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MADRAS RECORD OFFICE

GOVERNMENT OF MADRAS

Revenue DEPARTMENT

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*Proceedings of the Madras Government, Public Works Department,
8th May 1875.*

Read the following papers:—

No. 203. Despatch from the Right Honorable the Secretary of State for India.

Public Works,

No 19.

INDIA OFFICE, LONDON,
12th November 1874.

MY LORD,—From the Proceedings of your Excellency's Government, of 23rd May last, it appears that you have now under consideration the question of the measures to be adopted in order to provide for the navigation of the Madras Irrigation and Canal Company's Canal.

2. I now transmit a copy of a correspondence* with the Board of that Company relative to a proposal for the formation of a separate Company for the purpose, having a distinct capital and organization, together with a copy of my despatch relative thereto, to the Government of India of this date, No. 100, and I request that you will, in communication with that Government, furnish me with your views on the project, especially with reference to the manner in which the interests of Government may be affected by its adoption.

I have, &c.,

SALISBURY.

His Excellency the Right Honorable

The Governor in Council, Fort St. George.

Despatch from the Right Honorable the Secretary of State for India.

Public Works,

No. 100.

INDIA OFFICE, LONDON,
12th November 1874.

MY LORD,—Herewith is transmitted for your Excellency's information, a copy of a correspondence* with the Directors of the Madras Irrigation and Canal Company, relative to a proposal for the formation of a separate Company, with a distinct capital and organization, for the purpose of providing for the navigation of the Irrigation Company's Canal.

2. You will observe that I have declined to take the matter into consideration until I have received your Excellency's views, as well as those of the Government of Madras, on the project.

3. It will be remembered, that by the seventh clause of the Supplementary Contract with the Company, dated 2nd October 1866, the net revenue which may be derived from navigation is mortgaged to Government as security for payment of interest on loans. Were it not for this fact, I should have been disposed to decline to express any opinion, either of approval or otherwise, on the scheme. As it is, however, I request that you will consider, in communication with the Government of Madras, in what manner the interests of Government are likely to be affected by

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the formation of the proposed Company, and that you will acquaint me with your views on this point, together with any other observations that may occur to you in regard to the project generally.

I have, &c.,

SALISBURY.

His Excellency the Right Honorable

The Governor-General of India in Council.

ENCLOSURES.

No. 4 of 1874, Home.

No. 1.

THE MADRAS IRRIGATION AND CANAL COMPANY,

24, Coleman Street, London,

22nd October 1874.

SIR,—His Lordship the Secretary of State for India is, no doubt, aware that the construction of the canal between Kurnool and Cuddapah, a distance of 190 miles, undertaken by this Company, has for some time been completed, so as to be available for navigation as well as irrigation. This canal is designed to convey water sufficient to supply irrigation to from 300,000 to 400,000 acres of wet crops, and to provide subsidiary irrigation of great value to a much more extended area. This irrigation is now in progress, and the last year (which extended over about 19,000 acres) shows an increase on the previous year's irrigation in the ratio of 75 per cent., and which proportionate increase, from the recent reports of their Engineers, the Directors have reason to believe will be maintained during the present season, making 35,000 acres. When, however, the means of transporting the surplus production to available markets is provided, the information communicated to the Directors confirms their expectation of a more rapid and full development of irrigation.

The returns from irrigation are at present absorbed in providing conservancy and working expenses, and any surplus beyond this will, according to the stipulations of the Acts of Incorporation and the Original and Supplementary Agreements between the Government and the Company, be applicable to the payment of interest on the mortgages issued by the Company and on the debentures given to the Secretary of State, and in exoneration of interest on the guaranteed capital; and, until these returns are sufficient to cover all these purposes, the profits from navigation, if carried on by the Company, would be liable to make up the deficiency, and no dividend would be payable to those who might subscribe additional and unguaranteed capital to promote navigation until navigation returns were freed from such liability. Under these circumstances, the Directors cannot see their way to raising, on behalf of the Company, such additional and unguaranteed capital as will enable them to provide for the required navigation. The importance of making the canal available for the transport of goods and passengers, even in respect to the encouragement thereby afforded to local irrigation, has always been strongly impressed upon the

* G. O., No. 1,396.

Board, and it will be seen from the accompanying Minute,* recorded by the Madras Govern-

ment, under date 23rd May 1874, that they regard this further application of the canal's usefulness so desirable that, in their opinion, it should be no longer deferred in the interests of the intersected and adjacent districts.

The question how the foregoing most-desirable object is to be effected (in the benefits of which the Government would participate no less than the Company) has for some time past engaged the

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earnest consideration of the Directors, and they have come to the conclusion that the only practicable mode is by the creation of a distinct capital, to be raised under a separate organization, with conditions favourable to the Company, and securing to them and to the Government, in the interest they have in the Company, all that is necessary for their protection and control. These conditions the Directors propose should be the following, and they think that, under such an arrangement, the required capital may be subscribed:—

1. The Navigation Company shall place upon the canal an efficient service of steam boats and other vessels, sufficient to meet all public requirements, and shall construct and maintain all necessary landing places, approaches, accommodation, and accessory works.
2. The Navigation Company shall be subject to and shall perform, when required, the conditions contained in the 26th clause of the Agreement made the 3rd of July 1863, between the Secretary of State for India and the Madras Irrigation and Canal Company, as to the carriage of Her Majesty's mails, troops, ammunition of war, &c.
3. The Madras Irrigation and Canal Company shall be paid by the Navigation Company, either an agreed sum for the first five or any other number of years, or 5,000l. annually, to commence from 1st July 1875 (by which time it is estimated the navigation will be duly organized, and yielding returns), such payment to be made as a commutation of tolls, and for the exclusive use of the canal for purposes of navigation; and when the shareholders in the Navigation Company shall have received 10 per cent. upon their paid up capital, the same Company shall pay to the Madras Irrigation and Canal Company, in addition to the said agreed on yearly or consolidated payment, one moiety of all net profits realized by the same Navigation Company, over and above such 10 per cent.
4. The Madras Irrigation and Canal Company shall at any time, after the expiration of five years from the commencement of navigation, have power, after having given two years' notice of their intention to do so, to purchase all the rights and interests of the Navigation Company, by paying to the latter the full amount of its paid up capital, together with the average of any premiums at which the shares or stock shall have stood during the three years preceding such purchase.

The payments thus stipulated to be made by the Navigation Company would be available to this Company as revenue, and be applicable in aid to meet the several claims above described, and thus both the Government and the Company would be benefited.

The Directors would offer their apologies for troubling his Lordship with this communication, but they feel that it is but right that they should place the facts before him, and as time is pressing, in order that navigation may be provided on the canal next season, they trust his Lordship will approve of their taking immediate steps in furtherance of the proposed arrangements in conformity with the explanations now given, and which they will do, not anticipating that he will see any ground of objection to the course suggested. At the same time, however, should it be otherwise, the Directors will be most happy to give effect in any way in their power to the views of his Lordship.

I have, &c.,

(Signed) J. WESTWOOD,

Secretary.

The Under Secretary of State for India.

No. 204. From Captain G. T. SKIPWITH, R.E., Assistant Secretary to the Government of India, Public Works Department, (Civil Works—Irrigation), to Lieutenant-Colonel J. MULLINS, R.E., Joint Secretary to the Government of Madras, Public Works Department, (Irrigation Branch), dated Fort William, 15th December 1874, No. 748 I.

HER Majesty's Secretary of State for India having forwarded to this Government copies of correspondence with the Director of the Madras Irrigation and Canal Company relative to the formation of a separate Company with a distinct capital and organization, to provide for the navigation of the Irrigation Company's Canal, I am directed to state that the report of the Madras Government on the subject will be awaited before this Government sends reply to the Secretary of State.

No. 6.

No. 205. Note by the Chief Engineer for Irrigation.

THE proposals made by the Madras Irrigation and Canal Company for the opening of navigation on their canal have direct reference to G. O., No. 1,396, of the 23rd May 1874. The Directors wish to start a separate Company for the navigation of the canal, and name the conditions which they would propose. The conditions as drafted by the Board are four in number, and these may be noticed in succession, and it will then be shown what further conditions or provisions of agreement will need to be specified.

1. The first condition is the Navigation Company shall place upon the canal an efficient fleet of steam boats and other vessels, sufficient to meet all public requirements, and shall construct and maintain all necessary landing places, approaches, accommodation and accessory works.

It appears to be necessary that this condition should be so modified as to require that a certain minimum fleet be placed upon the canal within a certain period from the date of the agreement, and thereafter maintained efficiently together with the requisite power or means of working it.

2. The second condition, regarding the conveyance of mails, troops, and ammunition requires no remarks.

3. The third condition refers to the terms on which the navigation of the canal may be leased to the new Company. It is therein suggested that the latter Company shall either pay an agreed sum for the first five or any other number of years, or £5,000 annually with a moiety of all profits above 10 per cent. The maintenance of the canal and works must remain with the Madras Irrigation and Canal Company. It may be a question whether the locks should be excepted or not from the works to be so maintained, the reason against exemption being that the Navigation Company will have had nothing to do with their construction, and for, that the cost of maintenance will considerably depend upon the care taken in using them. Mr. Latham thinks that the Irrigation Company should maintain the locks, and there is no need, it is thought,

of negating this arrangement. The Irrigation Company will, therefore, in this case have to maintain the canal and all its works in a state of efficiency both for irrigation and navigation purposes, and in addition to direct outlay upon the locks, it will certainly cost more to ensure efficient navigation, at least until irrigation shall have been largely developed than would be the case had the latter alone to be considered. In the next place the Irrigation Company have to look for a return on the capital invested in navigation works, and this has been estimated by Colonel Rundall, in communication with the Company's Chief Engineer, at Rupees 36,80,584, or, say, £368,000, while further works* estimated to cost £12,350 are shown by

* Lock weirs crossing the Pennair.

