(1) Number of pages 88

(2) Date of repair 16.11.87?

(3) Initials of the Referencer Gus

TAMIL NADU ARCHIVES

GOVERNMENT OF TAMIL NADU

PW. DEPARTMENT

G.O. No. / B.P. No: 498 W	Press. / Mis.
Dated 24-2-1886	~~198~~ .

DFN7

to be folded or roughly handled

ves 1--10,005 1 -80.

498/1

GOVERNMENT OF MADRAS.

PUBLIC WORKS DEPARTMENT.

General.
Account.

READ—the following letter from D. C. GORDON, Esq., Examiner, Public Works Accounts, to the Secretary to Government, Public Works Department, dated Madras, 20th February 1886, No. 124 W. :—

I have the honor to submit, for information and orders of Government, notes by Mr. Rainier, Deputy Examiner, of his inspection of the office of the Buckingham Canal division.

2. As regards the state of the accounts work, the office is in fair order, but more care is evidently necessary in the preparation of work abstracts and ten-day reports, and greater punctuality is requisite in the submission of daily and ten-day reports.

3. The Executive Engineer should be required to explain the transaction connected with the cheque for Rs. 200 referred to in paragraph 5. The cheque was drawn on 5th February and was uncashed at date of inspection (10th idem); it was represented to be required for a remittance to the treasury, and yet was endorsed payable to a lascar.

4. The Superintending Engineer should inquire into the delay in payments for labor employed; on an average a month seems to elapse between the dates of employment and payment—see paragraph 9.

5. The very unusual procedure mentioned in paragraph 10 is brought to notice of Government. In my opinion it is irregular and unnecessary.

6. The orders of Government are desirable on the matter noticed in paragraph 12.

7. The Superintending Engineer's notice is necessary to the several points in paragraph 13 (in connection with paragraph 9, clause (*i*). It is not clear why, in the absence of authority, cheques were made payable to, or acknowledgments accepted from, other than Messrs. Master and Company. The absence of recorded measurement sheets in the Executive Engineer's office, and the employment of establishment contrary to the conditions of Code, paragraph 1090, require attention.

ENCLOSURE.

NOTES of inspection by H. RAINIER, Esq., Deputy Examiner, Public Works Accounts. Madras, of the office of the Executive Engineer, Buckingham Canal division, on the 8th, 9th and 10th February 1886.

Major Drake-Brockman, R.E., the Executive Engineer, and C. Bhoojunga Row, the accountant, were present. The office was last examined on the 26th and 30th of September 1884—see G.O., No. 2447 W., of 4th October 1884.

2. There are four sub-divisions—the "southern," under Conductor J. A. Power, Sub-Engineer, extends from the southern end of the canal to the 11th mile north of Madras; the "Pulicat," under the Executive Engineer, from the 11th mile to the 79th mile north of Madras; the "Iskapalle," under Mr. H. M. Bond, Sub-Engineer, from the 79th to the 139th mile; and the "northern," under Mr. F. J. Wilson, Assistant Engineer, from the 139th mile to the northern end of the canal at 196th mile. Each sub-divisional officer has a drawing account.

3. The head-quarters of this division were removed from Madras to Nellore by G.O., No. 2765 W., of 6th November 1884, and again from Nellore to Pulicat by G.O., No. 766 W., of 30th March 1885, at which latter date the sub-divisions were arranged according to paragraph 2.

4. There are three imprest-holders under Mr. Wilson—

	Rs.
(1) Mr. J. Pereira, overseer	400
(2) D. Vencataswami Naidu	200
(3) T. Muthucumaraswami Mudaliar	300
	900
One under the Executive Engineer—	
Mr. R. Enright, supervisor	300
Three under Conductor Power—	
(1) P. Narainasawmy Naidu	
(2) P. Manuvaloo Pillay	500
(3) B. Sarangapany Naidu	300
... ...	50
	850

5. The imprest accounts of three months and the cash-books of two months were checked. The cash balance in the Executive Engineer's office was tested, with the following result :—

	Rs.	A.	P.
Balance as per cash-book	582	10	0
Deduct imprests	350	0	0
	232	10	0
Counted—			
Cash	32	12	0
Cheque	200	0	0
	232	12	0
Surplus cash ...	0	2	0

The cheque for Rs. 200 was explained to have been drawn on 5th February 1886 for payment into treasury of miscellaneous receipts. The amount had been entered in the cash-book on the credit side in the column "bank or treasury" and again on the debtor side in the "cash" column as "cash from treasury," and formed a portion of the cash balance. The irregularity of this is obvious. If the cheque had been transacted at all so as to warrant its appearance in the cash-book, it would not have been there in the cash-chest. If it had been paid into the treasury for certain miscellaneous receipts, as stated in the cash-book, it would not have been cashed, so as to appear as "cash from treasury" on the debtor side; nor should it, if intended as "miscellaneous receipts paid into treasury," have been endorsed as it was "pay to lascar Kuppusawmy," unless the accountant's explanation that *all payments into treasury of miscellaneous receipts are made by cheque so endorsed* is correct, in which case the practice is open to objection.

6. The rules for payment into treasury of miscellaneous receipts are that the Executive Engineer, unless paying in such items as they come to hand, should (Code, paragraph 1894, as modified by standing order, No. 199 of 1884) by the end of the month cover all such items by a cheque which he should make payable to himself and endorse it with the words "received payment by transfer credit to the Public Works Department." The cheque should not be entered in the Executive Engineer's cash-book till actually paid away (*vide* direction 5 at back of form M 3) but as soon as paid away, it would appear in the creditor column "bank or treasury" and the entry in the column "head in cash abstract book" would be "payment into treasury." It would not appear on the debtor side of the cash-book. In the case of this division, the nearest treasury is Ponnéri, about 12 miles off, and the cheque, after being drawn at Pulicat, was no doubt at once entered in the cash-book pending its intended despatch by Kuppusawmy lascar to the treasury.

7. The two annas surplus cash (paragraph 5) was explained by the accountant to have arisen from incomplete payment of voucher No. II (of February 1886) for dieting the office cat. Annas 8 for this had been entered in the cash-book as *paid*, but two annas of this remained unpaid. The reason could not be explained.

8. The usual cash balance is about Rs. 50 at Pulicat. The sub-divisional officer's cash books are received in the divisional office with fair punctuality. The cash-books are generally

498/2

neat and well kept, and appear to be checked, but the accountant should leave no doubt of his having done this himself, by initialling and dating every voucher examined.

9. Certain payments for petty supervision and for labor came under notice, viz. :—

(*a*) *2nd-class rest-house at Kanuparthy*.—October 1885. Carpenter, as per voucher No. 71, pay from 21st to 31st August 1885, paid on the 25th October 1885.

(*b*) *Flood-gate, left bank, Pálár river*.—October 1885. Temporary establishment charged to this work for September, paid on 21st October 1885.

(*N.B.*—Date of payment not stated on the voucher.)

(*c*) *Diversions to canal from Coromandel to Thettupet*.—September 1885. Labor from 25th to 31st July 1885, paid on 30th August 1885.

(*d*) *Flood-gate at Rompera*.—September 1885. Labor from 1st to 10th August 1885, paid on the 14th September 1885; stone-cutters for July 1885, paid on 13th September 1885.

(*e*) *Flood-gate at north bank of Gundlakamma*.—September 1885. Labor from 21st to 31st July 1885, paid on the 5th September 1885.

(*f*) *Constructing flood-gate on south bank of Moodigundy river*.—September 1885. Labor 11th to 20th August 1885, paid on 10th September 1885.

(*g*) *Constructing two outlets at 191st mile*.—September 1885. Labor 1st to 10th August, paid on 9th September 1885.

(*h*) *2nd-class rest-house at Kanuparthy*.—Labor employed 11th to 20th November, paid on 24th December 1885; labor on 21st to 30th November, paid for on 16th January 1886.

(*i*) *Constructing flood-gates-south bank of Ennore backwater*.—Contract certificate for work done up to 24th December 1884, paid on the 5th August 1885.

N.B.—In the memorandum of payments made (office copy), there are alterations increasing the original figures, initialled only by a Mr. Moscrop, said to be agent for the contractors, not by the Executive Engineer.

10. The system of obtaining acquittance from petty contractors or piece-workers in this division is perhaps open to objection. The sub-divisional officer prepares the bill for the contractor as regards *total value of work done*, and gets the contractor's stamped receipt affixed *before any payment is entered*; the check is then drawn and posted to the contractor's address under registered cover. It seems very doubtful whether the blank receipt by contractors, as above described, is a legal acquittance—it is at all events quite insufficient. The Executive Engineer stated that he has adopted this method in order to pay contractors direct, and without the aid of sub-divisional officers (memorandum of the Chief Engineer, Public Works Department, No. 461, of 7th September 1881), and at present the Assistant Engineer in charge of northern sub-division is the only sub-divisional officer who pays contractors. A proper acknowledgment by a contractor should show the sum of money in writing as well as in figures, and should, when the payee signs in the vernacular, bear in his handwriting in the vernacular the sum of money he acknowledges; moreover, payments of this kind should generally be witnessed. The acknowledgment now obtained through the post office for registered covers sent to contractors might prove insufficient in the event of legal proceedings.

