M.R.O. 1—77,006—8-6-37.

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(3) Initials of the Referencer

MADRAS RECORD OFFICE.

Government of Madras.

Public works DEPARTMENT.

G.O. No. 1123	Press / Mis.
398-399	
Dated 27 4	1870.

Not to be folded or roughly handled

No. 398. Read the following Note by the Acting Chief Engineer for Irrigation, to the Secretary to Government, Public Works Department, dated 7th April 1870, No. 85 :—

Read the following letter from Lieutenant-Colonel F. J. MOBERLY, R. E., Superintending Engineer, 2nd Division, to the Chief Engineer for Irrigation, dated Camp at Masulipatam, 29th October 1869, No. 106.

I HAVE the honour to submit the following remarks on the present condition of the Commamoor Channel and suggestions for its improvement and completion as a line of first-class navigation.

One section. ,, sketch. ,, statement. } By Banghy.

The estimates have been prepared roughly but on accurate levels, and, I hope, will not differ much from the more detailed ones which I propose to defer till I am favoured with instructions on this report.

2. The main canal from the right bank of the Kistna was led into the old Toongabudra, the principal drain of that side of the country. At Dooggerolloh, twelve miles from the head-sluice, three weirs have been constructed, one for the canal to Nizampatam, which has been cut in a direction generally parallel to the river, the other two across the Toongabudra itself, which from this point is now called the Commamoor Channel. That name was formerly given only to the irrigation channel taken off near Jagerlamoody, eight miles further down for the supply of Bapetla, Commamoor, etc., tanks. A lock at the head of each canal allows boats to pass into them from the main canal.

3. Plans for the improvement of the first portion (upper Commamoor Channel) were forwarded in letter dated 8th February 1868, No. 144 : these have been based on allowing a fall of six inches per mile to the bed of the channel throughout ; but from experience on the lower Commamoor Channel and the Buntumilly Channel I am satisfied that, with the very little fall which the country has, this slope is too great. The water passes the sluices, and in both lines irrigation has been carried on only by frequent obstructions in the form of rough-stone dams or palmyra piles with grass and earth.

4. The Toongabudra, it was supposed, would silt itself up being generally too deep, but this expectation has no where been fulfilled. I propose, therefore, to provide means of reducing the slope of the canal to about two-and-a half inches per mile average, leaving the existing low level vents for discharge at times of extra water of irrigation in very dry weather, or of drainage in exceptionally wet seasons. I would mention here that all the details have been prepared by Lieutenant A. C. Smith, R. E., who has been in charge of the range for years. I have discussed the whole subject with him repeatedly, and we have prepared this project to meet the difficulties which experience has shown to exist.

5. The Toongabudra requires to be widened to carry down the supply needed, and I have modified the estimate already prepared in only one place, where I propose cutting off a very tortuous portion by a channel for navigation forty feet wide, leaving the old stream to supplement the supply ; as the two meet at the Jagerlamoody Lock, the difference in their slopes will not cause any difference in velocity, which will be checked by the weir. I propose to raise its wall and those of the lock two feet to reduce the gradient.

6. The chamber of this lock is merely a revetted excavation 150 feet long, forty feet wide at top and twenty at bottom, the upper and lower bays being included by masonry walls. I would suggest that a more permanent form of lock should be constructed at this point.

7. Below the lock the bed of the channel is very much altered by the large amount of drainage which flows into and along it, scouring in some places and silting in others, and always likely to cause trouble to navigation.

8. I propose, therefore, to carry the drainage wherever it is practicable under the canal, raising its bed by locks to get sufficient height above the drains and to obtain a more suitable gradient for navigation, and to convey water for irrigation by a separate channel, as is done on the Masulipatam and Nizampatam lines.

9. The drainage ought, I think, to meet with our earliest attention. The ryots have endeavoured to cultivate, even with the precarious supply now furnished, by cross dams ; but they have several times lost their crops by the rain-water which has now but little outlet to the sea.

10. Below Jagerlamoody the canal crosses the drainage of 1,256 square miles of country lying to the north and west, distributed as follows :—

Nuckkavagoo	376
Nullamada	428
Saki Calva and Purchur Vagoo	228
Sworna	15
Suntaravoor	209

11. It is not easy to say how much the Saki Calva and Purchur Vagoo respectively drain. They have no defined beds, and the country between their lowest parts and for some distance on either side is flooded. I propose, therefore, to divide the area equally. Below Suntaravoor there is a small local drainage, which will be carried by a cut above the line of the channel into the tidal creek.