Mr. Latham to be required. It will be seen

that Rupees 62,300, exclusive of stores available, are required to complete the telegraph, and Mr. Latham thinks that this should be a part of the capital outlay of the new Company; the stores available are proposed

Mr. Latham's No. 11, paragraph 22.

to be made over to the latter, who are in

return to convey the Irrigation Company's messages free. This arrangement is unobjectionable. I am unable to concur however in the Chief Engineer and Manager's proposition, that the cost of the Pennair crossing should not be a capital outlay of the Navigation Company; the works for this purpose have not been designed in detail, but they are

intended to secure a navigable channel between the tail lock of the 9th and the head lock of the 10th section. The Pennair crossing certainly presents difficulties, and if by any modification of the Adimappully anicut these difficulties would be pretty sure to be permanently surmounted, any moderate outlay might be sanctioned as a charge against the capital of the Irrigation Company. The latter should however have nothing to do with temporary or experimental works in the bed of the river, beyond the power of vetoing any interference likely to cause injury to the anicut and head works, a danger that must be guarded against very carefully. The capital of the Irrigation Company invested or to be invested in navigation will then be as above ... £ 368,000
For lock weirs, say, „ 3,500

£ 371,500

In the first instance it would apparently be undesirable to jeopardise the success of the Navigation Company by requiring any direct return upon this outlay for the use of the canal. Mr. Latham's Estimates VI. and VII. show that, taking the cheapest method* of working the traffic, the annual

* By horse-power.

expenditure will be Rupees 73,536, and if

to this be added a percentage on the difference between the original and revised estimate for floating plant, the total will become about 86,000 Rupees. It may be roughly calculated that the cost of canal maintenance specially debitable to navigation will be—

	RS.
172 miles, at 30 Rs. a mile	5,160
48 locks, at 334† „ each	16,032
	21,192
Superintendence at about 30 per cent.	6,308
Total	27,500

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which added to the annual expenditure will make the outgoings 1,13,500 Rupees, while the estimate of gross income is Rupees 1,39,104.

It may probably be assumed that to start the navigation a capital of 10 lakhs or £100,000 will be needed, viz. :—

	Rs.
For works	1,60,930
Buildings	1,38,000
Floating plant, say,	3,00,000
	<hr/>
	5,98,930
Management one-third	1,99,570
	<hr/>
	7,98,500
Working capital	2,01,500
	<hr/>
Total ...	10,00,000

A company cannot do without buildings, for there must be places for the receipt and safe custody of goods transmitted to be carried, and though it is to be regretted that nearly two lakhs will have to be devoted to this requirement, there is apparently no way of avoiding it. On the Godavery and Kistna canals the large traffic is carried on without any canal buildings for its accommodation, but there the carrying is entirely in private hands, and this fact makes the circumstances radically different. Five per cent. on 10 lakhs would be 50,000 Rupees, and without a development of traffic a net return of this amount is not to be expected. That such development will take place is certain, but at what rate it will occur, and within what time the receipts will cover the interest on capital, are points which cannot be determined accurately and must be left to be decided by experience.

So far I have suggested that the Navigation Company should be required to pay nothing for the use of the canal, but only to pay to the Irrigation Company the expenses incurred on account of navigation. It would appear to be desirable, moreover, that the shareholders should receive 5 per cent. on their investment before any thing is claimed on behalf of the Irrigation Company by way of return upon the capital invested in navigation works; thus if only two or three per cent. be obtained in the first few years, the other three or two per cent. might be made good from subsequent enhanced profits; but beyond this it would not be right to go, and all profits beyond 5 per cent. should be divided in the proportion of one-third to the Navigation Company and two-thirds to the Irrigation Company, until the Canal Navigation capital of £371,500 shall have obtained a return of at least 3 per cent., after which the excess profits might be divided equally. It would of course be understood that all additions to the capital of the Navigation Company, duly authorized or agreed to by the two Companies with the concurrence of Government, would be entitled to the first claim on profits up to the 5 per cent. It probably need not be anticipated that the required capital will exceed 10 lakhs of Rupees, or £100,000, and, on the other hand, so far as the amount is dependent upon the cost of floating plant some reduction may be possible.

5. Condition 4 gives the Madras Irrigation and Canal Company power to purchase all the rights and interests of the Navigation Company at any time after the expiration of five years from the commencement of navigation, two years previous notice of the intention to purchase being given. The terms appear to be more favorable to

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the Navigation Company than would be altogether equitable, but possibly for a compulsory sale they may not be deemed too liberal.

6. It appears to be necessary that the liability of the Madras Irrigation and Canal Company to maintain the canal in a state capable of navigation should be clearly defined, or there will be a risk of disputes. Whenever the supply of water may be sufficient between the 1st of June and the 31st of December, the canal ought to be available for navigation, and should be kept capable of conveying water at a sufficient depth. At other times the quantity of water, if any, which will enter the canal, will be dependent upon the wants of the Kistna Delta, and the requirements of the navigation of the Kurnool and Cuddapah Canal cannot on any account be permitted to influence the regulation. The interests of the Kistna Delta are not only of far more importance than the navigation of this canal, but they have the first claim upon the waters of the Toombudra. This matter must not be lost sight of, and it is here mentioned in order that the Navigation Company may clearly understand that the maintenance of the supply of water in the canal is dependent upon the water-supply in the Toombudra being in excess, between the 31st December and the 1st June, of the requirements of the Kistna Delta. The Chief Engineer and Manager has prepared a diagram which gives, if this point be considered, a more favorable view of the power of the Toombudra to maintain the requisite depth of water in the canal, than can be taken in that connection. The liability of the Madras Irrigation and Canal Company to keep the canal efficient might be enforced by penalties were the Navigation Company to be prepared to pay for the use of the canal: then for every day that it might be closed to navigation, not on account of a deficiency of water, but because from breaches or other accidents, the water had to be reduced or shut off, compensation might be claimable to the extent of perhaps twice the average daily expenses of the Company, seeing that in round numbers the navigation may be assumed to be for seven months only in the year, but if virtually the use of the canal be conceded without payment for some years, and with only a limited payment for many years more, no penalty ought to be incurred by the Madras Irrigation and Canal Company as a consequence of accidents. They will undoubtedly do all in their power to secure the safety of the canal on which the irrigation revenue is dependent, and the Navigation Company must take its share of the risk.

7. Again, the time during which navigation can be maintained will depend very materially upon the extent of irrigation during January to May inclusive. If this extent be at all considerable it may be taken for granted that navigation will be impracticable during the greater part of that time. The Government will no doubt continue to insist upon the primary importance of irrigation of as extensive a first crop as may be practicable, and the interest of the Madras Irrigation and Canal Company will be primarily concerned in securing this. With regard to second crop during the dry season, the agricultural interests concerned are at present very small, and will probably never in any case be very great, but it will be requisite to consider beforehand in what way the water available is to be utilized, seeing that its volume will be insufficient for both purposes.

8. For some period in each year, and generally for from six to eight weeks, the closure of the canal for clearances will be necessary. Such clearances will not be

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required throughout, but in each year particular portions will need this treatment, and the time named is not likely to be too great. The power to close the canal when necessary for this purpose, and for a reasonable time in each year, will have to be reserved.

9. The Navigation Company should be held liable for all damage done by its vessels or employés to any of the canal works.

10. It will be requisite that all accounts of expenditure by the Navigation Company should be audited and recorded in the same way as are those of the Madras Irrigation and Canal Company, and no capital outlay should be admitted but that which has been duly passed and recorded. Similarly all establishments to be entertained should be approved by Government, and all expenditure on this account and all receipts from navigation should be reported monthly. Whatever the terms of agreement may be they will be sure to involve questions which will have to be decided upon such information as will thus be placed on record, and it is essential that from the first this information should be properly and completely given.

11. In paragraphs 4 to 6 of his letter Mr. Latham refers to the nature and extent of the traffic to be expected on the provision of navigation, and he supposes that it will then amount to somewhere about 12 tons a day each way; he proposes a fleet capable of carrying 24 tons a day each way. He proceeds to give reasons why the canal should be worked by horse rather than by steam power, and I am of opinion that even with the lower estimates of the cost of plant originally prepared it is not advisable to introduce steam in the first instance; while if the estimate of the postscript to the letter be a more reliable forecast, the difference in favor of the simpler means of moving the goods and passenger boats becomes much more marked. Whether, on the whole, men rather than horses or ponies would not be still more appropriate need not be considered at present, but looking to the character of the canal, to the narrowness of the tow-paths at some of the aqueducts and other masonry works, and to the absence of a second tow-path, necessarily at many miles of the canal, this question will be worth consideration at some future time.

It will be seen that the first and alternative estimates of the cost of introducing navigation differ considerably; they consist of the following items, of which, if the foregoing recommendations as to the amount to be debited to the capital of the Madras Irrigation and Canal Company be accepted, only about 31,100 Rupees appertain to that account and the rest will have to be provided by the Navigation Company:—

Items.	STEAM.		HORSES.	
	First Estimate.	Alternative Estimate.	First Estimate.	Alternative Estimate.
Canals, telegraph, buildings, &c.	RS. 3,59,500	RS. 3,59,500	RS. 3,30,000	RS. 3,30,000
Floating plant	2,19,000	6,60,000	1,46,000	2,91,400
Management and Establishment charges, 33½ per cent.	5,78,500	10,19,500	4,76,000	6,21,400
	1,92,800	3,39,800	1,58,600	2,07,100
	7,71,300	13,59,300	6,34,600	8,28,500

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It will not be requisite to provide all the floating plant, or to construct all the buildings at once, but the Chief Engineer and Manager has rightly, it is thought, given on the best information available a statement of the probable outlay required for introducing systematic and effective navigation, and although details may have to be modified, and as regards floating plant the cost will depend upon the price of iron, freights, &c., for the time being, it will be better to err, if at all, on the safe side, and to assume that the scheme will involve an expenditure of from 6½ to 8½ lakhs.

12. On the subject of tariffs, Mr. Latham has expressed his views at length. He proposes to adopt the Railway tariff, with a reduction in the number of classes from six to three for insertion in the Act, and he suggests that the three classes to be adopted be termed 'high, ordinary, and low,' and be rated at 2½, 1½ and 1 Anna a ton a mile respectively. It must be noticed in connection with these rates that, as it is proposed that the Company shall conduct the traffic, and not merely transport goods between given points, to the cost of mere carriage must be added that of providing station buildings, booking arrangements, &c. Such being the case the rates are not, it is thought, too high, and they will, by securing comparatively cheap carriage, prove a great advantage to a country in which the cost of transport by carts is exceptionally high. For passenger fares Mr. Latham proposes two classes, to be charged 3 and 2 Pies a mile, respectively, while special accommodation would be provided at about Railway fares.

13. The connection of the Cuddapah terminus of the canal with the Madras Railway by a branch from the latter will be essential to the development of traffic; the distance is about 2 miles, and the junction would be at about 166 miles or 4½ miles north-west of the Cuddapah station. It is presumed that the Railway Company would be glad to construct this branch or long siding, and to work it in connection with the regular traffic.

FORT ST. GEORGE,
4th February 1875.

