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*Proceedings of the Madras Government, Public Works Department,
4th March 1862.*

No. 47. Read the following Memorandum from Colonel W. I. BIRDWOOD, Deputy Chief Engineer, Southern Circle, to Lieutenant-Colonel W. H. HORSLEY, Chief Engineer and Secretary to Government, Public Works Department, dated Chepauk, 12th February 1862, No. 10,515:—

In obedience to the Memorandum from the Chief Engineer and Secretary to Government, Public Works Department, No. 22, dated 31st January 1862, the Deputy Chief Engineer, Southern Circle, has the honor to forward the letters marginally noted from the District Engineer of Malabar, reporting on the progress of work on the Tambracherry and Karkur Passes in that District.

From Captain J. BEAN, District Engineer Malabar; to Colonel W. I. BIRDWOOD, Deputy Chief Engineer, Southern Circle, Department Public Works, dated Calicut, 15th January 1862, No. 279.

* Government Order, dated 10th June 1861, No. 1,073.
" " 8th October 1861, No. 1,857.
" " 30th September 1861, No. 1,804.
" " 9th December 1861, No. 2,258.
with Extracts of Proceedings of Chief Engineer, dated 4th July 1861, No. 2,336.
" " 19th October 1861, No. 6,167.
" " 21st October 1861, No. 6,209.
" " 12th December 1861, No. 8,286.

Referring to Government Orders and Chief Engineer's Extracts of Proceedings as per margin,* calling upon me to report on the extent of the water communication on the Beypore river eastwards from Mambât, and the feasibility of constructing a still-water Canal from Karkar, I have the honor to report

that I was engaged during the past week in making the necessary investigations regarding this subject, and beg to forward the following observations on the results of my inspection of the river.

2. Though it is generally considered that the navigation is open and perfectly free throughout the year to Mambât, which place is called the head of the water communication on the Beypore river, such is not altogether the case, for several obstacles interpose, in the dry months, to prevent ordinary laden boats from passing up and down the river. The distance between Eddawanah and Mambât is not more than 6 miles by water; this latter place being 38 miles from the mouth of the river at Beypore, but in this portion one small reef of rocks is met with, over which the river runs with considerable velocity, I should say, from 6 to 7 miles an hour, and at the period of my visit on the 30th December last, with a depth of only a foot, so that considerable difficulty is experienced in going up and down the stream, and it can only be effected, in any case, in a boat drawing but a small amount of water. Even in the month of December, I found the river very low, and I was surprised to see the stream, though confined in places, running only at a depth of 9 inches or 1 foot. At these places, where the stream is narrowed either by sand banks or by rocky formations, contracting the spread of water, the current runs at 5 or 6 miles an hour, but under ordinary circumstances, where an average section of the river-bed is met with, I measured the current at from 3 to 4 miles per hour. Later on in the season, and during the months of March and April, I cannot conceive laden boats navigating this portion, and as the great bulk of the Coffee crop was not brought down when I inspected the river, and as I understand that it is not generally sent to the coast until January and February, I can quite allow that great difficulties stand in the way of the planters in procuring a sufficient draught of water for their boats, even below Mambât. Between Eddawanah and Areacode, even, the state of things is not much better, for in the night of the 6th and morning of the 7th instant, I was constantly grounding in a boat drawing only a foot of water, and it was not until I passed Areacode that sufficient depth was obtained; I do not think the portions I have referred to susceptible of very much improvement. The sand banks are constantly shifting, and I believe it would be hopeless to attempt to keep open a free channel through these banks, with the present head of water, during the hot season. Even if the attempt were made, the expense attending it would eventually exceed the cost of a road along the river bank. Indeed, there is a fair road now between Areacode and Eddawanah, and it only requires to be extended to Mambât, which I recommend should be carried out.

3. My inspection of the river above Mambât to Nelumboor convinces me that it is not desirable to attempt any improvements to the navigation. In a light boat, it took me from 8 to 12½ o'clock, P. M. to reach Nelumboor, a distance of only 6 miles, and I found that the boatmen were disinclined to make the journey. In this distance there are reefs of rock, stretching obliquely across the bed, for a length of a quarter of a mile, and over these the fall was, in some cases, from one to two feet. The boat had to be dragged over, and at most of the reefs, by the boatmen jumping out into the stream, and hauling with a rope attached to the bows of the boat. The boat only drew from 9 inches to 1 foot of water, but there was scarcely sufficient water to float it, and as the season advances this navigation must be entirely stopped. One or two boats were to be seen at Nelumboor, but the traffic on the river is almost entirely in wood logs, floated by bamboos, which are pushed over the reefs of rocks by means of Elephants accompanying the rafts.

