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MADRAS RECORD OFFICE.

Government of Madras.

Revenue DEPARTMENT.

G.O. No.	1916	Press ~~Mis.~~
^{187-ss} Dated	10-7-	19 1868

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*Proceedings of the Madras Government, Revenue Department,
10th July 1868.*

No. 187. Read the following Proceedings of the Madras Government in the
Public Works Department:—

Passing orders on the question of making a
canal through Madras to connect the line of
navigation on the north from the Cooum to
Doogoorazapatam with that on the south
from the Adyar to Sadras. (Here enter 4th July 1868, No. 2,134.)

No. 188. ORDER THEREON, 10th July 1868, No. 1,916.

Irrigation, No. 5.

Communicated to the Revenue Board.

(True Extract.)

(Signed) H. SEWELL,
Acting Under Secretary to Government.

To the Board of Revenue, with Proceedings Public Works Department, No. 2,134.

Exd. F. R. Bantleman.

No. Read the following letter from the President of the Junction Canal Committee, to the Secretary to Government, Department Public Works, dated Madras, 15th May 1868 :—

I have the honor to forward herewith the Report of the Junction Canal Committee, convened in Order of Government No. 1,095, 7th April 1868, and to return all the plans and file of correspondence which accompanied the Order, sending at the same time the Committee's correspondence and the Orders of Government since received.

Report of the Committee appointed in the Proceedings of the Madras Government of the 7th April 1868, No. 1,095, on the proposed Junction Canal through Madras.

Points to be reported on. 1. The Committee were instructed to report upon the relative advantages and disadvantages of constructing the canal through Madras as a high level fresh water line of communication, or as a low level tide-water canal; also to state which of the various lines that have been proposed for the canal they considered most suitable.

Additional Orders of Government received.

* No. 1,148, 16th April 1868.
" 1,205, 21st " "
" 1,268, 24th " "
" 1,275, 27th " "

2. Since the receipt of the Order of Government quoted at the head of this report, the Committee have received the Proceedings of Government shown in the margin; * the last mentioned was obtained from the Superintending Engineer of the 4th Division.

Chembrumbakkam Tank Supply.

3. At the time Mr. Fraser's project for a high level fresh water canal was prepared, it was believed that, by the improvement of the Chembrumbakkam tank, water sufficient not only for the irrigation of a large additional area of land, but for the supply of such a canal would be made available. The Committee, however, learnt that circumstances had come to light, which made it doubtful whether the capacity of that tank could be made as great as had been intended, and for which an estimate had been sanctioned, and they deemed it necessary to be assured of the actual facts of the case before coming to any decision, and to know whether the formation or improvement of any other tanks, which would affect the question, was contemplated. They accordingly made a reference to Mr. Fraser, and that Officer stated* that he was under the impression that the quantity to be stored in the Chembrumbakkam tank need not, necessarily, be reduced to any great extent, though the details of the project would require modification; and this view is confirmed by the information contained in the letter of the 9th April last, No. 61, from the Assistant Engineer in charge of the tank.

* Letter dated 24th April.

[Procs. Madras Govt., 27th April, No. 1,275.
of the 9th April last, No. 61, from the Assistant Engineer in charge of the tank.

Tank will be large enough to contain supply for irrigation and for high level canal.

4. For the purposes of this report, therefore, it may be assumed that the Chembrumbakkam Tank will, or could be made to, hold the intended supply of water. If so, it would appear from the

subjoined particulars, that in seasons in which the rain-fall may be sufficient to fill the tank, the supply would be enough both for the lands now, or to be, irrigated, and for a canal having its bed, as proposed for the line called No. 7 in Mr. Fraser's report, 2 feet above mean sea level.

