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MADRAS RECORD OFFICE.

Government of Madras.

Public Works DEPARTMENT.

G.O. No. <u>2584</u>	Press Mis.
<u>55-57</u> Dated <u>4-11-38</u>	18 <u>55</u>

Not to be folded or roughly handled

Read the following letters.

No. 55. From Colonel C. E. FABER, Chief Engineer; to J. D. BOURDILLON, Esq.,
Secretary to Government, dated 31st March 1859, No. 9177.

In forwarding, as directed in Extract Minutes Consultation in the Revenue Department,
under date the 10th February 1859, No. 181, the accompanying
Copy of a letter from the district En-
gineer of Kistnah division, of 1st
March 1859, copy of a letter from the District Engineer of the Kistnah divi-
sion, reporting fully on what is said in paragraphs 5 to 8 of Mr.

Dykes' letter of January last, regarding the state of the crops and the communications of that
part of Masulipatam which is in the Kistnah delta, from the absence of the means of drainage,
I have the honor to state, that it appears to me, that in making the comparison between the
deltas of the Kistnah and the Godaveri, which forms the basis of his remarks, Mr. Dykes, as is
too customary I fear, with those unacquainted with the history of the recent operations in the
two tracts, has looked upon them as in an equal state of advancement, totally ignoring the fact,
that in the one case, they had been in progress for fully six years, before in the other, they had
been commenced, and that, owing to the scanty population in Masulipatam, to the introduction
of the budget system, and finally to the restriction on expenditure, the improvements under the
Kistnah have been unavoidably left in the unsatisfactory state he found them in.

2. When, however, Mr. Dykes speaks so sweepingly of the Masulipatam portion of the
Kistnah delta being under water from July to December, his assertion must be taken with all
due reservation, for though he no doubt describes what came under his own limited observation
in a particular neighbourhood during, and after a singularly heavy fall of rain, it is well known
that nineteen-twentieths of the delta are elevated far above the reach of inundations, while the
river embankments stand as securely as they did last year, and that, although the low lying lands
about Tamersha, where I believe Mr. Dykes was during the flood he noticed, and the borders
of the Colair lake, do suffer at intervals from a superabundance of water, the reason is, that in
the incomplete state of the project, the drainages which cause the mischief, must still be used
for carrying water from the annicut for irrigation, and cannot be left entirely to their natural
purposes. In fact, the continuous cry for water being fifty times more urgent than the occa-
sional one for improved drainage, the means of supplying all the higher parched lands must be
provided, before attention can be effectively given to the relief of the comparatively small tracts
which, from the very circumstance of their low position, are normally more favored, notwith-
standing their liability, from the same cause, to not unfrequent temporary inundation.

3. Local relief, with the object of protecting existing revenue, has in many cases been af-
forded, as far as means would allow, but nothing on a general and efficient scale can be done till
the removal of restriction admits of the works already projected and sanctioned being proceeded
with. For example, the Boodoomair, which is one of the main causes of inundations, and is one
of the natural water courses which Mr. Dykes considers should be made navigable, could have its
connection with the annicut channels at any moment cut off, were the lock and calingulah,
sanctioned so long ago as November 1857, and entered as item 217 of list 2 of the current bud-
get, completed at Casarapilly, these works being intended to regulate the quantity of water arti-
ficially thrown into the drainage, and to form the indispensable beginning of the series of works,
which it may be worth while, at some future time, to undertake, to render it navigable throughout
the year, but which it would certainly not answer to begin, while so much of far superior importance
requires to be done for opening lines of easier communication, as well as of irrigation almost

* Item No. 209 of list No. 2 of bud-
get of 1858-59.

† Item No. 215. † list No. 2 of budget
Do. „ 216. † of 1858-59.

parallel to it, such as the Ellore high level canal* on the one
hand, and the channel from Yenckepaud† to Mootoor, with its
branch from Valepoor to Nundewadah, on the other.

4. Were these channels, with others already sanctioned, to the collective amount of some
five lacs of Rupees; and those which have still to be planned, all finished, the water communica-
tions of the Kistnah delta would be placed in as efficient a state as those of the Godaveri, and
at the same time, the means of disposing of surplus water would no doubt be greatly improved

5. Captain Chambers' letter is far too complete, I think, to require me to say more to assure the Government that, if the progress of improvement is not so advanced in the Kistnah as in the Godaveri delta, the cause is simply connected with the circumstances of the two tracts, and that the remedy for the present unsatisfactory state of matters in the former is not to be sought in the projection of any special new works having only local results, but will be found in giving early effect to the original scheme, which, in the course of its development, is calculated to accomplish all that can be done for the effective drainage of the lands of the entire delta, as well as their thorough irrigation, and for opening out, at the same time, water communications where practicable, throughout the districts.

Letter from Captain O. W. S. CHAMBERS, District Engineer, in charge Kistnah division; to Colonel C. E. FABER, Chief Engineer, dated Bezoarah, 1st March 1859.

With respect to your resolution, No. 7879 of the 14th instant, on Extract from the Minutes of Consultation, as per margin, calling upon me to report what measures can be devised for remedying the evils existing in the Kistnah delta, complained of by Mr. Dykes in his letter of January 1859, and likewise to furnish plans and estimates to effect the early drainage of the said tract, together with the opening out of water communications throughout the same, I do myself the honor of stating as follows:—

1. That any comparison between the state of the delta here in Masulipatam, where a great project is almost in abeyance, with that of the Godaveri, where the works have been in operation for 13 years, and an expenditure, approaching $\frac{1}{2}$ million sterling, incurred, and where the population was not only much more wealthy originally, to say nothing of the wealth created since 1846, but also much more numerous to the square mile than that of this district, appears to me extremely unjust.

2. That there are Rupees 4,92,000, sanctioned for works on the Masulipatam side of the river alone, of which not one anna is being spent, whilst the works are in an unfinished state, and the delta itself in a state of transition, with the new system of irrigation not entirely introduced, and the old precarious method, of watering crops out of drainages, not entirely abandoned.

3. That with such a state of things existing, it is no wonder that there is no proper, "water-way either for drainage or for the carriage of goods," and that drainage channels must do "double duty:" that after a "plump of rain," they overflow and put the country under water, is nothing more than what might be expected, whilst irrigation channels are still undug.

4. That the great need of this delta is not plans and estimates for new works, but the execution of those already sanctioned, but with the exception of one main line of canal and of a river embankment, completely suspended.

5. As a case in point, I will mention the Boodoomair. This, the principal drainage of the district, with a drainage area of above 300 square miles before it enters the delta proper at the Bezoarah gorge, is towards the end of its course, tapped by various channels and forced to do duty as an irrigating channel in the Goodewadah taluq, because two channels designed by my predecessor, though sanctioned, are suspended.

6. The Boodoomair comes down once or twice in the monsoon, and covers for a few days the face of the country adjacent to its course, and to that of the irrigating ducts led off from it, but any attempt to remedy this, by deepening this channel upwards from the Colair lake into which it discharges, or to straighten its course by cutting off bends, would be greatly detrimental to the present irrigation: until the two channels before mentioned are excavated, this "unseemly state of affairs," must be allowed to continue.

7. In addition to the mischief done by the flood waters of the Boodoomair, comes that done by the Kistnah water itself, which cannot be regulated nor kept out of this drainage, until the Casarapilly lock and dam are constructed: these works were reported by me in a statement which accompanied my letter of the 4th October last, No. 74, as absolutely necessary for the control of the Kistnah water; which otherwise aids to flood certain portions of the Goodewadah

Channel from Yenckepand to Mootoor.
Do. from Valepoor to Nundewadah.
4th March 1857. Rupees 23,200 and
Rupees 9,500.

Budget list No. 2 of 1859-60.

taluk, whilst others are calling out for water, and have since been brought forward by me, as the first thing to be done in the delta.

8. The Boodoomair is then the principal cause of portions of the delta being at times flooded during the monsoon, though the Poolairoo also partially overflows, when a severe rainfall happens, the regulating sluice at its head is then closed and the Kistnah water kept out of its bed, but still individual villages suffer, and will do so until the Kistnah project is completed.