4. To make Locks at these passages of the river would be extremely expensive, and the cost would scarcely be thought worth the traffic which may be expected. The banks of the river average from 20 to 25 feet high, and, where these reefs occur, the rock invariably extends beyond the banks, so that Locks would have to be cut in this solid material. The blasting of the rock, where these ledges are met with, might not be quite so expensive, but still more so than would I believe be justified by the advantages gained. The current would run with great velocity, also, through such artificial openings, for I found, where the river was partially dammed up, that it escaped at from 6 to 7 miles per hour.

5. The river above Nelumboor to Karkur bears the character of a rocky jungle stream, and I cannot conceive how any one, who had inspected its bed and the country through which it flows, could have entertained the idea of constructing a still-water Canal. Even if the project were feasible, the expense would be very enormous, and far more than could be considered justifiable, to gain the advantages and profit which would accrue by opening a water communication from the foot of the ghâts with the Wynaad and Mysore countries, when a road might be made with comparative ease at a very much smaller outlay.

6. The road from Nelumboor to Yeddakarah is 10 miles, and from Yeddakarah to Karkur the foot of the ghâts, 6 miles in length, that is 16 miles in all, but the river winds very much, and between these places has a course of about 23 miles.

7. In all the places where I inspected the bed, I found rock, and in some instances it stretched across the river in ledges, over which the stream fell with much velocity. The depth of water, even at this season, is not sufficient for boats, and later on in the year most of the supply will fail, though there will always be found reaches and pools of sufficient depth, with a sluggish stream, owing to the current being dammed back in its course.

8. I found by taking a series of heights with the Aneroid Barometer, that the fall was very rapid from Karkur to Yeddakarah, but much less so from Yeddakarah to Nelumboor. The difference of level between the river bed at Karkur, and at the spot where it first crosses the road between Yeddakarah and Nelumboor, amounted to 174 feet, and as this length of the course amounts to about 14 miles, the fall per mile would be on the average nearly 12½ feet, though as the greater amount of this difference of all occurs between Karkur and Yeddakarah, the average for the first 8 miles must be taken at 21 feet per mile. The levels here mentioned may be taken, also, in order to arrive at a pretty accurate decision as regards the general fall of the country towards Nelumboor and Mambât, and they are not favorable for the construction of a still-water Canal.

9. The banks of this river are extremely high, as in many places I found them from 15 to 30 feet, and they were especially lofty where the bed forced itself through a gorge of a hill.

10. With the above difficulties before us, as regards the river navigation, it will be seen that the natural facilities for opening a Canal cannot be great. The only favorable feature consists in there being several long stretches of paddy and swampy land, through which portions of the Canal might readily be dug, but to obtain water for this Canal, I presume the river is to be made use of, though this supply would fail in the hot weather in the absence of any artificial

reservoir, and as the river is approached, much hilly ground is met with, not offering from its elevation any great impediment to the construction of a good road, but of elevation enough to cause very heavy cuttings for a Canal. As the navigation must pass into the river by Locks, the high banks must be cut through, and, as I have shown above, large quantities of rock are found in all portions of the river bank and bed. Many of these small ridges of hills extend across the line of country which the Canal would take, and my inspection of the country would lead me to suppose that the Canal must be cut through these ridges, a supposition supported by the opinion of the Sub-Engineer in charge of the Karkur ghât, who knows this portion of the District well.

11. Owing to the difficulty of getting water, therefore, the amount of rock and earth cutting, the level of the country, involving the construction of numerous Locks, and the comparative facilities for constructing a good road, I would strongly recommend that the project for opening a Canal from Karkur to Mambât be no further investigated.

12. As I took the opportunity of inspecting the old Karkur ghât, and the portion of new ghât opened out, as well as the new line of trace which has been lately made, I take this occasion to report to you on the progress of the work.

13. The height by the Aneroid from Karkur to Nadkamy the head of the ghât, I find to be 2,250 feet, and this has been confirmed by many observations already taken. The Sub-Engineer proceeded to the spot in the beginning of October, and was assisted at a later period by Assistant Overseer Campbell, and since that date much work has been carried out and at a moderate expenditure.

