate for the 1st Range of the distribution works of the 9th Section, forwarded with my letter No. 1 of the 11th instant; the remainder, Rupees 11,525, should therefore be deducted from the total amount of the estimate now submitted, the amount now requiring sanction is Rupees 21,699, on account of which an advance of Rupees 2,293 was made in Government Order No. 783, 15th March 1871.

From the Agent and Manager of the Madras Irrigation and Canal Company, to the Consulting Engineer for the Madras Irrigation and Canal Company, dated Madras, 6th December 1870, No. 509.

I have the honour to forward, for sanction, plans and estimates for distribution works in the 9th Section, with copy of the Chief Engineer's No. 1,619-A, dated 28th November 1870, and Mr. Gordon's letter, in original, to the address of Mr. Latham.

2. The drawings which accompany this scheme are enumerated in the list appended to Mr. Gordon's letter, but the village land plans, numbered 1 to 3 and 4 to 14, have not come to hand. They have been called for and shall be forwarded as soon as received.

3. The estimates in connection with this work are:—

- 1 Abstract Estimate of earthwork and masonry.
- 1 Tabular Statement of channels on east side of the canal.
- 1 Do. do. do. west do.

From the Chief Engineer, to the Agent and Manager of the Madras Irrigation and Canal Company, dated Camp at Adamapally, 28th November 1870.

Dhoor Distribution.

I have the honour to forward the documents marginally noted, and to request the sanction of Government to an expenditure of Rupees 33,122-4-0 thereon.

2. The works consist of those necessary for distributing water to 16,310 acres from the pond above the first lock, and might appropriately be called the second range of distribution for Dhoor division. No distribution takes place from below the first lock.

3. The sluices and size of channels for irrigating 8,000 acres from the canal between Rajoli and the first lock have been selected and approved by me, but the surveys are not quite complete, but will, I hope, be sent in before Christmas.

*Proceedings of the Madras Government, Public Works Department,
17th May 1871.*

4 The size of the channels has not been worked out strictly according to rule, but this it is proposed to remedy in accordance with the Consulting Engineer's last letter on the subject.

5 In reference to the Nuttaloore and Nundipad tanks, I think it will be best for the Company to take over the former, which has nearly sunk into disuse owing, I presume, to the decay of its artificial supply channel. The bund is a sound one, and the tank is capable of being usefully employed for irrigating a second crop.

6 I do not see any need to interfere with the latter tank, to which the Company might guarantee a full supply yearly, without any expense or waste of water.

From G. GORDON, Esq., Deputy Chief Engineer, to the Chief Engineer of the Madras Irrigation and Canal Company, dated Cuddalore, 24th November 1870.

Dloor Distribution Surveys.

Yaitoor and Maidhoor channels.

I have the honour to forward plans and estimates for the distribution of 32,620 cubic yards of water which is taken off from the canal immediately above Lock No. 1, and which is intended to irrigate 16,310 acres, the estimate amounts to Rupees 33,152-4-0 or Rupees 2-0-5 per acre, after adding 6 Annas per acre for subsidiary channels. The cost of permanent staff and office expenses is not included in the estimate.

2. At the 162nd mile occurs the first lock in the division, and from this point the Main Canal falls rapidly by locks towards the Pennair. This distribution district now under report lies on this Pennair slope (east and west of the canal), and is the most important in this division, as it contains, as above stated, 16,310 acres, the full irrigation power of the division being 24,000 acres.

3. It is desirable to take off the great bulk of water from above the first lock, as the canal below has been made in level reaches, and any water taken off below would have to be passed through the lock sluices which is considered objectionable. The water is therefore taken off above the locks, and there is discharged on the west side water for 4,576 acres,* and on the east

* Out of 9,072 irrigated on west side of canal

for 11,734 acres. The district to the west of the canal has, for convenience, been named the Yaitoor district; that on the east Maidhoor district.

4. 1.—Yaitoor district (west of Main Canal).—This contains 9,929 irrigable acres, and is bounded on the east by the Main Canal, on the west by the Koonair, on the south by the Pennair, and on the north by the Perchad vunkah; a large stream which the Main Canal crosses by an aqueduct of seven spans of 15 feet. From the off-take sluice the country falls in every direction, the sluice being, roughly speaking, at the apex of a half cone. The primary channel is carried straight down the slope for about 2 miles, when the country loses its conical shape, and forms a ridge between the Koonair river and the Yaitoor vunkah. The primary is then carried on this ridge till it falls into the Pennair after a course of 10 miles.

5. The Yaitoor vunkah is not a large stream, but has a very decided valley, and separates the land immediately touching the Main Canal from the primary ridge channel, so that it cannot be irrigated from the latter.

6. The primary has a very rapid fall, 45 feet in the first four miles and 32 in the remaining six, and as the land falls from it on both sides, subsidiary channels can be easily made to irrigate the whole of the land in the villages commanded, except the part above mentioned, adjoining the Main Canal. This consists of the villages of Mootaloore, Toodoomulinn, and a part of Yaitoor vunkah. It will be hereafter explained that water is brought from the Maidhoor side into the Yaitoor vunkah, a portion of this is picked up for the use of Mootaloore and Toodoomulinn. It now remains to describe the channels with their method of supply.