9. I must, however, be allowed to observe that Mr. Dykes' remarks must not be taken too literally—for example, when he says that from the end of July to the beginning of December, a period of four months, the Kistnah delta is under water, he doubtless refers to patches of land in individual villages in one or two of the taluqs visited by him; if the delta were literally under water during these four months, how comes it that the outcry for more water is occasionally so very fierce? How comes it that the Collector has not to make remissions on all crops wet and dry? How comes it also that dry crops can be profitably raised in the delta, if the cause, why irrigation has not spread properly, is to be found in its swamped state? Surely, if dry crops can be raised in a swamp, wet ones can be raised also? That certain low lands, situated for the most part in the taluk in which Mr. Dykes' investigations were principally conducted, are yearly swamped, and that the north eastern half of the taluk is sometimes for a few days flooded by the Boodoomair, is most certain, but the evil is not so general as Mr. Dykes would lead one to imagine, and the loss sustained cannot be very great when, in 1857-58 out of 51,000 and odd acres, reported by the Collector as being under irrigation from the Kistnah, only a few acres had their sists* remitted by reason of their crops being swamped.

* Rupees 101-8-7.

10. If the finances of the empire would allow this Government to continue the carrying out of the Kistnah project in its integrity, the present defective drainage arrangements would soon disappear.

11. With respect to the communications during the monsoon, things are bad enough, but not quite so bad as Mr. Dykes imagines, for there is a big river skirting the collectorate, which is navigated by boats and rafts; there is a totally unreformed drainage, the Boodoomair, with a fall of nearly one foot per mile and with infinite twistings, but which for all that has been "turned to a good account," and is navigated by a considerable number of dhonies along a course of some 50 miles, and has even been ascended by a steamer; there is a high road running from the coast to the interior which, though unmetalled and particularly heavy in places after a plump of rain, is still bridged and perfectly passable, so much so, that the transport of military stores along it during the past season was never once interrupted; and there is finally a stretch of 36 miles of first class canal opened from this to within 10 miles of Bunder.

12. I don't mean to assert that the three first mentioned communications are good, or even any thing more than indifferent, but I do mean to assert that Mr. Dykes' statement, namely, "that from July to December, the internal traffic of the delta is at a stand still," is a facon deparler, and not meant to be taken as an absolute fact; on the contrary, on all four lines specified above, there is a considerable movement even during the heaviest part of the monsoon.

13. Mr. Dykes recommends turning the great drainage before mentioned, the Boodoomair, into a navigable canal throughout the year. To make it a still water navigation, by a series of locks and dams would be very costly, would be against the first principles of canal engineering, inasmuch as a drainage always silts up and would, unless it were prodigiously embanked, render the state of the lower portion of the Goodewadah taluq rather more precarious than at present. The Boodoomair, in great rainfalls, has not section enough to carry off to the Colair, the volume of water which flows down it, and now a proposition is made to obstruct it by half a dozen or more weirs.

14. If a still water navigation is not contemplated by Mr. Dykes and his informant, how is he going to find in the dry season, the water to navigate the drainage for which a volume of not much less than 40,000 cubic yards per hour will be required, whereas at times the Kistnah itself does not bring down 10,000 cubic yards per hour, his informant, well qualified to give an opinion, and giving one to the

Velocity, due to a fall 9 per mile
when greatest depth is 4 feet 2,200
yards per hour. Section with 4 feet
depth and 10 yards bottom width
17 square yards. Total discharge
37,400 cubic yards per hour.

effect that the Boodoomair might easily be made navigable throughout the year, must have imagined that the reservoirs in the Mahratta country, which alone can give the Kistnah a supply of water in the dry weather, were already in existence.

15. What is required here to raise this delta to a level with the Godaveri is, not embarking upon new projects, which are incorrect in principle, but carrying out those that have already been commenced, and are now abandoned with their unfinished works deteriorating; the continuation of the high level channel to Ellore, for example.

16. The Poolairoo, which Mr. Dykes also mentions as a possible communication, can be and will be navigated; it is a channel of irrigation, and has lately been connected with the Bunder canal by a cut and head sluice: a mud lock must be constructed at the cuts head to get rid of the present portage—an estimate for the same will be submitted in due course, and I earnestly hope, that the same will be sanctioned, though it has no greater special claims upon Government, than the locks at Vullahapooram and Casarapilly—indeed, in my opinion, it is of inferior importance to either of those works that were designed by my predecessor, and sanctioned more than two years ago, but which for want of funds have been abandoned.

No. 56. From Colonel A. COTTON, Commandant of Engineers; to J. D. BOURDILLON, Esq., Secretary to Government, dated Upper Godaveri, 7th October 1859, No. 384.

In obedience to the proceedings of Government, dated September 28th 1859, on the subject of Mr. Dykes' letter on the present state of the Masulipatam portion of the Kistnah delta, I have the honor to state, that it was for the purpose of correcting this state of things, viz. the want of drainage, irrigation and communication, that the Kistnah works were proposed by Colonel Lake. That officer certainly nowhere stated that they would be corrected by taking levels, estimating, approving, or even *sanctioning*, (but with an order that the works should not be executed); the thing which the projector urged has not been done, viz. the *execution of the works*, and till this is effected, of course, matters will remain in the state Mr. Dykes complains of. The old state of things is indeed, if possible, in some degree aggravated, as at times some additional water is now thrown into the Boodoomair by the annicut channel, when it is not wanted, the necessary consequence of beginning works and not going through with them.

2. What is wanted is, in my opinion, simply to go one step further, and carry the project into execution. If it is said that no money can be obtained for this purpose, I have only to say, that I can propose no alternative that will meet that case. In my opinion, either the works must be executed or the poverty of the people, and the deficiency of the revenue, must continue. I may add, what I have so repeatedly said, that I am certain, that the want of funds is the inevitable consequence of not spending, that is, that if the Government cannot afford to execute these essential works, much less can they afford to lose the much greater sums that the unimproved state of the country prevents the Government from receiving. The matter is now indeed in its most aggravated form, for the heavy expenditure has actually been incurred, and has been comparatively unremunerative, because the minor works necessary to give effect to it are not executed. Nothing can be more evident than that in this way any amount of money may be expended, and the treasury only so much impoverished. When I was at Calcutta, one of the members of Government said to me on this subject, you have no idea of the difficulty we are in about money. My reply was, that it seems to me impossible that you can be otherwise while such a system is pursued. In the two years that these works have been stopped, much more has been lost than might have been spent in completing various minor works of distribution and navigation. It seems to me, that the mistake has in some measure arisen from confounding such vital works as these, which instantly return to the *community* more than they cost, and in a very short time even to the *treasury*, with such works as the Indian railways, which in a few cases which should turn out eminently successful, may after a series of years, return five or six per cent. of real profit.

3. It is established beyond all question, that an acre of irrigated land yields a produce of at least 15 Rupees more than one that is not irrigated, and when the heavy works have been com-

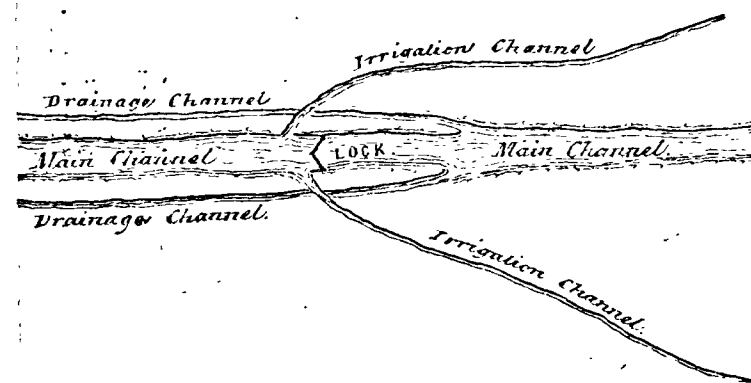
pleted for such a system, the actual distribution does not cost more than two or three Rupees, or $\frac{1}{10}$ th of the annual benefit from them. And this 15 Rupees does not include the profit of the water transit. The direct return to Government in a moderate water-rate, would be the whole cost in one year, besides the indirect returns from extended cultivation, export and import duties, &c.

For instance, part of the present pressure for money is owing to 20,000 Rupees for the completion of the Samulcottah and Kakinada canal having been withheld for two years, during which time much more than that sum would have been received for water-rate, customs, &c. and saved in carriage of materials for Government works.

4. So also with respect to the 60,000 Rupees sanctioned this year by the Secretary for India, (but withheld by the Indian Government,) for the Godaveri navigation works. An increased sale of salt of 2,000 tons, alone would replace it, while it is certain, that much more than that quantity would be sold additionally in a single year if it is carried by the Godaveri. And without any increase of sale, that sum would be realized by the *carriage* of only 2,000 tons 300 miles by the river, while 10 or 20 times that quantity will be carried in a single year, soon after the river transit is put on only a moderately effective state.