The intended capacity of the tank is cubic yards 196,873,935. The present area of irrigated land is cawnies 4,347.10 or acres, say, 5,750, and this area for a single crop, requires 7,000 cubic yards per acre, or cubic yards 40,250,000. Also 1,534 cawnies or 2,028 acres of the Nunjah Ayacut have been left waste for want of water, and these for the first crop would need cubic yards 14,196,000. The area of land not included in the Nunjah Ayacut of the tank, and requiring water is 1,347 cawnies or 1,780 acres, and it, for a first crop, would require 12,460,000. There can be no doubt also that, were water available, a very considerable proportion of the total of the areas abovementioned would be cultivated with a second crop; and, in considering the tank project, it has been assumed that this crop, which is usually on the ground for, comparatively, a short time, would need 5,000 cubic yards per acre. It is, however, not probable that more than two-thirds of that total area, 9,558 acres, would be so cultivated, and, therefore, 6,000 acres may be taken as the extent of land for which water has to be provided for a second crop, and the quantity will then be 30 millions of cubic yards.

5. The total quantity of water for irrigation required to be discharged from the tank sluices would then be 96,906,000 cubic yards, but this is not the quantity to be stored. It appears that the tank now holds when full 55½ millions of cubic yards, but that the "duty" performed by this water is that corresponding to the irrigation of an area for which 40½ millions of cubic yards only are actually required. The difference is doubtless due to evaporation and waste, and as the area of the present tank is 22 millions of square yards, and as, if its average area during the cultivation season be taken at 12 millions of square yards, a quarter of an inch a day of evaporation would in the five months of the season account for 12½ millions of cubic yards of water out of the 15½ millions, there is no difficulty in understanding the necessity for a somewhat similar allowance in calculating the quantity required for the extended irrigation. The present loss from all causes is about one-fourth of the total capacity of the present tank, and the provision for irrigation must consequently be one-third, plus a small addition for extra evaporation from the longer storage required for second crops, more than the quantity to be discharged into the irrigation channels. This latter quantity is for—

Present cultivation	40,250,000
Additional do. within the Ayacut	14,196,000
Do. do. beyond the Ayacut	12,460,000
Second crop	30,000,000
	96,906,000
	32,302,000

Add one-third	3,192,000
Add also extra for evaporation on second crop storage	
Total quantity required to be stored for irrigation, cubic yards	
	132,400,000

6. The water required for a navigation canal, having its bed 2 feet above mean sea level, and, therefore, needing locks with a 6-feet lift may be estimated as follows:—

The locks, as designed by Mr. Fraser, are 75 feet long and 20 feet broad. The Committee would not be prepared to advocate the adoption of this reduced length. The Shediancoopa lock, the only one on the existing canal, is understood to be 150 feet long; but they consider that, for an ultimate maximum traffic, the smaller would consume about as much water as larger locks, though so long as the traffic was small the short locks would economise water. There would be two locks, and each lock would take 350 cubic yards to fill it, and each boat or set of boats passed through the Junction Canal would require 700 cubic yards of water. Practically, perhaps the locks would not be worked for more than fifteen hours a day, nor charged more than ten times an hour, so that the daily consumption of water would, as a maximum, be $15 \times 10 \times 700 = 105,000$ cubic yards a day, or 38,325,000 cubic yards per annum. The quantity to compensate for evaporation would not be great. It may be taken as that due to an evaporation of one-fourth of an inch a day for 300 days. The length of line No. 7 is 3 miles and 63 yards, the width of water is 46 feet, and the area of the water surface would be 81,926 square yards, and the quantity evaporated daily would, therefore, be 568 cubic yards, say 600 cubic yards a day, or 180,000 cubic yards yearly. There are no reliable data for estimating the loss by absorption, but, as the springs would appear to be generally above bed level, this loss would not be very considerable. The requirements of a canal circumstanced as that under notice would be—

For lockage, cubic yards	38,325,000
" evaporation, do.	180,000
" absorption, say, do.	495,000

Quantity required for use, cubic yards 39,000,000

In estimating, however, in this case, the additional quantity to be stored, it must be remembered that evaporation from the storage reservoir will be in progress not during five months only, but for the whole year, and if, allowing for the monsoon season, this evaporation be considered as equivalent to one-fourth of an inch a day for nine months, the addition to the storage must be one-half instead of one-third, and the quantity to be stored for canal use will be 58½ millions of cubic yards.