11. At Pulicat, Dugarázpatnam, Mypaud, Iskapallo, Tammalapenta and Ramapatam, the loading and unloading of boats is restricted to a certain part of the canal bank, and a tax of one anna per ton on all traffic is levied under rule 17 of the canal Navigation rules, the object being to erect wharves at places where the traffic proves such as to justify the expense. The tax is collected by a clerk on Rs. 10 per month, who keeps a register. The recoveries at Pulicat in January, Rs. 58-10-0, were checked. The system in force for remitting such collections to sub-divisional officers was examined and found sufficient.

12. There is a register of contract and piecework agreements. With reference to Code, paragraphs 1605 and 1606, it is not surely within rule for an Executive Engineer to himself accept tenders for a schedule contract (form M. 174) running up to Rs. 80,000 simply because the contract is not for any specific lump sum and can be cut short at any time by the Executive Engineer: the contract for *improvements to the canal basin at Madras*, Rs. 81,243, was submitted under the above paragraphs to the Chief Engineer, Public Works Department, for approval, but the Superintending Engineer, II Circle, in his letter, No. 87 B.C., of 11th May 1885, ruled that no such approval is necessary in future.

The contract for a lump sum, form M 176, gives the Executive Engineer almost as much power to stop the contractor's work at any time—see paragraphs 14 and 20 of that form.

13. The work accounts (work vouchers) rendered to the Examiner for two months in 1885 were compared with the register of works; measurement of work done as far as recorded was examined with bills for such work, about one hundred in number; work abstracts for several

months were overhauled, and vouchers for payments scrutinised, the following points being noted :—

(1) Certain papers said to be in support of work on the Ennore diversion canal by Master and Company, contractors, show measurements, but no date of measurement or page of measurement book, or symptom of having been checked or compared with anything else, nor any date, though the figures were found to refer to March 1885.

(2) Messrs. Master and Company's work on the *flood-gate at south bank of Ennore back-water*, as also other work by that firm, appear to have been paid for to Mr. Moscrop, the agent of above firm ; but though Mr. Moscrop's authority by power of attorney to so receive money and to represent Master and Company was asked for by the Executive Engineer on the 5th November 1885, and again on the 11th January 1886, it was never sent, as requested, for registration in the Executive Engineer's office. Except in the case of well known firms, it would be well in future to insist more strictly upon the production of such authority, failing which, or the firm's known signatures, the signatures of all the partners would appear necessary to the final settlement.

(3) Measurement sheets for work paid for in the northern sub-divisional office do not come up to the Executive Engineer's office : this seems to cut off the Executive Engineer from an important means of check.

(4) Standing order, No. 158 of 1885, affecting rule No. 3 at back of form M 19, is not yet adopted and should be attended to now.

(5) With reference to standing order, No. 146 of 1885, certain petty supervision has been employed contrary to the conditions Nos. 1 and 2 (Code 1090) under which establishment can be charged to works. There are 14 men so employed and their salaries aggregate Rs. 500 per month and the Superintending Engineer has been applied to to sanction the arrangement as it stands. But there is apparently nothing for it but to apply for sanctioned temporary establishment sufficient to cover all petty supervision other than allowed under above paragraph.

(6) *Constructing flood-gate, south bank of Pyderu.*—September 1885. Rs. 574-15-11 is stated in the part II of work voucher to be for daily labor, but was found to be some portion of it (Rs. 37-9-1) for materials purchased.

Work abstracts in many cases are not well prepared, and in most of these documents part IV has not been verified by the party responsible for the materials.

(8) Ten-day reports require much more care and punctuality, particularly as regards the northern sub-division.

Daily reports for several works had not, at the date of inspection, been received for any period of January 1886, hence the lateness of work vouchers received in the Examiner's office.

(9) There are perhaps few works for which the normal cost system of accounting could be used, but it has not yet been tried.

14. The rate-book contains rates revised up to September 1885.

15. The budget registers are in fair order.

16. In the schedule of buildings rented and available, the Executive Engineer's office, rented for Rs. 40 per month, should now appear.

17. Rs. 2-6-11 is due to M. Munusawmy, a contractor, a long time, the man being lost sight of. Efforts are being made to find him ; meanwhile, the money is in the deposit account. The pass-books for all Savings Bank deposits were examined.

18. The schedule of miscellaneous advances contains nothing noteworthy.

19. The accountant is sufficiently assisted.

ORDER—dated 24th February 1886, No. 498 W., Public Works.

Communicated to the Superintending Engineer, II Circle, for the information of the Executive Engineer, Buckingham Canal division, and for such further action as may be necessary.

2. The Executive Engineer will explain the transaction connected with the cheque for Rs. 200 referred to in paragraphs 5 and 6 of the notes. Explanation should also be given respecting the surplus cash noticed in paragraph 7 of the notes.

3. From paragraph 9 of the notes, considerable delay appears to have occurred in sundry payments for labor. The Superintending Engineer will inquire into the matter, and take the necessary steps to insure more speedy payments.

4. The system adopted for obtaining acquittances from petty contractors or piece-workers, brought to notice in paragraph 10 of the notes, is irregular and should be discontinued. The Superintending Engineer will submit a report on the subject of paragraph 12 of the notes.

5. The Superintending Engineer's attention is specially directed to the various matters enumerated in paragraph 7 of the Examiner's letter, and he will submit the Executive Engineer's explanation of the circumstances under which payments were made to Mr. Moscrop in the absence of the necessary authority.

6. The state of the divisional accounts, as disclosed by the foregoing report, cannot be considered satisfactory. More care and punctuality are necessary in the accounts work, and room for improvement exists in other matters.

(True Extract.)

Major, R.E.,
Under Secy. to Govt., P.W.D.

To the Superintending Engineer, II Circle.
" Examiner, Public Works Accounts.

Exd. P. L. Pereira.
Spare Copies

GENERAL.
ACCOUNT.

Govt. of {1886} Madras

PUBLIC WORKS.

Dated February, 24th.

Recd. *E*

G.O., 24th Feb. 1886, No. 498 W

FEBRUARY.

Office of the Buckingham Canal Division

Passing orders on the notes of inspection of the — by the Deputy Examiner, Public Works Accounts.

498
4

GOVERNMENT OF MADRAS.

PUBLIC WORKS DEPARTMENT.

General.
Establishment.

ORDER—dated 10th January 1885, No. 97 W., Public Works.

The headquarters of the Buckingham Canal division having, under G.O., No. 2765 W., dated 6th November 1884, been fixed at Nellore, in the II Circle, His Excellency the Governor in Council considers that, for this and other reasons which have been explained by the Chief Engineer, it will be more convenient to incorporate the division into the II Circle. The transfer from the V Circle will accordingly be arranged as soon as practicable by the Superintending Engineers concerned.

2. His Excellency the Governor in Council is also of opinion that it would be highly advantageous to attach to the V Circle the North Arcot division, the irrigation systems of which are so intimately connected with those of the Chingleput division. This arrangement would, moreover, bring the configuration and size of the IV Circle within more workable limits.

The transfer will accordingly be effected by the officers concerned.

(True Extract.)

Colonel, R.E.,
Secretary to Govt., P.W.D.

To the Examiner, Public Works Accounts.
To Superintending Engineers.
To the Chief Engineer for Irrigation.
„ Revenue Department.
„ Financial „

Bxd. E. Fernandez.
Spare Copies

GENERAL.
ESTABLISHMENT.

Govt. of (1885) Madras

PUBLIC WORKS.

Dated January, 10th.

Recd. *Encl.*

G.O., 10th Jan. 1885, No. 97 W.

JANUARY.

Rearrangement of Divisions

The Buckingham Canal division transferred from the V to the II Circle, and the North Arcot division transferred from the IV to the V Circle.

D. No. 9169

Recd. 4/11/84

488/5

Office note No. 238

No. 2765 W. Septr. 6th 1884

To W.

Major Drake Brockman has represented that the works on the Buckingham Canal near Madras have so far advanced that it will be convenient to change the Head Quarters of ~~Madras~~ the Division from Madras to Nellore.

Considering the importance of pushing on the Canal works from the Nellore South ends & the large amount of important work yet to be done north of Madras, I agree with Major Drake Brockman in considering that this change is very desirable and I would therefore suggest that from the 1st Jany. 185 Nellore should be the Head Quarters of the Buckingham Canal Division.

[illegible]
1/11/84.

W

Despd. 7-11-84

H.R.D.

I entirely approve of the proposed change in head quarters of the Buck: Canal Division.

Is approval of Govt: necessary?

LL

3-11-84

To W

The approval of Govt. seems to be necessary. Supdg: or Chief Engineers are not specially invested with the power of fixing the head quarters of Divisions.

K.S

4.11.84

No. 2765 W

PUBLIC WORKS DEPARTMENT.

428/7

PROCEEDINGS OF THE MADRAS GOVERNMENT.