5. With respect to the particular works required for this tract, I conclude that they have already been projected and estimated by the District Engineer. I need here only say, that what I consider the first and main work required, is a nearly straight channel carried exactly along the general line of the Boodoomair, till that stream turns towards the Colair, at the high road bridge near Pootagoontah, and thence still almost in a straight line to Buntoomilly, where it will discharge into a creek, thus carrying the drainage water by the shortest route to tide-water. This canal would be connected with the Bezwada and Ellore canal, at a point about eight miles below its head, near where the canal is carried over the Boodoomair by an annicut. The water for irrigation from this Buntoomilly canal, would then be brought by the upper part of the Ellore canal. I would make this navigable by locks, and the local rains of each portion of the tract it passed through would drain into the part between the two next locks. The canal would irrigate a large tract of country, for branch channels should be led off from both sides above each lock, on a level commanding that part of the lands, passing over the drainage channels by small aqueducts.

These branch irrigation channels of course would be led off either near the locks or at any distance above them, according to the levels of the country.

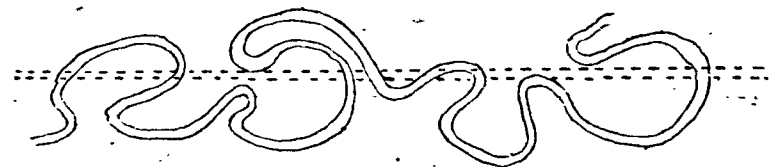


1st class locks of 150 feet $\times$ 20, it may be worth while to give the same to this.

It must be understood, that the quantity of water to be disposed of and conveyed to the sea by this line is not so very great, (excepting in the extraordinary floods of the Kistnah under the former state of things), and, therefore, a very large channel will not be required. The reason why the natural channel of the Boodoomair is so insufficient is, that from its great fall, combined with

6. This might form a main line of *navigation*, it would connect all the tract of country it passed through with the salt pans at Buntoomilly and with Narsapoor and Bezwada directly, and so with the general system of delta navigation, and as I understand Captain Rundall is giving his junction canal from Narsapoor to Coringa,

the softness of the alluvium here, it cuts away its banks, till it has formed so excessively winding a course, as to reduce its velocity to a great degree, and lengthen the distance the water has to flow two or three times the direct distance. Its course is like this.



A channel of moderate dimensions, therefore, carried straight, like the dotted lines, even with a moderate fall also, will convey away the same body of water.

7. I do not estimate the dimensions here, not having the data, but they can easily be calculated by the local officer. The length is 40 miles, and it will cost about 3,000 Rupees a mile, and including 30 feet of lockage at 2,000 Rupees a foot, 1,80,000 Rupees. With the small branch channels, which will not cost much, it will provide for the drainage and irrigation of about 400 square miles, or 200,000 acres.

8. It will be seen that this carries the water of the basin of the Boodoomair to the sea, clear of the Colair lake, just as those of the basin of the Weyairor on the Godaveri side, have already been diverted from the same lake, according to the original project which was to drain and irrigate the basin of the lake. It will only remain to conduct the Tamallair, which enters the lake near Ellore, across the basin between embankments to the Ooputtair, and the waters will then be completely regulated, and this tract of 25 miles by 10 or 140,000 acres will be ultimately converted into a fertile area of cultivation, yielding produce of the value of at least 40 lacs a year.

9. Mr. Dykes urges that the Boodoomair in its present state or slightly improved, should be made use of for navigation. My opinion is, that it might have been well worth while by means of temporary locks, &c., to have made this more available for navigation when first the Kistnah works were commenced, as it would at a slight expense, have provided a line of communication by the Colair, from Bezwada to the Godaveri canals, but now that the Ellore line is likely to be completed in a few months, there seems to me no object in improving this communication with the Colair. By means of the Ellore canal and that from Bezwada to Masulipatam now also near completion, the latter town and its adjoining country will be connected, though by a circuitous route with Kakinada, &c., and the main point will thus be gained. The Boodoomair at present forms a practicable communication in the monsoon between this tract and the Godavari canals, and in the dry season the produce can be carried to the nearest point of either of the two above mentioned canals now near completion.

10. One very important effect of the Buntoomilly canal here proposed is, that it will complete a second line of communication from Bezwada to Narsapoor and Kakinada, so that in case of accident or repairs, one line can be stopped for a time, without interruption of the traffic.

11. I may add, that a dead-level canal of 18 miles from Buntoomilly to Masulipatam, connecting this line with that from Bezwada to the latter town, would be all that would be required to complete the direct communication from Masulipatam to Narsapoor, Kakinada, &c. It would require no locks, and only small drainage tunnels, and would cost perhaps 50,000 Rupees.

P. S.—I have the honor to forward herewith a map of this tract, with the lines of the two canals now proposed marked on it in yellow; the canals now near completion, are in blue.

report what works ought to be immediately undertaken in both the Godaveri and Kistnah deltas, with the view of fully developing the benefits of the main works already completed there. In replying to that order Colonel Bell will properly use the reports both of Colonel Cotton and Captain Chambers; the former will now be communicated to him.

(Signed) J. D. BOURDILLON,
Secretary to Government.

Letter from Mr. J. B. Hamilton, Secretary,
in charge of the Madras Museum.

To, The Chief Engineer
in the Department P. W.
Madras.

Sir, D. S. Beggs Esq. 21st Nov. 1859.

Ms. 181 dated
10th February 1859

With respect to your Resolution
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That there are Rupees 4,92,000 sanctioned for works on the Masulipatam side of the River alone, of which not one anna is being spent, whilst the works are in an unfinished state and the Delta itself in a state of transition with the new system of irrigation not entirely introduced, and the old precarious method, of watering Crops out of drainages, not entirely abandoned.

3. That with such a state of things existing it is no wonder that there is no proper waterway either for drainage or for the Carriage of goods, and that drainage Channels must do double duty; that after a "plump of rain" they overflow and put the Country under water, is nothing more than what might be expected whilst irrigation Channels are still undug.

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5. As a case in point, I will mention the Boddomair. This, the principal drainage of the District with a drainage area of above 300 square miles before it enters the Delta proper at the Beyarrah gorge, is towards the end of its course, tapped by various Channels and forced to do duty as an irrigating Channel in the Goodemadiah talook, because two Channels designed by my predecessor though sanctioned are suspended.

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4th March 1857
Rs. 23,200 & Rs. 9,500

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Budget list
N: 2 of 1859/60

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to

and tell that is expected

to assert that Mr Dykes statement namely; "that from July to December the internal traffic of the Delta is at a stand still," is a facon de parler and not meant to be taken as an absolute fact; on the contrary on all four lines specified above there is a considerable movement even during the heaviest part of the monsoon.

13. Mr Dykes recommends turning the great drainage before mentioned, the Boodromair, into a navigable canal throughout the year. To make it a still water navigation by a series of locks and Dams would be very costly, would be against the first principles of Canal Engineering, in as much as a drainage always silts up and would, unless it were prodigiously embanked, render the state of the lower portion of the Godavari talook rather more precarious than at present. The Boodromair in great rain falls, has not section enough to carry off to the Colair the volume of water which flows down it, and now a proposition is made to obstruct it by half a dozen or more weirs.

If

Velocity, due to a fall of 9" per mile when greatest depth is 4 feet. 2200 yds per hour Section with 4 feet depth x 10 yards bottom width 4700 yds. 4 0000 Cubic yards per hour will be required, where as at times the Kistna itself does not bring down 10000 cubic yards per hour. his informant, well qualified to give an opinion, and giving one to the effect that the Boodromair might easily be made navigable throughout the year, must have imagined that the reservoirs in the Mahratta Country, which alone can give the Kistna a supply of water in the dry weather, were already in existence.

14 If a still water navigation is not contemplated by Mr Dykes and his informant how is he going to find in the dry season the water to navigate the drainage for which a volume of not much less than 10,000 Cubic yards per hour will be required, where as at times the Kistna itself does not bring down 10,000 cubic yards per hour. his informant, well qualified to give an opinion, and giving one to the effect that the Boodromair might easily be made navigable throughout the year, must have imagined that the reservoirs in the Mahratta Country, which alone can give the Kistna a supply of water in the dry weather, were already in existence.