(Signed) JOHN MULLINS, Lieut.-Colonel, R.E.,
Chief Engineer for Irrigation.

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From J. H. LATHAM, Esq., Chief Engineer and Manager, Madras Irrigation and Canal Company, to Lieutenant-Colonel J. MULLINS, R.E., Chief Engineer for Irrigation and Joint Secretary to Government, dated Kurnool, 23rd January 1875, No. 11.

I HAVE the honor to give my answer to the six queries on which His Excellency the Governor in Council asked my opinion and report in their G. O., No. 1,396, of 23rd May last. These queries are the following:—

- 1st.—What expenditure will be needed to render the canal itself fully efficient in all respects for navigation purposes, so long as the water-supply in the river at Soonkasala is sufficient?
 - 2ndly.—During what period may it be expected that a sufficient depth of water can, without reservoirs, be maintained, taking the information furnished by the water-registers kept at Soonkasala, and the discharge of the canal at a minimum depth of, say, 4 feet as a guide?
 - 3rdly.—What outlay on floating plant will be required to enable the navigation to be started on a scale suitable to the present requirements of the country traversed by the canal?
 - 4thly.—What additional establishments will be necessary for the management of the navigation, and their estimated cost?
 - 5thly.—What tariff may it be considered desirable to introduce in the first instance, and what maximum rates for the transport of produce, goods, and materials will be proposed for entry in the Act required under the contract?
 - 6thly.—What are the estimated gross and net receipts which may be anticipated, so soon as the arrangements shall have been brought into fair working order?
2. In the first place, I beg to make a few explanatory remarks, which seem to me necessary, in order to show the character or basis of my reply. And, first, I will say that the views of Board of Directors coincide with those expressed in the paragraphs 1 and 2 of the above order, and are in short that to start the navigation of the canal, the Company must provide works and floating plant necessary for carrying traffic of all kinds, and an establishment to do the work of carrying.
3. The first question put by the Madras Government is as to the expenditure needed to render the canal itself fully efficient in all respects for navigation. I have, of course, estimated this in reference to the class of navigation now proposed, and not as if it were the full capability of the canal which requires to be developed. You have in your letter printed with G. O., No. 2,902, of 19th September 1867, pointed out that I then considered locks of 60 feet by 12 feet sufficient for the requirements of the country (until indeed the canal should be extended, and in that case I suggested that larger locks might be added); and you show that the opinion of the Company's Consulting Engineer in England, supported by the Board of Directors, was that the locks should be built 75 feet by 15 feet; but the Madras Government thought it best to adhere to the size of 120 by 20 feet sufficient to fully accommodate the large traffic which the canal was designed to carry between Bellary and the sea. Taking the calculation in your paragraph 9 in this letter, these three sizes of locks would have a practical capacity of passing respectively at least 2,000 tons, 3,000 tons, and 6,000 tons in a day. Again in your paragraph 10 you show that the Madras Railway, canal, was carrying about 900 tons a day, and that the Railway has not the means of carrying more than 1,500 tons a day. Thus even if the Railway, by increasing its plant and staff, could carry 1,800 tons a day, this does not leave more than about 800 tons a day available for the Company's traffic, considering the increase of the Railway traffic since the date of your letter, i.e., about one-eighth of the capacity of the existing canal.

4. The existing road traffic to and from the Railway and the Koonder valley, Mr. Hope estimates at 5,150 tons for the five Kurnool taluqs; and adding 1,000 tons for Prodatur, we get 6,000 tons to be carried in the nine months during which the canal will be usually open. This will

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be only 22½ tons a day, pretty equally divided each way to and from. It seems then desirable to provide at once for the daily running of cargo boats capable of carrying fully double the existing traffic, or about 24 tons a day each way, with provision for adding extra boats if there be a press of traffic, or for local purposes; but the buildings should be sufficient, and the carrying power should be capable of increase for the accommodation at short notice of a much larger traffic; and that, in view, not only of the general development of yearly traffic, but also of great press of traffic occasionally occurring during a few weeks as for goods traffic after harvest and for passengers traffic during festivals.

5. The result of my investigations into every branch of the expenditure and working of the proposed navigation is a strong opinion in favor of commencing with horse power only, and not steam. The speed of steam boats, the facility for concentrating a fleet of barges or a large number of passengers and parcels under the eye of one responsible officer in a steam tug or in a large passenger boat, the simplicity of night running, the independence of any tow-path, and the capability of carrying a large gang of lascars to jump out and work the heavy locks, not to add the dignified character of a steam service compared with one worked by horse power, all these considerations caused me to approach the subject with a wish to find that steam would answer economically. Messrs. Dodson and Wilks, the Divisional Engineers, who met me to discuss the matter finally at Christmas, no doubt also approached the subject with an expectation that all the risk and trouble of working a horse service could be advantageously avoided by the use of steam. In the course of three days wholly given to the subject, we worked out the whole calculations of tonnage, horse power, cost, maintenance, and working staff, as embodied in my present report, according to the views of those Engineers; and they gave their unanimous opinion in favor of horses and against steam being used until traffic justifies it. The considerations favorable to horse power include the following:—A regular service, capable of working present traffic (calculated, in fact, to suffice for double the present traffic), and capable of expansion to meet certain temporary expansions of traffic, could not be started with steam without an annual burden from the very commencement of £3,000 a year, more than if started with horses; and even then the boats for cargo and for passengers could only pass on alternate days, whereas by horse power a cargo boat and passenger boat would each pass each way daily. Again, with steam power only, it would be impracticable to develop local traffic of considerable promise, such as market days, high festivals, and harvest offer; also the effect of an accident, such as a barge sinking in a lock, or a lock giving way, &c., might cripple the steam service, would do so, unless the steamers should happen to be conveniently divided on each side of the stoppage, while it would hardly affect the tow-boat service. To this I may add that, while I differ from Messrs. Dodson and Wilks in their views as to the character of the steam crew, and do not think that a steam boat's machinery could be safely trusted to a native driver on Rupees 50 a month, and three stokers to be run day and night 172 miles and back without any control or assistance, yet even taking their view, as embodied below, the working of the steamers will depend inconveniently on the health of an English mechanic and on the freedom of the engines and boilers from accidents and other risks from which the tow-boats will be free.

6. In comparison with existing means of locomotion, I think the difference between steam and horses is of little moment, though it would be quite a different thing if the traffic were large enough to demand and fill a high class kind of steam boat. There would be no quicker way of getting to Cuddapah from any part of the canal district than the canal, none so comfortable for passengers, nor so safe for goods, and if, as I presume would be the case, the Madras Railway make a branch to the Cuddapah terminus, the above remark applies if Madras be written for Cuddapah.

* Estimate No. I.

7. The enclosed estimate,* page 1, shows the expenditure required to make the canal itself perfectly efficient, viz.:—

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Waste weirs to locks, where none exist	Rs. 31,100*
Telegraph on Seimen's iron posts along bank	68,500
Crossing the Pennair	92,400
Total ..	1,92,000

The object of these expenses is to secure punctuality in the daily working of the canal, and with that protection from numerous kinds of dangers, indiscipline, and fraud.

8. Sheet† No. 2 shows the expenditure required in permanent buildings, including, I think, sufficient sheds, docks, slips, &c., for putting together and repairing all boats, but not for

† Estimate No. II.

fitting and repairing steam machinery, as Rupees 1,38,000.

9. From this point the estimate divides into two alternatives: the first is for steam boats. To establish a steam fleet, capable of carrying daily—

15,480 ton miles goods regularly.

688 " parcels "

34,400 passenger miles "

with a reserve of one tug and one passenger steamer, three barges and twelve open dredge prints, would require—

For fleet	Rs. 1,75,000
" special buildings	41,800
Total ..	2,16,800

10. To establish a service of tow-boats, capable of carrying daily—

12,384 ton miles goods regularly.

688 " parcels "

34,400 passenger miles "

with a reserve of eight passenger boats, six barges, and ten open barges, would require—

For fleet	Rs. 1,33,600
" horses and stables	24,200
Total ..	1,57,800

In either case the frequency of the passenger boats could be doubled; but, if that were done in the case of steam, there would be no reserve, and in the case of tow-boats speed would be sacrificed.

In both cases it would be well to add a four horse-power barge for English passengers and an eight horse-power barge to tow a string of barges of native excursionists to the feasts.

11. Summary.—The total expense then of starting a boat service may be taken to be—

	Steam.	Tow-boats.
Expenditure on Canal		
Do. on Telegraph	Rs. 1,23,500	1,23,500
Do. on Buildings	68,500	68,500
Floating Plant	1,67,500	1,38,000
	2,19,000	1,45,700
Management, one-third	5,78,500	4,75,700
	1,92,800	1,58,600
Total ..	7,71,300	6,34,300
" ..	72,000	59,500
= £		

* Note.—In this letter every item includes its 10 per cent. contingencies.

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And the entire annual cost of supervision and working would be about—

	Rs.
For steam	101,500
For horses	73,500
Difference ..	28,000

12. I propose to work the canal as follows:—

Passenger boats—I., Passengers.—The passenger boat will have its floor 2 feet below gunwale, and will consist of fore-castle 10 feet by 9 feet extreme dimensions; a first-class cabin 12 feet by 9 feet, with roof 5 feet high above gunwale; the bridge 4½ feet by 9 feet, with roof 7 feet high, under which will be on each side of the boat a gangway on the principle of a hinged draw-bridge. Over one or other of these gangways all passengers must land. Next will come a space 11 feet by 9 feet, with roof 3 feet high above gunwale, having 18 inches allowed as a central gangway, and the right side open (with shelves) for passengers' luggage, and the left side half fenced off and half closed and locked for the parcels in charge of guard; then comes the second-class passengers' cabin 12 feet by 9 feet and 3 feet high, and a space 7½ feet by 9 feet at the stern. Four privies, one for each sex, will be placed fore and aft right and left, and will support awnings over the fore-castle and stern. There will be a footway a foot or 15 inches wide all round the boat. The authorized way for a passenger to enter the boat will be the gangway; but, if he prefer it, as he no doubt will, he must be allowed to get on as he likes. When you have once got him, you can impose your laws upon him. To leave the boat except by the gangway must be forbidden by a bye-law, and even by the gangway it will be only allowed at stations. A passenger on entering by the gangway will be provided with a ticket by the Guard, and should be bound by the bye-law to take a ticket before he sit down or stand still if he enter elsewhere. A notice should be clearly posted that any person found seated or standing without a ticket will be charged from the last first-class station. The Serang should be empowered to detect such persons, and should, I think, receive as a reward the whole of the fare from the last first-class station to the point of detection. Travelling Inspectors also may be similarly empowered and rewarded. The tickets will be much like an old coaching ticket. They and their counter-foils will be consecutively numbered and boldly printed with the name and mile of the destination. The stamp will show the mile in which they were issued, with the date and guard, on both the ticket and counterfoil, in a square stamp. There will be space on the ticket for the subsequent round stamps of the first-class Station Masters (blue) and Inspectors (red). The former will stamp every passenger's ticket who passes his station, and who will thus have to show his ticket about every six hours. The latter, say two in number, will of course examine tickets at unexpected intervals, or, if that be found unnecessary, may merely count heads. Instead of using Inspectors, it may suffice to order some second-class Station Master by telegraph to examine and stamp all the tickets in a boat. The Station Master, or, at third-class stations, the Guard, will examine at the gangway the tickets of all who land, as they step ashore, and will collect such as are for his own station. He will send the tickets collected to Kurnool by the next boat post.