12. The Nuckkavagoo is already conveyed under the canal by an aqueduct at Kolemerla crown 18 feet above high water mark.

13. Provision has been made in the previous estimates* for passing all the other drains over inlet walls into the canal, and discharging their surplus by vents with shutters in the opposite bank. A great drawback to this is that the inlet wall must head the water back for 1½ to 2 miles or more, flooding the whole country close above our bank. This may be partly remedied by the insertion of two culverts under the canal to draw off as much as posible, leaving the main body to go in and out as now arranged. The channel is, and will be, always damaged by the process ; but, as the works have been built, I fear it may be too costly to take them up and lay pipes for all, as I shall explain below for two cases.

* G. O., No. 3,699, dated 15th December 1863.

14. The Nuckkavagoo and Nullamada fall into the Toongabudra, which will shortly be cleared out to the sea and have a good out fall.

15. Below the Nullamada all the drainage of 452 square miles sweeps slowly over the country, more or less obstructed by the Commamoor Channel, into the Ramparu, a swamp running parallel to the sea for 22½ miles with scarcely any fall and a bad outlet.

16. Lieutenant Smith has this year taken advantage of an unusually dry season to improve this latter ; but it must eventually be widened to at least 120

feet four feet below low-water mark from its mouth as high as the bridges on the Inkole road, near which, as I shall relate below, I propose to build the lowest lock.

17. The Ramparu swamp is at its head six feet above high-water mark ; we may, therefore, procure a fall of fourteen feet in the 22½ miles, allowing four feet for rise of tides. It will be impossible to carry off all this drainage immediately except at a great expense. I propose, therefore, to receive it between two banks 600 feet apart in the middle of the swamp, the earth for these banks to be obtained from channels fifteen feet wide at the upper end and forty-five feet near the Inkole road bridge, and with a fall of 7½ inches per mile from +6 to —8 high-water mark.

18. Openings of suitable width will be left in these banks to admit the drainage channels themselves running between banks from the Commamoor Channel.

19. Self-acting sluices will drain the enclosures thus made, as shown in the general sketch.

20. With an average depth of one yard over an area 22½ miles long and 200 yards broad we may count, on receiving the rainfall, of say one foot over 452 square miles in fifteen days, during six or seven of which the flood will lie above the Commamoor Channel banks. This quantity the creek will probably not discharge in less than twenty-one days.

21. In his examination for the Sungum project, Mr. R. Smith has come to the conclusion that for under-tunnels the most economical and handiest material is iron. It is more quickly laid and requires less depth, a very important matter in so flat a country as we are here dealing with.

22. Very little has been done for the Saki Calva, and, if the canal is locked, its level will be above that of the drain. I propose, therefore, to pass the water of the latter under the canal by ten pipes 4½ feet diameter, which will discharge one foot of rainfall in six or seven days, or under ordinary circumstances as fast as it falls.

23. The inlet and outlet of the Purchur Vagoo have been built ; but the stream passing, as I have already said in paragraph 7, over a great area of land, reaches the canal heavily charged with silt, which it now deposits in its bed. I would suggest, therefore, the removal of these works : the materials with which they are built could be used in the adjacent lock, so that very little loss would ensue, and, by building the lock beyond the drain, we shall obtain height sufficient for the free passage of the latter under the main canal.

24. The next point is the improvement of the navigation : to effect this I propose to reduce the surface fall of the channel with six feet on upper and five feet on lower sills of locks to 2½ inches per mile.

25. The first lock will be conveniently constructed immediately below the Kolemerla Aqueduct ; the second below that proposed in paragraph 19 for the Purchur Vagoo ; and the third at the junction with the creek.

	Feet.	Inches.
The upper sill of the first will be at	18	3¾
The lower sill	12	3¾
The upper sill of the second or Kunkalamurru Lock will be at	7	10½
	1	10½
Lower sill at	0	0
The upper sill of the third lock	8	0
At high-water mark lower sill		

26. The canal being almost entirely for navigation, I do not propose to build any calingulahs; but, by building the whole length of the lock, the culvert, which now only passes round each pair of gates, I shall get ample to supply evaporation.

27. I may mention here incidentally that the small lock bridge at Kunkalamurru will save the cost of a work long since promised to the inhabitants of that village.

28. For the irrigation of 40,000 acres lying below the Commamoor Channel and now most precariously supplied, I propose to excavate a side-channel from Jagerlamoody fifty-four feet wide at base, decreasing proportionately to nothing with a fall of six inches per mile, checked by masonry aprons with posts for shutters. With 5 to 5½ feet depth at head, this channel will easily supply the whole area, and we can put six feet or more at Jageriamoody.

29. I would build all lock upper walls with their gates high enough to retain the water absolutely still; the extra cost will be very small, and we may thus maintain navigation throughout the year.

