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MADRAS RECORD OFFICE

GOVERNMENT OF MADRAS.

REV DEPARTMENT

G.O. No.	13	Press
B.P. No.		Mis.
Dated	4.2.1873	1873 196

Not to be folded or roughly handled

Read the following papers:—

No. 619. From the Superintending Engineer, 2nd Division, to the Chief Engineer for Irrigation, dated Bezwada, 14th June 1871, No. 29.

In reply to G. O., No. 364, 6th February, I have the honour to observe that

1 Plan.
1 Data.

Major Mullins appears to have made some mistake in his memoranda

regarding the Kolakalur bridge. I have no idea where he received the rates he has given, nor can I recall to memory any discussion regarding them or the works. Lieutenant Campbell, the Range Officer, returned to Chebrole from Jagarlamudy, and the Overseer, Mr. Coghlan, met us on the spot, but he had no accounts; we proceeded to Duggirala, where we met Mr. Norris, but no word on the subject was said to him, or Major Mullins would have learned that the bridge was not, as he supposes in paragraph 9, in his charge.

2. As regards the amount of concrete, I beg to observe that Lieutenant Smith increased the quantity on finding what a slippery quick stuff he was dealing with. I regret that I did not know the Toongabuddra when I sent in the estimate as well as I do now, as I am inclined to think that the water-way should be increased. I received the papers as generally approved by my predecessors, who had far more local knowledge than I had.

3. Both Colonels Anderson and Winscom had turned their attention to the Toongabuddra, which from Duggirala to near Jagarlamudy is now flowing in its natural tortuous course. Both have had sketches prepared for alterations in form and gradient. Colonel Anderson was sanguine that some work which he commenced would tend to silt up the deep bed, and reduce the velocity of the water flowing in a wider channel; his expectations have not been, so far as I know, realized.

4. The rapidity of the stream is most inconvenient for traffic; the water rushes down to supply the cultivation below, and any decrease at Duggirala stops, or seriously hinders, all traffic in the upper miles; for this reason, and the actual deficiency of punts to carry materials, the local officers were obliged to seek for supplies in the neighbourhood.

5. I may mention, however, as a reason for my not remarking on this before, that I had contemplated carrying the navigable canal by a higher level nearer Guntoor; the whole subject will perhaps be more conveniently discussed as a part of Commamore project.

6. Major Mullins has also forgotten that I proposed personally to build the additional towing-path as a projecting bracket above water-mark. I understood that he was satisfied as to the necessity for its construction from the difficulty to boat coolies tracking on the lee bank. I trust that the Government will permit me to build it as I mention above.

7. The Toongabuddra at the point where the road crosses, and for some distance on either side, has low banks which are flooded during most part of the year. All materials were therefore necessarily stored some little distance (250 yards) from

the actual site; if the bridge had been built in the proper bed of the canal this extra distance would have been increased by 50 yards, the work would have been also very considerably delayed by the presence, during nine months, of water for irrigation.

8. Labour is by no means easily procured, and more especially skilled labour, and Major Mullins much underrated our difficulties. The Toongabuddra is the main drain of the Western Delta; its soft sandy bed is the natural holder of a great quantity of water slowly percolating to sea; any foundation work will disturb this, and necessitate constant baling. Seven archimedean screws and gangs of men with baskets were required to keep down the water at the Commamore lock three miles off, the cost of baling on that work was Rupees 4,172.

9. I forward, on a separate paper, the prices of concrete and ashlar masonry. As regards Major Mullins' estimate of stone for Seetanagram, we have the actual cost of material delivered for the road over this very bridge Rupees 1-3-5, or 1 pie less than the average cost from our land quarries. This is a single instance where no accident happened. If from any risk to the crops on Nizampatam or Western Bank Channel the supply in the Toongabuddra had been diminished or shut off, the cost would have been much increased. In the long time this bridge has been in progress many reasons for delay must have occurred, which would prevent our assuming this as a correct rate.

10. I beg also to protest against the remark regarding the use of small stones. Mr. Coghlan, in my presence, positively informed Major Mullins that he had, under instructions from Lieutenant Smith, levelled the top course with the small stones pending the sanction of a supplemental estimate.

11. I enclose a sketch, drawn up under instructions from Colonel Winscom, showing the cuts he proposed to make; that at the site of the bridge being one. If this be omitted from the supplemental estimate the bridge will be of no use, as the old canal will bar all traffic as it does now. In my letter* forwarding the revised estimate, I observed that the cost of the cut was really debitable to the Commamore project, a remark which Major Mullins appears to have overlooked.