14. With considerable difficulty, the old srace was discovered for the greater portion of its length, but the line for some miles in the centre appears never to have been traced. The Sub-Engineer in attempting to work out this line found the gradients to be most irregular, and thereupon determined to make a new trace at once; which was accordingly commenced, and is now completed. Many portions of the two traces descended the ghât parallel to each other for long distances, but so irregular was the remainder of the old trace, that in places it may be seen many feet above the new trace, and then, a short distance farther on, at many feet below it. In this way there is occasionally a difference of 50 feet in a few yards.

15. The average now taken gives a gradient of one in nineteen, which makes the ghât, if we allow for a level portion which winds round the grass hills at the top of the ghâts, between 9 and 10 miles in length. The exact length cannot be as yet ascertained, but from my inspection I believe it will be about 9½ miles. The trace has been most carefully made, and the pegs driven so that they cannot be removed.

16. Of the above distance of ghât about 2 miles at top and rather more than 2 miles at bottom, have been opened out to 8 feet wide, making 4½ miles in all, and leaving about 5 miles of trace, on which the jungle has only been cleared, to be still opened out. On inspecting the lower portion, I examined a new line, and resolved to alter ¼ of a mile in length of the trace opened out, and since my departure, I understand that the work has been completed and forms a great improvement.

17. I was led to believe that the whole distance would be opened out to 8 feet wide this season, as such was the opinion of the Sub-Engineer, but on inspecting the line with that Officer, I found masses of rock and very stony ground, so, I regret to say, that I do not consider that the ghât can be opened out for bullock traffic until, at the earliest, the close of the season of 1862-63. We shall, if possible, improve the present trace by introducing one or two zigzags to avoid rock, but this material is so abundant that I am afraid there is very little choice left to us.

18. Beyond the head of the ghât, a party of Wudders have been engaged in cutting a trace 8 feet wide towards Umbalavilloo; one mile of this has been nearly completed, and the remaining three I propose to have carried out this season, if the work people remain on the spot.

19. Though the working parties left at first from the dread of the jungles, I am glad to report that sickness latterly has not been prevalent, and that the inducement of liberal wages coupled with regular payment, have brought a considerable number of laborers. When I visited

4 *Proceedings of the Madras Government, Public Works Department,*
4th March 1862.

the works, there were 565 coolies employed, and I believe that sufficient gangs will be obtained until much sickness breaks out. In a month or so, we may expect fever to be prevalent, when probably operations must be brought to a close.

20. The coolies are paid very high, viz., 2 Rupees per week for full bodied men, that is, 5 Annas per diem when working, and 2 Annas additional for Sundays. This has certainly made the cost of the work rather high, but not more so than I should be inclined to allow in this locality.

21. The cost to this date has amounted to Rs. 4,483, and if we deduct preliminary expenses, such as tools and hutting coolies, amounting to about Rupees 1,600, the net expenditure for the ghât cutting will amount to Rupees 2,883. There have been $4\frac{1}{2}$ miles of ghât opened to 8 feet wide, the average section of cutting having been 4 feet by 4 feet, or 16 square feet, that is, 48 cubic feet or $1\frac{1}{2}$ cubic yards, per running yard of ghât, which, at the cost of Rupees 623 per mile, will give rather more than 3 Annas per cubic yard. I do not consider this excessive, when the nature and locality of the work and when the cost of tracing the whole line of ghât, are taken into consideration.

22. Though the cuttings stand well at this season, I must inform you that the slopes of the hills are very steep, and that no revetment or drainage of any kind has been provided for, so that all the heavy and difficult work to render the trace permanent and to prevent the excavated soil from being washed away, will have to be undertaken next season.

23. As the prevalence of fever will shortly stop working operations at Karkur, there remains to consider what is the most desirable manner in which Sub-Engineer Bailey and Assistant Overseer Campbell can be employed during the hot months; Mr. Assistant District Engineer König being now in charge of the former Officer's range, and Mr. Assistant District Engineer Brosnahan of Mr. König's range.