The forms necessary will be—

- (1.) A set of fares for every number of miles from 1 to 172.
- (2.) Sets of books of first and second class tickets numbered consecutively, say to 10,000, for each station to, each book containing 100. At the end of the journey the Guard's books and cash will all be delivered, and a receipt given him for the cash and tickets; and he will get at starting a set from which all counterfoil stamps have been removed, and will sign for them in a book.
- (3.) The form of receipt above.
- (4.) A form of book for each Guard for totalling in the office the numbers and amount of the stamps of tickets of each Guard given to each station, and so checking his balance, with a column for the numbers of those tickets afterwards received from each Station Master, and a reference to any inquiries in case of informality in the latter.

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(5.) A book form for entering the daily receipts and weekly totals for goods, passengers, parcels, cattle, &c.

13. *II., Parcels.*—These may be taken by Station Masters or Guards only, who will give a receipt for them. Each Guard and Station Master will have a transfer book in which he will prepare, in duplicate, a receipt for the transferee to sign when he transfers parcels to the charge of a Guard or Station Master, and a delivery book in which he takes the signatures of those to whom he delivers their parcels in person. The receiver of a parcel fixes on it a label duly filled up with weight, rate, &c.

14. *Goods.*—In some cases the goods barge may be in charge of a sort of Guard authorized to receive and deliver goods as above with parcels. In other cases the goods will pass from Station Master to Station Master, the bargee being simply responsible for their safe carriage. In other cases the barge and a bargee will be hired out at so much the trip (as for barging manure, &c.,) and the hirer will be allowed to load it with the specified material and within the proper load line and tow it as he likes with his own cattle.

15. I propose that, for traffic passing over the canal and railway, the Madras Railway and the canal guarantee and collect sums due on parcels and goods, unless it prove convenient to appoint a canal Clerk at Madras to deliver the goods sent from the canal to the Presidency town. Passengers should re-book at the junction.

16. Having thus answered the queries Nos. 1, 3, and 4, I refer for the answer to query 2, to the accompanying diagram* showing every day in every year since 1862 in which there was enough water flowing down the Toombudra at Kurnool to maintain (1) above 4 feet 6 inches in the canal enough for a steam fleet, (2) above 3 feet 6 inches enough for a horse fleet.

17. *The 5th query.*—The maximum rates to be inserted in the Act may very well be the same as those for the Railway; and, indeed, no other plan seems politic if the navigation be to be let to any unguaranteed individual or Company. Some words, however, are necessary about the tariff it may be desirable at first to introduce; it should be such as to secure existing traffic, and it should be levied in such a way as to encourage development of traffic.

18. I enclose a sheet of Railway goods tariff,† such as is posted in the Railway Stations.

† Appendix K.

I ask you to suppose a village blacksmith anxious to send some ploughshares to a neighbouring village, or even the Head Reddi and Magistrate of a village wishing to send half a ton of rice to his relation, a Reddi, 20 or 30 miles off, in order to get cholam or korra in return. He enters the station, bringing with him a fellow villager able to read Telugu. It seems to me clear that, be the sheet I enclose posted up in Telugu or in English, the two will be quite unable to make out the fare chargeable on the goods they wish to send. It is only to be feared that a very ordinary process will follow with such a Goods Clerk or Station Master as the Company could obtain. The men would be told to wait outside till the Clerk was not so busy. There, after long waiting, they would find a good-natured subordinate or porter, who would tell them that they were fortunate in meeting him, and that he could get the information they desired, but that they must pay down a rupee, and so on; and when finally told the fare, they could not verify it, nor prevent extortion at the other end of the journey. Even an Englishman cannot be certain what he should pay on fabrics and stores, unless he be in the trade. In order to simplify the tariff, I have reduced the six Railway classes into three (see enclosed list†) and have called them low, ordinary,

† Appendix J.

and high class goods. These lists I propose as a basis for the tariff, and suggest that the fares should be 1 Anna, 1½ Annas, and 2½ Annas a ton a mile, cotton in bales of any kind being put into the "ordinary" class. For the carriage of low-class goods I suggest that boats be also let out in charge of a bargee, the hirer to do his own towing, at a charge of 8 Pies a ton a mile. The only unit of weight tolerably known throughout the district is the English pound; the Railway seer is quite unknown, and it would be convenient enough to adopt that unit: 100, 1,000, and 100,000, being all monosyllabic words, would easily take the place of our cwt. and ton. At the same time

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a ton conveys an idea to a native readily, as being two good bandy-loads, and might soon become pretty well understood.

19. *Query 6.*—Appended is a sheet* showing the gross receipts to be expected, should the canal succeed in attracting all the export and import traffic, and adopting Mr. Hope's estimate

* Estimate VII.

of the extent of that traffic, with 3,000 tons of timber and bamboos added, and an allowance made for the taluq of Prodatur in Cuddapah District. The Railway fares are applied, and the distances are estimated from a general knowledge of the locality of chief production and consumption. With a reasonable amount added for passengers, the estimate amounts to Rupees 1,39,000 a year; and, while this will be diminished by the loss of some of the export and import traffic, the loss will probably be more than compensated by the local, internal traffic, if carefully nursed.

20. The passenger fares will need to be low, except for special accommodation, for which full Railway fares may be charged. A respectable native now pays 12 Annas for a lift by cart from Kurnool to Gooty; and he then pays Rupees 1-8-0 by slow train to Cuddapah; and he does the distance in about 2½ days. I think that two classes at 3 Pies and 2 Pies a mile, respectively, would pay the best on the canal. It must be remembered that the canal cannot compete with the Railway in speed for passenger traffic, at least with such boats as are at present proposed, nor until we can fill fast boats at high fares. In goods traffic it is otherwise. Thus recently some goods of Mr. Crawford's were delivered to the Railway at Bombay on the 19th of December last, and reached Gooty on the 30th, giving a speed of 1·8 miles an hour. When Messrs. Crawford and Wilks arrived from England, their goods were got from Bombay by dint of telegraphing and writing at a rate of 2½ miles an hour. Goods from Madras to Gooty have travelled, when the line was in full working order, as slowly as seven furlongs an hour. With these speeds the canal can compete at once.

21. It is essential to success that the Cuddapah terminus of the canal be connected with the Railway. No doubt farmers would prefer sending their produce by their own carts and people in the dry season, and delivering them at Cuddapah to a Soucar or to the Agent of a Madras house rather than send them by canal, if they would have to be present to receive their goods again at our Cuddapah terminus, and superintend their transfer five miles to the Cuddapah Railway Station, subject to all the extortion and risks of strange drivers. It seems out of the question for the Company to take the risk and responsibility of such a transfer themselves, to say nothing of the great cost. I have estimated for good water and fire-proof goods stations at Kurnool and Cuddapah; and at the latter place have provided for hydraulic apparatus, the working of which will cost nothing but wear and tear, in order that goods may be placed on the Railway trucks with a rapidity and simplicity sufficient to exclude fraud.

22. In the event of the Company letting out the use of the canal to another Company or to a firm, it will be necessary to draw a line between their mutual outlay and expenses. The cost to the Company of the existing navigation is estimated by Colonel Rundall in his report of the 18th March 1873 as Rupees 36,80,584. One-fourth of this is Rupees 9,20,000, which I consider the full value of the present navigation undeveloped as it is, and considering the slowness with which cultivation is extending under the canal. The proposed expenditure in lock weirs is desirable, in order to preserve the normal water level between locks, without necessitating the engagement of lock tindals competent to manage the rather delicate operation of maintaining the normal water level by means of the lock valves. They are essential if the canal is to be kept open in spite of accidents in the locks. With the weirs, in case a barge sank in a lock, it would only be necessary to make a ring bund round the lower end of the lock, and then the chamber could be bailed out and the boat floated, without stopping the traffic of boats up to the lock. Without weirs the whole reach below the lock would, in such a case, have to be allowed to run dry; and, if the accident were a serious one to the lock itself, probably many reaches would become unnavigable. Moreover, in every case these lock weirs would be very useful to supply irrigation. The Pennair crossing is almost essential for navigation; and at least without it much annual expense in maintaining a passage would fall on the Irrigation Company. The telegraph is part of the original design of

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the canal, but its chief use will be for the navigation. The dredgers will be used for removal of silt in the entrances of the canal—a work absolutely necessary to be done by some means for the irrigation and also for maintaining the Pennair crossing. It seems to me that it would be fair to charge the lessee of the navigation as follows:—

For the use of the canal between Kurnool and Cuddapah 5 per cent. on Rupees 9,20,000	RS. 46,000
Deduct for expenditure upon the Main Canal 5 per cent. on Rupees 1,23,500 (estimated)	6,165
Net rent (say) ...	40,000

The Company to maintain the navigation, and to supply such wire, material, and instruments as they already have in stock for the telegraph. The lessee to work the locks (thus releasing the bankers now in charge of them), or at least to pay the salaries of the three lock-keepers; to work the telegraph and convey any of the Company's messages free; to let out the dredgers when desired by the Company, the Company paying for the working and for their use; and in return to be allowed the use of the Kurnool and other workshops and tools of the Company, paying similarly for their use.

23. In order to provide for an equal distribution of the profits due to the development of the traffic, it seems fair that the Company should divide profits made in excess of 10 per cent.

24. In conclusion I desire to state clearly that in recommending a commencement with horse power, I am not anticipating a permanent paucity of traffic on the present canal. By means of horse power the traffic can be most advantageously picked up as it exists, that is, only one advantage. By means of horse power an immense traffic can be carried; and, though steamers will be introduced so soon as the demand of a few particular classes of traffic call for them and can maintain the establishment necessary to work them, horse power will always do an increasing amount of the canal traffic; and as in England and America, places where horses and food are dear and machinery and fuel cheap, horses will never cease to work on the canal and to repay the initial outlay upon them.