12. I trust that the Government will be satisfied that the excess above estimate is not unreasonable; we had not, in 1869, when the estimate was prepared, the experience acquired as to cost of carriage, baling, etc., etc., and future estimates will make due allowance.

No. 619A. From the Officiating Superintending Engineer, 2nd Division, to the Chief Engineer for Irrigation, dated Camp at Madras, 2nd August 1872, No. 67.

I SHOULD feel obliged by your kindly favouring me with the orders of Government on my predecessor's letter to your address on the subject of the revised estimate for the Kolakalur bridge in the Kistna District.

2. As the work is in progress, I trust Government will be pleased to sanction the revised estimate at an early date.

No. 619B. From the same Officer, dated Bezwarah, 3rd October 1872, No. 101.

I HAVE the honour to acknowledge the receipt of your letter, No. 150 of 14th August last, and to inform you the level of the Kolakalur bridge is correct. The mistake I mentioned to you is in a bridge lately constructed over an adjoining channel, and I have to express my regret for having misled you in the matter.

2. The expenditure on the Kolakalur bridge up to date has been Rupees 11,694-12-3, as will be seen by referring to the enclosed statement.* The wings, abutments, and piers have been built up to 11 feet above floor level, or to within 6 inches of the springing line. The floors have been laid, and a masonry wall, for one towing-path, has been constructed. The idea of building a second path appears to have been abandoned.

3. Judging from paragraph 6 of Major Mullins' report,* and from the state of the bridge as described by the Executive Engineer in his letter of the 7th ultimo, very little, if any, work appears to have been done since the date of the former officer's inspection.

4. The maximum velocity of the stream on the completion of the Commamore channel will be 1.85 feet per second, but it will, no doubt, be somewhat in excess of this until the regulating works have been built on that canal; but I believe arrangements could easily be made to prevent the current attaining a greater speed than $2\frac{1}{2}$ feet per second.

5. The new cut to divert the Commamore channel and carry it under the bridge has not yet been made; but as it is absolutely necessary, I have to solicit sanction for the amount required for this excavation as well as for the sum necessary to complete the bridge as annexed—

	RS.	A.	P.
Revised estimate submitted by Colonel Moberly ...	20,650	0	0
Deductions.			
For additional towing-path ...	364	0	10
" Saving of masonry in parapets ...	66	12	5
" Earthwork ...	30	0	0
	460	13	3
Contingencies... ..	34	2	9
	495	0	0
Amount of original estimate sanctioned in G. O., No. 1,676, of 21st May 1869 ...	13,650	0	0
Balance to be sanctioned... ..	6,505	0	0

6. As the bridge and new cut under reference fairly belong to the project for the extension of irrigation in the Western Delta of the Kistna, I would suggest the additional sum (Rupees 6,505) required to complete these works being charged to the old estimate of Rupees 1,95,770* for the improvement of the Commamore channel.

* Sanctioned in G. O., No. 3,215, dated 12th October 1868.

If Government approve of this suggestion, I trust you will arrange for Rupees 4,000 being transferred, from the Budget Item 27 to the Kolakalur Bridge, for expenditure during the current official year, and for the balance of 1873-74. With reference to the last part of this suggestion, I trust Government will be able to allot funds from the Reserve, as no provision has been made in my Budget for 1873-74 to meet the proposed outlay.

7. In connection with the extra expenditure on the Kolakalur bridge, I beg to forward a letter* from Captain Vibart, R.E., and should feel obliged by your returning it at your convenience.

* No. 157, 30th May 1871.

From Captain H. M. VIBART, R.E., Executive Engineer, Western Delta, Kistna District, to the Superintending Engineer, 2nd Division, dated Camp at Guntur, 30th May 1871, No. 157.

In reply to your memorandum giving cover to papers referring to Kolakalur bridge, I have the honour to forward the following explanations.