7. The fall of the country is so rapid that it would be very expensive to bring the full quantity of water required for the primary down from the beginning. It is proposed, therefore, to take

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off at the off-take sluice only sufficient for the 4,576 acres in the first four miles; the remainder for 4,147 acres, together with that for 1,206 acres in Mootaloore and Toodoomulinn, is taken out at the Maidhoor primary (on the east side of the canal) and thrown into the Bokyapully vunkah, where it is picked up by an anicut and brought under the Main Canal through the culvert at 17th mile into the Yaitoor vunkah. Here water for 1,206 acres is carried off by the Mootaloore channel, and the rest brought by the Goodaloore channel into the primary ridge channel. In this way a fall of 45 feet is effected at a small expense, but with the inconvenience of interfering with the Mootaloore tank. This latter is a small affair, formed by a bund thrown across the Yaitoor vunkah, and irrigating 324 acres. A channel for its supply from the Bokyapully vunkah has been made, and a drystone regulating calingulab placed at the end of channel; the calingulab has not been kept in repair, and the channel is breached in two or three places. It is proposed to build a masonry anicut* across the vunkah, to regulate the channel at an expense of Rupees 500, and make use of it and the outfall channel already dug from the culvert to carry the water required for the Yaitoor channels.

8. It will be necessary for the Company to acquire the tank or arrange to supply it with sufficient water for its present irrigation. It belongs to several partners in Muttatoot.

9. The primary leaves the Main Canal at 168th mile by an English sluice of four openings, which throws sufficient water for 4,576 acres, (11,440 cubic yards per hour,) into a channel 24

feet wide at bed, 14 feet deep, and falling 1:2000. The channel gradually decreases till it is 6 feet wide and 1 foot deep at three miles from its commencement; the inclination also gradually increases till it reaches 1:776. This part will irrigate, by subsidiary channels to be hereafter and gradually made, the villages of Bokyapully, Alludipally, Pedda, and Chenna Goodaloore with the small part of Maidhoor lying on the west of Main Canal, and this will just use up the 11,440 cubic yards an hour admitted from the Main Canal (maximum discharge).

10. The masonry works on this length of about 4 miles (more exactly 22,900 feet) consist of—

Drawing No. 1.

" " 12.

" " 13.

" " 11.

1 English Sluice of four openings.

1 Masonry Overfall, 3 feet.

1 Bridge, first class, across Pootatoot and Nundialampett road with overfall 3 feet 10 inches.

1 Bridge in Pedda Goodaloore.

1 Road Crossing.

32 Overfalls of 6 inches.

11. The rest of the land to be irrigated from the primary is 4,147 acres, the water for which, as above stated, is dropped from the Maidhoor channel into the Bokyapully vunkah. The anicut from which it is dropped would have to be built in any case for the use of Maidhoor channel, so no expense is incurred by bringing the Yaitoor water from the Maidhoor side, beyond the necessary enlarging of the Maidhoor channel. After running for three-quarters of a mile in the Bokyapully vunkah, the water is picked up by an anicut of 60 feet crest, which anicut is also required for the purposes of the Maidhoor side.

Drawing No. 7.

12. As before stated, the water required is then taken off from the above anicut by an existing channel, and its regulation is effected by a sluice placed about half a mile down the channel* where good foundations occur, it then passes

under the Main Canal by the culvert, already built at 17th mile, when a drop of 34 feet is gained by the help of the breast wall of the culvert; it then follows the channel, which has by the time become the Yaitoor vunkah, to the boundary of Chenna Goodaloore, where an anicut with right

Drawing No. 10.

and left side sluices will be built. A supply sufficient for the Muttatoot tank will have to be passed over the anicut and the rest used for the Company's works. Water for the acres 1,206

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will be taken by the left sluice to Mootaloorpal, and its disposal will be hereafter described. Water for 4,447 acres will be carried by the right sluice into the Goolaloor channel, which joins the Yancoor primary at about 4 miles from the beginning of the latter. The Goolaloor channel is 16 feet wide at bottom, 2 feet deep, and falls 1 in 3,000, and has one masonry overfall of 2½ feet. The masonry works on this portion of the work are —

Drawing No. 14	1 Sluice for 11,200 cubic yards
" " 10	1 Anicut 13 feet crest with side off-take sluices.
" " 13	1 Overfall 2½ feet (similar to Yancoor 3½ feet fall)

13. The Yancoor primary thus re-enforced proceeds along the ridge in a channel 23 feet 8 inches wide at bottom, and 1½ feet with fall of 1 in 2,000; these dimensions are gradually reduced to 6 feet 9 inches wide and 1 foot deep, and the inclination increased to 1 in 746; with these latter dimensions it reaches the Pennair near the village of Kottaloor. The only masonry works on this

Drawing No. 11.

length are 17 overfalls of Ginchewach and a road crossing. This channel would cross the waste channel of the Mittatoot tank, but it is intended to divert this as shown on the General Plan No. 2.

14. Reverting now to the water for 1,200 acres taken off at the off-take of Goolaloor channel, 900 of it is expended in Mootaloorpal and Tooloomulidina and the remainder thrown into the culvert at 17th mile 75 chain, for the use of the part of Tooloomulidina lying on the east of Main Canal.

15. The summary of land irrigated is as follows —

	Acres
Yancoor primary 1st to 4th mile direct from Main Canal	4,576
Do do 5th to 10th supplied by Mandloor channel by Goolaloor channel	4,447
Mootaloorpal and Tooloomulidina supplied from Mandloor channel by Goolaloor channel	500
	9,523
	2

or cubic yards per hour 12,858

General Plan No. 1

16. II — *Maidloor District (east of Main Canal)* — This contains 6,350 acres, and is

bounded on the west by the canal, on the east by the Nundipal vankah to the main road and then by the Kaseppett vankah, on the south by the Pennair, and on the north by the Mandloor primary channel, which latter is carried from the Main Canal with as flat a fall as possible (1 foot per mile for the greater part of its length). The District slopes generally from the primary towards the Pennair at the rate of from 10 to 5 feet per mile, but is cut up longitudinally into hollows and ridges by the Bokyapully, Nundipal, Sookhasala and Borechappally vankahs. The general fall of the ridges is too rapid to allow ridge channels to be used, and it has therefore been necessary to let the irrigation water into the natural water-courses and to pick it up again when required.