30. This scheme will afford means of communication to the country lying above the delta into the sea at Chinna Ganjam. I see no reason why a good port should not be made there when the creek is properly opened. It will not be difficult, however, to carry a branch canal by the bed of the Condaroo to the already-established shipping point Vadaravoo, (or Ipurpollem as it is called in official papers,) and thus obviate the necessity for the expensive roads suggested by the Revenue Officers to convey produce by Inkole, Purchur, Bapetla, etc., which would all have to cross the Ramparu drain and then three to five miles of deep sand.

Read the following letter from Lieutenant Colonel F. J. MOBERLY, R.E., Superintending Engineer, 2nd Division, to the Chief Engineer for Irrigation, dated Camp at Caza, 27th March 1870, Extra No. 2.

I HAVE the honour to furnish the additional information called for in your No. 317, 6th December, so far as I can supply it without going into the estimates in detail.

One section. } sent by Banghy.
,, sketch. }
,, statement. }

2. I beg to point out that, in paragraph 4 of his letter, No. 1,010, 30th October 1863, Colonel Anderson estimated the area under the Commamoor Channel at 1,00,000 acres, and in paragraph 5 contemplated the necessity for locks to complete the navigation; it can scarcely be said, therefore, that, in providing for 18,300 acres, he had asked for all the requirements of the channel.

3. The plan which I lately submitted provides also for draining the Ramparu swamp and carrying off all the rainfall of the country above the line of the Commamoor Channel so fully, that I hope, in all but very extraordinary circumstances, we may count on obtaining full crops from all the land under the canal. Part of this is now occupied by widespreading shallow tanks, all of which will be cultivated as soon as we can regulate the drainage and supply, now both very bad.

4. The drainage of the upland crosses the channel principally by inlet and outlet, and in its course deposits an enormous quantity of silt in the channel,

notably below the passage of the Nullamada, for which on further consideration I think we shall do well even now to supply under-tunnels.

5. Owing to the small fall from the Ramparu to the sea, the water accumulates in its basin and stands back over the gently sloping land below Commamoor Channel, in some years for so long a time that the crops are ruined, and the cultivators naturally lose confidence in our statements.

6. I hope to procure shortly from the Revenue Survey and the Collector full information as to the actual area available; but the most cursory view of the expanse of country lying under the channel would, I believe, satisfy any one as to the advantage of extending the works of, and turning to further account the benefit from, the Kistna Anicut.

7. The omission in the statement of cost of works of a comma replies to part of paragraph 7 and paragraph 10: the item should be Irrigation Channel, Sluices, etc., 1 lac.

8. Experience satisfied Colonel Anderson that navigation and irrigation on the Kistna channels must be carried on separately. I am only proposing on the Commamoor Channel the system which he originated on the Masulipatam, the Nizampatam, and western bank channels. The Toongabudra does not silt itself up as Colonel Anderson expected some years ago that it would do, because the fall in its bed is so great that the water does not deposit till it is met by the drainage below. There the section of the channel is utterly ruined; its bed is choked; its banks are all washed in; and everything must be re-modelled.

9. With so great a velocity the water sufficient by theory for the irrigation does not reach the sluice floors, but shooking past them is wasted at the tail. We carry on the irrigation in the early season by sending over the very large calingulah at the head a far larger supply than is required. After the freshes we can only maintain irrigation by constructing temporary dams, the management of which is a ground of inconvenience and complaint, and leaves much opening for corruption among the subordinates of the department. Navigation up-stream is very difficult at first owing to the current it is impossible afterwards from the existence of the dams, and eventually the utter want of water,

10. My attention was first drawn to the channel with the idea of making it navigable and affording to the villagers over that tract of country means of communication, for want of which they are competing at great disadvantage with the cultivators of the adjacent districts, who have either canals or roads whereby to remove their surplus crops.

11. It was clear, however, that great injury must occur to any line of navigation if the means of drainage were not improved. I believe that my proposition covers all necessities between Dooggerolloh and Chinna Ganjam for a first-class line of navigation and irrigation.

12. I did not intend in my No. 106 of 29th October 1869 to state the levels as accurate. At the time I wrote there was much doubt on the subject, but I always proposed that the existing level at the Kolemerla Aqueduct should rule the height of the lock upper sill. From the latest surveys and check levels it appears that the crown of this work should be called 16·50, not 18; but, as we cannot

afford to give so much fall in this distance, I would still adhere to my original idea, open to any slight modification of detail.

13. I do not understand how you have arrived at the conclusion in clause 3, paragraph 7, as the channel is really rather below my level in the 19th mile; at the 36th it is full of silt from the Nullamada drainage, which has altered the gradient, (see paragraph 8.)