2. In paragraph 2 of the Chief Engineer's Note he remarks, first, on the increased rate for concrete; secondly, on the increased quantity of concrete laid on, and the increase of thickness allowed in the flooring; thirdly, on the alterations in thickness of parapets; and, fourthly, regarding the site of the new bridge. The increase of rate in concrete will be entered more fully further on, but I may state here, with reference to the Chief Engineer's statements that "the great difference is due to cost of breaking stone," that in the remarks attached to the comparative statement the difference of cost is put down "as owing to the cost of breaking stone, etc.," vide Statement A, thus clearly showing that there were other reasons, besides that of breaking the stone; moreover, so far from the stone from Tangellamooddy having been in constant use in the delta it has been but rarely used for concrete. In this case half of the stone used was from Bezwađa, while the other half was obtained from Tangellamooddy Quarries. Now, with reference to increased quantity of concrete, Lieutenant A. C. Smith states that the increase of depth of concrete was owing to the nature of the soil, which was in some parts running sand and in others slush. Some discretion in these matters must, it appears to me, be allowed to the officer in charge of such works. He is, I submit, not bound to put down precisely the quantity allowed for in the estimate should he deem, on personal examination, an extra quantity necessary. The increase of the width of parapet from 1½ feet would, as proposed by Lieutenant Smith, not diminish the roadway, as the top of the backing course would be level with it; the width of available roadway would actually be increased by 1 foot, although the parapets would not be protected from the contact of carts, as in the plan originally intended. The original plan can of course be adhered to.

3. With reference to the Chief Engineer's remark regarding site of bridge, I beg to say that the straight cut was approved by late Colonel Winseom, as being a part of the improvement of the Commamore channel. Plans and estimates for the improvement of the whole of this channel, as far as Nallamada, were submitted long ago to the Chief Engineer, but were returned by Colonel Anderson, with the remark that it would be requisite, before submitting the estimates to the Government of India, to afford such information as would enable the Government to form an opinion as to the remunerative effect of the work.

4. I have in my possession a plan signed by Colonel Winseom (which I obtained through your Manager from your office) in which the straight cut in question is distinctly laid down.

5. I wish now to make some remarks on paragraph 6 of the Chief Engineer's note, in which he states that the proper rate for concrete would be Rupees 2-45-0.

6. I do not think that the concrete could possibly have been laid down for this amount. He has, I think, very much under-estimated the different items—

1st.—Cost of stone.—He states it should be only 13 annas, supposing it to be got from Bezwađa, and states that this is a high allowance. In order that all the stone to be used on the work should be obtained from Bezwađa, it would be necessary to increase the number of iron punts. These punts are limited in number, and there is frequently considerable difficulty in procuring a sufficiency of labour for loading, etc., so that it has always been considered desirable to open up other sources of supply besides those at Seetanagaram and Bezwađa. Hence half the stone used for concrete was obtained from Tangellamooddy. Stone has lately been brought from Seetanagaram to Kolakalur, for the road from Guntur to Iyaloor, and costs Rupees 1-3-5, besides 4 annas for breaking, while the Tangellamooddy stone cost only 1-7-6 (1 pie per cubic yard more); this was made up as follows:—

	RS.	A.	P.
Digging	0	7	0
Carting	0	12	0
Breaking	0	4	0
Measuring up	0	0	6
	1	7	6

7. Supposing punts to be available for the conveyance of stone, the carriage from Seetanagaram to Kolakalur will cost at least 12 annas per cubic yard, and this charge may at any time be increased by accidental delays in loading, etc., and from bad weather, not to mention the want of water in the channel towards the close of the season when the water is passed down the Commamore channel for half the week and down in the main canal channels for the remainder.

8. Major Mullins allows but two paras of chumam and four of sand; owing to the force of the springs it was found necessary to employ a much larger quantity, 2½ paras of chumam and 5 of sand. He allows only 9 annas 2 pies for labour, that is for mixing mortar, carrying stone and mortar to work spot, mixing them together on the work and ramming, which is really insufficient when the material is close to the work spot; but in this case a very considerable extra charge had to be incurred owing to the materials being placed unavoidably nearly 250 yards from the site of bridge, owing to the ground in the vicinity being always flooded when the Commamore channel is fully supplied. At the close of this report I will add a statement of cost of concrete and ashlar.

9. In paragraph 7 Major Mullins states that the rubble, including the dressing, should be executed for 5 rupees, and leads Government to suppose that the rubble was made up with small stones. The stones used, as far as I can learn, varied from 8 to 12 in width and 10 to 15" long, and the small stones seen by Major Mullins were used merely to bring the incomplete work to a uniform level when it was stopped.

10. Major Mullins states that the foundations could easily have been got in during the dry season of 1870, but as the work was sanctioned in May 1869 it was surely intended by Government that the work should be pushed on without delay.