P.S.—On the cost of iron hulls and engines.

The above estimates for iron hulls and engines are in accordance with Mr. Dodson's letter of 1st January 1873 to Mr. Westwood, giving the prices delivered in Madras from Mr. Charles Turner, of 12, Fourposts Hill, Southampton; but for dredges the letter of Colonel J. C. Anderson, R.E., to the Secretary of Government, No. 83, of 28th October 1868, has been followed. Returns you have been so good as to show me give the actual experience of the Godavery boats. To agree with them, estimate No. III. should be more than trebled, and No. IV. doubled, and my summary given in my paragraph 11 would become—

	Steam.	Horses.
Expenditure on canal, telegraph, buildings, as before ... Rs.	3,59,500	3,30,000
Floating Plant	6,60,000	2,91,400
Management, one-third Total ..	10,19,500	6,21,400
Grand Total ..	3,39,800	2,07,100
Grand Total ..	13,59,300	8,28,500
= £	127,500	77,700

I cannot compare these estimates positively, not knowing the comparative dimensions, thickness, actual horse power, nor whether the Godavery boats were sent out in sections, as the Company's would be, to be riveted or screwed together on the canal bank. The experience gained

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on the Godavery, however, confirms me in the opinion that that kind of navigation is best which can be brought within £60,000 or £65,000 certainly without crippling the regular service proposed, and probably without curtailing the accommodation nor style of any one of the buildings.

MADRAS,
4th February 1875.

(Signed) J. H. LATHAM.

I.

Expenditure required to make the Canal itself navigable.

Particulars.	Amount.	Total.
	RS.	RS.
I.—MAIN CANAL (desirable expenditure.)		
Waste weirs for locks not yet provided with them with necessary culverts and drops	28,273	
Crossing the Pennair	84,000	
Telegraph	62,300	1,74,573
Contingencies at about 10 per cent ...		17,427
Grand Total ...		1,92,000

II.

Expenditure required to make the Canal itself navigable.—(Concluded.)

No.	Particulars.	Amount.	Total.
		RS.	RS.
II.—BUILDINGS (necessary.)			
<i>Passenger and Parcels Stations.</i>			
7	First class with master's house attached	11,106	
10	Second class with master's house detached	7,706	
20	Third class	10,000	
<i>Goods Stations.</i>			
2	First class	69,735	
4	Second class	9,216	
	Bollards and Mooring dolphins to wharves and locks ...	6,500	1,14,263
	If steam power be used, there should be added to the above Fitting Shop and stock		38,000
	Contingencies at about 10 per cent ...		1,52,263
	Total ...		15,237
			1,67,500
	If horse power be used, add to the same		1,14,263
22	Post-houses		10,983
	Contingencies at about 10 per cent ...		1,25,246
	Total ...		12,754
			1,38,000
	Grand Total for steam power, Rs. 3,59,500 Do. for horse power „ 3,30,000		

NOTE.—In either case the Kurnool Workshops sanctioned at Rupees 30,612, of which Rupees 15,159 had been spent up to end of 1874, need to be completed.

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III.

Second Expenditure required on Floating Plant.

No.	Particulars.	Rate.	Amount.
I.—FOR STEAM POWER.			
		rs.	rs.
4	20 horse-power tug steamers 60 feet by 12 feet by 4 feet draft to ton 3, 30 ton barges, 6 miles an hour, at ...	10,000	40,000
12	30 ton barges (net load) 50 feet by 9 feet by 4 feet draft, at ...	2,250	27,000
2	10 horse-power dredgers at £3,000 per horse-power...	60,000	
12	30 tons punts (strong) for do. at ...	2,250	27,000
3	20 horse-power passenger boats 90 feet by 15 feet by 1½ feet draft to carry 200 passengers and 8 tons of goods 8½ miles an hour (37½ tons displacement), at ...	15,000	45,000
	Contingencies at about 10 per cent...		1,99,000
			20,000
	Total ...		2,19,000

NOTE.—The above would admit of a train of barges of 90 tons total burden passing each way every two days, if only, and there seems no reason against it, the tug were reduced to 9 feet width, leaving her 48 tons displacement still, thus :—

Up.	Down.
172 miles, at 5 miles per hour = 34.4 hours.	172 miles, at 7 miles per hour = 24.5 hours.
48 lockages, at 15 minutes = 12.0 "	48 lockages, at 15 minutes = 12.0 "
37 stations, at 10 " = 6.0 "	37 stations, at 10 " = 6.0 "
5 coaling stations, at 10½ minutes = 1.0 "	5 coaling stations, at 10½ minutes = 1.0 "
Total, 2 days 5½ hours = 53½ "	Total, 1 day 9½ hours = 43½ "

Also of a passenger boat capable of carrying 200 passengers and 4 tons of freight passing each way every second day, thus :—

Up.	Down.
172 miles, at 7 miles per hour = 24.5 hours.	172 miles, at 9 miles per hour = 19.1 hours.
48 lockages, at 5 minutes = 4.0 "	48 lockages, at 5 minutes = 4.0 "
37 stations, at 5 " = 3.0 "	37 stations, at 5 " = 3.0 "
Coaling ... " = 1.0 "	Coaling ... " = 1.0 "
Total, 1 day 8½ hours = 32.5 "	Total, 1 day 3 hours = 27.1 "

In each case it being possible to continue the service even while one steamer is laid up.

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IV.

Second Expenditure required on Floating Plant.—(Concluded.)

No.	Particulars.	Rate.	Amount.
		rs.	rs.
II.—FOR HORSE POWER.			
20	Covered cargo barges 57 feet by 9 feet by 3 feet 4½ inches draft, displacement 31½ tons or 24 tons burden, to run 2½ miles an hour with 1 horse, 4 hours at a stretch, at ...	2,250	45,000
10	Do. open with bag and spoon crane, at ...	2,250	22,500
12	Passenger boats 54 feet by 9 feet by 1½ feet draft, 13 tons displacement, 7 tons burden, to run 3½ miles an hour with ½ a horse or 4½ miles with 1 horse, at ...	4,500	54,000
110	Ponies and harness, at ...	100	11,000
	Contingencies at about 10 per cent. ...		1,32,500
	Total ...		13,500
			1,46,000

NOTE.—The above would admit of two loaded cargo boats going down past each station each day and one loaded and one empty going up, thus :—

Up.	Down.
172 miles, at 2 miles per hour = 86 hours.	172 miles, at 4 miles per hour = 43 hours.
48 lockages, at 10 minutes = 8 "	48 lockages, at 10 minutes = 8 "
37 stations, at 5 " = 3 "	37 stations, at 5 " = 3 "
Total, 4 days 1 hour = 97 "	Total, 2 days 6 hours = 54 "

Requiring 14 barges out of the 20. Also a passenger's barge able to take 100 passengers and 2 tons of freight once or twice each way according to the pace adopted, thus :—

Up.	Down.
Slow Pace.	
172 miles, at 3½ miles per hour = 49 hours.	172 miles, at 4½ miles per hour = 38½ hours.
48 lockages, at 5 minutes = 4 "	48 lockages, at 5 minutes = 4 "
37 stations, at 5 " = 3 "	37 stations, at 5 " = 3 "
Total, 2 days 8 hours = 56 "	Total, 1 day 21½ hours = 45½ "
Quick Pace, with 2 Ponies.	
172 miles, at 4 miles per hour = 43 hours.	172 miles, at 5½ miles per hour = 31½ hours.
48 lockages, at 5 minutes = 4 "	48 lockages, at 5 minutes = 4 "
37 stations, at 5 " = 3 "	37 stations, at 5 " = 3 "
Total, 2 days 2 hours = 50 "	Total, 1 day 14½ hours = 38½ "

In the former case ten boats are kept running, in the latter four boats.

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ANNUAL EXPENDITURE

On Establishment (including Workshops, Fuel, Fodder, and all Working Expenses) required to work the
Navigation.

STEAM POWER.

No.	Particulars.	Rate.	Amount.	Total per Annum.
			RS. A. P.	RS. A. P.
2	Engineer's time in charge of traffic and shops at Kurnool ...	Rs. 750	500 0 0	
1	Assistant do. at Cuddapah ...	" 400	400 0 0	
1	English Machinist ...	" 200	200 0 0	
2	Workshop Staff, including share of Store-keeper ...	" 200	400 0 0	
1	Kurnool Office Staff ...	See details.	262 0 0	
1	Cuddapah ...	Do.	40 0 0	
2	1st-class Goods Master Rs. 50, Assistant Rs. 10, and 4 men at Rs. 6 ...		168 0 0	
4	2nd-class do. Rs. 35, Tindal Rs. 8, and 2 men at Rs. 6 ...		220 0 0	
2	1st-class Station Master Rs. 25, and 2 men at Rs. 6 ...		74 0 0	
5	Do. 1 man where Station Master already included at Rs. 6 ...		30 0 0	
8	2nd-class Station Masters ...	Rs. 15	120 0 0	
2	Crane Gomastahs ...	" 25	50 0 0	
40	Sets Lock Lascars, 2 men each, at Rs. 6 ...	" 12	480 0 0	
3	Steam Tug Crews ...	" 200	1,000 0 0	
2	Steam Boat do. ...	See details.		
9	Barge Crews of 2 men each at Rs. 6½ ...	Rs. 13	117 0 0	
	Contingencies at 10 per cent. ...		4,061 0 0	
			406 0 0	
			4,467 × 12	53,604 0 0
	Annual.			
Tons.	Fuel ...	Rs. 6	18,000 0 0	
3,000	Oil and waste ...		2,250 0 0	
30,000	Repairs and renewals, shops and stock for hulls ...	5 per cent.	1,500 0 0	
38,000	Do. do. for engines ...	Do.	1,900 0 0	
85,000	Steam Fleet, omitting dredgers ...	10 per cent.	5,400 0 0	
54,000	Barges ...	2½ do.	2,856 0 0	
114,263	Buildings ...		1,000 0 0	
	Stationery ...			
	Contingencies at 10 per cent. ...		43,531 0 0	
			4,353 0 0	
	Grand Total ...			101,488 0 0

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VI.
ANNUAL EXPENDITURE.
HORSE POWER.