14. Clause 4 will be duly considered in estimating details.

15. Clause 5.—It is true that the widening of the main canal from Seetanagram will take some years; but at present the supply is obtained by a very great velocity, there being at times a surface fall of 9½ inches per mile between Seetanagram and Dooggerolloh, and of six inches between the latter place and Jagerlamoody. All this prevents the silting on which Colonel Anderson counted.

Beside these a heavy fall of rain compels us to open sluices and calingulahs to such a degree below that in such cases the head and scour are for certain periods increased.

16. I beg to point out that in my paragraph 24 I wrote of a "surface fall;" your argument is merely a point of detail, and I am anxious to obtain permission to make a survey which shall enable me to judge as to these points.

17. Clause 8.—The drainage is divided precisely as Colonel Anderson proposed; his words* are "there is no alternative but to turn it (Purchur Vagoo) into Ramperu swamp." The difference between Saki Calva and it is inappreciable. The Purchur Vagoo is only fourteen, not twenty-four, miles from the tidal creek. The line of drainage channel will be laid out along the lowest part of the swamp. I presume by "eastern" side you mean "southern." It will be necessary to give some allowance for the cultivation under the spring channels from the sand ridge; purely, however, a matter of detail.

* G. O., No. 3,699, 15th December 1863, paragraph 18.

18. Here I would point out that the "comparatively good outfall" by the Nizampatam creek is not yet available. The Dumpakodu Calingulah, mentioned in paragraph 12 of Colonel Anderson's letter, is still there. The Carlapollem Tank has received its supply; but Budam, Yazali, and Allur are still waiting for the completion of the Aramanda Channel, which in your No. 15 of 18th January 1870 you have returned.

19. If the Calingulah already much damaged is carried away, the entire revenue from those villages will probably be lost. Colonel Anderson prohibited any expenditure on its repair.

20. The Ramperu swamp lies so flat that it is impossible to drain it as you expect, and, if we do not enclose the plots of irrigated land, they will be submerged. It will not be difficult to diminish or shut off the supply to them in case of rainy weather, and they will scarcely suffer from local rainfall.

21. I had no intention of proposing iron syphons but merely tunnels; where the fall is so slight and difference between irrigation channel and drain so little, I submit that iron pipes will be very advantageous, and, I believe, economical.

22. I have now, I believe, answered all your remarks. I must again point out that my report is only preliminary, with the view of obtaining the sanction of

Government to an establishment for the more thorough survey of the whole ground embraced, to complete the information already in hand.

23. It has lately occurred to me, however, that it would be better to make the navigation channel utterly distinct and to carry it along the original high-level line a still-water canal with locks from Ravendrapad, where it was originally commenced.

24. It will be of great advantage to the traffic from Guntoor, whether towards Cocanada or Chinna Ganjam. It will cross the drainage at better defined points and with more favourable levels, and I think the separate project will be less expensive.

25. I beg permission to include this in my survey, and request that Government will, if they approve my proposals, allow me to entertain two Surveyors for four months, at 60 Rupees per month, under Lieutenant A. C. Smith, with Lascars.

THE correspondence now submitted for the orders of Government relates to the Commamoor Channel, the improvement and completion of which are under consideration.

2. In Government Order of the 15th December 1863, No. 3,699, an estimate, Rupees 1,85,460, was sanctioned, which provided for certain improvements; but as now the Government of India require a complete project for the whole delta to be submitted before any more individual works are allowed to be taken up, it becomes necessary to prepare plans and estimates for this as well as for other parts of the general scheme.

3. It will be seen that the preliminary discussions have gone as far as can be useful in the absence of the surveys and levels which are necessary for the determination of details. The small fall of the country and the necessity for providing for a considerable quantity of cross-drainage render it difficult to decide what the specific arrangements of the canal should be until a complete series of levels shall have been obtained.

4. The Superintending Engineer asks for the services of two Surveyors with Lascars for four months, and I beg to recommend that his request be acceded to. I have already informed him that the establishment as per margin* now employed under Mr. R. Smith in Nellore can be transferred to the Kistna as soon as the estimates for the Sungum project are ready, and this will very soon be the case. The Superintending Engineer should be allowed to make the most of the sum provided for this and other temporary establishments at work under his orders.

	Rs.
* One Surveyor	150
,, Draughtsman...	60
,, do.	40
Total...	250

5. Colonel Moberly was asked in paragraph 2 of this Office Memorandum, No. 317, of the 6th December last, to show clearly what has been done, or is being done, on the estimate sanctioned in 1863, as also to report what effect the works provided for in that estimate have had. This information has not yet been received.

Proceedings of the Madras Government, Public Works Department, 27th April 1870.