UNDER date the

READ the following

Office Note from the Chief Engineer for Irrigation } (H.E. No: 288 of 1st Novr/84)

The head quarters of the Buckingham Canal Division will ~~on, and after, the 1st January 1885~~ be fixed at Nellore from 1st January 1885.

W.S.
4.11.84

S.E. V Circle ✓
Exor I ✓
Ex: P.W. Accounts ✓

Despd 7-11-84

Note.

1288/8

In order dated 6-11-84, N° 2765 W, the Govt directed that, from the 1st January 1885, the head quarters of the Buckingham Canal Division should be fixed at Nellore, — and it seems highly desirable now that the Division in question should, after the end of the current Official year, be transferred from the V to the II Circle

The reasons for this suggestion are that the head quarters of the Canal Division are now situated within the II Circle, — and that the bulk of the work which remains to be executed lies to the north of Pulicat. On both these grounds, it will be far more convenient that the Division should be attached to the II Circle; and it is expected that the Dy.S Engineer of that Circle will be able to exercise a more thorough supervision over the progress of this important line of communication than the Dy.S Engineer of the V Circle has found it possible to exercise. It may further be mentioned that the II Circle is the smallest & most compact

in the Presidency; and that, although five Divisions are now included within its limits, one (Godivada) is a temporary Division, and another (Sangum) will probably be merged in the Nellore Division before long.

Following upon the transfer of the Canal Division to the II Circle, it is suggested that the North Arcot Division should be transferred from the IV to the II Circle.

The reasons for this suggestion are that the IV Circle is now inconveniently unwieldy in extent & shape, as will at once be seen from the accompanying map. It extends along the west coast from Kondapur to Cochin, more than 250 miles; and from east to west about 350 miles. On the other hand, the extent of the V Circle is small; and, with North Arcot added and the Canal taken away, it will remain much smaller than the IV

1878/9.

Circle. But the most important reason for the transfer is the intimate manner in which the rivers & irrigation systems in North Arcot are connected with those in Chingleput, a connection which last year's floods have made more prominent. It seems to be on all grounds undesirable that the important irrigation works in North Arcot should remain under other control than that of the Supt. Engineer who is responsible for the safety of the Town of Madras and of the irrigation works in Chingleput.

[illegible]
9-1-83.

To E.I. for favour of opinion.

Noting agm^t close proposals.

[illegible]
9/1/83.

No 97 W

PUBLIC WORKS DEPARTMENT.

488
10

PROCEEDINGS OF THE MADRAS GOVERNMENT.

UNDER date the 10 January 85

~~READ the following~~

The head quarters of the Buckingham Canal Division having under G.O. 2765 W dated 6th November 1884, been fixed at Kellane in the II Circle, His Excellency the Governor in Council considers that, for this and other reasons which have been explained by the Chief Engineer, it will be more

convenient to incor=
=porate the Division
into the II Circle. The
transfer from the V
Circle will accordingly
be arranged as soon
as practicable by the
Superintending Engi=
=neers concerned.

2. His Excellency the
Governor in Council
is also of opinion
that it would be
highly advantageous
to attach, to the V
Circle, the North Arcot
Division, the irrigation
systems of which

are so intimately
connected with those
of the Chingleput Divi=
=sion. This arrange=
=ment would more=
=over bring the con=
=figuration and size
of the IV Circle within
more workable limits.

3. The transfer will
accordingly be effected
by the officers con=
=cerned.

[initials]
10.1.85

Ex: Mrs. [?]
S. Do
C. Gond.
Rev: Dept.
Finl. Dept.

[illegible] 10/1/85

R.S.

Govt. of (1885) Madras.

PUBLIC WORKS.

Dated 12-1-85

Recd.

Encl.

G.O. 10 Jan 1885 No. 97 W.

~~Break~~

Rearrangement of Divisions

The Buckingham Canal Dn transferred from the 5th to the 2nd Circle and the N. Arcot Dn transferred from the 2nd to the 5th Circle.

180/12

12/4 PM

488/13

GOVERNMENT OF MADRAS.

PUBLIC WORKS DEPARTMENT.

General.
Establishment.

Read—the following paper :—

No. 18 E.W.

Note by the Chief Engineer for Irrigation.

On my recent inspection of the Buckingham canal I saw the necessity of decreasing the size of the sub-divisions if work is to be carried on properly. At present the canal is divided into three sub-divisions—the northern, upwards of 100 miles long, being under the Assistant Engineer, Mr. Wilson; the centre, upwards of 90 miles long, under the Executive Engineer, Major Drake-Brockman; and the 3rd, the southern part of the canal, under Sub-Engineer Power.

2. I propose now to make four sub-divisions; the limits of these are not finally settled, but I have referred to the Superintending Engineer for his opinion: this would make each sub-division rather over 60 miles in length, quite enough when new work is in hand considering the speed at which boats travel here. The new sub-division I would place in charge of Sub-Engineer Mr. Bond, who is at present under Mr. Wilson. The only additional establishment required would be one overseer, who should be a man of some experience, and the southern division office and overseer's establishment. It is suggested that if possible sanction should be accorded to this change and an overseer posted at once, the Superintending Engineer being called on to report the final limits and designations of the sub-divisions.

(Signed) J. O. HASTED, Colonel, R.E.,
Chief Engineer for Irrigation.

Chepák,
7th February 1885.

To the Chief Engineer, Public Works Department.

Order—dated 14th February 1885, No. 355 W., Public Works.

The proposals of the Chief Engineer for Irrigation are approved.

2. The Superintending Engineer, II Circle, is authorised to engage the requisite sub-divisional office establishment. An additional overseer will be posted to the canal by the Chief Engineer, Public Works Department.

3. The establishment of the sub-division will be permanent, but the additional overseer and his clerk will be on the temporary establishment.

(True Extract.)

Major, R.E.,
Under Secy. to Govt., P.W.D.

To the Superintending Engineer, II Circle.
" Examiner, Public Works Accounts.
" Chief Engineer for Irrigation.
" " " Public Works Department.

Exd. A. Grubert.

Spare Copies

GENERAL.
ESTABLISHMENT.

Govt. of 1885 Madras.

PUBLIC WORKS.

Dated February, 14th.

Recd. *Encl.*

G.O., 14th Feb. 1885, No. 355 W.

FEBRUARY.

New Sub-division, Buckingham Canal

Orders approving of the formation of a —

GOVERNMENT OF MADRAS.

PUBLIC WORKS DEPARTMENT.

General.
Establishment.

READ—the following papers :—

From J. W. RUNDALL, Esq., Superintending Engineer, II Circle, to the Chief Engineer for Irrigation, dated Masulipatam, 4th March 1885, No. 46-B.C.

I have the honor, with reference to G.O., No. 355 W., of the 14th February 1885, to report that I have arranged with the Executive Engineer, Buckingham Canal, that the charges of the canal shall be sub-divided as follows :—

Limits of each Sub-division and Head-quarters.	Length of each Sub-division.	Name of new Sub-division.	Name of the Officer in charge of the Sub-division.	Remarks, &c., showing the Overseers required for each Sub-division.
196th mile to 139th mile, Ramapatam.	57	Northern.	Mr. F. J. Wilson, Assistant Engineer.	Two temporary Overseers should do duty in this sub-division. These men will be made imprest-holders. A writer for each of them has been applied for in the temporary establishment for 1885-86.
139th mile to 79th mile, Iskápalle.	60	Iskápalle.	Mr. H. M. Bond, Sub-Engineer.	Overseer Mr. Noronho will assist the sub-division officer.
79th mile to 11th mile, Pulicat.	68	Pulicat.	Under direct charge of the Executive Engineer.	Mr. R. Enright, Supervisor, will be an imprest-holder under the Executive Engineer in this sub-division.
11th mile to the end of Southern Canal, Madras.	77	Southern.	Conductor J. A. Power, Sub-Engineer.	An Overseer has been applied for and when supplied will have his head-quarters at Sadras.

2. I request you will be good enough to obtain the sanction of Government to this arrangement and to its introduction from the 1st April.

3. There is another point in connection with the Buckingham Canal, regarding which, I think, further consideration is required, viz., the position of the head-quarters.

4. In G.O., No. 2765 W., of the 6th November last, Nellore was fixed as the head-quarters from the 1st January 1885, and the office has accordingly been moved there ; but the Executive Engineer informs me that he is unable to get a bungalow there. When I was last at Nellore, I know that every available bungalow was rented.

5. I am not aware of the reasons upon a consideration of which Nellore was fixed on as suitable for the head-quarters, but it has many disadvantages.

6. It is fourteen miles from the nearest point on the canal (Máipad), and every journey into Nellore and back is so much time lost by the Executive Engineer. It would for this reason be much better to have the head-quarters on the canal, if it can be arranged.

7. Two places appear suitable—Kistnapatam and Pulicat. At the former place, accommodation for the Executive Engineer and for the office would have to be built. I am informed that a good site west of the canal can be obtained. The money allotted

for a rest-house at Kistnapatam might be spent on an office, but a bungalow at a cost of not less than Rs. 10,000 would have to be built for the Executive Engineer. Kistnapatam is 103 miles from the northern and 159 miles from the southern end of the canal. There is a Post Office at Muthukur, about 2 miles off, and the office establishment would be able to get accommodation in the villages of Kistnapatam and Muthukur, both of which are within 2 miles of the site where office and bungalow could be built.