7. It appears then that the total quantity required to be stored would be, in round numbers, for—

Irrigation, cubic yards	132½ millions.
A high level canal	58½ "

Total, say, cubic yards 191 millions.

and this total is considerably within the proposed capacity of the tank.

8. It is necessary, however, to take into account the character of the tank supply. The tank is dependent upon the north-east monsoon, and, however efficient the tank and its channels may be, the rains of that monsoon are by no means so regular and certain as to make it otherwise than probable that in some

years the tank would not fill, and in that case cultivation would have to be provided for first, and the canal would be left unsupplied. This result would certainly have occurred in 1867 when, with the exception of 1832, the rain-fall was less than in any year since the commencement of the century. It is difficult to suggest even what particular extent of rain-fall would be only just enough for cultivation, for very much depends upon the character of the several falls; but the Committee think that whenever the yearly total is less than three-fourths the average, 47.82 inches, the supply for irrigation would not be in excess, and this may be expected to be the case once in five or six years.

9. All that can be said, therefore, is that in good years the supply is likely to prove abundant, but that occasionally a high level canal would for months together and, perhaps for an entire year, be without water, and therefore useless.

10. This important point having been determined as accurately as the data at the disposal of the Committee would allow, the advantages and disadvantages of a fresh water high level canal have to be considered. The advantages which have been at various times brought more or less prominently to notice are—

That the water in a high level canal would be near the surface of the ground; that the cutting would be shallow, and the canal therefore easy to keep in repair; that branch canals could be cheaply formed where required; that there would be no obstruction to the free circulation of wind from high banks; that the water in such a canal would improve the supply obtainable from wells and springs, and so be a blessing to the neighbourhood.

The Committee do not doubt that all these advantages might be secured by constructing a canal with its bed on an average 5 or 6 feet below ground level, but they observe that on only the coast lines could this arrangement be carried out without making the lift of the terminal locks more than 6 feet, and an increase of lift would require an increased storage of water. With a bed level 2 feet above mean sea level, the depth of cutting for a fresh water canal would be greater on lines Nos. 6 and 7 than, and nearly as great on lines Nos. 4 and 5 as, that required for a tidal canal on the lines numbered 1, 8, and 9. Practically, therefore, the advantages dependent upon a small depth of cutting are not very easily attainable, and the Committee do not attach very much importance to them. The other description of advantages is that due to the presence of a body of fresh water in a district which is not well supplied, and in which there is occasionally much inconvenience felt from the failure of the wells. A high level canal would certainly improve the supply of wells in its vicinity, but after all how far would its influence extend? On the other hand, the desirable advantages of an improved supply either for agricultural or for domestic use, can be far more easily, and far more completely, obtained without the intervention of a navigation canal. It may be considered certain that, if the Chembrumbakkam tank be not required to supply a canal, it will have water available for keeping the Mylapore and Nungumbakkum tanks full for the greater part of the year. These latter tanks command every part of the area to the eastward between the Adyar and Cooum. Irrigation channels already traverse a considerable part of this area, and as long as they are

running, the wells and springs have plenty of water. All that seems necessary, therefore, is to supplement the ordinary supply of these tanks from Chembrumbakkam, and thus to keep water in the channels under the tank for several additional months, and to extend these channels where necessary.

11. The disadvantages of a high level canal are:—

Disadvantages of high level canal.

The obstruction caused to navigation by locks.

The great waste of water entailed by the use of locks.

The necessity for lock establishments.

Considerable interference with the level of public roads.

The two latter considerations are comparatively of little moment; they have a money value which might, in the absence of the other disadvantages of this system, demand some notice, but the fundamental objections to a high level canal are the first two of the disadvantages noted above.

Locks.

12. Locks are always a great impediment to navigation, and they would be particularly inconvenient on a line much of the traffic of which will be local, and on which it may be expected that there will be a very considerable passenger traffic between the various parts of Madras adjacent to the line. Locks indeed would, the Committee think, make all the difference between a successful and an unsuccessful junction of the present North and South Canals. If the line be well chosen, there ought, in addition to the very important advantage of enabling country produce to be put down close to the most populous parts of Madras, to be a heavy local traffic, the greater part of which would be shut out by such delays and impediments as locks would occasion. Nothing but a very strong necessity would warrant the imposition of the delays occasioned by lifting boats several feet at one end, and lowering them at the other end of a short piece of canal, and it has been already shown that some of the supposed compensating advantages do not exist, and that others are not dependent upon the construction of a fresh water canal.