6. The Superintending Engineer has, in Government Order, No. 920, dated 1st instant, been requested to report how soon the estimates for improving and completing the delta works would probably be ready.

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

To the Secretary to Government, Public Works Department.

No. 399. ORDER THEREON, 27th April 1870, No. 1,123.

IRRIGATION, No. 24.

ORDERED that the note by the Acting Chief Engineer for Irrigation be communicated to the Superintending Engineer, 2nd Division, and that Colonel Moberly be informed that either the establishment, which will be available on the completion of the Sungum project in Nellore, may be transferred to the Kistna for employment on the Commamoor and other channels, or the cost of it, Rupees 250 per mensem, may be made use of to strengthen the temporary survey establishments in any way which the Superintending Engineer may consider to be advisable.

(True Extract.)

(Signed) J. MULLINS, Major, R.E.,
Acting Joint Secretary to Government.

To the Superintending Engineer, 2nd Division.
,, Controller of Public Works Accounts.

Exd. A. S. Rodgers.

No. 85

Note by the Acting Chief Engineer for Irrigation

The correspondence now submitted for the orders of Government relates to the Commamoor Channel, the improvement and completion of which are under consideration.

2. In Government Order of the 15th Decr. 1863 No. 3699 an estimate Rupees 185,460 was sanctioned which provided for certain improvements, but as now the Government of India require a complete project for the whole Delta to be submitted before any more individual works are allowed to be taken up, it becomes necessary to prepare plans and estimates for this as well as for other parts of the general scheme.

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X	1 Surveyor	Rs 150
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	1 do	— 40
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Fort St George
7th April 1870.

To Lt Colonel Cullins Major RE
Acting Chief Engineer for Irrigation

To
The Secretary to Government
P.W.D.

was formerly given only to the Irrigation Channel

to Rou

No - Note by the Sup. Ch. Engr. Vol 1

Sup. Engrs Office 2nd Div
Camp Nuggulapatam
29th October 1869

No 106

From Lieutenant Colonel T. J. Mokerly R.E.
Superintending Engineer 2nd Div.

To The Chief Engineer for
Irrigation

Enclosures
1 Section
1 Sketch
1 Statement

I have the honor to submit the following report on the present Condition of the Commamoor Channel, and suggestions for its improvement and completion as a line of 1st class Navigation. The Estimates have been prepared roughly, but on accurate levels; and I hope will not differ much from the more detailed ones, which I propose to defer till I am favoured with instructions on this report.

2. The Main Canal from the right bank of the Kistna was led into the old Toongabadra the principal drain of that side of the Country. At Broggerollah 12 miles from the Head Sluice, 3 weirs have been constructed one for the Canal to Nuggulapatam, which has been cut in a direction generally parallel to the River, the other two across the Toongabadra itself, which from this point is now called the Commamoor Channel. That name was formerly given only to the Irrigation Channel

taken

* By Bangy.

From Lieut. Colonel T. J. Mokerly
Superintending Engineer
To The Secretary to
Government of Madras
No 1454
Dated 29th October 1869
Rec'd 1st November 1869
Answered
Records

Note on the Correspondence relative to the Commamoor Channel & the improvement & completion thereof

Rec'd 1/11/69
Sent 3/11/69

taken off near Jagerlamoody 8 miles further down for the supply of Dauspetta Commamoor Vte tanks. A lock at the head of each canal allows boats to pass into them from the main Canal.

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4 The Toongabadra, it was supposed, would silt itself up, being generally too deep; but this expectation has nowhere been fulfilled. I propose therefore to provide means of reducing the slope of the Canal to about 2½" per mile average, leaving the existing low level vents for discharge at times, of extra water of irrigation in very dry weather, or of drainage in exceptionally wet seasons.

I would mention here that all the details have been prepared by Lieut. A.C. Smith R.E. who has been in charge of the range for years, I have discussed the whole subject with him repeatedly and we have prepared this project to meet the difficulties which experience has shown to exist.

5 The Toongabadra requires to be widened to carry down the supply needed and I have modified the estimate already prepared in only one place, where I propose cutting off a very tortuous portion by a channel for navigation, 20 ft. wide, leaving the old stream to supplement the supply. as the 2 meet at the Jagerlamoody lock the difference in their slopes will not cause any difference in velocity which will be checked by the weir. I propose to raise the wall and those of the lock 2 ft. to reduce the gradient.

6 The Chamber of this lock is merely a revetted excavation 150 ft. long 40 ft. wide at top & 20 at bottom. the upper & lower bays being included by masonry walls. I would suggest that a more permanent form of lock should be constructed at this point.