24. In the Order of Government, dated 26th November last, No. 2,179, they directed that Rupees 5,000 should be expended in improving the road from Mambât to Karkur, this sum being transferred from Coimbatore, in which District it was originally appropriated for the Goodaloor ghât trace. Nothing has been done on that grant in my District hitherto, owing to the Executive Officers being too fully engaged on the trace, but as soon as the jungles become too unhealthy, I strongly recommend that the working parties should move down to Mambât, and the new line of road be opened out as far as Nelumboor. From March to May, when the monsoon generally commences, the above sum can be expended, and Mr. Bailey is desirous of undertaking the work in this way, the low country near the river though very jungly, not being nearly so feverish as the ghâts. The present arrangements of the executive ranges need not, therefore, be disturbed until the monsoon; but during the heavy portion of the monsoon, from the middle of May to September, that is for four months, I do not know what is the best arrangement to recommend. Mr. Bailey is very averse to returning to his range for only four months, and having to receive and hand over charge again in this short period. Very little work can be executed in these months, and it might perhaps be desirable to allow me to employ him as I thought best during this period, either at the top of the ghâts, or in his own range.

25. In my letter of the 5th September last, embodied in Proceedings of Government, No. 9,126 of the 8th October last, I stated that a bullock track might be opened out during this season. Though this is the case, I would rather endeavour to have a good line traced and opened out to 6 yards wide between Mambât and Nelumboor, and if time be available, carry it on towards Karkur before the monsoon. The present road is available for bullocks, there are no great difficulties met with in using it, so that no immediate pressing want of a new line is felt from this cause.

26. In conclusion, I beg permission, in accordance with my views expressed above, to expend the sum, sanctioned for improving the present road, in opening out a new line altogether, instead of in altering the present road, indeed, I believe, such to be the intention of Government, though Mr. Sub-Engineer Bailey called my attention to the wording of the order.

Proceedings of the Madras Government, Public Works Department, 5
4th March 1862.

From Captain J. BEAN, District Engineer Malabar, to Colonel W. I. BIRDWOOD, Deputy Chief Engineer, Southern Circle, dated Calicut, 6th February 1862, No. 302.

SIR,

1. In reply to a Telegram received yesterday directing me to report on the progress made on the Tambracherri new Ghât, I have the honor to inform you that no great amount of work has been carried out since my report dated 10th of May last, No. 13.

2. The reasons for this are, firstly, owing to the monsoon which commenced in May 1861, having stopped all operations on the trace carried out by the Sappers and Miners until the middle of September last; and secondly, to the other working party of coolies not having commenced blasting and revetting the trace until the middle of December, when an Overseer was available for the work in the room of the Sub-Overseer formerly employed on the ghât, but who had been placed on the sick list. The month of November also was very wet, the monsoon having been unusually protracted.

3. We have had therefore only $4\frac{1}{2}$ months of working season, as yet, for the Sapper Detachment, consisting of about 50 men for duty on the ghât, and $1\frac{1}{2}$ months of coolie labour to the close of January 1862. The principal employment for the working parties consisting of boring and blasting rock, the progress must necessarily be very slow.

4. In my letter referred to above, I mentioned that I found it absolutely necessary to alter the proposed line of the upper portion of the trace, and my opinion on this point was concurred in by the Sapper Officer, who agreed with me that it would be impossible to work out the intended zigzags. In altering therefore the number and direction of these zigzags, I had to pass over a large sheet of rock, which must necessarily cause much time and labour to blast. The Sappers have begun at this work, but the rock is of an extremely hard nature, and with a Company of only 50 working men, which is the average strength of the Detachment, I do not contemplate completing the trace this year or even next official year, unless the strength of the Detachment is increased.

5. The coolies have been learning blasting operations, and we have daily from 30 to 40 men employed with the Jumpers. I have directed the Overseer to increase this number as much as possible, and to offer higher wages, if this inducement is required to make them work. Coolies much prefer taking employment on the Coffee Estates, as they find their work easier, and in the crop season more profitable.

6. If the line originally proposed could have been carried out, I believe my anticipations as to the completion of the bullock trace by the close of this official year would have been realized, but the extent of rock now met with will delay us considerably. Another Company of Sappers, however, if sent to assist the present one ought to complete the work by the close of next season.

7. The lower portion of $5\frac{1}{2}$ miles of ghât has been opened out, and I am improving the upper two miles of it by removing rock and altering the gradient in a few places. This brings us to within 500 feet of the top of the Pass at Luckadie, and to a crossing on the old ghât, leaving 2 miles to complete, or nearly so, the new bullock trace being about $7\frac{1}{4}$ miles long.