8. Major Brockman considers that the office should be at Pulicat, where a suitable building could be rented cheaply and the clerks find accommodation for themselves and families. The Executive Engineer could live at Coromandel, where a good bungalow could be rented. The distance between Coromandel and Pulicat is $1\frac{3}{4}$ miles. There is a ferry between, but the Executive Engineer could go over to office in his boat Coromandel is 27 miles from Madras, and the distances would be 93 and 169, respectively, from the southern and northern ends of the canal, but it will almost be equi-distant from the ends of those sub-divisions of which subordinates will be in charge.

9. On the whole, therefore, I am inclined to think Pulicat will be the best place for the head-quarters.

10. There is no telegraph office either at Kistnapatam or Pulicat, but this is an objection which applies to every place on the canal, with the exception of Madras.

No. 40 E.W.

Note by the Chief Engineer for Irrigation.

In G.O., No. 355 W., dated 14th February 1885, the formation of four sub-divisions for the Buckingham Canal was approved. The Superintending Engineer now reports the limits of the sub-divisions and the names of the officers who are to be in charge. The arrangements are approved.

2. The proposal to fix the head-quarters of the canal at Pulicat from the 1st April 1885 is also, under the circumstances represented, approved.

CHEPÂK,
25th March 1885.

(Signed) J. O. HASTED, Colonel, R.E.,
Chief Engineer for Irrigation.

To the Chief Engineer, Public Works Department.

ORDER—dated 30th March 1885, No. 766 W., Public Works.

The proposals of the Superintending Engineer, recommended by the Chief Engineer for Irrigation, are sanctioned.

2. It is understood that Nellore was fixed as the division head-quarters on Major Drake-Brockman's recommendation.

(True Extract.)

(Signed) J. SHAW-STEWART, Colonel, R.E.,
Secretary to Govt., P.W.D.

To the Superintending Engineer, II Circle.
" Chief Engineer for Irrigation.
" Examiner, Public Works Accounts.

Exd. A. F. Aaron.
Spare Copies

for a rest-house at Kistnapatam might be spent on an office, but a bungalow at a cost of not less than Rs. 10,000 would have to be built for the Executive Engineer. Kistnapatam is 103 miles from the northern and 159 miles from the southern end of the canal. There is a Post Office at Muthukur, about 2 miles off, and the office establishment would be able to get accommodation in the villages of Kistnapatam and Muthukur, both of which are within 2 miles of the site where office and bungalow could be built.

8. Major Brockman considers that the office should be at Pulicat, where a suitable building could be rented cheaply and the clerks find accommodation for themselves and families. The Executive Engineer could live at Coromandel, where a good bungalow could be rented. The distance between Coromandel and Pulicat is $1\frac{3}{4}$ miles. There is a ferry between, but the Executive Engineer could go over to office in his boat Coromandel is 27 miles from Madras, and the distances would be 93 and 169, respectively, from the southern and northern ends of the canal, but it will almost be equi-distant from the ends of those sub-divisions of which subordinates will be in charge.

9. On the whole, therefore, I am inclined to think Pulicat will be the best place for the head-quarters.

10. There is no telegraph office either at Kistnapatam or Pulicat, but this is an objection which applies to every place on the canal, with the exception of Madras.

No. 40 E.W.

Note by the Chief Engineer for Irrigation.

In G.O., No. 355 W., dated 14th February 1885, the formation of four sub-divisions for the Buckingham Canal was approved. The Superintending Engineer now reports the limits of the sub-divisions and the names of the officers who are to be in charge. The arrangements are approved.

2. The proposal to fix the head-quarters of the canal at Pulicat from the 1st April 1885 is also, under the circumstances represented, approved.

CHEPÂK,
25th March 1885.

(Signed) J. O. HASTED, Colonel, R.E.,
Chief Engineer for Irrigation.

To the Chief Engineer, Public Works Department.

ORDER—dated 30th March 1885, No. 766 W., Public Works.

The proposals of the Superintending Engineer, recommended by the Chief Engineer for Irrigation, are sanctioned.

2. It is understood that Nellore was fixed as the division head-quarters on Major Drake-Brockman's recommendation.

(True Extract.)

(Signed) J. SHAW-STEWART, Colonel, R.E.,
Secretary to Govt., P.W.D.

To the Superintending Engineer, II Circle.
" Chief Engineer for Irrigation.
" Examiner, Public Works Accounts.

Exd. A. F. Aaron.
Spare Copies

GENERAL.
ESTABLISHMENT.

Govt. of [1885] Madras.

PUBLIC WORKS.

Dated March, 30th.

Recd. *Encl.*

G.O., 30th March 1885, No. 766 W.

MARCH.

Buckingham Canal

Arrangements of the limits of the sub-divisions of the — and the officers placed in charge, and proposal to fix Pulicat as the head-quarters, approved.

1428
W

GOVERNMENT OF MADRAS.

PUBLIC WORKS DEPARTMENT.

Irrigation.

READ—the following paper:—

Notes of Inspection by the Acting Chief Engineer for Irrigation, Buckingham Canal and South Arcot Division, December 1883.

Buckingham Canal, South of Madras.—Lock on Adyar, N. Bank.—Masonry work almost completed; rough stone revetment in chamber only partly done; gates not put up. This lock is to have double gates on the inside to meet the Cooum and Adyar water; the coping of the heel post buttresses is of cut granite, but the buttresses are built of concrete, partly faced with blocks of concrete made with Portland cement, the gate recesses and hollow quoins being brought up smooth with Portland cement. It remains to be seen how the cement will stand; should there be any friction at the heel parts of the gates, it does not seem certain that the cement work, which is cheapest at first, will prove economical in the long run, but it is quite worth trying; slight cracks were noticed in some parts on the surface of the cement, and here, it is feared, it will not stand. Material is said to be ready for completing the work by January.

The blocks are made of 1 Portland cement, 3 sand, and 6 broken granite (rather fine); the concrete, of which the main part of the abutments is found, is 1 lime, 2 surkhi, 2 sand, and 6 broken stone. The ordinary concrete is said to set and remain quite hard under water, but when exposed to the salt air begins to crumble, hence all exposed portions are coated with Portland cement. The lock gates were made at Dowlaishweram; the balance beams are unnecessarily heavy near the gates, and the planking 3 inches is thicker than necessary. The anchors are not of the best patterns but it is understood that the designs were made some time since. A 6-inch centrifugal pump with 10 H. P. engine is on the work, and pumping will soon be recommenced to complete the chamber revetments; while the engine is standing idle, it should be attended to, and exposed portions liable to rust tarred or painted.

2. *Lock on S. Bank of River.*—This lock is completeted and looks well; the quoins here are of cut granite but the heel post buttresses of concrete are plastered with surkhi plaster, and only portions are covered with Portland cement. This plaster is cracked and will certainly come off, when Portland cement will have to be used. The revetment to chamber-wall has sunk in places from saturation of the earth in rear while new, and will need repacking; the upper portion of it has been plastered, and this will always look untidy; it should be neatly repacked, and the berm at top sloped to the rear and drained through the small embankment. Below the lock the ground wants to be levelled and made tidy.

The lock establishment quarters are very good; the lascars, who have but little to do, should be made to keep the ground in the neighbourhood of the lock clear from prickly pear and croton, and the establishment should not, on any account, be allowed to keep cattle and goats in dirty sheds close to the quarters.

So long as goats are allowed near the work no trees can be got to grow, and the establishment should be expected to plant and maintain trees below the lock on the canal berms for some little distance.

3. *Canal Southwards.*—The first four miles of the canal are very difficult to maintain; the cutting is considerable in places, the banks are thrown far back, and the soil is white saltish earth which washes down into the canal with any rain. In carrying out the improvement estimates here, the best plan will be to cut the side-slopes, as estimated, at 4 to 1, make up the berms, slope them away from the canal, and drain them back under the banks. The top of the banks should also be levelled and drained to the rear. If the margin within the berm or the second step, which is observable in some places, has any width at all, it also should be drained backwards and the drainages brought into the canal at selected places. In any case it is feared this portion of the canal will always be troublesome.

An iron drainage syphon, noticed not far from the lattice bridge, is not used and might be taken up; the pipes being used for drainage under the banks, or, if not suitable, disposed of.

The lattice bridge, which, it is understood, is in charge of the Local Fund Board, seems in want of a coat of paint.

After the 8th mile, the canal enters a backwater and may be said to run in backwater up to the Seven Pagodas and beyond to the bar at Edeiyur. The completion estimates allow for cutting a new channel to the east of the backwater throughout. Near Sadras tamarind trees and korkapally are growing well on the banks. The casuarina trees, which were planted many years ago, have all been lately cut for firewood; they should be replaced and some efforts made to secure and extend the plantations, which will always pay. Of late years apparently these plantations have been neglected and they are objected to because they keep off the wind and prevent boats sailing; but though they may do this, they also protect boats going against the wind from its effect, and they are in other ways beneficial. The fine masonry bridge at Sadras, in the 30th mile, is much in need of plastering both on the abutments and the arch near the springing; it is in charge of the Local Fund Board. Some trees on the tow-path below the bridge require cutting and prickly-pear is extending, which should be removed.