15 What is required here to raise this delta to a level with the Godavari is, not embarking upon new projects, which are incorrect in principle, but carrying out those that have already

already been commenced and are now abandoned with their unfinished works deteriorating; the continuation of the High Level Channel to Ellore, for example.

16 The Polairio, which Mr. Dykes also mentions as a possible communication, can be and will be navigated, it is a channel of irrigation and has lately been connected with the Bunder Canal by a cut and Head Sluice: a mud Lock must be constructed at the Cut's head to get rid of the present portage - an estimate for the same will be submitted in due course, and I earnestly hope that the same will be sanctioned, though it has no greater special claims upon Government, than the Locks at Tullahapooram and Casarapilly. indeed, in my opinion, it is of inferior importance to either of those works that were designed by my predecessor and sanctioned more than two years ago, but which
for

19
for want of funds have been
abandoned.

Beyoorah
1st March 1859

I have &c

(Signed) Esbr. Chamber

District Engineer in
charge Kistna &c

(True Copy)

Am. L. B. A. Captain

Supg. Engineer N. Circle

Point to
enclosure

Recd in
Central Office of Public Works,
Fort St. George, 31 March 1859.

Revenue

No 9177

From The Chief Engineer.

To The Secretary to Government
Public Works Department.

Enclosure 1

Copy of letter from
Dist Eng^r of Kistnah
D^o of 1st March 1859.

In forwarding as directed in Extract
Minutes Consultations in the Revenue Department
under date the 10th February 1859. No 181 the accompanying
Copy of a letter from the District Engineer
of the Kistnah Division, reporting fully on what
is said in paras 5 to 8. of Mr Dykes' letter of
January last, regarding the state of the Crops and
the Communications of that part of Madulipatam
which is in the Kistnah Delta, from the absence
of the means of drainage, I have the honor to state
that it appears to me, that in making the Compar-
ison between the Deltas of the Kistnah and the
Godavery, which forms the basis of his remarks, on
Mr Dykes, as is too customary. I fear with those
unacquainted with the History of the recent opera-
tions in the two tracts, has looked upon them as
in an equal state of advancement, totally ignor-
ing the fact that in the one case they had been

10 1859 Defunct

Enclosure in a letter

from the Chief Engineer

To the Secretary to Govt.

Dated 31st March 1859

Copy of a letter from

The District Engineer Kist-
nah Division reporting on the
measures to be devised
for remedying the evils
existing in the Kistnah
Delta together with the
opening out of water Com-
munications through-
out the same.

in progress for fully six years before, in the other they had been commenced, and that, owing to the scanty population in Masulipatam, to the introduction of the Budget System, and finally to the restriction on expenditure, the improvements under the Kistnah have been unavoidably left in the unsatisfactory state he found them in.

2. When however Mr. Dykes speaks so sweepingly of the Masulipatam portion of the Kistnah Delta being under water from July to December, his assertion must be taken with all due reservation, for though he no doubt describes what came under his own limited observation in a particular neighbourhood during, and after a singularly heavy fall of rain, it is well known that nineteen twentieths of the Delta are elevated far above the reach of inundation, while the River embankments stand as securely as they did last year, and that although the low lying lands about Samarecha, which I believe Mr. Dykes was during the floods he noticed, and the borders of the Colair Lake, do suffer at intervals from a superabundance of water, the reason is, that in the incomplete state of the project, the drainage which causes the mischief must still be used for carrying water from the ancient for irrigation, and cannot be left entirely to their natural purposes. In fact the continuous cry for water being fifty times more urgent than the occasional

One

2
one for improved drainage, the means of supplying all the higher parched lands must be provided, before attention can be effectively given to the relief of the comparatively small tracts which, from the very circumstances of their low position, are normally more favored notwithstanding their liability, from the same cause, to not infrequent temporary inundation.

3. Local relief, with the object of protecting existing revenue, has in many cases been afforded as far as means would allow, but nothing on a general and efficient scale can be done till the removal of restriction admits of the works already projected and sanctioned being proceeded with. For example the Boodomair, which is one of the main causes of inundations, and is one of the natural water courses which Mr. Dykes considers should be made navigable, could have its connection with the ancient Channels at any moment cut off were the Lock and Calingulah, sanctioned so long ago as November 1857 and entered as item 217 of list 2 of the Current Budget, completed at Cacrapilly, these works being intended to regulate the quantity of water artificially thrown into the drainage, and to form the indispensable beginning of the series of works which it may be worth while at some future time to undertake to render it navigable throughout the year, but which it would certainly not answer to begin while so much of far superior importance

and till this is effected, of course matters

importance requires to be done for opening lines of
 easier communication, as well as of irrigation in
 almost parallel to it, such as the Ellore high level
 Canal on the one hand, and the Channel from
 Yenkepraud to Mootoor, with its branches from
 Talepoor to Kundwadale, on the other. —

* Item No. 209 of list No. 2
 of Budget of 1858/59.
 * Item No. 215, list No. 2 of
 do do do 216. Budget 1859/59.

4. Were these Channels, with others already
 sanctioned to the Collectors amount of some five lacs
 of Rupees, and those which have still to be plan-
 ned, all finished, the Water Communications of the
 Kistnah Delta would be placed in as efficient
 a state as those of the Godavary, and at the same
 time the means of disposing of Surplus water
 would no doubt be greatly improved. —

5. Captain Chambers's letter is far too com-
 plete. I think, to require me to say more to
 assure the Government that if the progress of im-
 provement is not so advanced in the Kistnah as
 in the Godavary Delta, the cause is simply con-
 nected with the Circumstances of the two tracts, and that
 the remedy for the present unsatisfactory state of
 matters in the former is not to be sought in
 the projection of any special new works —
 having only local results, but will be found
 in giving early effect to the original scheme,
 which, in the course of its development, is
 calculated to accomplish all that can be done
 for

for the effective drainage of the lands of the
 entire delta, as well as their thorough irrigation,
 and for opening out, at the same time, water com-
 munications where practicable throughout the
 Districts. —

Central Office of P.W.
 Fort St. George
 31st March 1859 —

I have the honor to be,
 Sir,
 Your Most Obedient Servant.
 Michael Colvill
 Chief Engineer

W.B.

To
 The Secretary to Government
 Public Works Department

W.B.

Commandant of Engineers Office
N. 384

From Colonel A. Cotton
Commandant of Engineers

To J. Bourdillon Esq
Secretary to Government
D. P. W.

Sir, In obedience to the Proceedings of Government dated September 28th 1859 on the subject of Mr. Dykes' letter on the present state of the Manipulation portion of the Nistnah Delta, I have the honor to state that it was for the purpose of correcting this state of things, viz the want of drainage, irrigation and communication that the Nistnah works were proposed by Colonel Lake. That Officer certainly nowhere stated that they would be corrected by taking levels, estimating, approving, or even sanctioning (but with an order that the works should not be executed, the thing) which the projectors urged has not been done, viz the execution of the works, and till this is effected, of course matters will

Received by Mr. Cotton 1859

1859 M. 1859. Dykes' letter
120. of April 10. 1859
No. 714

From
The Chief Engineer
To
The Secretary to Government
J. H. D.

Dated 31st March 1859
No. 1. 1859

1 Enc. No. 1. 1859

Forwards Copy of letter from
the Dykes' Eng. to the Nistnah
Delta with reference to the Nistnah
of the 10th February 1859. 1859.
in the Revenue Department
and in reply to Mr. Dykes
letter to Government of January
1859.

221. 6. 1859

will remain in the state Mr. Dykes com-
plains of. The old state of things indeed
if possible in some degree aggravated, as at times
some additional water is now thrown into the
Broomfield by the Sunning Channel, when it
is not wanted, the necessary consequence of
beginning works and not going through with them.