7 Below the lock the bed of the Channel is very much altered by the large amount of drainage which flows into & along it, scouring in some places and silting in others & always likely to cause trouble to navigation.

8. I propose therefore to carry the drainage wherever it is practicable under the Canal, raising it to bed by locks to get sufficient height above the drains,

and to obtain a more suitable gradient for navigation - and to convey water for irrigation by a separate Channel as is done on the Madras Par=tam and Tiyagapatam lines.

9. The drainage ought, I think, to meet with our earliest attention. We have endeav=oured to cultivate, even with the precarious supply now furnished, by cross dams; but they have several times lost their crops by the rain water which has now but little outlet to the sea.

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This does not seem to agree with Colonel Austen's report which gives 690 Sq. miles as far as 15 Miles from 15 Dec. 1863 No 3699

conveyed under the Canal by an aqueduct at Kolamarla - crown 18'0 above high water mar k.

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16 Lieutenant Smith has this year taken advantage of an unusually dry season to

improve

Why cannot some of this drainage be turned into the Toongabadra which seems to have more water out of the Saki & Purchur drainage and seem to be capable of being so carried

X 16 or dwg 1 Section but perhaps the 18 means high Canal above

G.O. No 3699 of 15th December 1863.

179

improve this latter, but it must eventually be widened to at least 120 feet 4 feet below low water mark from its mouth as high as the bridges on the Inkole road; near which as detail plate below, I propose to build the lowest lock.

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20. With an average depth of one yard over an area 22½ miles long and 200 yards broad we may count on receiving the rain fall of say 1ft over 452 square miles in 15 days;

during 6 or 7 of which the flood will be above the Commamoor Channel banks. This quantity the creek will probably not discharge in less than 21 days.

21. In his examination for the Surgam project Mr R. Smith has come to the conclusion that for underground the most economical and handiest material is iron. It is more quickly laid and requires less depth, a very important matter in so flat a country as we are here dealing with.

22. Very little has been done for the Inkle Calva and if the Canal is locked its level will be above that of the drain. I propose therefore to pass the water of the latter under the Canal by 10 pipes 6½ ft diameter which will discharge 1ft of rain fall in 6 or 7 days or under ordinary circumstances as fast as it falls.

23. The inlet & outlet of the Parchèr Vagoo have been built but the stream passing, as I have already said in para 7, over a great area of land, reaches the Canal heavily charged with silt, which it now deposits in its bed. I would suggest therefore the removal of these works, the material with which they are built could be used in the adjacent lock, so that very little loss would ensue, and by building the lock beyond the drains, we shall obtain

height sufficient for the free passage of the latter under the main Canal.

24. The next point is the improvement of the navigation; to effect this I propose to reduce the surface fall of the Channel with 6 feet on upper and 5 ft. on lower sills of locks to 2½" per mile.

25 The first lock will be conveniently constructed immediately below the Kolamula aqueduct, the second below that proposed in para 19 for the Purchai Vagoo; and the third at the junction with the Creek.

The upper sill of the first will be at 18. 3¾"
The lower sill 12. 3¾"
The upper sill of the second or Kunkalamurra lock will be at } 7. 10½"
Lower sill at 1. 10½"
The upper sill of the third lock.
at High water mark lower sill .. 8. 0.

26 The canal being almost entirely for navigation, I do not propose to build any Calingulas, but by building the whole length of the lock the culvert, which now only passes round each pair of gates, I shall get ample to supply evaporation.

27. I may mention here incidentally that the small lock bridge at Konkalamurroo will save the cost of a work long since promised to the inhabitants of that village.

28. For the irrigation of 40000 acres lying below the Commamoor Channel and now most precariously supplied, I propose to excavate a side Channel from Jagarlamoody 5 ft. wide at base, decreasing proportionately to nothing with a fall of 6" per mile, checked by masonry apron with posts for shutters. With 5 to 5½ feet depth at head this Channel will easily supply the whole area and we can put 6 feet or more at Jagarlamoody.

29. I would build all lock upper walls with their gates high enough to retain the water absolutely still, the extra cost will be very small and we may thus maintain navigation throughout the year.