4. The Pálár crossing, in its present state, is a great obstacle to traffic. It commences at 38 miles and ends at 40 miles (old mileage from Adyar). There are two main branches of the river, and a bar is now open near the north side and another near the south side; the passage runs close to the north bar above which it crosses and then through an island by a tortuous channel into the other main branch. The completion estimates provide for bringing the channel into the river on the north by a cut called Fraser's channel, some distance inland, from thence the crossing of the north branch will be direct to the island on which the south embankment will be brought across the south branch with the view of washing away the greater part of the island and closing the south branch permanently. Judging from what could be seen of the river on crossing with both bars open, this should be feasible, and the waterway left to the river should be ample. The embankments are now in progress on both sides of the river and the bank across the south branch will be formed very shutty so as to be consolidated before next year's floods come down the river.

5. From the south bank of the Pálár the canal was first cut during the famine and has now been completed to 20 feet bottom-width and slopes 2 to 1. In the upper portions, where there is considerable cutting, there are two berms, one about 3 feet above ordinary H.W. and the other 3 feet higher; the entire inside slopes have been turfed and planted with camels-foot creeper and a rough coarse grass at the water's edge; the gullying has been very trifling, and the canal is well maintained and looks very well; the depth seems to be about 4 feet below M.S.L. Ramps at villages have been well laid out, and are kept up, and, altogether, considering the sandy soil, the slopes are in very good order.

The upper berms here might well be planted, and it would seem that tooma trees would grow without difficulty here; there are already some few trees growing naturally, and the plantation should be extended. Croton is beginning to grow in several places and should be eradicated, also the silk cotton plant, which spreads rapidly. This part of the canal having been completed should have mile coolies kept on it, whose duty would be not only immediately to fill any gullies formed by rain, but to pull up croton

428/17

and other objectionable growth, and at the proper season to plant seeds of such trees as are found suited to the soil, and to keep cattle from destroying them. From the Pálár river the mile and furlong stones are cut into the new canal mileage, which starts from St. Mary's bridge, Madras.

6. Near the 50th milestone there is an inlet where the surplus of a tank comes in; a rough stone flooring with wings was put down here, but owing, it is stated, to the villagers having made a cut above, which brought the rush of the water against one side of the inlet, it has been breached and probably will require extending; the water which came in has apparently found its way out at a cattle-crossing a little below the inlet, and it seems probable that a rough stone floor will be required here to allow the water to spill out when a flood gets into the canal.

7. Near the 53rd milestone the canal runs into a swamp and beginning of backwater; but here the sides have been planted with grass and stand well. At 53½ mile it runs into the backwater which widens out into a wide deep sheet of water running immediately within the high blown sand hills; this is a grand backwater which runs inland for many miles, passing close to Seyyur near which place there are salt pans and from which a metalled road leads into the interior, crossing the railway near the Acharapák railway station; when the Pálár river-crossing is improved, it may be advisable to open a canal along this backwater, that is, simply deepen the backwater and make a tow-path up to Seyyur. Salt should then be brought to Madras by canal.

The ridges of sand dunes at this point are higher and better defined than any seen to the south of Madras. Four distinct ridges can be seen running in a direction more north and south than the coast which here has a north-easterly run; the consequence is that the ridges tail into the sea and the canal must inevitably be cut through one or more; this is the arrangement that has been adopted in the extension to Merkanam; the canal leaves the backwater at 58 miles 3 furlongs, about ½ a mile north of the village of Mudaliyarkuppum, at right angles by a cut through the second ridge, the first ridge tailing into the sea near the bar opposite the village; it then turns almost at right angles to the left and runs in the hollow between the second and third ridges for about ½ a mile when it passes through the third ridge in a perfectly appalling cutting of 9 yards through pure fine sand; behind the third ridge the country is much higher and the canal consequently has to be carried in very considerable cutting for a distance of about 3 miles. Inside of these ridges there commences here a very considerable extent of cocoanut plantations (for miles there is a perfect forest of them, and the produce was being collected on the canal banks to be sent to Madras). I am informed that the average rate paid for this cutting was 1 anna 5 pies per cubic yard which, considering the height the spoil has to be raised, is very moderate; the original cost of the canal has not therefore been so great as might have been expected, but the maintenance seems to me a serious question. The whole length of the cutting is just 4 miles or to 62 miles 3 furlongs, where the canal enters the Merkanam backwater, and the depth of cutting varies from 2 to 9 yards. This portion of the canal was taken up after the famine and has only lately been completed; it has evidently been carefully designed, laid out, and executed; the whole of the slopes and the banks have been turfed and planted with grass and camels-foot creeper, which has had a wonderful effect in preventing gullying, and only in a few places is a little gullying in the spoil banks to be noticed. The great difficulty is the drainage of the low portions of land into the canal. The first and most serious of these inlets is at 62 miles 2 furlongs; here, as in other places, the plan adopted has been to cut a silt-trap outside the inlet with turfed sides, and a bund has been formed between it and the canal with piles and lumps of sand kunkur, which are generally found hereabouts in the cutting, for the canal over which the water is supposed to flow quietly into the canal down a slope. To all appearance this dam must have been too high, and the water having been headed up outside, the canal breached through and rushed into the canal with great violence, completely filling it in. I do not consider that in light sand this plan is at all suitable. A masonry inlet will be necessary, the crest of which must not be higher than the level of the fields outside the canal bank; this inlet wall must have good foundations and be built of stone in mortar; the ends must be built well with the banks which must be protected from some distance with a good stone revetment banked by gravel, below the wall there should be a solid horizontal

rough stone apron at a level of not more than 2 feet below crest of inlet, then, according to the vertical height between the crest of the anicut and low-water mark in the canal, one or more similar drops must be built. It will certainly be more economical to build an inlet in this way than to allow sand to be brought into the canal, which has to be dug out by manual labor and lifted on coolies' heads a vertical height of more than 10 yards. Care must be taken also that channels to the inlet are not formed close to the rear slope of the banks, which will cut into the banks and bring the loose sand of which they are formed with the canal. If there are any channels in this position they must be defined and kept at a distance from the toe of the bank by means of groynes running out from the bank; the nose being of stone and the upper side protected either by stone or fascine revetment. The great object is to allow the drainage to run into the canal at the field level without acquiring a head and generating a velocity which will convey sand into the canal, and it will therefore be necessary to ascertain carefully the area to be drained by the inlet and proportion the length of crest to the discharge to be anticipated.

Not far below this, the most serious of the inlets, is a village-crossing, a gap through the banks with a long sandy slope down to the canal, sufficiently good for foot traffic and possibly for cattle, but which has been used by carts for bringing the cocoanuts down to boats. The slope will not, of course, stand cart traffic and must be made fit for it, as every facility should be given to bringing produce to the boats; it must be carefully packed with good sized stone and then metalled and gravelled; and it seems likely that a rough stone drain will have to be made under the centre of it as the sub-soil drainage finds its way down the slope into the canal. On the opposite side of the canal carts are not apparently used, and a sand slope will probably be sufficient, but if drainage finds its way thus into the canal, some rough stone flooring may be necessary.

There are three or four other inlets lower down where the canal is not in such a deep cutting, but all have breached during the late heavy rains, and flood-water has run along the outside toe of the banks and eroded them, carrying a great deal of sand into the canal. The proper disposal of cross drainage in this portion of the canal needs serious consideration. In the first place the levels of the country west of the canal must be carefully studied, and it must be seen whether at any reasonable cost the drainage cannot be directed entirely and carried in a direction somewhat parallel to the canal into the backwater. It will be worth while to spend money in making a good diversion channel here. If this is not feasible, the most suitable place for an inlet must be selected, and channels to it aligned with a very easy slope and rough stone drops if necessary to lead to it; these channels must be kept away from the canal bank. Without a survey and levels it is impossible to form a correct judgment on this point, but from an examination of the country from the canal banks, it seemed that probably two inlets would suffice below the large breach at 60 miles 2 furlongs.

The country drained to the east of the canal consists of small hollows between the sand ridges, and probably inlets with simply a rough stone flooring will be sufficient.

This 4 miles length of canal requires careful conservancy, and I think an establishment should be continually employed on it, whose duty would be to fill gullies, plant grass on any bare spot, pull out all objectionable growth, and plant trees on the upper berm. If neglected, the canal will very soon become impassable, and good conservancy is essential to its maintenance.

8. The Merkanam backwater, which is entered at about $62\frac{1}{4}$ mile, has had a channel cleared in it and at present is a fair navigation. The bar opens into the sea near the old ruined fort at Alambarai; the bar has evidently, as usual with these openings, worked northwards till at some time it has washed the walls of the old fort and probably has aided the work of demolition. The bastions have, for some cause or another, fallen in masses, and on the portions of the brick ramparts left standing banian trees have grown in a most remarkable manner; masses of roots, yards in width, extend all over the face of the walls.