17. As the levels of the district are very irregular it will be better to examine separately each natural division, and explain how it is proposed to irrigate it.

18. The land in Maidloor and Mootaloorpal, lying between the Main Canal and the Bokyapully vankah, contains 1,002 acres, and is commanded by the primary channel and the off-take channel which passes under the canal by the culvert at 17th mile. Subsidiary channels can be easily made from these to serve the whole of this part.

19. Tooloomulidina lies also between the Main Canal and the Bokyapully vankah, contains 500 acres; water for which is brought from the west side of canal through the culvert at 17th mile, where it is delivered at the highest point in Tooloomulidina.

20. Coming now to the lands between the Bokyapully and Nundipal vankahs, containing 2,500 acres, the upper part will be irrigated by subsidiary channels direct from the primary. To

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facilitate the irrigation of the lower lying parts a channel for 1,600 acres is run from the Bokyapully vankah, taking up by an anicut with side-slucies the necessary water for which will have been brought by sluices from the primary.

Drawing No. 7

21. There remains the large village of Sookhasala between the Nundipal and Kaseppett vankahs and south of the Kurnool-Cullapah road, containing 2,500 acres. The water for this is dropped from the primary into the Nundipal vankah, a small wall or floor to preserve the bed of the channel is all that is required at this place as the soil is hard bunkum. There already exists across this vankah, at its junction with Annaloor vankah, a weir of 143 feet crest, which was built for the supply of the Nundipal tank; from above it leads a channel passing under the Kurnool-Cullapah road by a culvert of three openings of 4 feet, and leading to the tank. It is

Drawing No. 8

proposed to make use of the works by placing an anicut of 16 feet crest across the tank supply channel and taking off above it a channel for 2,500 acres, a regulating sluice can be placed across the channel near its head, if thought necessary, but it is not included in the estimate. The supply for 2,500 acres is carried then to the Sookhasala vankah, where it is dropped, to be shortly afterwards picked up and water for 11,000 acres (the

Drawing No. 9

area between the Sookhasala and Kaseppett vankahs) is carried on to the Borechappally vankah. This latter is a small stream with a shallow valley, and water may be easily taken up from it. There already exists a weir across it, the property of Government. As the Sookhasala vankah is too large to allow channels to be taken off where required, a channel for 500 acres is carried across to the Nundipal vankah, from the anicut serving for the 1,100-acre channel above mentioned.

22. The Nundipal tank, which it will be necessary for the Company either to acquire or to arrange to supply with water, is said to be the property of the Reltly of Nundipal. It seems to be a thriving property, as it now irrigates 100 acres, and the owner is building a surplus weir and raising the banks which will enable him to irrigate in all 250 acres. The stream which supplies it is large and never fails to fill the tank. The same interference with Nundipal tank occurs at the crossing of the Annaloor vankah by the primary channel, where we cross by an anicut, and in years of drought it would be urged on by the owner that water which would otherwise have filled his tank had been taken away by the Company's channels. In fact, if it is required not to interfere with this tank, we must carry 7,500 cubic yards an hour across the Nundipal and the Annaloor vankahs by aqueducts. It would be very expensive to do so, as the Annaloor stream is a very large one and hard foundations are deep. Of course I assume that the owner has a right to the water in the stream, but am not sure of the law on this subject.

23. The summary of land irrigated in the Maidloor district is as follows —

	Acres
Between canal and Bokyapully vankah in } supplied from primary	1,000
Maidloor and Mootaloorpal } channel	2,500
Bokyapully and Nundipal vankah	do. do. 2,500
Nundipal and Kaseppett	do. do. 2,500

Total from primary 6,050

Between canal and Bokyapully vankah in Tooloomulidina supplied from Yancoor channels 500

Total acres irrigated in Maidloor district 6,350

Total cubic yards required 12,760

24. The total acreage which is supplied directly or indirectly by the primary as above shown 6,050
To this add for water sent to Yancoor channels 5,634

Total 11,731

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The sum is the acreage which the first part of the Maidkhor primary must be capable of supplying. This is taken off at the 169½ mile by an English sluice of ten openings, and is carried in a channel 4½ feet wide at bottom and 2½ feet deep to the crossing of the west branch of the Bookyapully vunkah. It is here proposed to let into the vunkah for the Maidkhor secondary a supply for Acres 1,062. And for the supply of Yaitoor channels Acres 5,654. There will also have been expended in irrigating Maidkhor and Mootaloorpad, west of Bookyapully Acres 1,065. In all Acres 7,721.

So that the quantity to be carried on by the second part of the primary is for acres 4,013. The vunkah is crossed by an anicut of 3½ feet crest, and sluices are provided in it to throw into the vunkah a quantity equal to the difference in capacity between the first and second part of the primary, namely acres 7,721, or, say, 15,500 cubic yards per hour.

25 The second part of the primary is 13 feet wide and 2½ feet deep and falls 1 foot per mile. It crosses the Kurnool-Cuddapah road by a first class bridge of two spans of 5 feet, two irrigation channels from the Maidkhor tank are then passed over it in timber troughs, it then reaches the east branch of Bookyapully vunkah, which is crossed by an anicut of 50 feet crest, the inlet channel to Maidkhor second tank is next crossed by a culvert of four spans of 4 feet. This is not an important tank and we do not at all interfere with it, but can fill it if it is found desirable. The new road from Polatour to Nundialumpett is next crossed by a first-class bridge of two openings of 5 feet, and then there are no masonry works for 2 miles where the Nundipad channel is reached. It is proposed to carry surface drainage across the channel by revetted out and in-lets. By this time there have been supplied with irrigation from primary Acres 1,513. And there are here let into the Nundipad vunkah for the use of the village of Sookkasala Acres 2,500.

being the area for which the second part carries water.