Waste of water.

13. In the next place, a high level canal would involve the loss of a vast quantity of water, which the Committee feel assured may be turned to good account, partly in improving the irrigation and water-supply under the Mylapore and Nungumbakkum tanks, and partly in extending and improving cultivation in other villages than those noticed in Mr. Fraser's report on the Chembrumbakkum tank project. All the water used for lockage would be discharged into the Adyar and Cooum, and would then be of no use whatever.

The papers which have come under the Committee's notice do not show that the quantity of water which would be consumed by lockage and its value have ever been noticed, or that this value has ever been considered as part of the cost of a high level canal. Taking 4 Rupees an acre as the water-rate for the first crop, and 9,400* cubic yards as the quantity of water, including evaporation and wastage, consumed, it follows that 2,350 cubic yards are worth 1 Rupee, and that consequently every charge of the locks would cost more than 5 Annas, and that the yearly value of the water used upon, or reserved for, the canal would be nearly

25,000 Rupees. This capitalized at 5 per cent. would give 5 lacs, and it would appear, therefore, that the cost* of a high level canal would certainly be, in reality, more than two and a half times that† of a tide-water canal. This is one

* About 3 + 5 = 8 lacs.

† About 3 lacs.

and, perhaps, the most correct way of estimating the value of the water; but it may be considered with reference to the cost of storing it. With the required modifications Mr. Fraser thinks that the Chembrumbakkam tank project will cost 4½ lacs of Rupees. The additional quantity to be stored is 141 millions of cubic yards, of which a canal, having locks of 6 feet lift, would require 58½ millions, and the cost of storing this latter quantity would, therefore, be nearly 1,087,000 Rupees. Lastly, the canal supply would be liable to periodic failure. If this difficulty could not be met by an alternative arrangement, it might be faced under the conviction that a navigation subject to interruption would be better than none at all; but it would, in the absence of any such necessity, be unwise, the Committee think, to incur the risk of the disappointment, loss, and inconvenience, which would result from the withdrawal of this means of communication when the population had become accustomed to use it, and had adapted their habits and arrangements to the new order of things. It will take time, and perhaps some trouble also, to bring a canal into full use, for the Natives of India are not easily induced to make changes, even when the advantages of a change are most apparent to less conservative natures, but the object of the canal is to afford facilities, and, when these have, in time, become appreciated, it would be most unfortunate and inconvenient were they to be withdrawn.

Tide-water canal.

14. The only disadvantage of a salt water canal which, after what has been said above, needs special consideration, is the possible injury to wells and spring water. Such a canal might, from its low level, lower the average level of the water in wells, and of the springs generally: it might also, where the well bottoms, and the water in them are much below mean sea level, injure that water by making it more or less brackish. In any case, however, the salt and the fresh water will follow the ordinary laws which regulate their action, and it may be considered as certain that where the soil is not particularly porous, the effect of the canal cutting, and of the presence of salt water in it, would extend to a very small distance. All subsoil drainage into the canal may readily be compensated by the increased supply of fresh water, which it is supposed will be available. Similarly, as the salt water will not injure the wells so long as the water in them is above mean sea level, and as it never falls below that level except in seasons of drought, it may be assumed that, when the water supply shall have been improved, such will seldom, if ever, happen.

The Committee, however, are extremely desirous that all proper precaution should be taken to guard against injury to the properties situated near the line of proposed canal, and they admit that where the soil is sandy, or otherwise porous, such injury might, in the absence of preventive arrangements, extend to some considerable distance. A simple, and not very expensive, and at the same time effectual remedy for the more general and more prejudicial description of injury, that of lowering the springs by sub-soil drainage, is available. All that appears necessary

for this purpose is to cut a trench on the line of the outer toe of the spoil banks, or thereabouts; to carry this trench down to about 2 feet below bed level, and to fill it with puddle 3 feet thick up to 2 feet above spring tide level, or to the level of the springs themselves, whichever may be the higher. The rest of the trench would be filled in with ordinary soil.