No.	Particulars.	Rate.	Amount.	Total per Annum.
			RS. A. P.	RS. A. P.
2	Engineer's time in charge of traffic and shops at Kurnool ...	Rs. 750	500 0 0	
1	Assistant do. at Cuddapah ...	" 400	400 0 0	
1	Workshop Staff do. ...	" 200	200 0 0	
	Kurnool Office Staff ...	See details.	262 0 0	
	Cuddapah do. ...	do.	40 0 0	
2	1st-class Goods Masters at Rupees 50, Assistant Rupees 10, and 4 men at Rupees 6 ...		168 0 0	
4	2nd-class do. at Rupees 35, Tindal at Rupees 8, and 2 men at Rupees 6 ...		220 0 0	
2	1st-class Station Master Rupees 25, and 2 men at Rupees 6 ...		74 0 0	
5	Do. 1 man where Station Master already included at Rupees 6 ...	Rs. 6	30 0 0	
8	2nd-class Station Master at Rupees 15. ...	" 15	120 0 0	
2	Crane Gomastahs at Rupees 25 ...	" 25	50 0 0	
40	Sets Lock Lascars, 2 men each lock, at Rupees 6 ...	" 12	480 0 0	
22	Post House Staff ...	" 22½	495 0 0	
		See details.		
4	Crews for Passenger Boats ...	Rs. 64	256 0 0	
		See detail.		
7	Crews for Cargo Boats ...	Rs. 14	98 0 0	
		See details.		
			3,393 0 0	
			339 0 0	
	Contingencies at 10 per cent. ...		3,732 × 12	44,784 0 0
	Annual.			
110	Food for 110 Ponies at 3 Annas per day a pony ...		7,528 0 0	
11,000	Renewals and Shoeing Ponies ...	1-6th	1,830 0 0	
	Repairs and Renewals of			
30,000	Shops and stock for hulls ...	5 per cent.	1,500 0 0	
1,21,500	Fleet omitting dredges ...	10 "	12,150 0 0	
1,25,246	Buildings ...	2½ "	3,131 0 0	
			26,139 0 0	
			2,613 0 0	
	Contingencies at 10 per cent. ...			28,752 0 0
	Grand Total ...			73,536 0 0

VII.

Estimate of Gross and Net Receipts anticipated from existing Traffic (based on Mr. Hope's Estimate for the Kurnool District) at Railway Rates.

Quantity.	Particulars.	Miles.	Rate.	Amount.
			RS. A. P.	RS. A. P.
900	Tons Cotton carried through ...	172	0 2 0	19,350 0 0
900	" " " half... ...	86	0 2 0	9,675 0 0
180	" Indigo " half... ...	86	0 2 0	1,935 0 0
400	" Leather " all ...	172	0 1 2	5,016 10 8

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Estimate of Gross and Net Receipts anticipated from existing Traffic.—(Concluded).

Quantity.	Particulars.	Miles.	Rate.	Amount.
			RS. A. P.	RS. A. P.
3,000	Tons Salt carried half	86	0 1 0	16,125 0 0
360	" Iron " " " " " " " " " " " "	86	0 1 0	1,935 0 0
120	" Iron, manufactured... ..	86	0 2 0	1,290 0 0
240	" Cloth " " half " " " " " " " "	86	0 1 6	1,935 0 0
3,000	" Timber 80 miles " " " " " " " "	80	0 1 0	15,000 0 0
				72,261 10 8
	Add for demurrage, ware-house rent, &c., 10 per cent.			7,226 5 4
				79,488 0 0
	Add for passengers 75 per cent. of the above			59,616 0 0
	Total			1,39,104 0 0

APPENDICES.

A.

Detail Estimate of Expenditure to make the Canal itself efficient for Navigation.

Particulars.	Quantity.	Rate.	Amount.	Total.
		RS. A. P.	RS. A. P.	RS. A. P.
<i>6th Section.</i>				
Waste weir at lock No. 2—				
Rubble masonry in walls, &c. ...	C. yds. 122	4 0 0	488 0 0	
Coping to crest 4 inches thick... ..	Feet. 188	0 4 0	47 0 0	
Stone on edge for water cushions ...	C. yds. 16	4 0 0	64 0 0	
Excavation of banks and foundations... ..	" 545	C. yds. 10	54 8 0	
Channel to carry water below the lock.	" 924	Do. ...	92 8 0	
Masonry drop into canal—				
Rubble masonry in walls, &c. ...	C. yds. 14	4 0 0	56 0 0	
Archwork in back " " " " " " " "	" 10	6 8 0	65 0 0	
Stone on edge " " " " " " " "	" 1½	4 0 0	6 0 0	
Excavations for foundations	" 64	C. yds. 8	8 0 0	
				881 0 0
Waste weirs at locks Nos. 2-A, 3, 4, 5, 6, 7, 8, 9, 9-A, 10, 11, and 12, same as above.	No. 12	881 0 0	10,572 0 0	10,572 0 0
<i>8th Section.</i>				
Waste weirs at locks Nos. 10, 10-A, 11, 12, 14, 15, and 16, same as above	7	881 0 0	6,167 0 0	6,167 0 0
<i>9th Section.</i>				
Waste weirs at locks Nos. 1 to 9	9	881 0 0	7,929 0 0	7,929 0 0
<i>6th Section.</i>				
Culvert over the waste channels at lock No. 2—				
Rubble masonry	C. yds. 28	4 0 0	112 0 0	
Archwork (2 feet of 6 feet span)	" 11	6 8 0	71 8 0	
Stone on edge under do. " " " " " " " "	" 8	4 0 0	32 0 0	
Foundations	" 115	C. yds. 10	11 8 0	
				227 0 0
Culvert over the waste channels at locks Nos. 4, 6, 7, 8, 9-A, 11, (6th Section) 10-A, (8th Section) 1, 4, 6, and 8, (9th Section) 11	11	227 0 0	2,497 0 0	2,497 0 0
Total				28,273 0 0

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B.

Detail Estimate for Telegraph.

Particulars.	Quantity.	Rate.	Amount.	Total.
		£ s. d.	RS. A. P.	RS. A. P.
Siemen's Brother's Telegraph per mile packed and delivered on board in London.	No.			
Patent iron posts 16 feet above ground ...	20	1 0 6	20 10 0	
Stretching insulators galvanized	2	0 3 6	0 7 0	
Intermediate do. do. " " " " " " " "	18	0 1 6	1 7 0	
			22 4 0	
			237 0 0	
or Rupees				
Cost of posts and insulators per mile on board in England			237 0 0	
Add—				
Freight, duty, and passage to site			90 0 0	
Share of instruments, tools, and batteries... ..			15 0 0	
Erecting " " " " " " " "			14 0 0	
			356 0 0	
	Miles.	RS.		
Telegraph on Siemen's iron posts... ..	175	356		62,300 0 0
Grand Total				62,300 0 0

NOTE.—Six sets pair twisting levers, winch and devil's claws, cost about £10 to be added.

C.

PLANS 799, 802, 803, 805.

Detail Estimate of Cost of First-class Goods Station.

Particulars of Work.	KURNOOL.				CUDDAPAH.		
	Unit.	Quantity.	Rate.	Amount.	Quantity.	Rate.	Amount.
			RS.	RS.		RS.	RS.
Remove bank... ..	C. yds.	6,750	1 10 8	675-00	4,400	1 10 8	440-00
Excavation	"	7,488	2 1 4	1,248-00	6,600	2 1 4	1,100-00
Rubble masonry... ..	"	3,647		8,205-75	3,647		14,588-00
Archwork (centering fixed)	"	1,482-3	5	7,411-50	1,482-3	6 1 2	9,634-95
Centering	"			3,000-00			3,000-00
Paved platform	Sqrs.	24-3	5 1 8	121-50	24-3	6 1 2	145-80
Curb to footways... ..	Yd. run.	106	1 1 8	13-25	106	1 1 8	13-25
Doors and windows	Sqr. ft.	879	1	879-00	879	1	879-00
Cut stone	C. yds.	29-58	8	236-64	29-58	8	236-64
Concrete	"	726	2 1 8	1,452-00	726	2 1 8	1,815-00
Plinth or cornice	L. ft.	1,760	3 1 4	220-00	1,760	3 1 4	220-00
Plastering for dome	Sqrs.	121-00	4 1 2	363-00	121	4 1 2	484-00
Teak	C. ft.	100-50	4 1 2	452-25	100-50	3 1 2	376-87
Hydraulic cranes, &c.	Sqrs.	7-56	1 1 2	11-34	7-56	1 1 2	11-34
Total				24,289-23			45,444-85

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PLAN 800.

D.

Detail Estimate of Cost of Second-class Goods Station.

Particulars of Work.	JUTOOR TO MILE 185.			
	Unit.	Quantity.	Rate.	Amount.
Rubble masonry	C. yard.	356.55	RS. 3 1/2	RS. 1,247.92
Archwork	Do.	3.55	6	21.30
Centering to do.	Sqrs.	29.25	3	87.75
Roofing with bamboos and mud	R. feet.	3.10	1/6	19.37
Coping	C. feet.	94.62	4 1/2	425.79
Teak	lbs.	251.50	1/4	62.87
Double wrought iron 1 inch diameter	No.	1	..	100
Double gate, with small door opening out for export shed	"	1	..	90
Do. do. for import do.	"	1	..	85
Do. opening out	"	3	48	144
Do. do.	"	..	..	20
Excavating foundation, &c.	"	..	..	..
Total	..	..	..	2,304.00

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PLAN 798.

E.

Detail Estimate of Cost of First-class Passenger and Parcels Station.