It would perhaps be considered objectionable to demolish the old ruins altogether, but there are masses of fallen brickwork all round which are of no use to any one and might well be cut down into blocks and used for flooring and revetments on the canal.

1298/18

The fort walls are not more than 300 or 400 yards from the backwater, so the material could easily be conveyed to the cutting where stone is so much wanted and where there is no stone to be had.

9. Before reaching Merkanam the old road to Tindivanam crosses the backwater on an embankment. There are two bridges here, one with 9 arches and the other with 12 openings, but these are evidently not sufficient for the passage of flood-water, as the embankments between the bridges, a distance of perhaps 100 yards, has been washed away entirely and a wide gap has also been formed west of the bridge; through the gap between the bridges the boats sailed, and after this some difficulty in navigation was experienced, as the backwater, here a very considerable width, is very shallow and the channel is not properly defined.

Effective navigation south of Madras seems to terminate at this old road, or rather the canal runs into the Merkanam backwater, and has no end; it goes to no large town and taps no extensive agricultural district. On the margins of this backwater are the salt pans, but it would appear that the canal is not used for conveyance of salt to Madras. If by being brought close to the platforms, it would be made of use for this purpose, the canal should certainly be extended along the east of the backwater to the screw pile bridge near Merkanam (a distance of about 5 miles) from which point there is a good road to Tindivanam, about 22 miles, and to Pondicherry, about 20 miles. Inquiry on this point should be made and the extensions estimated for. Subsequently it will be well to ascertain whether, if the canal is extended to the French boundary, the French authorities are prepared to complete the navigation to Pondicherry and extend the canal southwards. South of Cuddalore some portions of canal have been cut between backwaters, and in former days parts of a coast canal were excavated south of the Coleroon in the Tanjore district. It would not be difficult to carry the canal south of French territory to Negapatam to join the Vadarniem canal now in use, but unless it can be carried through French territory, it seems of little use to take up this part of the canal, unless there is a reasonable prospect of its being connected with Madras within some definite period.

10. *Pelandorai Anicut.*—This is the first year that heavy freshes have passed over the anicut since its completion. In 1882 it was still incomplete as regards aprons, and the floods were not very heavy. There was ·9 feet going over the anicut at date of inspection, and therefore nothing could be seen of the body-wall, flooring or aprons. Soundings have, however, been lately taken all over the rough stone apron, and these show that only in one place, opposite to the point where a cut was made through the old anicut to carry the river-water while the new work was progressing, has any settlement taken place; here a hole has been scoured, but of no great depth; it is probably a settlement of the apron in consequence of its having been constructed over an old scour-hole; all that can be done is to repack the apron with the largest stone available, and if at this particular point the apron continues to settle, it would be well to construct a horizontal, instead of a sloping, apron, with a drop of about $1\frac{1}{2}$ feet from the top of the retaining wall. To join this horizontal apron with the sloping one, wing-walls of stone in mortar, founded some 3 feet below the lower apron, would have to be built.

11. The limestone used for the apron and revetments is not procurable in large pieces, and is a light stone badly shaped for such work; the quarry is situated about 1 mile above the anicut, and till lately all stone required, except the cut stone for facing, has been brought from this place. Lately a different kind of stone has been found within a mile of the head-sluice near the channel; this stone is a sand stone of varying quality with a good deal of iron in places; it is hard and very heavy, and has been quarried in good sized pieces; the quarry was inspected and it seems probable that it is of some extent; trial pits should be sunk to ascertain its extent, and if any quantity of stone is available, the land should be acquired and a good quarry opened, and in future only this stone should be used for the aprons.

12. The revetments below the lower wings of the anicut are made entirely of the limestone, and being new, with new earth behind, have settled in places, and in one place on the right bank *it* has slipped down altogether; apparently there is here a scour-hole caused by the eddy below the under-sluices; it will be necessary to get a

good foundation and toe of stone at the bottom of this hole, and to reconstruct the revetment and repack all places where settlement has occurred; in time the earth will consolidate and the revetments retain their shape.

13. The river above and below the anicut requires attention; the anicut having been lengthened the margins above are contracted. A survey on a large scale should be made, and on it the proper alignment of the margins laid down, and all bushes and grass within these lines removed and kept down in future. At present the water comes down on the anicut and turns at right angles to reach the head-sluice; it will probably be impossible to remove the accumulation of silt above altogether, but it may be much improved, and if, when the aprons and revetments have consolidated and are beyond risk of damage, every opportunity is taken of working the under-sluices, the silt may, to a great extent, be removed. When the under-sluices are first opened the bank should be stirred up with crowbars, and as much as possible washed away.

14. The under-sluices have been fitted with screw gearing and the moveable screw spear designed for the Godávari by Major Drake-Brockman, and they seem to work well; the platform above the sluices is 3 feet above the crown of the anicut, and as the floods do not seem to rise at the most above 1 foot in an hour, there should always be time to raise the shutters. The cast-iron beams in which the screw spear is held, and to which the shutters are hung, should have been sunk between the stones of the platform, instead of being almost entirely above them; the stones have been very roughly cut on either side of the beams and should be neatly dressed all alike. The piers and platforms faced with good cut sand stone have lately been very roughly painted with cement by the lascars; this painting is quite unnecessary and should be removed; it spoils the look of the work. It is to be regretted that the wing-walls of the anicut have been plastered instead of being built of good brickwork painted; the plaster has already small cracks in it, and in time will want patching or entire removal.

15. The head-sluice is also of brick plastered; the screws working the shutters were tried, and it was noticed that the grooves are too narrow, the shutters touching the part of the grooves in places. The grooves should be cut out next working season to 6 inches wide. The handles used for turning the screws here and at the under-sluice are not good; the best handles are the bent ones designed by Major Drake-Brockman, and it is stated that one of these procured for the under-sluices broke; this must have been due to defective casting, and the same design should be tried again. The face-wall has been built to a height of about $4\frac{1}{2}$ feet above the M.F.L. deduced from the flood which breached the original anicut; this should be quite safe; but the flood-banks above have settled a little and are somewhat lower; they should be made up to the same level.

16. The anicut superintendent and lascars are hutted on the east side in a good situation near the head-sluice; the bungalow is on the west side; and a boat is kept to enable those engaged on the work to cross the river during freshes. Here there are old store-sheds and other buildings which were required when the work was being constructed; they should all be removed, except those required for present use, and the old brick-kilns should also be pulled down, and the ground made level and neat. The bungalow is a good one but of most extraordinary design, the two bed-rooms being so arranged as to have a minimum of light and air. Each room requires to have two large venetion windows inserted, and the honeycomb work in the front verandah in front of these rooms should be removed.

17. The first mile of the channel was inspected; the original cutting, 6 or 7 yards in depth, was evidently roughly excavated, the spoil not being thrown sufficiently back from the channel, consequently the slopes of the channel cut up very badly. A great deal of pains has evidently been taken with it of late; the banks have been cut back and the berms drained away from the channel, and grass is now growing nearly all over the slopes. Continued care and attention is necessary; the bushes should all be cut, croton should be eradicated, and in places where grass has not acquired a footing, it should be dibbled in and on no account should pools of water be allowed to lie on the berms; with good conservancy the channel will before long be in good order.

498/19

18. The survey of the channels was examined, and the work done discussed; there remains but little to be done to the main channels. Some distributaries have still to be taken in hand and a few minor masonry works, also the enlargement of the tanks. Major Smith has taken great pains with the irrigation, and from all that can be learned, there seems now every probability of the works being effective and the cultivation being extended to the area provided for. It is stated that about 2,600 acres of additional cultivation have been taken up this year, against 1,200 in last year, and the people have every desire to extend cultivation. The temporary overseer, Govindarajulu Moodelliar, formerly anicut superintendent, takes great interest in the extension of irrigation, and with continued efficient management there seems to be every chance of the system being worked successfully.

19. *Shatiatope Anicut.*—More than one foot of water was going over the anicut, and while we were there the tail water rose to 3 feet on floor and the under-sluices were opened. The anicut floor is said to be in good order, and when last examined no holes could be found below the apron. The under-sluices have lately been fitted with screw gearing shutters, which work satisfactorily. The bolts to the holding-down plates appear to have been sent down rather longer than allowed in the plan, and as the plates were built in at the level allowed in the plan, the bolts projected above the platform, and, to make them fit, a low platform was built between the vents. The platform, thus, has not as neat an appearance as it should have, but the small raised portions are of use in holding down the wooden platform which is extended beyond the stone platform. When the shutters are down, the top of the screw is very nearly down to the nut, but still it will be advisable, to prevent undue forcing down of the shutters, to have a gauge on each shutter and also a pin in the screw shaft. The handles for working the screws were short iron spokes acting horizontally; these have been fitted with wooden handles to give more leverage, and while at the anicut we had the irons bent so that the wooden handles could be worked by men without stooping down. In this way more leverage could be exerted and they seemed to work satisfactorily.