What is wanted is in my opinion simply
to go one step further, and carry the project into
execution. If it is said that no money can be
obtained for this purpose, I have only to say
that I can propose no alternative that will meet
that case. In my opinion either the works must
be executed in the poverty of the people and the
deficiency of the Revenue must continue. I may
add what I have so repeatedly said, that I am
certain that the want of funds is the inevitable
consequence of not spending, that is, that if the
Government cannot afford to execute these essential
works, much less can they afford to lose the much
greater sum that the improved state of the country
prevents the Government from receiving. The matter
is now indeed in its most aggravated form, for the
heavy expenditure has actually been incurred, and
has been comparatively unremunerative, because the
minor works necessary to give effect to it are not
executed. Nothing can be more evident than that
in this way any amount of money may be expended
and

and the Treasury only so much impoverished.
When I was at Calcutta one of the members of
Government said to me on this subject you have
no idea of the difficulty we are in about money.
My reply was that it seems to me impossible that
you can be otherwise while such a system is per-
sued. In the two years that these works have
been stopped, much more has been lost than
might have been spent in completing various minor
works of distribution and navigation. It seems
to me that the mistake has in some measure
arisen from confounding such vital works with those
which instantly return to the Community more
than they cost, and in a very short time, even to the
Treasury, with such works as the Indian Rail-
ways which in a few cases which should turn
out eminently successful, may after a series
of years return 5 or 6 per cent of great profit.
It is established beyond all question
that an acre of Irrigated Land yields
produce of at least 15 Rupees more than one
that is not irrigated, and when the heavy works
have been completed for such a system the re-
peated distribution does not cost more than 2 or
3 Rupees out of the annual benefit from them.
And this 15 Rupees does not include the profit
of the water transit. The direct return to
Government in a moderate water rate would
be the whole cost in one year, besides the indirect
returns from extended cultivation, Export and
Import.

For instance part of the ^{present} ~~present~~ money
is owing to 20,000 Rupees for the completion of the
Samitcottah and Cocanada Canal having
been withheld for two years, during which time
much more than that sum would have been re-
ceived for water-rate, Customs, ^{and} ~~and~~ and
carriage of materials for Government works.

So also with respect to the 60,000 Rupees
sanctioned this year by the Secretary for India,
(but withheld by the Indian Government) for
the Godavery Navigation Works. An increased
sale of salt of 2000 Tons, alone would replace it,
while it is certain that much more than that quantity
would be sold additionally in a single year, if it is
carried by the Godavery. And without any increase
of sale, that sum would be realized by the carriage
of only 2,000 Tons 300 miles by the river, while 10 or
20 times that quantity will be carried in a single
year; and after the river transit is put on only a
moderately expensive state.

With respect to the particular works
required for this tract, I conclude that they have
already been projected and estimated by the District
Engineer. I need here only say that what I con-
sider the first and main work required is a
nearly straight Channel carried exactly along
the general line of the Godavari
till that stream turns towards the Coland at the
High

31
High Road Bridge near Costrycottah,
and thence still almost in a straight
line to Buntomilly, where it will
discharge into a Creek, thus carrying
the drainage water by the shortest
route to Tide water. This Canal
would be connected with the Buz-
wurah and Ellore Canal at a point
about 8 miles below its head, near
where the Canal is carried over
the Godavari by an aqueduct.
The water for irrigation from
this Buntomilly Canal would then
be brought by the upper part of
the Ellore Canal. It would make
this navigable by locks, and
the local runs of each portion
of the tract it passed through
would drain into the part between
the two next Locks. The Canal
would irrigate a large tract
of Country; for branch Channels
should be led off from both
sides above each Lock on a
level commanding that part
of the lands, passing over
the

the drainage Channels by small aqueducts.

These branch Irrigation Channels

of course would be

led off either near

the Locks or at any

distance above them

according to the

levels of the Country.

5 This might form a main line of Navigation, it would connect

all the tract of Country it

passed thro' with the ^{at Benarsh} ~~at Benarsh~~

~~and with~~ Narsapoor and Bogwarah

directly, and so with the general

system of Delta Navigation,

and as I understand Captain

Rundall is giving his junction

Canal from Narsapoor to Comiga,

1st Class Locks of 150×20 , it may

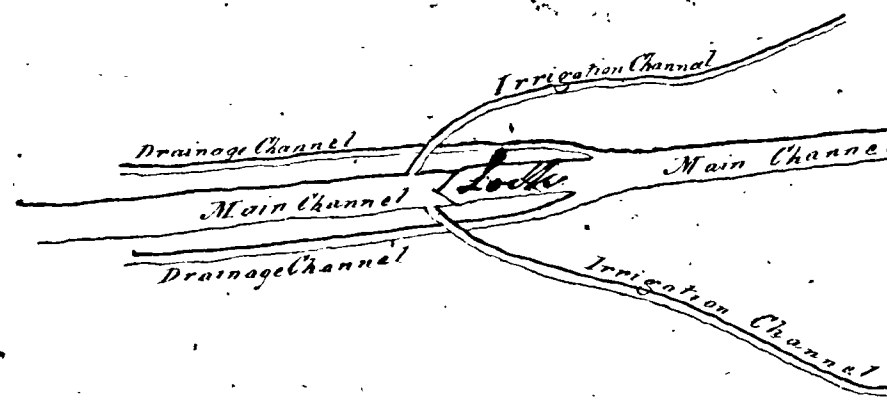
be worth while to give the

same to this.

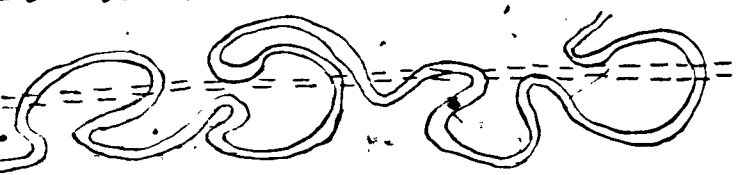
It must be understood that

the quantity of water to be

disposed



33/1
disposed of and conveyed to the sea by this line is not so very great (excepting in the extraordinary floods of the Hista, under the former state of things), and therefore a very large Channel will not be required. The reason why the natural Channel of the Boodoonie is so insufficient is, that from its great fall combined with the softness of the alluvium here, it cuts away its banks till it has formed so excessively winding a course as to reduce its velocity to a great degree, and lengthen the distance the water has to flow two or three times the direct distance. Its course is like this



A Channel of moderate dimensions therefore carried straight, like the dotted line, even with a moderate fall also, will convey away

always the same body of water.

7. I do not estimate the dimensions here, not having the data, but they can easily be calculated by the local Officer. The length is 40 miles and it will cost about 3000 Rupees a mile and including 30 feet of Lockage at 2000 Rupees a foot, 180,000 Rupees. With the small branch Channels, which will not cost much, it will provide for the drainage and irrigation of about 400 Square Miles, or 200,000 acres.

8. It will be seen that this carries the water of the Basin of the Brahman to the sea, clear of the Colair Lake, just as those of the Basin of the Weyanor on the Godavary side have already been diverted from the same Lake according to the original project which

was

35
was to drain and irrigate the Basin of the Lake. It will only remain to construct the Laminallur which enters the Lake near Ellore, across the Basin between embankments to the Ooputtur and the waters will then be completely regulated, and this tract of 25 miles by 10 or 140,000 acres will be ultimately converted into a fertile area of cultivation, yielding produce of the value of at least 40 Lacs a year.

9. Mr. Dykes urges that the Brahman in its present state or slightly improved should be made use of for navigation. My opinion is that it might have been well worth while by means of temporary Locks to have made this more available for navigation when first the Histranki Works were commenced as it would at a slight expense have

have provided a line of communication by the Colair, from Begwara to the Godavery Canals, but now that the Ellore line is likely to be completed in a few months, there seems to me no object in improving this communication with the Colair.

By means of the Ellore Canal and that from Begwara to Masulipatam now also near completion, the latter town and its adjoining Country will be connected ~~the~~ by a circuitous route with Cannada ~~for~~ and the main point will thus be gained. The Boodanum at present forms a practicable communication in the Monsoon between this tract and the Godavery Canals, and in the dry season the produce can be carried to the nearest point of either of the two above mentioned Canals now near completion

completion.

10. One very important effect of the Buntomilly Canal here proposed is that it will complete a second line of communication from Begwara to Narsapur and Cannada so that in case of accident or repairs, one line can be stopped for a time, without interruption of the traffick.

11. I may add that a dead-level Canal of 18¹/₂ miles from Buntomilly to Masulipatam, connecting this line with that from Begwara to the latter town, would be all that would be required to complete the direct communication from Masulipatam to Narsapur, Cannada &c. It would require no Locks, and only small drainage tunnels, and would cost perhaps 50,000 Rupees.

Upper Godavery,
October 7th 1859

I have the honor to be
Sir,
Your most obedient Servant
J. Cotton Colonel
Chief Engineer.

Central Office, Pl.

7492

Memorandum.

The Chief Engineer has the honor to request that he may be favored for a short time with the Map referred to in the Postscript of Colonel Cotton's letter dated 7th October 1859. N^o 384. communi- cated with the Proceedings of Government under date 4th No- vember 1859. N^o 2594.