26 It is undoubtedly more expensive to take off so much water at one point as is proposed in the plans under report, as it implies making channels for the purpose of carrying water parallel to the Main Canal, which could be done equally well by the Main Canal itself, but there are advantages which on the whole more than counterbalance the drawbacks. In the first place it is desirable to have an emptying sluice at the end of the long reach (26 miles) above Lock No. 1, and one would have to be built if the off-take of the Maidkhor channel did not supply its place. Again, if water were taken off between the locks the supply would have to be regulated by the lock sluices, and I am afraid this would be inconvenient and even dangerous when left to ignorant lock peons, so that the original plan would probably have to be reverted to of building calingolaks above each lock, for which 13,000 Rupees were formerly sanctioned, and this did not include, what would have to be built, bridges for roads across the waste weir channels round the locks. Again, the staff of peons required for irrigating sluices may be smaller when the sluices are all together as now proposed, but the principal advantage is the much greater ease of taking off water from the primaries than from the Main Canal.

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27 These remarks apply more to the Yaitoor than the Maidkhor irrigation district, as in the latter case the number of streams running parallel to the canal would probably make it as cheap in any case to take off from above Lock No. 1.

28 It has been assumed throughout that 500 acres in each square mile commanded are available for irrigation, and wherever acres are mentioned in this report the smaller quantity is meant, and not the whole area of the country commanded: that 2 cubic yards of water per hour are required for each acre irrigated. The formula for discharge is—

Velocity in feet per sec. = 92 √ hyd. mean depth inclination, and the velocity has been made 2,000 yards per hour for larger, and 3,500 for the smaller channels.

29 The quantity per acre per hour which the channels have been calculated to carry is as follows—

Area	Cubic yards per acre per hour.
200 to 300	8
300 to 400	7
400 to 500	6
500 to 750	5
750 to 1,000	4
1,000 to 2,000	3½
2,000 to 3,000	3
3,000 to 4,000	2½
4,000 to 5,000	2
above 5,000	2

But although the estimate has been framed according to this table it is proposed, in the first instance, to make the channels of rather smaller dimensions, that is to say all below 750 acres at the rate of 4 cubic yards per hour per acre, and all above 750 acres half cubic yards less than the table shows; the minimum rate (for above 4,000 acres) being 2 cubic yards per hour per acre. The land taken is wide enough to admit of the small increase necessary, and the spoil will be thrown wide enough to allow of a berm after the channels have been increased in width, should that be found necessary.

30. The plans are shown in the accompanying list.
31. The usual schedules of channels and villages are annexed.

*List of Drawings to accompany Report on Maidkhor and Yaitoor Distribution
General Plan No. 1, Maidkhor District*

Do. Do. No. 2, Yaitoor
Masonry Works.

- No. 1. Sluice of ten openings.
.. 2. Anicut west branch, Bookyapully vunkah.
.. 3. First class Bridge for main road.
.. 4. Timber Aqueduct for crossing Maidkhor primary (for existing irrigation).
.. 5. Anicut east branch of Bookyapully vunkah.
.. 6. Culvert for supply of tank.
.. 7. Anicut and off-take, Bookyapully vunkah.
.. 8. Sookkasala Anicut.
.. 9. Bookyapully do.
.. 10. Anicut and headworks above Mittatour tank.
.. 11. Six-inch falls in Yaitoor primary.
.. 12. Three feet overfall, Yaitoor primary.
.. 13. Bridge and overfall ..
.. 14. Sluice for 11,304 cubic yards per hour in the Yaitoor supply-channel.

*Proceedings of the Madras Government, Public Works Department,
17th May 1871.*

Three village land plans, Maidkhor District, namely, Maidkhor, Nundialumpett, Soonkasala, numbered 1 to 3.

Eleven land plans, Yaitoor District, namely, Maidkhor, Balerapully, Aliulpully, Pella Goodaloor, Chinna Goodaloor, Mittatour, Yaitoor, Thippapully, Komaaloor, Mootaloorpad Tondur-mallinna, Nos. 4 to 14.

(Signed) G. GORDON.

From the Consulting Engineer for the Madras Irrigation and Canal Company, to the Agent and Manager of the Madras Irrigation and Canal Company, dated 17th December 1870, No. 276.

I have the honour to acknowledge your No. 509, of the 6th instant, requesting Government sanction to an expenditure of Rupees 33,122-4-0 for certain distribution works under the 9th Section of the Main Canal, and to inform you that it appears to me, on examination of the survey plans, that in the preparation of this project due attention has not been paid to the Proceedings of Government No. 610, 26th March 1861. Provision is therein made that the Company's works shall not injuriously affect any existing irrigation works, and in the 25th paragraph of Mr. Gordon's report he has correctly described the manner in which existing interests should in all cases be protected. Describing the course of a primary channel, he says:—

"The inlet channel to Maidkhor second tank is first crossed by a culvert of four spans of 4 feet. This is not an important tank, and we do not at all interfere with it, but can fill it if it is found desirable."

I do not think that the proper mode of dealing with all tanks, or indeed with any existing supply of water for irrigation, could be described in more appropriate language; yet, in the same project, other interests are treated very differently.

With respect to the Mittatour tank the Chief Engineer thinks "it will be best for the Company to take it over," but other people's property cannot be taken possession of in this summary manner, nor could sanction be given for the Company appropriating the Yaitoor tankah, which supplies the tank, by building an aqueduct across it, until satisfactory arrangements had been made with the owners of the tank. It is not very material what is the cause of the alleged disease of the tank; the Chief Engineer attributes it to the decay of the artificial supply-channel; but it seems to me that the tank has a prescriptive right to the 11,117 cubic yards an hour of water, for the passage of which a culvert has been provided under the Main Canal. Mr. Gordon in his paragraph 8 suggests as an alternative that the Company might arrange to supply the tank with sufficient water for its present irrigation. It is improbable that the owners would consent to this.