8. Of this upper portion, at a gradient of 1 in 18, we shall have 9,000 feet to open out, and of this about 2,000 have been completed, leaving 7,000 more untouched. This was the state when I inspected the works at the end of last month, and as we have three more months of working season this year, I hope to reduce the incompleting portion to one mile in length.

9. The net expenditure to the close of last official year (1860-61) amounted to Rupees 18,397-6. This year the expenditure, deducting recoveries to the close of November, has amounted to Rupees 2,217-8-1. Captain Symes' accounts for December have not been received, but the expenditure for that month will probably amount to Rupees 800. This will make the actual balance on estimate on the 1st December Rupees 5,326, and the probable balance on the 1st January 1862, Rupees 4,526. I ought to mention that the estimate amounts to Rupees 25,940, and that Messrs. Smith and Kennedy have still Rupees 1,011 to recover from former years advances.

6 *Proceedings of the Madras Government, Public Works Department,*
4th March 1862.

10. I am having a platform constructed across the rocks to enable me to prepare an estimate of the exact amount required to complete, and I intend to proceed to Luckadie in the month of March for this purpose. It may take from five to ten thousand Rupees in excess of the balance of the present estimate to complete the bullock trace.

No. 48. ORDER THEREON, 4th March 1862, No. 356.

1. With the above letter the Deputy Chief Engineer, Southern Circle, submits a report from the District Engineer Malabar, regarding the practicability of extending the water communication to some point beyond Mambât with reference to paragraph 5 of the Order of Government, No. 1,073, dated 10th June 1861, and of the progress made on the Karkur Ghât, and also a report of work executed on the Tambracherry Ghât since May last. From the particulars given in the first mentioned report it is evident that it will be next to impracticable to navigate the river or to construct a Canal between Mambât and Karkur, and therefore the proposal need not be any further investigated.

2. The Karkur Ghât is described to be laid out on a gradient of 1 in 19 and to be about 9½ miles in length. Of that distance two miles at the top and rather more at bottom have been opened out to a width of eight feet, making 4½ miles in all, and leaving about five miles of trace still to be cleared. So much rock has been met with, that the District Engineer considers the Ghât cannot be opened out for bullock traffic till the end of 1862-63; but he hopes to be able to avoid the rock in some measure by the introduction of zigzags. The total expenditure, inclusive of tools, huts, &c., has been Rupees 4,483, but the net cost of the excavation has been Rupees 2,883, giving a rate of rather more than three Annas per cubic yard.

3. As the unhealthy season will commence in March, the District Engineer's suggestion to remove the working parties to the road between Karkur and Mambât for the purpose of opening a new line six yards wide between Mambât and Nelumboor, instead of altering the present road, is approved. During the monsoon months the District Engineer will employ Mr. Sub-Engineer Bailey and the Subordinates under him in surveying and tracing the line between Nadkány and Chikkinalla on the borders of Mysore, as it is very desirable that this portion should be opened out as soon as possible.

4. The Government regret to find that the District Engineer cannot report any great progress on the Tambracherry Ghât, the cause apparently being the small quantity of labor procurable, and the great prevalence of very hard rock which has to be removed all along the trace. Application has been made through the Military Department* for an additional Company of Sappers, and with their aid, it is hoped, Captain Bean's anticipation of completing a bullock track by the close of next season may be realized. The lower portion of the Ghât, 5½ miles in length, it is observed, has been opened out, while the upper two miles of it are being improved, leaving two miles still to be completed before the top of the Pass at Luckadie is reached. There being yet three months of the working season, the District Engineer hopes to reduce the length of the unmade portion to one mile by the close of it.

5. The net expenditure to the end of 1860-61, amounted to Rupees 18,397. During the present official year about 3,017 Rupees have been expended up to the end of December, leaving a balance of Rupees 4,526. Owing, however, to the extreme hardness of the rock the District Engineer, it is observed, anticipates a further sum of between Rupees 5,000 and 10,000 will be required to complete the bullock trace. The Government will await the estimates promised in the District Engineer's letter.

(Signed) W. H. HORSLEY, Lieut.-Colonel,
Secretary to Government.

Public Works Dept.

No 356

Proceedings of the Madras Government
Under date 11th March 1862.