20. River margins above the anicut require some attention; the correct alignment of the river in the neighbourhood of the anicut has been laid down on a chart which was not forthcoming at the time; it appeared that some grass and bushes on the north side want removing, and on the south side, at a distance of about $\frac{1}{4}$ mile from the anicut, there is a most objectionable growth of prickly pear and jungle on an island in the bed of the river; this island, or rather part of the river bed, the cut that was once made between it and the high margin on the south being open during floods, is understood to have been given out on putta, and the puttadar objects to the removal even of jungle on it. Standing on the north side of the southern under-sluices it is very evident that all jungle going to the north of a line drawn up-stream at right angles to the anicut is most objectionable and should be removed. Inquiry should be made regarding the title to this land, and, if necessary, it should be acquired. In any case, the prickly pear and jungle noticeable from this point must be removed.

Below the anicut there is a sand bank on the north side which has some tendency to extend into the river. Something may be done to wash it away by opening the north under-sluices first in a rising fresh (the effect of opening them and closing the south sluices was tried while we were there, but there was not sufficient water to have any appreciable effect on the bank). On the north side, the bank has been revetted for some distance; but the revetment has slightly subsided and grass planting below has slipped in. An effort should be made to give a good toe here, on which the revetment can stand, and the proper alignment should be attended to, the grass being removed where it is extending with the bed.

21. The bungalow on the north side is a very good one; huts for the superintendent and lascars have been built at a little distance. All these arrangements are good, and the place is evidently carefully attended to.

A large number of concrete blocks have been made and kept as a reserve for the apron or filling in holes; the boxes used for making these blocks are rather old fashioned; a better description of box is being used at the lower anicut which might be copied.

22. Head-sluice has to be improved and fitted with screw-shutters; the parapet walls had better not be raised; solid hut railings may be put on; the improvements should be carried out as early as possible. Below the head-sluice on the road is an old surplus weir which is not in good order; below it a considerable hole has been scoured, and the tail channel is much blocked up with silt; an escape in this position should be of value as a scouring sluice, and should be kept in good order; the channel should be cut out and the bed planted up on either side from the lower wings, and the work maintained in as good order as possible.

23. The M.F. levels on the anicut and head-sluice should be cut with the masonry and painted, and the letters cut from stencil plates.

24. The flood-bank from the south wing to the Veeranum tank sluice has been made up lately and is in very good order; the grass has grown nearly all over it; an aloe fence has been planted at a little distance from either toe, and trees planted within it. Great pains have been taken with the work.

This sluice is an old masonry work with four vents of 4 feet span, through which water is passed from the Veeranum tank across the Vellár above the anicut into the channels of the Vellár system. It seems to be used in this way in the early part of the season when the Veeranum tank, which is supplied from the Lower Coleroon anicut, and therefore gets water from the Cauvery during the south-west monsoon, fills, and the Vellár which drains part of the Shevaroy, has no water; the arrangement is of old standing, apparently, and what water the Vellár irrigation has any claim to seems doubtful. The shutters of this sluice are on the Veeranum tank side of course, but it has happened that the Vellár water has risen to 2 feet above the level of the water in the Veeranum tank, in which case the shutters are taken aback and consequently the front cut-waters have all been broken to some extent. About 100 yards from the sluice is the Veeranum tank calingulah, a work with a tambogy or notch in it, the weir crest being 2 feet below F.T.L., and the tambogy 2 feet lower; over this weir there was a bridge of 3 arches, which collapsed in January last; the old work is evidently undermined and there are considerable leaks under the body-wall.

Between the sluice and the tank weir is a calingulah leading into a surplus channel which falls into the Vellár; this curious old work has only lately collapsed, having long been in a dangerous state.

A full consideration of the circumstances leads me to think that the tank weir should be altogether abandoned or left to fall down when its time comes; that a new surplus weir, which I think should take the form of surplus sluice, should be built at the head of the surplus channel, the shutters being worked by screws and the discharge being thus under command; that a bank should be thrown up from the tank bank east of the tank weir to the sluice at the road, and the sluice itself put into good order. So far as could be seen the bridge itself is in fair order and repairable; the width of roadway is 20 feet, so that it could be reduced and the shutters made to work further back from the end of the piers. Retaining walls might be built above and below at the wing returns and the work refloored and under-pinned where necessary, and probably made secure at a small expense.

25. The dimensions and levels of the surplus weir will require careful consideration. Whatever water the old weir could pass under favorable circumstances should be provided for and the new work should be capable of discharging rather more than less than this quantity. As to the level at which water should be discharged, so long as the old weir stands no alteration will be made, but it is probable that there were certain rules observed in the old Maramut Department regarding the working of the surplus weir which should be inquired about. If nothing can be traced, and the flood levels of late years, which have been carefully recorded, show that there is no objection, it will probably be safe to place the sill of the sluices at the level of the crest of the old surplus weir. The shutters to these works will, of course, be in charge of the anicut superintendent, who will observe the rules laid down for working them; both should be fitted with screw gearing and the whole will then be under command.

26. It was stated that in the flood of 1880 the Vellár, above the anicut, spilt into the Veeranum tank; there could be no great depth of water passing over the

country and the tank bank stood though it had a narrow escape; since then it has been considerably strengthened and there seems to be no fear of Vellár flood-water causing damage. When the Vadavár head, at the lower anicut, has been furnished with shutters and the banks made secure, there will be a connecting bank between the Lower Coleroon anicut and the Shatiatopé anicut, with efficient escape and all sluices under control.

CAMP BEZVÁDA,
23rd January 1884.

(Signed) J. O. HASTED, Colonel, R.E.,
Acting Chief Engineer for Irrigation.

No. 12 I.

Submitted for the information of Government.

CAMP BEZVÁDA,
23rd January 1884.

(Signed) J. O. HASTED, Colonel, R.E.,
Acting Chief Engineer for Irrigation.

To the Acting Joint Secretary to Government,
Public Works Department, Irrigation Branch.

ORDER—dated 9th February 1884, No. 160 I., Public Works.

Communicated to the Superintending Engineer, V Circle, for information and guidance.

(True Extract.)

(Signed) J. O. HASTED, Colonel, R.E.,
Ag. Joint Secy. to Govt., P.W.D.,
Irrigation Branch.

To the Superintending Engineer, V Circle.
" Chief Engineer for Irrigation.
" Examiner, Public Works Accounts.
" Revenue Department.

Exd. E. Fernandez.
Spare Copies

IRRIGATION.

Govt. of {1884} Madras

PUBLIC WORKS.

Dated February, 9th.

Read. *Encl*

G.O., 9th Feb. 1884, No. 160 I.

FEBRUARY.

Notes of Inspection

The —, by the Acting Chief Engineer for Irrigation, of the Buckingham canal and South Arcot division, communicated to the Superintending Engineer, V Circle, for information and guidance.

GOVERNMENT OF MADRAS.

PUBLIC WORKS DEPARTMENT.

Irrigation.

READ—the following papers:—

Notes of inspection by the Acting Chief Engineer for Irrigation, Buckingham Canal, North; January 1884.

Buckingham Canal, North.—The wharf-wall, immediately to the north of the bridge below the basin, is in progress, but there seems little chance of its being completed before the end of the year, and some considerable portion of the allotment given for the year has had to be gven up. The contractors, Messrs. Masters and Company, until lately appear not to have had efficient supervision. Between the bridge and the basin the piles are all down and most of the foundation has been laid, and the face-wall for a considerable distance has been raised to nearly full height. The excavation close to the bridge shows that the wing-walls of the bridge have very little foundation, the bottom of the foundation being exposed. The wharf-wall here should be built up as soon as possible. North of the basin, for a short distance, the wall has been nearly completed and then a considerable length with coping and steps above has been finished. The work has been fairly done but is not altogether satisfactory. The top of the wall is not built true to level as is noticeable by looking at it from the canal where even an inch or two out of the horizontal is very conspicuous. The granite coping also has not been very neatly dressed. In one part, this coping or platform, which rests partly on the retaining wall and partly on concrete behind it, has slightly sunk to the rear and consequently has cracked at its junction with the laterite facing of the wall; it is very plainly noticeable as the platform now slopes to the rear and rain-water lodges on it, but the settlement which took place before the last heavy rains is not now likely to continue and is so slight that the work may be allowed to stand, and all that is necessary is to cut grooves on the granite platform to carry off rain-water to the front. The cause of the settlement is probably the imperfect ramming of the earth behind the retaining wall and the concrete. I saw only one light wooden rammer on the work, but was informed that several iron rammers have been issued to the contractors. When the earth behind the retaining wall is dug, it should be well rammed with heavy rammers before any concrete is laid, and the concrete itself should be rammed with wooden, not iron, rammers. If the earth is wet and sloppy, dry broken stone should be well rammed with it till quite solid and then the concrete laid.

The stones of the granite platform are laid in Portland cement and put in position before the ends and surface are finally dressed. This is a mistake as the dressing, of necessity, shakes the joint and the cement does not of course set again. The stones should be truly cut before being placed in position and set in cement.