2. With regard to the Nundipal tank, the Chief Engineer does not see any need to interfere with it, as the Company might guarantee a full supply yearly without any expense or waste of water; but seeing that his design provides for taking possession of the weir on the Nundipal tankah, and that a large channel branches off the supply-channel of the tank, the interference is very serious, and it would be necessary to obtain the consent of the owner of the tank to whatever is done. Mr. Gordon describes the adjoining land as a thriving property, and that the owner is improving the tank to enable him to extend the irrigation. The supply-stream, it is stated, never fails, from which I infer that he would expect the Company to fill his tank free of charge as often as he required so long as the Company's canal had water, and afterwards to leave at his disposal the water in the tankah in the dry season.

3. I have further to observe that in Mr. Gordon's 23rd paragraph he mentions:—

"The same interference with Nundipal tank occurs at the crossing of the Annaloor tankah by the primary channel, etc." But all this arrangement on the plans appears to have been changed in the Chief Engineer's Office, while the report is in preparation, and there are other discrepancies; in fact the report and its illustrations do not agree. This requires correction.

4. I regret the delay that will be necessarily caused by this reference, but the papers have not been properly examined and arranged before being sent to me; there is not even the usual

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estimate, nothing but a concise abstract which is of no use, neither are there any cross sections of the channels as is usual.

5. I must also take exception to the provision of only 6 Annas an acre for the channels that will be necessary in addition to those estimated for. In former distribution projects, where the channels estimated for were primary and secondary, or primary, secondary, and minor, (see the 6th Section,) and the area to be irrigated under each smaller channel was limited, 6 Annas an acre was admitted as a suitable provision for the immediate delivery of the water to the fields; but in the scheme under review the blocks of land to be watered by each channel are very large, as much as 3,000, 4,000, and 5,000 acres. I request to be favoured with a decided expression of opinion by the Chief Engineer as to the sufficiency of 6 Annas an acre for this distribution of water. My own impression is that double the amount would not be enough. I do not return the drawings and report, because their further examination can be proceeded with while this reference is being considered, and they can be exchanged for corrected copies hereafter.

From the Agent and Manager of the Madras Irrigation and Canal Company, to the Consulting Engineer for Irrigation and Canal Company, dated Madras, 26th March 1871, No. 139.

I have the honour to transmit copy of Mr. Gordon's letter, No. 100, dated 13th February 1871, with the Chief Engineer's endorsement, No. 590, of 14th instant, together with the revised plans and estimates, as particularized below, of the Maidkhor and Yaitoor distribution districts in the 9th Section, and to request sanction for Rupees 20,200, and for a further sum of Rupees 2,925 to be kept in reserve for the lower portion:—

Memorandum.

Drawings.

- 2 Plans of Aqueduct over Hockypully tankah
- 1 Plan of do Mittatour tank supply.
- 1 Do of Masonry Channel across waste, etc.
- 1 Do of Sluice Maidkhor, secondary
- 2 Do general of Maidkhor and Yaitoor Districts.

Estimates.

- 1 General Abstract Estimate
- 1 Tabular Statement
- 1 Abstract Estimate.
- 1 Detailed do

From G. GORDON, Esq., Deputy Chief Engineer, to the Chief Engineer of the Madras Irrigation and Canal Company, dated Calcuttaph, 15th February 1871, No. 100.

I have the honour to forward herewith revised plans and estimates of the Maidkhor and Yaitoor distribution districts in the 9th Section. On the 9th January your letter No. 5 informed me of the Consulting Engineer's objection to the plan proposed, of making use of the supply-channel of Mai Moor tank and of acquiring the proprietorship of the tank, and of the interference with the Nundipal tank without first getting the consent of the owners.

2. I at once made inquiries of the owners of the tank, and the result of them is that while the Mittatour owners might in course of time be brought to see that it would be advantageous to them to have a ready means of supply in times of drought, yet negotiations with them would take so long that I thought it better to alter the design by which water was brought from the Maidkhor side to the Yaitoor side by means of the channel, and to enlarge the Yaitoor primary so as to carry all the water needed for that side without any interference with their tank at all. This plan is more expensive, but better in several ways than the other, first, all disputes about the right to the water will be avoided; second, the water will be more under control than by the first plan where, at three places at least, a division of the water to the Company's consumers and to the

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tank owners would have had to be made, third, less maintenance on account of drainage crossed or intercepted will be needed, the channels being now chiefly ridge channels.

3. The interference with the other tank, the Nundipal, though similar in kind, met at first with no opposition on the part of the owners, who are an equivalent to the free use of their anicut and channel in the liability of the Company to keep them in repair. They promised to sign an agreement by which the Company should be at liberty to use their anicut and channel, but they have now begun to stipulate for a free supply of water for two crops for 500 acres. Also some statements they made showed they were not to be trusted, and I therefore recommend that, for the present, the works proposed for irrigating 2,500 acres below their off-take be abandoned or at least postponed until it is seen whether there will be sooner a demand for water there than in the lands referred to below paragraph 6.

4. The general description of the country proposed to be irrigated being given at length in paragraphs 1 to 5, and 16 to 21 of my report, dated 26th November 1870, I need not repeat it; but I will now describe the course of the water for each district, which is much simpler than it was before.

5. The Mailloor district is supposed to contain 6,500 acres of irrigable land, and is entirely supplied from a sluice in the Main Canal of six openings with the exception of 500 acres in Tuckamallana, which are supplied from a branch of the Yattour works.