W. B. Sientt Colonel
Chief Engineer

To
The Secretary to Government
D. C. S.

Portsmouth 27th November 1859

W. B. Sientt

+ 700000
26/11/59

R. 15th 7/11/59
142 3/200
10/11/59

274

Portsmouth 27th November 1859
Colonel Cotton
Comd^g of Eng^s

J. C. B. in the name of
the Govt

20th 11th 1859

11th 11th 1859
N^o 2594

Map of the Port of Portsmouth
the name of the subject
of the Govt's letter in
the present state of the
Manufacture of the
the steam power

I have the honor to forward
herewith a Map of this Port with
the lines of the two Canals now propos-
ed marked on it in yellow; the Canals
now in construction are in blue.

1056

20 October 1859

This interesting Reports may be
published with the Survey Reports,
but it does not at present

require any special notice
in my Minute on the
Historic and Marine Letters
I have proposed that a Report
and Estimates should be

called for of the expense of
completing the most necessary
and possible works of improve-
ment and navigation; and before
submitted should be
considered
11th 11th 1859
W. B. Sientt

17th Sept

41

No 2594-4

Proceedings of the Madras Government

Under date the 14th Novr. /59.

Read the following letter

From the Chief Engineer

I forwards copy of letter
from the Chf. Eng. of the Ristnah
Dn with reference to L.M.O. of the
10th May 1859, in the Per. Depart.
& in reply to Mr. C. K. S. letter to Govt.
of January 1859.

From Col. A. Cotton Comd. of Eng.

With reference to the or-
ders of Govt. submits his views
on the subject of Mr. C. K. S. letter
on the present state of the Ma-
salem portion of the
Ristnah Delta.

A detailed order on
these interesting and val-
uable papers is not now
necessary. The order of Govt.
of the 28th October, No 2524,
called on the Chief Eng.
(Para 8) to report what
works ought to be imme-
diately undertaken in
both the Godavery and
Ristnah Deltas, with the
view of fully developing
the

997/1859, D. 1st
No 3028.

From
The Chief Engineer
To
The Secy to Government
D. 1st

Dated 21st November 1859.

Received 21st Nov 1859

1092

forwarded for a short time
with other papers referred to

in the Postscript of the
C. K. S. letter dated 10th

October 1859. No 3028 com.

communicated with the

Proceedings of the Government
dated 14th November 1859

No 2594

the benefits of the main
works already completed
there. In replying to
that order Colonel Bell
will properly use the
reports both of Colonel
Cotton and Captain
Chambers; the former
will now be communi-
cated to him

J. A.

10 Copies

To
the Chief Engineer, with Copy of Col. A. Cotton's Report - Copy 5
Board of Rev. for information, with copies of the papers. 1
Collector of Massachusetts, Q. - Q. 1
Commandant of Engineers. 1

Public Works 1859 21/11/18
Office of Govt. & Co. 1859

No 2594

Pro. of the Atlantic Coast
27/4/18 1859

From the Chief Engineer 2/10
1/11/18 1859 6 m 1859

ALL

Chief Engineer, in
reporting on works to be
immediately undertaken
in the Province of the
Dollars, will find that
and will be able to
consider reports.

No 55 1859

1859

(1) Number of pages 1-8
(2) Date of repair 17-10-38
(3) Initials of the Referencer _____

MADRAS RECORD OFFICE.

Government of Madras.

Puducherry DEPARTMENT.
Can, 107153

G.O. No. <u>2584</u>	Press Mis.
Dated <u>4-11-1859</u>	

Not to be folded or roughly handled

90
7/10/38

PROCEEDINGS OF THE MADRAS GOVERNMENT.

Read the following letters.

From Colonel C. E. FABER, Chief Engineer; to J. D. BOURDILLON, Esq., Secretary to Government, dated 31st March 1859, No. 9177.

In forwarding, as directed in Extract Minutes Consultation in the Revenue Department, under date the 10th February 1859, No. 181, the accompanying copy of a letter from the district Engineer of Kistnah division, of 1st March 1859, copy of a letter from the District Engineer of the Kistnah division, reporting fully on what is said in paragraphs 5 to 8 of Mr. Dykes' letter of January last, regarding the state of the crops and the communications of that part of Masulipatam which is in the Kistnah delta, from the absence of the means of drainage, I have the honor to state, that it appears to me, that in making the comparison between the deltas of the Kistnah and the Godaveri, which forms the basis of his remarks, Mr. Dykes, as is too customary I fear, with those unacquainted with the history of the recent operations in the two tracts, has looked upon them as in an equal state of advancement, totally ignoring the fact, that in the one case, they had been in progress for fully six years, before in the other, they had been commenced, and that, owing to the scanty population in Masulipatam, to the introduction of the budget system, and finally to the restriction on expenditure, the improvements under the Kistnah have been unavoidably left in the unsatisfactory state he found them in.

2. When, however, Mr. Dykes speaks so sweepingly of the Masulipatam portion of the Kistnah delta being under water from July to December, his assertion must be taken with all due reservation, for though he no doubt describes what came under his own limited observation in a particular neighbourhood during, and after a singularly heavy fall of rain, it is well known that nineteen-twentieths of the delta are elevated far above the reach of inundations, while the river embankments stand as securely as they did last year, and that, although the low lying lands about Tamersha, where I believe Mr. Dykes was during the flood he noticed, and the borders of the Colair lake, do suffer at intervals from a superabundance of water, the reason is, that in the incomplete state of the project, the drainages which cause the mischief, must still be used for carrying water from the annicut for irrigation, and cannot be left entirely to their natural purposes. In fact, the continuous cry for water being fifty times more urgent than the occasional one for improved drainage, the means of supplying all the higher parched lands must be provided, before attention can be effectively given to the relief of the comparatively small tracts which, from the very circumstance of their low position, are normally more favored, notwithstanding their liability, from the same cause, to not unfrequent temporary inundation.

3. Local relief, with the object of protecting existing revenue, has in many cases been afforded, as far as means would allow, but nothing on a general and efficient scale can be done till the removal of restriction admits of the works already projected and sanctioned being proceeded with. For example, the Boodoomair, which is one of the main causes of inundations, and is one of the natural water courses which Mr. Dykes considers should be made navigable, could have its connection with the annicut channels at any moment cut off, were the lock and calingulah, sanctioned so long ago as November 1857, and entered as item 217 of list 2 of the current budget, completed at Casarapilly, these works being intended to regulate the quantity of water artificially thrown into the drainage, and to form the indispensable beginning of the series of works, which it may be worth while, at some future time, to undertake, to render it navigable throughout the year, but which it would certainly not answer to begin, while so much of far superior importance requires to be done for opening lines of easier communication, as well as of irrigation almost parallel to it, such as the Ellore high level canal* on the one hand, and the channel from Yenckepaud† to Mootoor, with its branch from Valepoor to Nundewadah, on the other.

* Item No. 209 of list No. 2 of budget of 1858-59.
† Item No. 215 of list No. 2 of budget of 1858-59.

4. Were these channels, with others already sanctioned, to the collective amount of some five lacs of Rupees, and those which have still to be planned, all finished, the water communications of the Kistnah delta would be placed in as efficient a state as those of the Godaveri, and at the same time, the means of disposing of surplus water would no doubt be greatly improved.

5. Captain Chambers' letter is far too complete, I think, to require me to say more to assure the Government that, if the progress of improvement is not so advanced in the Kistnah as in the Godaveri delta, the cause is simply connected with the circumstances of the two tracts, and that the remedy for the present unsatisfactory state of matters in the former is not to be sought in the projection of any special new works having only local results, but will be found in giving early effect to the original scheme, which, in the course of its development, is calculated to accomplish all that can be done for the effective drainage of the lands of the entire delta, as well as their thorough irrigation, and for opening out, at the same time, water communications where practicable, throughout the districts.

Letter from Captain O. W. S. CHAMBERS, District Engineer, in charge Kistnah division; to Colonel C. E. FABER, Chief Engineer, dated Bezoarah, 1st March 1859.

With respect to your resolution, No. 7879 of the 14th instant, on Extract from the Minutes of Consultation, as per margin, calling upon me to report what measures can be devised for remedying the evils existing in the Kistnah delta, complained of by Mr. Dykes in his letter of January 1859, and likewise to furnish plans and estimates to effect the early drainage of the said tract, together with the opening out of water communications throughout the same, I do myself the honor of stating as follows:—

1. That any comparison between the state of the delta here in Masulipatam, where a great project is almost in abeyance, with that of the Godaveri, where the works have been in operation for 13 years, and an expenditure, approaching $\frac{1}{2}$ million sterling, incurred, and where the population was not only much more wealthy originally, to say nothing of the wealth created since 1846, but also much more numerous to the square mile than that of this district, appears to me extremely unjust.