Quantity.	Unit.	MILE 16 TO 18.		MILE 18 TO 56.		MILE 56 TO PARA-MATUR.		JUTOOR TO MILE 185.		MILE 185 TO END.	
		Rate.	Amount.	Rate.	Amount.	Rate.	Amount.	Rate.	Amount.	Rate.	Amount.
195	C. yard.	RS. 2 1/2	438.75	RS. 2 1/2	487.50	RS. 3 1/2	633.75	RS. 3 1/2	682.50	RS. 4	780.00
3.9	"	5	19.50	5	19.50	6	23.40	6	23.40	6 1/2	25.35
12.25	Square	3	36.75	3	36.75	3	36.75	3	36.75	4	49.00
26.80	"	2 1/2	60.30	2 1/2	67.00	3	80.40	3	80.40	4	80.40
184	R. feet.	1 1/2	11.50	1 1/2	11.50	1 1/2	11.50	1 1/2	11.50	1 1/2	11.50
13	L. yard	1 1/2	1.08	1 1/2	1.08	1 1/2	3.25	1 1/2	3.25	1 1/2	3.25
312	Sq. feet.	1	312.00	1	312.00	1	312.00	1	312.00	1	312.00
537	C. feet.	4 1/2	228.22	4 1/2	241.65	5	268.50	4 1/2	241.65	3 1/2	201.37
1	Pair.	40	40.00	40	40.00	38	40.00	40	40.00	38	40.00
2	"	38	76.00	38	76.00	38	76.00	38	76.00	38	76.00
1	"	13	13.00	13	13.00	13	13.00	13	13.00	13	13.00
1	"	16	16.00	16	16.00	16	16.00	16	16.00	16	16.00
1	"	15	15.00	15	15.00	15	15.00	15	15.00	15	15.00
13 1/2	C. yards	1 1/2	3.37	1 1/2	3.37	1 1/2	3.37	1 1/2	3.37	1 1/2	3.37
1	No.	..	15.00	..	15.00	..	15.00	..	15.00	..	15.00
1	"	..	35.00	..	35.00	..	35.00	..	35.00	..	35.00
1	"	..	0.10	..	0.10	..	0.10	..	0.10	..	0.10
1	C. yard.	..	7.58	..	9.42	..	10.95	..	11.80	..	13.48
3.37	No.	..	1.00	..	1.00	..	2.00	..	2.00	..	2.00
4	"	..	2.00	..	2.00	..	2.00	..	2.00	..	2.00
2	Square.	..	8.50	..	8.50	..	8.50	..	8.50	..	10.62
4.25	No.	..	1.00	..	1.00	..	1.00	..	1.00	..	1.00
4	C. feet.	..	0.50	..	0.50	..	0.50	..	0.50	..	0.50
4	"	..	19.68	..	20.81	..	23.12	..	20.81	..	17.84
4 1/2	No.	..	1.00	..	1.00	..	1.00	..	1.00	..	1.00
4	"	..	..	..	..	..	..	..	..	..	..
4	"	..	..	..	..	..	..	..	..	..	..
Total	..	..	1,362.83	..	1,434.68	..	1,631.09	..	1,651.53	..	1,723.28

Detail Estimate of Cost of Second-class Passenger and Parcels Station.

Quantity.	Unit.	Particulars of Work.	MILE 16 TO 18.		MILE 18 TO 56.		MILE 56 TO PARA-MATUR.		JUTTOR TO MILE 185.		MILE 185 TO END.	
			Rate.	Amount.	Rate.	Amount.	Rate.	Amount.	Rate.	Amount.	Rate.	Amount.
43.	C. yards.	Excavating foundation	RS. $\frac{1}{16}$	4.30	RS. $\frac{1}{16}$	4.30	RS. $\frac{1}{16}$	4.30	RS. $\frac{1}{16}$	4.30	RS. $\frac{1}{16}$	4.30
70.	"	Rubble masonry	$2\frac{1}{2}$	157.50	$2\frac{1}{2}$	175.00	$3\frac{1}{2}$	227.50	$3\frac{1}{2}$	245.00	4	280.00
0.75	"	Archwork	5	3.75	5	3.75	6	4.50	6	4.50	$6\frac{1}{2}$	4.87
3.00	"	Dry stone walls for pials	$\frac{1}{2}$	1.50	$\frac{1}{2}$	2.25	1	3.00	1	3.00	$1\frac{1}{2}$	4.50
1.60	"	Filling to do.	$\frac{1}{2}$	0.40	$\frac{1}{2}$	0.40	$\frac{1}{2}$	0.40	$\frac{1}{2}$	0.40	$\frac{1}{2}$	0.40
98.	"	Filling red gravel	$\frac{1}{2}$	11.25	$\frac{1}{2}$	11.25	$\frac{1}{2}$	11.25	$\frac{1}{2}$	11.25	$\frac{1}{2}$	11.25
1.60	"	Concrete under flags to room	2	3.20	2	3.20	2	3.20	2	3.20	$2\frac{1}{2}$	3.20
0.54	"	Flags	4	2.16	$4\frac{1}{2}$	2.43	5	2.70	5	2.70	6	3.24
26.73	C. feet.	Teak	$4\frac{1}{2}$	113.60	$4\frac{1}{2}$	120.29	5	133.65	$4\frac{1}{2}$	120.29	$3\frac{1}{2}$	100.24
35.00	Square.	Mud roof	3	105.00	3	105.00	3	105.00	3	105.00	4	140.00
1	No.	Door	12	12.00	...	12.00	...	12.00	...	12.00	...	12.00
1	"	Window	4	4.00	...	4.00	...	4.00	...	4.00	...	4.00
1	"	Counter	3	3.00	...	3.00	...	3.00	...	3.00	...	3.00
		Total	...	421.66	...	446.87	...	514.50	...	518.64	...	571.00

Overseer's House to be used for Second-class Station Master's House.

(SAME PLAN AS FOR OVERSEER'S HOUSE.)

Quantity.	Unit.	Particulars of Work.	MILE 16 TO 18.		MILE 18 TO 56.		MILE 56 TO PARA-MATUR.		JUTTOR TO MILE 185.		MILE 185 TO END.	
			Rate.	Amount.	Rate.	Amount.	Rate.	Amount.	Rate.	Amount.	Rate.	Amount.
28.78	C. yds.	Excavating foundation	RS. $\frac{1}{16}$	2.87	RS. $\frac{1}{16}$	2.87	RS. $\frac{1}{16}$	2.87	RS. $\frac{1}{16}$	2.87	RS. $\frac{1}{16}$	2.87
78.75	"	Rubble masonry	$2\frac{1}{2}$	177.18	$2\frac{1}{2}$	196.87	$3\frac{1}{2}$	255.93	$3\frac{1}{2}$	275.62	4	315.00
7.50	"	Dry stone for pial and steps	$\frac{1}{2}$	3.75	$\frac{1}{2}$	5.62	1	7.50	1	7.50	$1\frac{1}{2}$	11.25
26.	"	Flooring, metalling, and filling pials	$\frac{1}{2}$	6.50	$\frac{1}{2}$	6.50	$\frac{1}{2}$	6.50	$\frac{1}{2}$	6.50	$\frac{1}{2}$	6.50
3.69	Square.	Roofing with bamboos and mud	3	11.07	3	11.07	3	11.07	3	11.07	4	14.76
0.25	C. yds.	Cut stone in steps	5	1.25	5	1.25	$5\frac{1}{2}$	1.37	$5\frac{1}{2}$	1.37	6	1.50
82.	L. feet.	Coping	$\frac{1}{2}$	5.12	$\frac{1}{2}$	5.12	$\frac{1}{2}$	5.12	$\frac{1}{2}$	5.12	$\frac{1}{2}$	5.12
25.75	Square.	Washing	$\frac{1}{2}$	4.83	$\frac{1}{2}$	4.83	$\frac{1}{2}$	4.83	$\frac{1}{2}$	4.83	$\frac{1}{2}$	4.83
50.00	L. feet.	Broken glass coping	$\frac{1}{2}$	3.12	$\frac{1}{2}$	3.12	$\frac{1}{2}$	3.12	$\frac{1}{2}$	3.12	1	3.12
76.00	Sq. feet.	Doors and windows	1	76.00	1	76.00	1	76.00	1	76.00	...	76.00
		Total	...	291.69	...	313.25	...	374.31	...	394.00	...	440.95

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Quantity.	Unit.	Particulars of Work.	KURNOOL.		MILE 18 to 56.		MILE 56 to KALLI.		KALLI to PENNER.		PENNER to END.	
			Rate.	Amount.	Rate.	Amount.	Rate.	Amount.	Rate.	Amount.	Rate.	Amount.
44.7	C. yds.	Excavate foundations (supposed soil) used again in floor.	RS. 1 1/2	4.47	RS. 1 1/2	4.47	RS. 1 1/2	4.47	RS. 1 1/2	4.47	RS. 1 1/2	4.47
89.8	Do.	Rubble masonry	2 1/2	202.05	2 1/2	224.50	3 1/2	314.30	4	359.20	4	359.20
2.6	...	Archwork in walls	5	13.00	5	13.00	6	15.60	6 1/2	16.90	6 1/2	16.90
32	Feet	Do. total span	1 1/2	2.00	1 1/2	2.00	1 1/2	2.00	1 1/2	2.00	1 1/2	2.00
16.4	C. yds.	Puddle flooring (16.4—14.4=2)	1 1/2	4.10	1 1/2	4.10	1 1/2	4.10	1 1/2	4.10	1 1/2	4.10
17.7	Do.	Metal or gravel filling in and outside	1 1/2	4.42	1 1/2	2.21	1 1/2	4.42	1 1/2	4.42	1 1/2	4.42
1.1	Do.	Flagging drains and doorways	4	4.40	4 1/2	4.60	5	5.50	6	6.60	6	6.60
1.	Do.	Concrete under do.	2	2.00	2	2.00	2	2.00	2 1/2	2.50	2 1/2	2.50
20.	C. ft.	Teak	4 1/2	45.00	4 1/2	90.00	5	100.00	4 1/2	90.00	3 1/2	75.00
100.	L. ft.	Coping	1 1/2	6.25	1 1/2	6.25	3	15.60	1 1/2	6.25	1 1/2	6.25
5.20	Square	Mud roof	3	15.60	3	15.60	3	15.60	4	20.80	4	20.80
2.	No.	Door steps	1 1/2	1.00	1 1/2	1.00	1	1.00	1	1.00	1	1.00
20.	Sq. ft.	Doors, teak, with frames and glass fan lights.	1	20.00	1	20.00	1	20.00	1	20.00	1	20.00
		Total ...	...	324.29	...	389.73	...	472.79	...	485.24	...	524.24

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H.

ABSTRACT

Showing each Building in one item.