6. The Mailloor primary leading from this sluice carries the whole of the water, but it is only reckoned that 4,000 acres will be irrigated from it and from the Mailloor secondary direct. There are two areas separated by the Bookyapully vunkah on which the remaining water (for 2,500 acres) could be distributed. The last plan showed the land under the off-take for the Sookkassala channel. A former plan showed 2,215 acres, between the Main Canal and the Bookyapully vunkah irrigated by water passed down by the lock sluices, which was considered objectionable, and the channels were abandoned. This land could be reached from the Bookyapully vunkah, into which the necessary water could either be turned out of the Mailloor secondary, enlarged, (by the drainage at Palhem), or if it is found better to adhere to the plan of watering the land near Sookkassala, the water could be sent down the Nundipal vunkah as was proposed when it was intended to make use of the Nundipal tank supply-channel.

7. There is more land, according to the calculations adopted (500 acres per square mile), than the water will supply, and it is better to defer the construction of channels until it is known when the water will most likely be wanted. In the meantime the works proposed to be carried out, i.e., the Mailloor primary, will provide for the water being sent down either to the probable off-take for the lands next the canal, which would be just below the junction of the Bookyapully and Nundipal streams, or to any work it may be proposed to construct for carrying the water to the Sookkassala lands. I hope no objection will be made to this alternative plan and to reserving a sum for it. Government have approved the principle of leaving, for the present, the construction of some of the channels, and it will certainly be to the advantage of the Company that they should not have to construct works which in all probability will not be wanted for several seasons, while they would require repairs every year. The estimate for the Sookkassala channels amounted to Rupees 1,973, and I think if the other land is chosen the same sum will suffice for them, or, say, Rupees 2,000, and if to that is added minor irrigation, at 6 Annas per acre, the sum required to be reserved would be Rupees 2,925.

8. The Mailloor district therefore, as at present proposed for sanction, contains 4,000 acres, with the capacity, as to the head sluice and primary channel, of supplying 2,500 acres additional in the lower part of the district for the works in which it is proposed to reserve a sum of Rupees 2,925.

9. The Mailloor channel in its first part, as far as the west branch of the Bookyapully vunkah, carries 13,000 cubic yards per hour. The second part carries 12,000 cubic yards, and although the Mailloor secondary takes off by a sluice placed in the primary, about 2½ miles from its head, a supply for 1,000 acres, the capacity of the primary is not diminished, but continues the same to the end, as the alternative plan described in paragraph 7 requires the supply of 7,500 cubic yards per hour to be allowed for and the relative capacity of the canal increases when the area irrigated decreases

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according to Major Mullins' scale. The Mailloor secondary is in the first part of its course, as far as Palhem, a ridge channel with twenty-one falls or repairs in addition to its normal fall of 5 feet per mile. Near Palhem it crosses a drainage which could be used for sending water down to the lower district if the lands next the canal (paragraph 7) are to be irrigated. In either case the expense will be about the same, because if the Sookkassala lands are not to be irrigated the supply of 7,500 cubic yards need not be carried beyond the Mailloor secondary sluice, and the reduction of the sectional area of the primary would be set off against the enlargement of the secondary down to Palhem which would then be necessary.

10. The masonry works on this district are—

1. A sluice of six openings (Drawing No. 1).

2. An aqueduct across the west branch of the Bookyapully vunkah (Drawing 2-A), instead of the anicut formerly proposed, which would have intercepted the water to the Mittatour tank. A fall of about 1½ inch is allowed over this aqueduct.

3. A bridge for the Kurnool Cullapah road and another for the Polatour Nundialumpet road (Drawing No. 3).

4. Two timber troughs to carry the irrigation water from the Mailloor tank across the primary (Drawing No. 4).

5. A covered aqueduct across the east branch of the Bookyapully vunkah (Drawing No. 5). This supercedes the culvert (Drawing No. 5) first submitted. The bed of the sandy stream is so high that the arches of an aqueduct of the ordinary kind would be closed up by the stream altogether after every fresh; I therefore propose to let the freshes pass over this aqueduct, and to allow the small quantity of water ponded up by it, which would otherwise obstruct the drainage of fields above, to sink away through openings left in the substructure of the aqueduct. This work will only raise the bed of the stream above it 1½ feet, and flows probably less than one foot. The waterway allowed under the Cullapah road for this stream is only six 3 feet and three 2 feet 3 inches vents. For the west branch only three 4 feet vents and in the new Nundialumpet road three 3 feet space.

6. A culvert for the supply of the second Mailloor tank (Drawing No. 6).

7. On the Mailloor secondary a sluice for the supply of Mailloor secondary (Drawing No. 17).

8. A first-class bridge for the Cullapah road.

9. A second-class bridge at Palhem and another near Mittatumpet.

3A. Drainage culvert near Palhem and on both channels where required six paved fords.

10A. The Mailloor primary interferes injuriously with no irrigation or drainage. It necessarily passes through some wet cultivation north at least of Mailloor, but the levels make this unavoidable. The Mailloor secondary is a matter of the wet cultivation and drainage is provided, for small surface nullahs are taken in and out by paved slopes.

11. The Yattour District, which contains 10,200 acres, is supplied from one sluice in the canal above the first lock, it will require ten openings. The interference with the Mittatour tank mentioned above as involved in the first scheme and avoided in this was as follows:—In order to avoid carrying so large a body of water, as is required for this district, all the way down the steep gradient of the Yattour primary, a part of it (11,000 cubic yards per hour) was taken down the Mailloor primary as far as the Bookyapully vunkah, into which it was discharged, and from which it was again taken out by an anicut at the head of the supply-channel to the Mittatour tank. The supply was taken down this supply-channel to a point a little above tank, where it was divided by an anicut with two sluices, the one on the right

giving a supplemental supply of 11,400 cubic yards per hour to the Yattour primary, and the other to the left taking off 3,900 cubic yards per hour by the Mittatourpal channel, the tank being supplied over the anicut or through sluices in it. This plan is abandoned, and the Yattour primary now carries the whole of the water used in the district, and that for 500 acres on the east side of the Main Canal directly from the Main Canal at the ten vent sluice mentioned above.