2. That there are Rupees 4,92,000, sanctioned for works on the Masulipatam side of the river alone, of which not one anna is being spent, whilst the works are in an unfinished state, and the delta itself in a state of transition, with the new system of irrigation not entirely introduced, and the old precarious method, of watering crops out of drainages, not entirely abandoned.

3. That with such a state of things existing, it is no wonder that there is no proper, "water-way either for drainage or for the carriage of goods," and that drainage channels must do "double duty:" that after a "plump of rain," they overflow and put the country under water, is nothing more than what might be expected, whilst irrigation channels are still undug.

4. That the great need of this delta is not plans and estimates for new works, but the execution of those already sanctioned, but with the exception of one main line of canal and of a river embankment, completely suspended.

5. As a case in point, I will mention the Boodoomair. This, the principal drainage of the district, with a drainage area of above 300 square miles before it enters the delta proper at the Bezoarah gorge, is towards the end of its course, tapped by various channels and forced to do duty as an irrigating channel in the Goodewadah taluq, because two channels designed by my predecessor, though sanctioned, are suspended.

6. The Boodoomair comes down once or twice in the monsoon, and covers for a few days the face of the country adjacent to its course, and to that of the irrigating ducts led off from it, but any attempt to remedy this, by deepening this channel upwards from the Colair lake into

which it discharges, or to straighten its course by cutting off bends, would be greatly detrimental to the present irrigation: until the two channels before mentioned are excavated, this "unseemly state of affairs," must be allowed to continue.

7. In addition to the mischief done by the flood waters of the Boodoomair, comes that done by the Kistnah water itself, which cannot be regulated nor kept out of this drainage, until the Casarapilly lock and dam are constructed: these works were reported by me in a statement which accompanied my letter of the 4th October last, No. 74, as absolutely necessary for the control of the Kistnah water; which otherwise aids to flood certain portions of the Goodewadah taluq, whilst others are calling out for water, and have since been brought forward by me, as the first thing to be done in the delta.

8. The Boodoomair is then the principal cause of portions of the delta being at times flooded during the monsoon, though the Poolairoo also partially overflows, when a severe rainfall happens, the regulating sluice at its head is then closed and the Kistnah water kept out of its bed, but still individual villages suffer, and will do so until the Kistnah project is completed.

9. I must, however, be allowed to observe that Mr. Dykes' remarks must not be taken too literally—for example, when he says that from the end of July to the beginning of December, a period of four months, the Kistnah delta is under water, he doubtless refers to patches of land in individual villages in one or two of the taluqs visited by him; if the delta were literally under water during these four months, how comes it that the outcry for more water is occasionally so very fierce? How comes it that the Collector has not to make remissions on all crops wet and dry? How comes it also that dry crops can be profitably raised in the delta, if the cause, why irrigation has not spread properly, is to be found in its swamped state? Surely, if dry crops can be raised in a swamp, wet ones can be raised also? That certain low lands, situated for the most part in the taluq in which Mr. Dykes' investigations were principally conducted, are yearly swamped, and that the north eastern half of the taluq is sometimes for a few days flooded by the Boodoomair, is most certain, but the evil is not so general as Mr. Dykes would lead one to imagine, and the loss sustained cannot be very great when, in 1857-58 out of 51,000 and odd acres, reported by the Collector as being under irrigation from the Kistnah, only a few acres had their sist* remitted by reason of their crops being swamped.

10. If the finances of the empire would allow this Government to continue the carrying out of the Kistnah project in its integrity, the present defective drainage arrangements would soon disappear.

11. With respect to the communications during the monsoon, things are bad enough, but not quite so bad as Mr. Dykes imagines; for there is a big river skirting the collectorate, which is navigated by boats and rafts; there is a totally unreformed drainage, the Boodoomair, with a fall of nearly one foot per mile and with infinite twistings, but which for all that has been "turned to a good account," and is navigated by a considerable number of dhonies along a course of some 50 miles, and has even been ascended by a steamer; there is a high road running from the coast to the interior which, though unmetalled and particularly heavy in places after a plump of rain, is still bridged and perfectly passable, so much so, that the transport of military stores along it during the past season was never once interrupted; and there is finally a stretch of 36 miles of first class canal opened from this to within 10 miles of Bunder.

12. I don't mean to assert that the three first mentioned communications are good, or even anything more than indifferent, but I do mean to assert that Mr. Dykes' statement, namely, "that from July to December, the internal traffic of the delta is at a stand still," is a facon de parler, and not meant to be taken as an absolute fact; on the contrary, on all four lines specified above, there is a considerable movement even during the heaviest part of the monsoon.

13. Mr. Dykes recommends turning the great drainage before mentioned, the Boodoomair, into a navigable canal throughout the year. To make it a still water navigation, by a series of

locks and dams would be very costly, would be against the first principles of canal engineering, inasmuch as a drainage always silts up and would, unless it were prodigiously embanked, render the state of the lower portion of the Goodewadah taluq rather more precarious than at present. The Boodoomair, in great rainfalls, has not section enough to carry off to the Colair, the volume of water which flows down it, and now a proposition is made to obstruct it by half a dozen or more weirs.

14. If a still water navigation is not contemplated by Mr. Dykes and his informant, how is he going to find in the dry season, the water to navigate the drainage for which a volume of not much less than 40,000 cubic yards per hour will be required, whereas at times the Kistnah itself does not bring down 10,000 cubic yards per hour, his informant, well qualified to give an opinion, and giving one to the effect that the Boodoomair might easily be made navigable throughout the year, must have imagined that the reservoirs in the Mahratta country, which alone can give the Kistnah a supply of water in the dry weather, were already in existence.

15. What is required here to raise this delta to a level with the Godaveri is, not embarking upon new projects, which are incorrect in principle, but carrying out those that have already been commenced, and are now abandoned with their unfinished works deteriorating; the continuation of the high level channel to Ellore, for example.

16. The Poolairoo, which Mr. Dykes also mentions as a possible communication, can be and will be navigated; it is a channel of irrigation, and has lately been connected with the Bunder canal by a cut and head sluice: a mud lock must be constructed at the cuts head to get rid of the present portage—an estimate for the same will be submitted in due course, and I earnestly hope, that the same will be sanctioned, though it has no greater special claims upon Government, than the locks at Vullahapooram and Casarapilly—indeed, in my opinion, it is of inferior importance to either of those works that were designed by my predecessor, and sanctioned more than two years ago, but which for want of funds have been abandoned.

From Colonel A. COTTON, Commandant of Engineers; to J. D. BOURDILLON, Esq.,
Secretary to Government, dated Upper Godaveri, 7th October 1859, No. 384.

In obedience to the proceedings of Government, dated September 28th 1859, on the subject of Mr. Dykes' letter on the present state of the Masulipatam portion of the Kistnah delta, I have the honor to state, that it was for the purpose of correcting this state of things, viz. the want of drainage, irrigation and communication, that the Kistnah works were proposed by Colonel Lake. That officer certainly nowhere stated that they would be corrected by taking levels, estimating, approving, or even *sanctioning*, (but with an order that the works should not be executed); the thing which the projector urged has not been done, viz. the *execution of the works*, and till this is effected, of course, matters will remain in the state Mr. Dykes complains of. The old state of things is indeed, if possible, in some degree aggravated, as at times some additional water is now thrown into the Boodoomair by the annicut channel, when it is not wanted, the necessary consequence of beginning works and not going through with them.

2. What is wanted is, in my opinion, simply to go one step further, and carry the project into execution. If it is said that no money can be obtained for this purpose, I have only to say, that I can propose no alternative that will meet that case. In my opinion, either the works must be executed or the poverty of the people, and the deficiency of the revenue, must continue. I may add, what I have so repeatedly said, that I am certain, that the want of funds is the inevitable consequence of not spending, that is, that if the Government cannot afford to execute these essential works, much less can they afford to lose the much greater sums that the unimproved state of the country prevents the Government from receiving. The matter is now indeed in its most aggravated form, for the heavy expenditure has actually been incurred, and has been comparatively unremunerative, because the minor works necessary to give effect to it are

not executed. Nothing can be more evident than that in this way any amount of money may be expended, and the treasury only so much impoverished. When I was at Calcutta, one of the members of Government said to me on this subject, you have no idea of the difficulty we are in about money. My reply was, that it seems to me impossible that you can be otherwise while such a system is pursued. In the two years that these works have been stopped, much more has been lost than might have been spent in completing various minor works of distribution and navigation. It seems to me, that the mistake has in some measure arisen from confounding such vital works as these, which instantly return to the *community* more than they cost, and in a very short time even to the *treasury*, with such works as the Indian railways, which in a few cases which should turn out eminently successful, may after a series of years, return five or six per cent. of real profit.