This arrangement would cost, supposing the canal to be in 12 feet cutting about 3 Rupees a running yard, so that a mile of puddle on both sides of the canal would cost about 10,000 Rupees. Supposing a salt water canal adopted, and its line chosen, the nature of the soil should be carefully ascertained, and where injury is likely to be occasioned, puddle trenches should be provided. Also the level of all wells in the neighbourhood of the line should be noted and registered, and the character of the water which they contain in the dry seasons be ascertained, so that hereafter all well-founded complaints may receive attention, and that those which are not so may be the more easily disposed of. Either by prevention, making it difficult for water to pass either way transversely to the line of canal: or by cure, giving fresh water in lieu of that injured, all possible injury may be avoided or obviated. The Committee believe that the effect of a tidal canal in these respects has been over-estimated. The Seven Wells water has not been injured by Cochrane's Canal, and along and near its banks wells continue to yield water which seems fit for agricultural purposes.

Advantages do not need comment.

15. It will not be necessary for the Committee to dwell on the advantage of a tidal canal. No one has ever disputed the convenience of unobstructed and uninterrupted navigation, and even on the one point, freshness and sweetness, in which it has been assumed a high level canal would excel, they believe a salt water canal would have the advantage from the currents caused by winds and tides.

Line of canal selected.

16. The Committee having, after a careful consideration of the subject, determined to recommend the construction of the Junction Canal as a tide-water communication, it remains for them to state which is the best line for such a canal. In the first place, position has to be considered. The best lines for the accommodation of local traffic, and for bringing country produce into the midst of the population, are Nos. 1, 2, 3, 5, 8, and 9. Those passing through St. Thome, however, the Committee think, should be rejected, because it would never do to admit a considerable town drainage into the canal, and to pass it by under-tunnels in such deep cutting as is there unavoidable would be expensive, and it would be far from easy to keep the drains clear and efficient. Line No. 5, Sir Arthur Cotton's, is a good one, but the part near the Coom end would interfere with valuable property, which would add much to the expense; the average cutting would be deep (14.30 feet), and it is perhaps some disadvantage that it would have to be taken across the Mount Road, at a part where the traffic is very heavy.

On the whole, therefore, it is considered that line No. 9, that edged with purple on sheet No. 1, is the best. It will accommodate the population of Mylapore, Triplicane, and Chepauk, and run not far from Royapetta; the average depth of cutting is moderate, 9.60 feet; the estimated cost Rupees 3,03,632 is below that of many lines, and but 14,000 Rupees in excess of the very cheapest; it does not

require the removal of much valuable private property; the point of entrance into the Cooum is convenient, and it is believed that this lower part of the river may always be kept navigable, whereas the upper part of the river, which the lines entering at D would use, would be more or less interfered with and altered by freshes.

It may be deemed some objection to all the coast lines entering the Cooum near its mouth, that they interfere with the Chepauk and Government House parks; but it is thought that, by carrying the line on the west side of Chepauk park, and removing the railings to what would be then the east side of the canal; by revetting this portion of the line, and using the spoil for raising low ground, and in the improvement of the right bank of the Cooum, so as to train the river properly to the new bridge; by making the approaches to the bridge for the Cooum bank road in Government park wide and nearly level, and indeed by raising the ground near the bridge generally rather than specially on the line of road, the canal will not prove in any way an inconvenience; while on the other hand, the passing to and fro of boats will give animation to the Cooum. A towing path round the island would be an advantage, and could probably be laid down at a small cost with spoil from the canal cutting.

Drainages.

Kooshalpett back-water. It apparently receives but little sewage, but this point may with advantage be further investigated and, if its admission would be prejudicial, it would be better to exclude it.

Bridges.

* Near Mylapore.