No.	Particulars.	Amount.	Total.
		RS.	RS.
7	1st-class Passenger and Parcels Stations at—	1,363	
	Kurnool	1,435	
	Nagatur	1,631	
	Yerragudur	4,954	
	Nandial, Patkundukur, and Mardkur, each Rupees 1,651 1/2	1,723	
	Cuddapah		11,106
9	2nd-class Passenger and Parcels Stations with Station Master's house detached—	2,280	
	Joharapooram, Ulloor, and Moochimurri	1,778	
	Jupaud, Ragidigudur	3,648	
	Yallur, Oopalur, Iddymadaka, and Dhoor		7,706
20	3rd-class Stations, averaging Rupees 500	10,000	10,000
2	1st-class Goods Stations at Kurnool	24,290	
	Do. do. at Cuddapah	45,445	69,735
4	2nd-class Goods Stations at Nandial, Deepaguntla, Chintakoonta, and Maidkur, each Rupees 2,304	9,216	9,216
	Bollards and Mooring dolphins to locks and wharves		6,500
	Add if steam power be used, Fitting Shops and Stock of Materials		1,14,263
	Contingencies at about 10 per cent		38,000
			15,237
			1,67,500
	Or add if horse power be used—	324	1,14,263
	Twenty-two Post-houses at Kurnool	1,950	
	Puthapad, Sultanpur, Malyala, Uralpad, Ranganathapet, No. 5, at Rupees 390		2,365
	Turgapully, Yerragudur, Tudicherla, Velapanur, Parmatur, and Jutur, No. 5, at Rupees 473		
	Parlapully, Nandial, Deepaguntla, No. 4 Lock, Chintakoonta, No. 12 Lock, Rajoli, Iddimadaka, Dhoor, Baniapully, No. 6 Lock, Bakrapuram, and Adimapully=12, at Rupees 485	15,820	
	Cuddapah	524	10,983
	Contingencies at about 10 per cent.		1,25,246
	Grand Total		12,754
			1,38,000

NOTE.—In either case it will be necessary to complete the sanctioned Workshop at Kurnool now in course of construction, sanctioned at Rupees 30,612, of which Rupees 15,159 had been spent up to the end of 1874.

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I.
Detail Cost of Staff per mensem.

No.	Particulars.	Amount per Mensem.
<i>Kurnool Office Staff.</i>		
1	Accountant	Rs. 150 0 0
2	Ticket checkers at Rupees 35	70 0 0
1	Clerk	30 0 0
2	Office Peons at Rupees 6	12 0 0
	Total ..	262 0 0
<i>Cuddapah Office Staff.</i>		
1	Clerk	34 0 0
1	Office Peon	6 0 0
	Total ..	40 0 0
<i>Steam Tug and Steam Boat Crew.</i>		
1	Guard	60 0 0
1	Syrang	15 0 0
1	Engine Driver	50 0 0
3	Stokers at Rupees 11	33 0 0
6	Lascars at " 7	42 0 0
	Total ..	200 0 0
<i>Post-house Staff.</i>		
1	Tindal	7 0 0
1	Horse-keeper	6 0 0
2	Lads at Rupees 4½	9 8 0
	Total ..	22 8 0
<i>Crew for Passenger Boat.</i>		
1	Guard	35 0 0
1	Syrang	8 0 0
3	Lascars at Rupees 7	21 0 0
	Total ..	64 0 0

J.

HIGH CLASS GOODS,

Including Artistic, Philosophical, Ornamental, Manufactures, and Luxuries.

Alabaster and work.	Doolies.
Ammunition.	Dyes.
Baggage.	Explosives.
Baskets, fancy.	Fancy goods.
Bonnets.	Fire-arms.
Carriage spring.	Fur.
Cases, unspecified.	Furniture house, imported, iron or wood.
Chemicals.	Glass-ware.
China.	Hats.
Cloth (any).	Howdahs.
Clocks.	Indigo cake.
Confectionary.	Instruments—
Corrosives.	Engineer's.
Cutlery (not tools).	Musical.
	Philosophical.

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8th May 1875.

HIGH CLASS GOODS.—(Concluded.)

Instruments—
Surgical.
Telegraphical.
Ivory.
Lithographic Stones.
Meat, fresh.
Meerscham.
Medicines, sundry or mineral.
Moonsheals.
Metals, precious.
Palkes.

Plan's.
Piece goods.
Perfumery.
Silks.
Spirits and Varnish, bottled.
Stationery.
Stores.
Toys.
Twist.
Watches.
Wine, bottled.

NOTE.—The above contain Railway classes 4 and 5.

J.

ORDINARY CLASS GOODS,

Including useful Manufactures and Garden and Plantation Produce.

Asphalte.
Bangles, glass or lac.
Bark.
Baskets, plain.
Bottles.
Beads, glass, lac, earthen, or wooden.
Beverages, except wine or spirits in bottle.
Brooms.
Butter.
Canvas.
Cards.
Carpets.
Carriage work in cases.
Carts.
Cases, empty.
Castings.
Cattle-gear.
Chemicals, single (a)
Chocolate.
Cloth, common, country.
Clothing.
Coffee.
Coir and rope.
Crookery and clay pipes.
Cumbles.
(Cotton.)
Dye roots or wood.
Eggs.
Felt.
Food, dried, tinned, or potted.
Furniture, common.
Fruits of any kind.
Glass, roofing or window.

Gum, (b) any.
Haberdashery.
Hair.
Hemp and cable.
Hosiery.
Ink.
Ironwork as tools, machinery, fittings.
Leather, skins, goods.
Leaves, dry.
Lime, quick.
Metals.
Milk.
Oils, country.
Paints.
Paper.
Quick-lime.
Rags and waste.
Sandalwood and chips.
Shells, sea, plain.
Soap.
Spices.
Steel, bars, plates, sheets.
Stonework.
Sugar and candy.
Tape of cotton, wool, or linen.
Tar.
Tents and gear.
Timber, sawn and work.
Umbrellas.
Vegetables, perishable.
Wagons.
Wax.

(a) as brimstone, saltpetre, &c.
(b) as camphor, myrrh, &c.

NOTE.—The above contain Railway classes 2 and 3.

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J.

LOW CLASS GOODS.

Including the Necessaries and Raw Produce of Agricultural Life.

Animals—	Jungle produce—
Hides and skins, undressed horns, and hoof.	Charcoal.
Salt-fish.	Wood, unsawn, except sandal.
Earth and stones including slaked lime and salt.	Manufactures, coarse, country-made only—
Field produce—	Bags.
Grain.	Bricks.
Grass or hay.	Earthenware, unglazed.
Indigo, green.	Gunny cloth.
Jaggry.	Mats of bamboo or reeds or Palur, not cane
Pods.	nor grass.
Soap-nuts.	Pegs.
Stalks.	Staves for barrels, &c.
Straw.	Wheels and axle for carts or parts thereof.
Sugar-cane.	Manure from farm or home stead.
Vegetables, unperishable.	
Ice.	
Iron—	
Angle. Hoop. Rails. Scrap. Tree.	
Bar. Pig. Rods. Sheets.	
Chair. Plate. Rivets. Spikes.	

NOTE.—The above contain Railway classes S. and I.

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Nos. 206 & 207. Note by the Hon. J. D. SIM, C.S.I.
(Here enter 1st March 1875.)

No. 208. Note by the Right Hon. the President.
(Here enter 8th March 1875.)

No. 209. ORDER THEREON, 8th May 1875, No. 1,320.

IRRIGATION, No. 19.

THE Honorable the Governor in Council, after careful consideration of the proposals of the Board of Directors of the Madras Irrigation and Canal Company for the formation of a separate Company for the navigation of the Kurnool and Cuddapah Canal, is of opinion that it is not advisable that these proposals should be entertained, and that it will in every way be better to work the navigation by means of the establishments employed on the maintenance of the canal and the management of the irrigation under it.

2. The canal is primarily an irrigation work, and the requirements of navigation must be subordinated to the supply of water to the fields, consequently it would be difficult, if not impracticable, at times to reconcile the interests of the Navigation Company with those which would have to be first considered, and disputes would arise involving questions of breach of agreement which it is in every way better to avoid. The Governor in Council doubts, moreover, with the information contained in the papers which have now been read, whether the necessary capital could be raised without the guarantee of Government.

3. The Honorable the Governor in Council believes that the introduction of navigation, if carried out in an economical manner, will be of advantage to the canal and tend to promote the spread of irrigation. Although this canal is nominally the property of the Company, still as the State pays the guaranteed interest on the capital, and has hitherto provided also a large part of the working expenses, the Government have really a far greater interest in its success than even the Company; such being the case, it is

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8th May 1875.*

considered that much the best and simplest plan will be for the Government to advance the money needed for the provision of boats and floating plant, and to keep in their hands the control over expenditure on this account and over the tariff of rates and fares, so that the canal may be made as useful as the circumstances will admit.

4. It would be greatly preferable could navigation be conducted on the Kurnool and Cuddapah Canal in the same manner as on the canals of the Godavery and Kistna Deltas, *viz.*, by licensing boats, the property of private individuals, so leaving the trade entirely in private hands; but, as this arrangement would certainly not be popular at any rate at first, the alternative will be to start the navigation by constructing and placing on the canal a moderate number of boats, and conveying goods and passengers at fixed rates. Thereafter it will probably be found practicable to hire boats to merchants and others, and ultimately private boats may be expected to altogether supersede those belonging to Government in carrying on the traffic of the country.

5. For the commencement of navigation in the manner which the Government propose, no permanent buildings will be needed. A few sheds may be requisite, but that will be all. The boat crews will be able to aid in working the locks, as there will be but one controlling authority, and the establishments at the latter will be a minimum.

6. In the estimate of capital required by a Navigation Company, the amount needed for floating plant was put down at Rupees 3 lakhs. Under the arrangements now proposed, probably 2 lakhs for such plant will suffice, and it may be necessary to spend 1 lakh more on works for rendering the canal better adapted for navigation than it now is. Altogether then it may be assumed that the advances required will not exceed $3\frac{1}{2}$ lakhs.

7. Ordered that the Government of India be advised accordingly of the views entertained by this Government.

(True Extract.)

L. H. Astle

Major, R.E.,

Offg. Joint Secretary to Government.

To the Chief Engineer for Irrigation.

- " " and Manager, Madras Irrigation and Canal Company.
- " Revenue Department.
- " Financial "
- " District Engineer, Kurnool.
- " " Cuddapah.
- " Examiner of Railway and Irrigation Accounts.

Erd. A. Grubert.

20 Spare Copies will be sent to the Madras office.

Rev: 1875: Sept
No. 2083

Govt. of [1875] Madras.

PUBLIC WORKS.

To

THE CHIEF ENGINEER FOR IRRIGATION,

&c., &c., &c.

Further No 1350/76.

Dated May 8th.

Issued

Recd. June 1st

Encl.

G. O., 8th May 1875, No. 1320.

MAY.

Nos. 203-209

Navigation of the Kurnool and Cuddapah
Canal.—Passing orders on the proposal of
the Board of Directors of the Madras
Irrigation and Canal Company for the
formation of a separate Company for the

No 1173 Carran? totta
Board of Revenue

2nd June/75.

Alu

14. To the Board of Directors 9th June