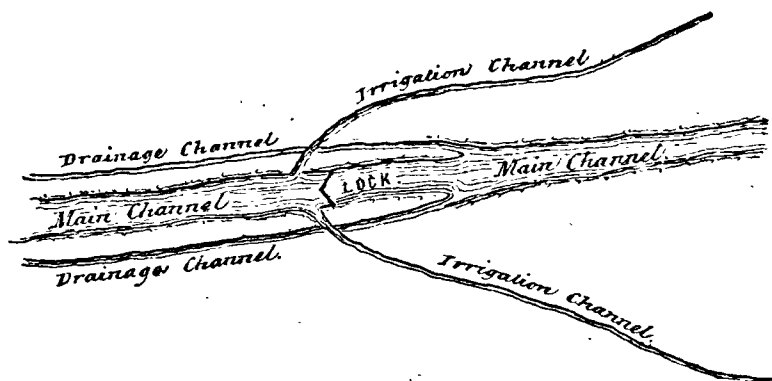
3. It is established beyond all question, that an acre of irrigated land yields a produce of at least 15 Rupees more than one that is not irrigated, and when the heavy works have been completed for such a system, the actual distribution does not cost more than two or three Rupees, or $\frac{1}{10}$ th of the annual benefit from them. And this 15 Rupees does not include the profit of the water transit. The direct return to Government in a moderate water-rate, would be the whole cost in one year, besides the indirect returns from extended cultivation, export and import duties, &c.

For instance, part of the present pressure for money is owing to 20,000 Rupees for the completion of the Samulcottah and Kakinada canal having been withheld for two years, during which time much more than that sum would have been received for water-rate, customs, &c. and saved in carriage of materials for Government works.

4. So also with respect to the 60,000 Rupees sanctioned this year by the Secretary for India, (but withheld by the Indian Government,) for the Godaveri navigation works. An increased sale of salt of 2,000 tons, alone would replace it, while it is certain, that much more than that quantity would be sold additionally in a single year if it is carried by the Godaveri. And without any increase of sale, that sum would be realized by the *carriage* of only 2,000 tons 300 miles by the river, while 10 or 20 times that quantity will be carried in a single year, soon after the river transit is put on only a moderately effective state.

5. With respect to the particular works required for this tract, I conclude that they have already been projected and estimated by the District Engineer. I need here only say, that what I consider the first and main work required, is a nearly straight channel carried exactly along the general line of the Boodoomair, till that stream turns towards the Colair, at the high road bridge near Pootagoontah, and thence still almost in a straight line to Buntoomilly, where it will discharge into a creek, thus carrying the drainage water by the shortest route to tide-water. This canal would be connected with the Bezwada and Ellore canal, at a point about eight miles below its head, near where the canal is carried over the Boodoomair by an annicut. The water for irrigation from this Buntoomilly canal, would then be brought by the upper part of the Ellore canal. I would make this navigable by locks, and the local rains of each portion of the tract it passed through would drain into the part between the two next locks. The canal would irrigate a large tract of country, for branch channels should be led off from both sides above each lock, on a level commanding that part of the lands, passing over the drainage channels by small aqueducts.

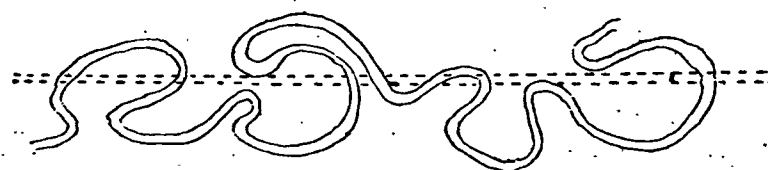
These branch irrigation channels of course would be led off either near the locks or at any distance above them, according to the levels of the country.



6. This might form a main line of navigation, it would connect all the tract of country it passed through with the salt pans at Buntoomilly and with Narsapoor and Bezwada directly, and so with the general system of delta navigation, and as I understand Captain Rundall is giving his junction canal from Narsapoor to Coringa,

1st class locks of 150 feet $\times$ 20, it may be worth while to give the same to this.

It must be understood, that the quantity of water to be disposed of and conveyed to the sea by this line is not so very great, (excepting in the extraordinary floods of the Kistnah under the former state of things), and, therefore, a very large channel will not be required. The reason why the natural channel of the Boodoomair is so insufficient is, that from its great fall, combined with the softness of the alluvium here, it cuts away its banks, till it has formed so excessively winding a course, as to reduce its velocity to a great degree, and lengthen the distance the water has to flow two or three times the direct distance. Its course is like this.



A channel of moderate dimensions, therefore, carried straight, like the dotted lines, even with a moderate fall also, will convey away the same body of water.

7. I do not estimate the dimensions here, not having the data, but they can easily be calculated by the local officer. The length is 40 miles, and it will cost about 3,000 Rupees a mile, and including 30 feet of lockage at 2,000 Rupees a foot, 1,80,000 Rupees. With the small branch channels, which will not cost much, it will provide for the drainage and irrigation of about 400 square miles, or 200,000 acres.

8. It will be seen that this carries the water of the basin of the Boodoomair to the sea, clear of the Colair lake, just as those of the basin of the Weyairor on the Godavari side, have already been diverted from the same lake, according to the original project which was to drain and irrigate the basin of the lake. It will only remain to conduct the Tamallair, which enters the lake near Ellore, across the basin between embankments to the Ooputtair, and the waters will then be completely regulated, and this tract of 25 miles by 10 or 140,000 acres will be ultimately converted into a fertile area of cultivation, yielding produce of the value of at least 40 lacs a year.

9. Mr. Dykes urges that the Boodoomair in its present state or slightly improved, should be made use of for navigation. My opinion is, that it might have been well worth while by means of temporary locks, &c., to have made this more available for navigation when first the Kistnah works were commenced, as it would at a slight expense, have provided a line of communication by the Colair, from Bezwada to the Godavari canals, but now that the Ellore line is

likely to be completed in a few months, there seems to me no object in improving this communication with the Colair. By means of the Ellore canal and that from Bezwada to Masulipatam now also near completion, the latter town and its adjoining country will be connected, though by a circuitous route with Kakinada, &c., and the main point will thus be gained. The Boodoomair at present forms a practicable communication in the monsoon between this tract and the Godavari canals, and in the dry season the produce can be carried to the nearest point of either of the two above mentioned canals now near completion.

10. One very important effect of the Buntoomilly canal here proposed is, that it will complete a second line of communication from Bezwada to Narsapoor and Kakinada, so that in case of accident or repairs, one line can be stopped for a time, without interruption of the traffic.

11. I may add, that a dead-level canal of 18 miles from Buntoomilly to Masulipatam, connecting this line with that from Bezwada to the latter town, would be all that would be required to complete the direct communication from Masulipatam to Narsapoor, Kakinada, &c. It would require no locks, and only small drainage tunnels, and would cost perhaps 50,000 Rupees.

P. S.—I have the honor to forward herewith a map of this tract, with the lines of the two canals now proposed marked on it in yellow; the canals now near completion, are in blue.

ORDER THEREON, 4th November 1859, No. 2594.

A detailed order on these interesting and valuable papers is not now necessary. The order of Government of the 26th October, No. 2524, called on the Chief Engineer (paragraph 6) to report what works ought to be immediately undertaken in both the Godavari and Kistnah deltas, with the view of fully developing the benefits of the main works already completed there. In replying to that order Colonel Bell will properly use the reports both of Colonel Cotton and Captain Chambers; the former will now be communicated to him.

(True Extract.)

Secretary to Government.

To the Commandant of Engineers.

- „ Chief Engineer.
- „ Board of Revenue for information.
- „ Collector of Masulipatam.

Exd. Wm. Thomas.

Q. H. 1839. Department
No. of Government
for March 1839
1st 2594.
Proceedings of the Marine
at St. Louis 1839.