The bridge plans do not show how the towing paths are to be taken under the roadway, but Mr. Fraser has stated that it is intended to carry them on brackets. Mr. Fraser's letter of the 8th instant shows that the Wallajah bridge will not pass firewood and other large boats, and that they will have to use the branch of the Cooum to the south of the island, which is, however, almost equally convenient. Perhaps some day Wallajah bridge may be superseded by one better placed for the Black town road-traffic.

A slight addition to width of land recommended. It is considered that the width of land to be taken up should be a little in excess of the present and immediate requirements of the canal. An additional 20 feet of width will admit of future widening and deepening, both of which the Committee think will probably be required in the future, and the amount to be paid in compensation will be but very slightly increased by this addition.

Conservancy and Police.

20. The management of the canal should, from the first, receive careful attention. The habits of the people make it certain that the canal banks and towing-paths will be rendered unclean, unless the people be determinedly prevented from using them as latrines. It is easy to prevent all nuisance, but very difficult to prevent a half-tolerated nuisance from becoming unbearable.

21. The petition from certain inhabitants of Mylapore, communicated with the Order of Government of the 16th April has been considered, and much that the petitioners urge has been already answered. Whatever line be chosen, and whatever description of canal be constructed, some objection will be found, for many acres of land cannot be taken up at a Presidency town for public works without occasioning a good deal of inconvenience. All that can be done is to select that line which, while securing the objects contemplated, interferes as little as possible with property of all kinds, and avoids, where practicable, such property as cannot be destroyed without inflicting injuries not remediable by the payment of compensation; as, for instance, burial grounds, and edifices connected with religion.

The interest of Government and of the people generally is equally concerned in the selection of that line which has most advantages and presents fewest objections

Boat basins and branch canals.

22. It is not thought necessary to make any recommendations regarding boat basins, which can, and should be, allowed at frequent intervals, or on the subject of branches from the main line, which will be a subsidiary consideration; but it may be remarked here that if the Cooum be made navigable from Chintadrepettah upwards, almost every populous part of Madras, with the exception of Teynampett, will be able to get a share of the benefits of a connection with an unbroken navigation of about 130 miles in length.

23. The Committee, in conclusion, venture to hope that the contents of the report will enable the Government to decide in what manner, and where, the Junction Canal is to be carried out, so that a want, which has been so repeatedly acknowledged to exist, and which has for many years made the Sadras Canal almost useless, and cut off Madras from many advantages to which its situation and physical conditions entitle it, may be speedily supplied.

MADRAS,
14th May 1868.

(Signed) J. CARPENDALE, Colonel, R. E.
J. MULLINS, Captain, R. E.
W. H. EDGECOME, Captain, R. E.

Ed. S. T. Augustin

*Proceedings of the Madras Government, Public Works Department,
4th July 1868.*

No. 113. Read the following letter from the President of the Junction Canal Committee:—

(Here enter 15th May 1868.)

No. 114. ORDER THEREON, 4th July 1868, No. 2,134.

IRRIGATION, No. 6.

1. The question of making a canal through Madras to connect the line of navigation on the north, from the Cooum through Madras, after the Adyar to Sadras, after remaining for some time in abeyance, was revived by the late President in 1861, in connection with the investigation which was in progress for supplying Madras with water, and the consideration of the subject was referred to Mr. Kennedy, who being in charge of the Coast Canal, had previously submitted a project for effecting the object in view.

2. Mr. Kennedy appears to have executed his instructions; but his views do not appear to have been laid before Government, and the matter remained in abeyance till March 1865, when Mr. Fraser, who had succeeded Mr. Kennedy in charge of the Coast Canals, and was engaged on the examination of the Water Supply Schemes, was directed to prepare the requisite plans and estimates.

3. With the first of the papers read at the head of these Proceedings, Mr. Fraser, after giving a comprehensive digest of the voluminous papers that are on record on the subject of this short line of canal, and describing the various proposals which have, from time to time, been made for its construction both as a high level fresh water line of communication to be fed from water stored in reservoirs, and as a low level salt water canal dependent on a tidal supply of water from either end, submitted plans for carrying out the work on the former principle. Adhering pretty closely to his instructions, Mr. Fraser proposes to take his canal from the Cooum, at a point a short distance above the Commander-in-Chief's bridge, by Peter's road, through Royapettah to the Cathedral road, thence by the Horticultural Gardens, and crossing Pulli Tenampett and Chamier's road at the west end of Mowbray's road, through Sir Colley Scotland's compound, to the Adyar.