11. He further remarks that in "soil such as is met with in the locality the baling need not be costly." The water in the foundations was very troublesome, and required a large amount of labour to keep it within reasonable bounds. I may mention here that I myself laid down the foundations of Commamore Lock in 1867, and that the springs were so numerous and powerful that we had seven archimedean screws at work night and day, besides a number of men employed with baling baskets, and we found very considerable difficulty in keeping the water down. The sum spent in baling at this lock (three miles distance from the bridge) was 4,172 Rupees, whereas only 1,500 were allowed in the estimate.

12. I beg to state that the Chief Engineer is in error in supposing that the Kolakalur bridge was under the charge of the Officer at Duggirala. The Range Officer in charge of the work resided at Chebrole, some ten miles from site of bridge, and I may add that Lieutenant Smith but seldom remained there during this period, as he had to take charge of the 3rd Range as well as his own in the month of June, just after the time that the work was commenced at Kolakalur.

*Proceedings of the Madras Government, Public Works Department,
30th January 1873.*

13. Great difficulty was experienced in procuring labour, partly doubtless owing to the quarries at Tangellamoody, etc., being worked at this time; but I would beg to observe that it was absolutely necessary to carry on the quarry work at Tangellamoody-Vegerla, or otherwise the works in the 1st and 3rd Ranges would have been brought to a stand-still for want of stone.

14. From the amount of the revised estimate the Chief Engineer has deducted certain items. The two first are correct, as the towing-path is not to be built and the parapets are to be built in accordance to original design.

15. But in the third item it appears as if the Chief Engineer had made an oversight. In the original estimate only 151-15-0 were allowed for earthwork; this has been found utterly insufficient, and Rupees 652-8-0 was allowed in revised estimate, leaving 500-9-0 to be sanctioned. Of this amount 100 rupees is required for filling in behind abutments, and remainder for excavation, which latter has been already spent. I suppose Major Mullins has deducted this with a view of charging 350 Rupees to the channel. I think but a very small proportion should be so charged, say 400 cubic yards (*i.e.*, what would have been excavated had there been no bridge). This will increase the amount requiring sanction to Rupees 2,411 as shown below:—

	RS.	A.	P.
Revised estimate ..	20,650	0	0
Deduct towing-path ..	364	0	10
Increase parapet ...	66	12	5
Earthwork... ..	30	0	0
New cut	3,807	12	0
Superintendence, at 7½ per cent. ...	320	6	9
	4,589	0	0
Reduced amount estimate	16,061	0	0
Already sanctioned	13,650	0	0
Balance requiring sanction	2,411	0	0

16. In conclusion, I add the data for a cubic yard of concrete.

The stone was excavated, then carted to site of work, packed and measured, it was then broken up by quite different people. It is evident that a cubic yard of rough stone would, when broken, measure considerably less than a cubic yard, as it would pack much closer. Taking then 1½ cubic yards rough stone to make 1 cubic yard of broken stone—

¾ths of a cubic yard of kunkur would equal ¾ths of a cubic yard of rough stone.

The Concrete was composed of half Bezwada and half Tangellamoody stone, average cost of cubic yard would be ...	RS.	A.	P.
	0	9	6
¾ cubic yard would cost	0	7	11
Carting do.	0	10	0
Measuring	0	0	6
Breaking	0	3	4
2½ Parahs, lime	1	4	0
5 Do., sand	0	7	6
Mixing mortar	0	7	0
Conveying to site	0	4	0
Ramming, etc.	0	11	0
Sundries	4	7	3
	0	5	3
	4	12	6

Actual cost Rupees 4-14-10.

*Proceedings of the Madras Government, Public Works Department,
30th January 1873.*

Ashlar Masonry.

The stone was obtained from three quarries:—

1st.—VAGERLA, seven miles from site, where the excavation cost 10 annas.

2nd.—BEZWADA, where stone cost 12 annas, price paid to 6th Range Officer.

3rd.—TANGELLAMOODY, four miles from site, where the excavation cost only 7 annas.