30. This scheme will afford means of communication to the Country lying above the Delta into the sea at China Ganjam. I see no reason why a good port should not be made there when the Creek is properly opened. It will not be difficult however to carry a branch canal by the head of the Condaroo to the already established shipping point Vadaravoo (for I purpollem as it is called in official papers) and thus obviate the necessity for the expensive roads suggested by the Revenue Officers to convey produce by Inkolu Purchon. Daupetta &c which

would all have to cross the Ronsparo drain
& then 3 to 5 miles of deep sand—

I have the honor to be
Sir
Your Most Obed. Servant
J. J. Bicknell Lieut Col R.E.
Supt Engineer 2d Dn

Statement Showing the Cost of Works for the Completion of Commanoor Channel-

25

Additions & Improvements to the Channel	
esp to Nullamada 28 Miles	141500
Deepening tidal Creek	15000
2 Channels in Romparoo Swamp and branches from Comanoor	141700
10 Pipes Purchoor Vagu	20000
" " Soki Calvoh	20000
" " Alairoo	4000
2 " Suntaravoor	4000
" " Nullamada	4000
" "	2000
1 Sworna	
Asparoo & Jannalairoo	4000
Clearing to tidal Creek	35000
Tidal Lock	30000
Kon Kalamuttoo Lock	30000
Kolemula Lock	100000
Irrigation Channels, Sluices &c	11000
Embankment above Kolemula Lock,	25000
Kon Kalamuttoo	50,000
Tidal Creek	
Total Rupees	637200

Supt Engrs Office 2d Div
Masulipatam
29 October 1869

J. Hudson Lt Colonel RE
Supt Engineer 2d Div

No 317.

Memorandum

99

Enclosures

1. Letter
1. Sketch
1. Statement

3

The undersigned has the honour to acknowledge the receipt of the letter No. 106 of the 29 Oct. last from the Superintending Engineer 2 Division, to make the following remarks on the proposition to transfer forward further improvement of the Commanoor Channel with a view to render it more efficient for navigation as well as thereafter serviceable for navigation

2. Letter first shows it object to enquire further right understanding of the project to show clearly on the Sketch map, what has been done & what is being done on the estimates sanctioned in P.W.D. 18 December 1863 No 3699 - Secondly it should be clearly pointed what effect the works the provided for in these estimates have had.

3. It will be seen that the Government suffered that in sanctioning the estimates 19,7,60 there asked for all

Sub Enclosure in a letter No 106, from Superintending Engineer 2nd Division to the Chief Secretary to Government Public Works Department dated 29 Oct 1866 Received 5th Nov 1866

To the Chief Secretary to Government Public Works Department

By Order &c

Superintending Engineer 2nd Division

Memorandum

The Cost of the Works for the Completion of the Commanoor Channel

the requirements of the channel would be provided for and now that it is proposed to extend more than 6 lacs additional it will be requisite to show very clearly why this additional outlay is now found to be necessary.

4- Again it will be essential that the exact position and area of the lands to be irrigated, as also the levels of the different plots should be shown, otherwise considerable uncertainty will remain as to the effect of the works ~~already executed~~ contemplated.

5- In para 25 of the letter under reply 40,000 acres of land to be irrigated are referred to - In the Proceedings of Government already quoted the total area which it was thought could be obtained is put at 35,020 acres & of this only 18300 were expected to yield Revenue -

6- The decision of Government as to the extent to which sanction may be properly given to expenditure on this channel will depend upon the evidence which may be adduced of the value of the probable results, and without a tolerably clear exposition of these results based upon reliable data, the undersigned cannot well advise the extent of improvement which should be sanctioned for.

7- As per print- Engineer cannot make comments. Although in reference to the estimate submitted in February 1868 with the plan submitted by Engineer letter to the Superintending Engineer of the 6th January

1st Vide para 4 of the Supdg Engr's letter of the 25th inst. he proposes that in addition to the Jayalamoorthy Pettai Irrigation of 40,000 acres - The rough estimate of cost of works does not show what this item would amount to and moreover, as the Longabutton C. Engineer does not state if upon the plan, it is not quite clear why the water should be carried in a side channel in preference to using the main canal for that purpose.

2nd If the Jayalamoorthy lock is in good order it is thought it may be left with

its vaulted chamber until the traffic should have so far developed as to make time a matter of consequence. New locks should however be built with larger chambers.

3rd. The levels of inlet & outlet sills of existing locks are not distinctly shown as they should be on the longitudinal section and it is consequently difficult to ascertain what alterations may be requisite. This undoubtedly advantageous to keep drainage under the Canal when the levels will admit of such under drainage being efficient but, with reference to the proposed alteration of the slope of the channel, it is not clear how the present locks at the 19th & 36th miles would render this impracticable for this would be the lowering of the level of the Canal between them.

4th. If, as mentioned in para 12, the Crown of the aqueduct or tunnel at Kolimala is at +18.0 this level is 19th mile
practically a point point and the Canal bed cannot be much altered. It is doubtful however whether the depth of the locks here should be as much as 6 feet as this appears to add to the expense in earthworks and to depress the level in the next reach more than is advisable.