4. Fixing the bed of the canal at two feet above mean tide level, Mr. Fraser would have a lock at either end to drop boats into tidal water, and drawing the supply of water for those locks as well as for the canal through the channel of the Adyar, he would raise the surface of the water in the latter to that in the canal by means of a masonry dam across the river, which it is presumed would be kept full from some convenient reservoir.

5. Following nearly a direct line between the rivers, and avoiding as far as possible interference with valuable property, the proposed line of canal appears to be laid out with great care and judgment, and the work, estimated to cost Rupees 5,24,742, would probably be as little expensive as any canal taken through the heart of Madras on so low a level as the one adopted. There is no necessity however for excavating the bed of the canal to so low a level as only two feet above mean tide, or for its deriving its supply from the Adyar, and Mr. Fraser accordingly shows that, if the Chembrumbaukum tank can be relied on as a source of water supply, the canal might be kept on a level to require for its excavation a

*Rev. 23rd July/68
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*Proceedings of the Madras Government, Public Works Department,
4th July 1868.*

mean depth of cutting of only 6 feet, and that such modifications could be made in all the works connected with it, including the dispensing with the dam across the Adyar, as would reduce the estimate to Rupees 3,69,457.

6. The Government have no reason to doubt that, if there were no other mode of connecting the navigation north and south of Madras than by a fresh water canal fed from a storage basin in the neighbourhood, Mr. Fraser's designs, modified to suit the higher level, would be in all respects appropriate, but His Excellency the Governor in Council not being satisfied that it would not be better to take advantage of the vicinity of the sea to make use of the facilities of keeping a tidal canal always supplied which that vicinity affords, Mr. Fraser was called upon to examine the question, and to prepare plans and estimates for a low level salt water canal, in order that the two schemes might be taken into full consideration by Government in all their bearings at the same time.

7. In his second report Mr. Fraser complies with that requisition, and indicating the direction in which nine several lines which he had surveyed for the canal might be carried, submits sections taken along them, with rough approximate estimates of the cost at which he calculates that a low level salt water canal might be made on each. One of these lines corresponds with that on which he has laid out his high level canal, and the others are either identical with lines previously suggested or surveyed, or are modifications and combinations of them. They show that, though no difficulty exists in the way of completing the canal in almost any direction through Madras, very considerable interference with private property is inevitable, and that the amount of compensation to be allowed for is, in all cases, a very important item of the probable cost of the work.

8. Mr. Fraser states what, in his opinion, are the advantages and disadvantages of each of the lines, and gives his preference to one which, though no doubt very suitable, appears to the Government to be carried too much to the westward, and to enter the Cooum at a point much higher up than that river can very readily be made navigable. It encroaches too upon private property generally of a more valuable description than that which a line nearer the coast would touch. For these reasons the Government did not feel assured that they had sufficient information before them to warrant their selecting any of the specific alignments for the canal which Mr. Fraser had pointed out, and seeing how opinions have differed regarding the superior advantages of one description of canal over the other, the Government, now that the idea of supplying Madras with water by means of the canal no longer complicates the question, considered it advisable that the whole subject should be carefully re-examined by competent professional Officers. The gentlemen named

Colonel J. Carpendale, R. E.
Captain J. Mullins, R. E.
W. H. Edgcome, R. E.

in the margin were accordingly requested to form themselves into a Committee, and to furnish the result of their deliberations in a report which might assist the Government in deciding definitively, and finally, not only whether the canal, if carried into execution, ought to be made a high level fresh water or a low level salt water line of navigation, but also the exact direction through Madras it ought to follow.