As far as the work is carried out these stones appear to have been used in the proportion of

	1 to 3 to 6.	RS.	A.	P.
A cubic yard would thus have cost		0	8	6
Cartage—1 cubic yard, Vagerla stone	1	5	0	
3 Do. Bezwada	2	7	9	
6 Do. Tangellamoody	4	8	0	
	10 cubic yards...	8	4	9
Packing		0	0	6
Conveying to work		0	3	0
Dressing and re-dressing at spot		1	2	0
Two parahs lime		1	0	0
Four do., sand		0	6	0
Mixing sand and lime		0	6	0
Conveying mortar... ..		0	1	0
Two Bricklayers		1	0	0
1½ men coolies		0	5	0
Two women		0	4	0
		6	1	3
		0	6	9
Superintendence, 7½ per cent		6	8	0

17. In future operations on this work it is possible that we may be enabled to get the work done cheaper as the material might perhaps be deposited nearer the site, and we might perhaps pay the bricklayer so much for each cubic yard; in fact, have it done on contract; but it would hardly do to estimate as if we were certain to be able to effect this.

18. I shall certainly do my very best to keep the charges as low as possible when the work is recommenced.

19. In conclusion I beg to state that should you raise no objection I will at an early date submit the altered estimate, and request you to be so good as to get it sanctioned at an early date.

20. I have the honour also to forward the plan* of the Toongabuddra from Duggirala downwards, showing clearly the new cuts it is proposed to make so as to straighten the channel between Duggirala and Jagarlamooddy. The new cut could be charged to the allotment of 50,000 rupees allowed for the Commamore channel.

* Plan sent in a separate cover by lock tappal.

No. 2.

No. 619c.

Note by the Chief Engineer for Irrigation.

In G. O. of the 6th February 1871, No. 364, certain explanations were called for before disposing of the revised estimate for the Kolakalur bridge across the Commamore channel in the Kinnana District.

2. In a letter, No. 29 of the 14th June 1871, from the Superintending Engineer, 2nd Division, these explanations were submitted, but the subject appears to have been overlooked until the then Officiating Superintending Engineer in a letter dated 2nd August last, asked for orders on his predecessor's communication.

3. After a careful examination of the papers connected with this bridge, including the explanations, I regret that I am obliged still to express an unfavourable opinion both of its cost and management. In the first place the site should have been selected before any estimate was submitted for sanction; secondly, after sanction was given materials should have been collected under the best arrangements practicable; thirdly, the foundations should, after getting materials together, have been got in at the most favourable season for work of this kind. It is not necessary to attempt to put down foundations of works of this kind during the season of the freshes, and had six or eight months been allowed for making suitable arrangements, collecting materials, obtaining orders as to the site when it was thought advisable to change it, etc., instead of occasioning delay there would have been a saving of time as well as of money.

4. In my former Note I made no comment on the quantity of concrete used; the alteration made was simply noticed. Captain Vibart is quite right in supposing that an Executive Engineer has discretionary power in the case of foundations, and no objection was made to the use of it in this instance. With regard to the rate for concrete for which Rupees 3-6-0 were allowed, Rupees 4-14-10 spent, while my estimate of the proper rate was Rupees 2-15-0. I may remark that I was not aware that the materials had to be deposited 250 yards away from the bridge and afterwards carried thereto. I find on referring to my note book that I obtained the labour and cartage rates on the spot, as also the cost of stone at the quarry. From these data it was easy to deduce a rate, the quantity of material and labour required being, within very narrow limits, the same everywhere. Some of the data given by Captain Vibart for this material are, in my opinion, not admissible. The additional lime and sand used may be allowed as possibly requisite at the time when the foundations were laid; they added $5\frac{1}{2}$ annas to the rate. Conveying the concrete to the bridge is put down at 4 annas, and may be admitted; but ramming, etc., 11 annas is many times too much, and as the soil is reported to have been "in some parts running sand and in others slush," the concrete under such ramming would have disappeared altogether. One-third of a man cooly per cubic yard of concrete is sufficient for its consolidation, and the charge on this account should therefore have been but little, if at all, more than one anna. I allowed 9 annas 2 pies for labour, exclusive of lead, and there is nothing in these papers to show that this should not have sufficed. Again, 5 annas 3 pies are too much to allow for sundries. Not having visited the Tangellamooddy quarries, I do not know whether they possess stone available with but little labour for concrete, but at most quarries there is an abundance of small stone which can be used for concrete or for road purposes, and which would usually cost about 4 annas a cubic yard for collection and little or nothing for breaking to a proper size. The data given by Captain Vibart appear to me to require looking into in several respects. The rates for excavation or getting of stone, for cartage, etc., should all bear reference to the actual quantity required to make a cubic yard, otherwise great uncertainty must exist as to whether the right quantities are received, and in the case of distant quarries the item for cartage may be seriously and unnecessarily increased; five-sixths of a yard of rough stone, as obtained I suppose at the quarries, is put down as equal to two-thirds