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12. At the end of the first part the supply required for the Mittaloorpaul irrigation is taken off by a secondary channel, called the Mittaloorpaul channel, and the primary goes on as on the original plan, except that it carries the additional water in its second, third, and fourth parts, which it was first proposed to bring down the supply-channel into the fifth part of the primary. The capacity of each part is shown on the plan, there being no alteration below the end of part 4 except that it is not now proposed to divert the waste channel of the tank but to cross it by a masonry work described below.

13. The Mittaloorpaul secondary goes down a rather steep ridge by a fall of 7 feet per mile and 8 feet 9 inches over falls to near Kistunpully, where, in order to avoid some well cultivation and also to reach the Mittaloor supply-channel at a suitable place for crossings, it turns a little to the left, and, falling 4 feet per mile, reaches the supply-channel near the main canal crossing the former by an aqueduct (Drawing No. 15). It again becomes a ridge channel until it joins the Mittaloorpaul channel as formerly but, in the last part of the Mittaloorpaul channel and the branch, called the culvert channel, remain unaltered.

14. The masonry works required on the Yaitoor primary are —

1. Sluice of ten openings (Drawing No. 1).
2. An overfall (Drawing No. 12).
3. A first-class bridge and overfall (Drawing No. 10) for the Pulatour road, length of overfall increased.
4. Three second-class bridges for Goudalur, Chinnumpully, and Yaitoor.

5. A work for crossing the Mittaloor tank waste (Drawing No. 16). The latter is found to be cheaper than diverting the waste channel; it is an open masonry channel which the water from the tank may pass over, as it is sunk in the ground, if indeed any water ever overflows from the tank, which does not appear at present to be the case. Possible floods are prevented from going down the channel by planks put across the lower end with the lower edge just above the ordinary maximum water line of the primary channel, a fall of 1 foot in the length of the work (10 feet) is allowed, none of the other work seems to need special notice.

15. The masonry works on the Mittaloorpaul secondary are —

1. A second-class bridge near Kistunpully.
2. Two small dry masonry culverts near the same place.
3. An aqueduct over the supply to Mittaloor tank (Drawing No. 15).
4. A second-class bridge for the road leading to tank No. 4.

16. Thus, in the Yaitoor District, there is no interference with irrigation channels or tanks, and the small amount of drainage that has to be considered is provided for.

17. I have no data as to the cost of the minor distribution channels, but possibly it is now approximately known from the works in the upper portion of the canal.

18. There is no doubt it will be years before the whole of the land proposed to be irrigated is ready for the water. At the same time it is necessary, I think, to show the people that water can be delivered where it is wanted by constructing some of the main channels. I would, therefore, recommend that although sanction is asked for the completion of the works shown on the revised plan, Government should be asked to allow the construction of the channels to stop short at the following limits at present, without prejudice to the contract, namely —

1. The Maidoor primary channel complete. This will send water down to the Soenbar's and Towarpully lands and as far as the works first proposed go.
2. The Yaitoor primary as far as the end of the 7th part.
3. The Towarpully channel as far as and including the aqueduct over the supply-channel. The Company should, however, be allowed, if it seemed in course of construction that water would be required within a season or so, to construct more of the channels or, at all events, the masonry works.

19. As the alterations in the plans are chiefly in figures and lines I have only sent in tracings of the centre lines of channels, from which the general plans or a fully sent can be corrected.

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17th May 1871.*

20. Of the masonry drawings formerly sent in the following are superseded or cancelled, namely —

- | | | |
|---------|--------------------|---------------------------|
| No. 2. | Superseded by 2 A. | Central office No. 551 A. |
| No. 5. | do | 5 A. do 551 A. |
| No. 7. | Cancelled. | (Work abandoned.) |
| No. 8. | do. | do |
| No. 9. | do. | do. |
| No. 10. | do. | do. |
| No. 11. | do. | do. |

And the following additional plans are sent herewith —

No. 15. Aqueduct for Mittaloorpaul channel over the tank supply.

No. 16. Masonry channel for crossing waste from Mittaloor tank.

No. 17. Sluice for Maidoor secondary. The enlarged section of the Yaitoor primary required additions to be made to the lengths of the overfalls. This has been done in the estimates.

21. As required by the Consulting Engineer, detail estimates of the earthwork and masonry works are supplied. An abstract of them is

enclosed of the 2,500 acres proposed. From this it will be seen that the

Maidoor district of 4,000 acres is estimated to cost Rupees 11,100, or Rupees 2-13-7 per acre, but this includes the necessary capacity at the head-works and primary channels for 2,500 acres additional. Yaitoor district, 10,200 acres, Rupees 18,500, or Rupees 1-13-5 per acre, and the average of the two districts Rs 2-2-0 per acre, including minor distribution at the rate of 6 Annas per acre.

22. I have the honour to request that if you approve of the above project as altered you will apply for sanction to the amount of Rupees 50,200, and for a further sum of Rupees 2,925 to be kept in reserve for the lower portion.

No. 320

To the Agent and Manager.

Forwarded with recommendation that sanction be asked.

As to the rate for subsidiary channels experience only can decide. I believe the rate of 6 Annas an acre will enable the Company to do all that will be required or desirable to distribute the water to each field commanded.

AYATTOOR,
14th March 1871.

(Signed) J H LATHAM,
Chief Engineer.