Read the following letter from the Deputy Chief Engineer S.C.

Forwards letter from the District Engineer of Malabar reporting on the progress of works on the Tambracherry and Carveoor passes in that District. (Here enter 12th February 1862 No 10575)

With the above letter the Deputy Chief Engineer S.C. submits a Report from the District Engineer Malabar regarding the practicability of extending the water communication to some point beyond Mambât with reference to para 5 of

MD

W.H.

W.H.

of the Order of Government
No 1073 dated 10 June 1861
and of the progress made
on the Parkur Ghaut
and also a report of work
executed on the Tambra-
cherry Ghaut since May
last. From the particu-
lars given in the first
mentioned report it is
evident that it will be
next to impracticable to
navigate the river or to
construct a canal between
Mambat and Parkur,
and therefore the proposal
need not be any further
investigated.

The Parkur
Ghaut is described to be
laid out on a gradient
of 1 in 19 and to be about
9 1/2

9 1/2 miles in length - of
that distance 2 miles
at the top and rather
more at bottom have
been opened out to a
width of 8 feet, mak-
ing 4 5/8 miles in all,
and leaving about 5
miles of trace still to
be cleared. So much
Rock has been met with,
that the District Engi-
neer considers the
Ghaut cannot be open-
ed out for Bullock
traffic till the end
of 1862/63; but he hopes
to be able to avoid the
rock in some measure
by the introduction of
zigzags. The total
expenditure inclusive
of

of Tools, 1448 Rs has been
Expenses 4483, but the net
cost of the excavation has
been Rs 2883 giving
a rate of rather more
than 3 annas per cubic
yard.

As the unhealthy
season will commence
in March, the District
Engineers' suggestion
to remove the working
parties to the Road
between Markur and
Mambâh for the purpose
of opening a new line
6 yards wide between
Mambâh and Melum-
boor, instead of altering
the present Road, is ap-
proved. During the
monsoon months the

District

District Engineer will
employ Mr Sub Engi-
-neer Bailey and the
Subordinates under
him in surveying and
tracing the line between
Mambâh and Chikki-
-malla on the borders
of Mysore, as it is
very desirable that
this portion should
be opened out as soon
as possible.

The Government
regret to find that the
District Engineer cannot
report any great progress
on the Sambracherry
Grant, the cause appa-
-rently being the small
quantity of labor pro-
-curable, and the great
prevalence

prevalence of very hard
Rock which has to be removed
all along the Trace. Applica-
-tion has been made
through the Military
Dept^x for an additional
company of Sappers and
with their aid, it is hoped,
Captain Bean's anticipa-
-tion of ~~opening out~~ ^{completing} of
Bullock Tracks by the close
of next season may be
realized. The lower por-
-tion of the ~~Phonix~~ ^{Phonix} 5 1/2
miles in length, it is
observed, has been opened
out, while 1 1/2 upper
2 miles of it are being
improved, leaving 2 miles
still to be completed before
the top of the Pass at
Pickadix is reached.

There being yet 3 months
of

Proc^x No 255 of 19th
7 Feb/62.

13
of the working season
the District Engineer
hopes to reduce the
length of the unmade
portion to one mile
by the close of it.
The net expenditure
to the end of 1860/61
amounted Rupees 18,397.
During the present
official year about 3017
Rupees have been expended
up to the end of Decr.,
leaving a balance of
Rupees 4526. Owing,
however, to the extreme
hardness of the Rock
the District Engineer,
it is observed, antici-
-pates a further sum
of between Rs. 5000 and
10,000 will be required
to

to complete the Bullock
Trace. The Government
will await the estimate
promised in the District
Engineers letter.

19/11/77

Public Works 1862 Dept.
Pro: of Govt for March

C 4: 856.
Pro: of the Madras Govt.
D/ 4: March/62

From the Chief Eng. S. C. of 22/2/62
C 3: 1958 in Pao.
From the Chief of Malabar of 23/2/62
C 2: 2227 in Pao

Copy in letter to England
dated 31st October 1860 of 1862

N^o 47 & 48.

13 Copies.

To the Deputy Ch. Engr. S. C.
disposed

on Feb 26th

Memo: from Dy. Engr.
Chief Engineer Southern Circle
Submitting a report on the
Progress of works on the
Lambacherry and Harhur
Dams in the District of
Malabar with orders thereon.