5th. The alteration of slope for the purpose of making the Canal more efficient for irrigation requires consideration with reference to the present & probable future conditions of the supply. The late Superintending Engineer (letter No 144 of the 8 Feb. 68) proposed that it should take some means to widen the main Canal from Sultanpore and it would seem therefore that hitherto the difficulties in procuring water have not been considerable, the absence of a proper supply of water.

However in para 24 it is stated that a slope of 2½ inches a mile is considered to be the proper arrangement, but the details given in the following paras appear to allow 3".2 for the 16½ miles between the first two locks & 1 13/32 for the 16 miles between the last two locks. It appears to be highly probable that 6" a mile would be too high a rate of fall but whether this should 2½ inches

would make the locks further
somewhat more costly than is necessary,
and it would seem to be advisable
to regulate the fall in the various
inland reaches so as to ensure a tolerably
regular current not exceeding say
1320 to 1500 yards an hour.

6th. It will be found that locks with
side culverts from end to end will
be much more expensive than those
with short culverts at each end.
The Engineer undersigned has been requested to furnish Colonel
Moberly with a tracing of a lock
design furnished from those Office
which it is thought is on the whole
a fairly economical & efficient
arrangement.

7th. There is no objection to the employ
of piers in connection with locks where
[illegible] the quantity of water passing
down is but small but when drainage
are admitted to a reach it would
seem to be requisite to provide ample
escapes at the lower end and the
undersigned would therefore suggest

with reference to paras 28 & 29 that they
should be considered.

8th. As regards the drainage it will be
seen [illegible] that Colonel Anderson's
letter (G.O. 15 December 1883 No. 3699)
& para 14 the Comparatively flat outfall by
the Nizamabatam creek is noticed
& it will be well therefore to divide
the drainage of the Nampairi swamp
so as to give each part an equally
good outfall & it would appear
that at present about the Paracherla
drainage would be better performed
to make the division. The available
fall Southwards is not as mentioned
in para 17 - fourteen feet but
10 feet as a maximum viz 6 &
4 the rise of the tide - It is thought
that the most economical plan
will be to cut a deep channel
as near the Eastern side of the
swamp as the levels will allow &
a width sufficient to drain off all
the flood waters of this Southern part
of the swamp in say 3 or 4 days
The bed at the lower end may as
proposed be at 4 feet below low water

Channels

and if a fall of 5 inches a mile
be allowed the 10 per cent fall would
be just absorbed in the 24 miles to ±
the Paraclure drainage. It must
be remembered that if all the space
between the Commander channel
the swamp drain & the crop drain
be embanked all round it may
be very difficult to clear the ground
of water volumes if the channels
be open and dug the water % for
a few hours in floods will prepare
the whole surface & volume for that
discharge in the drip channels
will act efficiently in carrying off
the remainder. Care should be taken that
through out the whole course there is no obstruction to the free
9th It is not considered that large outlet of water at
river inundation explains can be least at one side
economically employed. Generally of the drip drain
if masonry under drains cannot over the ground
be constructed without difficulty surface."
the only practicable alternative is
the admission of water by inlets &
its outlet by escapes.
10th Letter absence of explanations [illegible]
[illegible] to a large sum for Irrigation channel sluices

In the Supt Engr 2nd Grade
6/12

№ 317.

To
The Supg Engineer
2nd Do.

WW 1457/70
Rec.d 27th April 70 in L. 398.

Dated 6th Dec. 69
Desp 10th Dec. 69
Encls 3

Remarks on the
propositions brought
forward for the
improvement of
the Commamoor
Channel.

P. W. Department.

1123

Proceedings of the Madras Government

Under date the 27th April 70

Read the following

From. The Ag. Chief ~~Engr~~
Engineer for Irrigation
} P. C. № 850 of 7th April 1870

Ordered that the note
by the acting Chief Engr. for
Irrigation be communicated
to the Supg Engr. 2d Division,
and that Col. McHerly be
informed that either the
establishment, which
will be available on the
completion of the Singam
project in Nellore, may
be transferred to the Kistna
for employment on the
Commamoor and Ther

Channels

Channels, on the east Sib,
Rs: 250 per mensem, may
be made use of to strengthen
the temporary survey es-
tablishments in any way
which the Supdg. may
consider advisable.

Dy. 11/4/70

22

To Supdg. 2d Divn
Controller W.D. accts

Despd. 2/5/70.

Cue 1457

Govt. of 1870 Madras.

PUBLIC WORKS.

To The Superintending Engr.
2nd Division

15-3

Dated

Recd. Encl. 6

G. O. 27 April 1870 No. 1123 W

Nos. 398-399

Communication of channel

Note by the Chief Engr for Govt relative to the proposed Communication channel in the District of Cuddapah and enclosed with instructions.