9. The Committee have fulfilled the duty entrusted to them in a thorough and satisfactory manner, and as the first thing to be looked to in determining the

*Proceedings of the Madras Government, Public Works Department,
4th July 1868.*

feasibility and advantages of the high level scheme is the source from whence water is to be supplied, they have fully investigated this point. They calculate that to keep a high level canal full, and to re-place the waste at the locks, not less than 39,000,000 cubic yards of water would be consumed annually, and they show that the Chembrambaukum tank, which is about to be enlarged to hold some 197,000,000 cubic yards, could in years of average rain-fall be able to supply this quantity after providing 132½ millions of cubic yards for all the irrigation, both first and second crop, immediately dependent on that tank. They point out, however, that in years of exceptional dryness there might be no surplus, and that in all seasons any surplus beyond the requirements of that irrigation might be most beneficially utilized in keeping the Mylapore and Noongumpaukum tanks full throughout the year, and in the extension of irrigation to a second crop of the very valuable cultivation which is carried on in Madras under those tanks. They estimate the value of the 39,000,000 cubic yards of water that might thus be usefully applied to agricultural and domestic purposes, instead of being run to waste in the Cooum and the Adyar through the locks of a high level canal, at Rupees 25,000 per annum.

10. The Committee are clearly of opinion that, though a high level canal filled with fresh water would improve the wells in its immediate vicinity, and that it has other advantages, such as requiring little depth of cutting and low embankments, none of these advantages are of sufficient importance to counterbalance the disadvantages of the interruption to traffic which locks in a canal occasion, or compensate for the great waste by those locks of valuable water.

11. With these views, and looking to the uncertainty of the supply from even so favorably situated a source as the Chembrambaukum tank, the Committee are not favorable to the construction of a high level canal, and decidedly recommend that, if undertaken, it should be made on a low level and supplied with tidal water; and they select as the most favorable direction in which it can be carried, the line numbered 9 in Mr. Fraser's list.

12. The Government entirely concur with the Committee. They think it would be a great mistake to apply a large quantity of valuable water to the sole use of a short line of navigation which could be easily provided for by other means costing nothing. Any water that could be spared from the surplus of the Chembrambaukum tank might be most advantageously employed in the manner indicated by the Committee, and in no way, in the opinion of Government, could that water be more gratefully utilized in and about Madras than in the better irrigation and extension of cultivation. A low level salt water canal would not be without its disadvantages, but the Committee believe that these have been greatly exaggerated. They think it doubtful that a canal having the surface of its water only on a level with the tide would affect the wells, but even if it should be found to injure those in its immediate neighbourhood, the Committee are of opinion that a remedy, which they point out, may be applied. The depth of cutting required for a low level canal involving massive embankments, is an objection, but the Government agree with the Committee that neither this objection nor the supposed damage to wells is of such importance as to outweigh the simplicity and other advantages of a salt water canal.

13. The Government assent in principle to the recommendations of the Committee, and direct that the papers be returned to Mr. Fraser in order that he may

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at once complete the survey of the line selected by the Committee, and submit plans and estimates in full detail for a low level salt water canal on that line, which, numbered 9 in his list, is shown edged with purple on Sheet No. 1, of the maps submitted by him with his second report. That line, starting from opposite the head of the Sadras Canal, would, as shown by the Committee, accommodate the population of Mylapore, Royapett, Triplicane, and Chepauk, and, would enter the Cooum at a convenient point, to which the river may always be made easily navigable.

14. In preparing his plans, Mr. Fraser will be careful to provide for passing under the canal all drainage contaminated with sewage. The Committee state that the only drainage to be admitted to the canal is that passing down to what is called the Koshupett back-water, and that it apparently contains little sewage. Mr. Fraser will ascertain this, and, in the event of sewage being mixed with the drainage, will provide for passing all under the canal.

15. Whether the Government will be able to sanction and undertake the execution of the Junction Canal in any form is a question which must be determined in connection with many considerations beyond the sphere of the present technical inquiry, but they deem it important to set at rest the long debated points of the nature, direction, and cost of the contemplated communication.

(True Extract.)

Wm. D. Orr

Colonel, R. E.,

Secretary to Government.

To the Superintending Engineer, 4th Division.
" Junction Canal Committee.
" Revenue Department.
" W. Fraser, Esq., C. E.

With 21 Copies of Committee's Report.

8/8/68

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