of a yard of kunkur or broken stone, if so probably this quantity would probably be but half a solid yard, on which latter the rates should be based. Probably the best arrangement would have been to break up the stone at the quarries and then to allow 14 or 15 parabs to the cubic yard solid, according to circumstances, in fixing the rate for cartage. I was told that the cartage of stone was 4 annas a cubic yard per mile, but if the actual quantity carted for this rate was in reality only about $15\frac{1}{2}$ cubic

* 27 feet less, about $11\frac{1}{2}$ cubic feet, the space feet, * the actual rate becomes about 7 annas a yard a mile. It has not been occupied by 5 parabs of sand.

stated how the rate of Rupees 3-6-0 per cubic yard of concrete entered in the original estimate was made up, and it would have been well to compare its items with those shown in Captain Vibart's letter.

5. Turning to the masonry of the bridge it may be noticed that there seems to be good reason for the Executive Engineer's remark that "in future operations on this work it is possible that we may be enabled to get the work done cheaper as the material might perhaps be deposited nearer the site, and we might perhaps pay the bricklayers so much for each cubic yard;" he adds, "but it would hardly do to estimate as if we were certain to be able to effect this." The essence of good executive supervision, so far as this affects cost of work, is in the determination, after careful examination of the actual circumstances of the work, what is the proper price to be paid on account of each component item. My experience is altogether against the assumption that Rupees 4-14-6 for concrete and Rs. 6-12-0 for coursed rubble masonry are proper proportional charges; if the latter be correct, and it is the rate entered in both the original and revised estimates, I believe that Rupees 3-6-0, the rate allowed for concrete in the first instance, should have been ample.

6. With these remarks I beg to recommend that the revised estimate for the bridge itself, amounting to Rupees 16,000, as deduced from Captain Vibart's letter, be sanctioned, and that the following items, belonging to the improvement of the Commamore Channel be debited to that work:—

	RS.	A.	P.
Earthwork of new cut	3,838	12	0
Superintendence, at $7\frac{1}{2}$ per cent....	321	4	0
Total ...	4,160	0	0

The second towing-path should be omitted, and the parapets should be built according to the sanctioned design.

FORT ST. GEORGE,
2nd January 1873.

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

No. 620. ORDER THEREON, 30th January 1873, No. 304.

CIVIL WORKS, No. 32.

UPON the recommendation of the Chief Engineer for Irrigation, the Government sanction the revised estimate, amounting to Rupees 16,060, for the Kolakalur Bridge over the Commamore Channel. The cost, Rupees 4,160, of the new cut on which the bridge, as built, is situated will be charged to the estimate for the improvement of the

*Proceedings of the Madras Government, Public Works Department,
30th January 1873.*

Commamore Channel, for which it is observed there is an allotment in the Budget of the current year, Item No. 27, of Rupees 20,000.

2. The history of this bridge as exhibited in these papers is very far from satisfactory. The executive management has not been at all what it should have been, and the Government trust that, in carrying the work to completion, the arrangements will be such as to ensure good work at a moderate cost.

3. Orders will be issued in the Revenue Department for the provision of half the increased cost of the bridge from Local Funds.

(True Extract.)

(Signed) C. J. SMITH, Captain, R.E.,

Officiating Under Secretary to Government.

To the District Engineer, Kistna.

„ Revenue Department.

„ Financial „

„ Controller of Public Works Accounts.

„ Accountant-General.

„ Chief Engineer for Irrigation.

Order thereon to S. Jy 1873. A^o 13.

*Communicated to the
Board of Revenue.*

(True Extract)

*Signed D. F. Carmichael
Sly to Govt.*

Govt. of 1873 Madras.

PUBLIC WORKS.

THE DISTRICT ENGINEER, KISTNA.

&c., &c., &c.

Dated January 30th.

Recd.

Encl.

G. O., 30th January 1873, No. 304.

JANUARY.

Nos. 619-620

Mr. B. 13

24/4 February 1873

Kolakalur Bridge over the Commamore
Channel—Revised estimate for the Kola-
kalur Bridge, sanctioned with remarks.

With Order