No. 320.

ORDER THEREON, 17th May 1871, No. 1,364.

IRRIGATION, No. 18.

With this letter the Consulting Engineer for the Madras Irrigation and Canal Company submits estimates amounting to Rupees 33,125 for the distribution works in the Yaitoor and Maidoor Districts in the 9th Section of the Company's canal.

2. The total area which the works are designed to irrigate is 16,730 acres, and the cost of distribution is therefore about 2 Rupees an acre.

3. The amount already sanctioned in G. O., No. 2,786, dated 10th September 1867, for the distribution works under notice, is Rupees 11,525 which being

report which accompanies the report last named
 Ltr. No. 139. 28 March 1897 in the 1st
 paragraph of which he remarks that no ex-
 isting irrigation or drainage is injuriously in-
 terfered with further than that in some
 cases channels pass through wet cultivation
 which however was unavoidable and the
 Revenue authorities will no doubt see that
 the crops receive equitable compensation.
 4. Mr. Gordon has carefully described the
 sources taken by each channel and the site
 of each masonry work. It only remains for
 me briefly to notice the chief features of
 the scheme.

The irrigation comes to us from two places, one on the
 right side of the Main Canal called the Eastern
 District and the other on the left side called the
 Maidhūr district, the former extending from the
 168th to the 177th mile, and the latter from the
 168th to the 175th mile.

5. On the Eastern district the supply is taken
 off the Main Canal by a sluice of 10 ft. in the
 169th mile where one long channel called
 the Eastern primary carries water for 10,230
 acres the part of which is distributed direct
 from the channel by 1221 cuttings and an hour
 being parted with for the irrigation of 1306 acres
 and a supplementary channel called Moolah
 pad - these channels are shown on Drawing No.
 565A and their further extension on No. 565B
 November

November 1897. —
 6. On the Maidhūr district the supply is
 taken off the Main Canal by a sluice of 6 ft. in
 the 169th mile. The channel is designated —
 Maidhūr primary, and Maidhūr secondary, and the source is shown
 on Drawing No. 564B. The area to be eventually
 irrigated is 6500 acres, exclusive of 3500 acres
 which is supplied from a branch of the Eastern
 works on the opposite side of the Main Canal.
 by water carried under it in a culvert. Of the
 6500 acres, it is proposed to construct channels
 for 4,000 only at present, though the head works
 and primary channels are designed and will be con-
 structed to carry water for the larger area. On
 this point the Hon. Secy. Chief Engineer
 shows that there is more land commanded
 than there is water available, and that it is
 advisable to defer the construction of some
 of the channels until it is known where the
 demand for water will be, and with this object
 it is proposed that the estimated cost of the
 minor channels for 2500 acres, namely the pa-
 ges of the estimate for which provision is now
 made, shall for the present be retained unex-
 pended.

Estimate
 Maidhūr 1,000 acres
 Sluice in Main Canal No. 900
 Channels Eastern District 5530
 masonry works 3470
 Subsidary channels at 60s. per acre 1500
 Channels in masonry works for an additional
 2500 acres hereafter 2925

Vaitoon - 10230 acres
 Chinnai - 1420
 Chinnai - 1075
 Subsidy - 3836
 Total 33125

Further irrigation of 1674 acres given by
 N. P. 2 in 1867 which is a fair average -
 Looking to the comparatively large block
 of land to be watered from each length of channel
 and to the allowance of 1/2 anna
 an acre, and requested the Chief Engineer to
 consider the same - He replied that experience
 only can decide as to the sufficiency of this
 rate, but he is of opinion that 1/2 anna an
 acre will enable the Company to do all that
 is required for the delivery of the water to each
 field demanded.

The Maining works the cost of which are shown
 on the survey are -
 For Vaitoon district
 One hundred feet
 one 1st class bridge
 four 2nd
 one masonry channel
 two drainage crossings
 sixty overfalls
 six paved roads - 3 miles under survey
 Madhav District

One head dam
 two masonry bridges
 two aqueducts
 three 1st class bridges
 two timber bridges
 one culvert
 two 2nd class bridges
 one drainage crossing
 twenty one overfalls
 six paved roads - 5 miles under survey

The rates are -
 Irrigation - 10 cub yds per acre.
 Public masonry - 1/2 Rs. per cub yd.
 Concrete - 3
 Puddle - 1/2 6 annas per
 Concrete floor - Rs. 2.0
 Arch masonry - 6
 Leathered - 6 - cut for
 Stone pitching - 182
 Public works - 1

which excepting concrete which is high and
 leathered which is enormous, are fair.

I recommend the estimates for sanction -
 The previous sanction for the distribution works
 of the 9th Section as given in Government Order
 No. 2786 of the 10th September 1867 is Rs. 15125
 for which Rs. 3000 were allotted
 in the estimate for the 1st range of the distribution
 works of the 9th Section forwarded with my letter
 No. 1 of the 14th inst. The remainder Rs. 11525
 should therefore be deducted from the total
 amount of the estimate raised in the - Rs. amount

Have the honor to be,

[Handwritten signature]

J. J. Walker (1878)

Wm. H. & Co. —

[Faint, illegible handwritten text]

[illegible]

1871
 J. N. 13. 64
 21
 27
 Proceedings of the Madras Government
 Under date the 17th May 1871.
 1871
 Read the following
 From the Chief Secy
 to Council (copy) Here with the 12/24 April
 1871

With this letter the
 Engineer for the
 Madras Irrigation and
 Canal Company sub-
 mits estimates amounting
 to Rs. 33,125 for the
 distribution works in
 the Guntur and Maddur
 Districts in the ninth
 section of the Company's
 Canal.

The total area
which the works are
designed to irrigate is
16,730 acres and the
cost