The laterite steps are fairly laid but the stone is not very well dressed and the edges have been left to be levelled off afterwards, though they are laid in cement. Part of the roadway and platform above the steps has been laid but not yet levelled and rammed; there is a great deal to be done here. The granite steps round the place, on which it is proposed to erect the 10-ton crane, are in progress, and this work looks neat.

A good deal of material is lying on the spot; the stone is good, but the metal for concrete is very dirty, mixed with straw and refuse, and should be screened before being mixed.

The question of closing this part of the canal to cut it out in front of the wharf has not been decided; it was intended to close it in January and re-open in March, but it now seems certain that the contractors cannot complete the work before the end

of March, and it may be better to close later on when the weather is drier and there will be less trouble in excavating in the canal.

2. *Shadiencoopum Lock.*—The cement plastering has been knocked off in places and requires renewal, the gates are very badly in want of tarring. One of the quoins at the entrance of the lock has been knocked about by boats entering; it should be faced with laterite in place of the old brick in chunam which is showing in places. Mr. Ottmann has lately planted several trees near the lock, some of which are from seed brought from Australia, the name I could not learn. Arrangements having been made to bring good water from the sand ridge to near the lock, there should be no difficulty in getting trees to grow, but the lock establishment must be made to take care of them and not allowed to keep cattle and goats to destroy them. The prickly-pear growing on the west bank near the lock should all be removed by the lock lascars when not otherwise employed. I think more should be done to get up trees where there are berms between the lock and Madras. The soil is bad and saltish but in places trees have grown and the same description of trees might be extended, but cattle *must* be kept off.

3. The diversion between Shadiencoopum and Ennore is in progress under Messrs. Masters and Company. In places, the excavation is quite dry and the work is easy, but there are not many men at work. Many more should be employed. Some of the allotment for this portion has had to be given up, owing to the backwardness of the contractors. The proposed alteration of the line here, as shown on the plans, is approved; some valuable land near Ennore is thus avoided. In one place, where the bank of the canal comes into the backwater, the Kortalayar river, when in flood, will set directly on it and probably some protection will be necessary. If piles and hurdle work do not prove sufficient, it will be necessary to put down some revetment which might be of concrete blocks which here would be cheaper than stone. The blocks could be made of broken laterite and surkhi cement and the dimensions might be $2\frac{1}{2}$ feet by $1\frac{1}{4}$ feet square. Boxes for making the cubes should be of the pattern now used at the Lower Coleroon anicut, without hinges.

4. The flood-gate into Ennore backwater was sanctioned for execution this year under the same contractors who are constructing the quay; but no material has yet been sent down, and it certainly cannot be completed this year. All material, however, should be got down as soon as possible. I am afraid the contractors have undertaken more than they can do, and have not efficient superintendence for all the work they have in hand.

5. The next work in progress is the diversion in the Pulicat lake from 37th mile to 42nd mile 6 furlongs. The greater part of this was inspected; it is very nearly completed and about to be opened to traffic, and will be most valuable to traffic in diverting the navigation from the lake for 5 miles, which is at times very difficult. The work has been carefully carried out by petty contract; the flood-bank on the west and the smaller bank on the east have been well laid out and sectioned; the front slopes turfed throughout, and the rear sloped away from the top and planted with camels-foot creeper; the margins of the canal have been also planted with coarse grass for the whole distance, and casuarina and other trees have been planted on the berm and in rear of the east bank. The only point requiring notice is the drainage of the berms and front slopes; all rain-water falling on them must pass into the canal, and the best arrangement is to give the berm a backward slope to the toe of the bank, from longitudinal drains there, and lead the water into the canal at selected places by means of turfed channels. By this means all gullying and washing of sand into the canal will be avoided.

While the work was in progress and before the grass grew, heavy rains caused some slight gullying, which has now been repaired: the sand thus washed down has gone into the canal, which is now said to be generally a few inches above level. It seems unavoidable that some silting from this cause should occur before the banks are turfed, and the estimates should provide for maintenance during the construction; otherwise the new channel will, on being opened, immediately require repair. The estimated rates may perhaps be high enough to allow of this charge, but it should be

met from the Capital and not from the Revenue account; in fact the reach when completed should be true to section throughout.

6. In the 41st mile the flood-bank comes almost into the lake, and there will be considerable action on the bank when the lake is full and there is a westerly wind. Screw pine has been planted along here, and some turfing to outside slope has been done. Some of the screw pine is growing, and it is the most efficient wave-breaker that can be used; more should be planted and it should be carefully conserved.

It will be advisable for some time to maintain a conservancy establishment on each new portion of canal opened. Gullies must be filled, turf must be repaired, planting attended to, and cattle kept off; and, unless a constant watch is maintained, the new work will soon suffer. It, probably, will be necessary eventually to maintain mile coolies all along the canal, but the new portions opened should have a conservancy establishment at once. With the aid of this establishment, plantations may be commenced, which will in time be a source of income. Much has been done, in the way of planting, by Mr. Ottmann, and it should not be neglected in future. The lake might be planted out altogether in course of time, and the bank would be protected by the plantation.

The inlets on the east side seem to have acted very satisfactorily; they are turfed and have a silt trap just outside the bank, the sides of which are also turfed; the drainage brought is, however, trifling.

Arrangements are now being made for opening the canal, and it is hoped that it will be available for traffic by the end of the month. It seems a very satisfactory piece of work.

7. From here to the Swarnamukhi river, in the 76th mile, nothing new has been undertaken, and, generally speaking, the canal is in good order; but the attempted crossing of the river has proved a great failure,—the river, in the great flood of 1882, having destroyed a great deal of the work that had been done, and cut a new course for itself. When the canal was first excavated here, the mouth of the Swarnamukhi was some 4 miles to the north (as shown on the atlas sheet) and the Pamanji bar was apparently opened by spill from the river above, and from drainage from the south. The canal consequently did not, as originally cut, come into the river till about $76\frac{1}{2}$ miles (present mileage); the navigation then followed the river upwards for about $\frac{1}{2}$ a mile and was led out to the north at 77 miles. This arrangement soon came to an end; the river turned into the canal, cut itself a new channel, and made its main mouth at the Pamanji bar; consequently the river-bed to the north silted up and now only carries water to the sea in high floods. This action is the same as it is observable in all rivers on the east coast; the mouth works gradually and steadily away to the north until, after the course of years, the river is running parallel to the sea coast for some distance; then, in some unusual flood, the pent-up waters find for themselves a shorter course to the sea; a new bar is formed to the south, the old course of the river partially silts up, and once more the mouth begins to travel northwards. I have lately noted on a river bar on the Buckingham canal, south, where the career of the river northward has been checked by the ruins of an old fort close to the sea; and this case points to the means to be adopted to prevent the shifting of this bar northwards. If the Swarnamukhi is to discharge at the Pamanji bar, a fortification of some sort must be erected to the north of the bar, and this fortification should probably take the form of a casuarina plantation with screw pine margin. The river will naturally take the shortest course to the sea, there being in floods a heavy surface fall; but if this course is not defined and restricted, it will assuredly follow the prevailing law, and work away to the north.

8. Just before the 77th mile, the Swarnamukhi river is joined by the Salu calva, which at one time may have been the main bed of the river, and is now, I understand, threatening again to carry the larger portion of the flood-water. The plan which has been attempted was to make a new cut across a bend of the river immediately below the junction of the Salu calva into the Swarnamukhi, confine the river by means of high embankments, and then to carry the canal from near the 75th mile outside and to the south of the river, until it met the river bank almost opposite the point at which the canal on the north is taken off. The new cut for the river was made and the banks

constructed; but in the flood the river seized on the new cut, and, not being satisfied with it, cut away the banks in all directions and again formed a new bed for itself, following, however, very nearly the straightest line to the Pamanji bar. The navigation now is conducted up the river under great difficulties, the shoals being cleared so as to allow boats to pass towards high tide. The soil is all loose sand and banks made of it are utterly useless to confine the river in floods when a vast body of water spreads over the country and is headed up by these banks. The proposal made by Mr. Ottmann, the sub-divisional officer, is to cross the river at no great distance from the bar and excavate a new channel, which would be about 3 miles in length, to the north of the river, crossing the old northern bed at the point where it is most silted, and joining the northern canal a little distance above its present entrance to the river. All things considered, I think this will probably prove the most satisfactory arrangement, provided that means are taken to prevent the Pamanji bar from running northward. The original plan might of course still be carried out, and the canal cut to the south of the river, crossing it a little above the present north entrance to the canal; but here the soil seems all to be loose sand, and the course of the Swarnamukhi is, for some distance, more or less parallel to the coast, and it may, at any time, take a shorter cut towards the Pamanji bar, while on the north firm clay is seen underlying the sand on the margin of the river, and it is probable that less difficulty will be experienced in preventing erosion, but great precautions must be taken to prevent the river breaching into the canal. The old abandoned course towards the river must have one or more cross bunds put up, and along the canal banks plantations of screw pine and any bushes that will grow must be made. At what point the new cut should tail into the canal to the north, it is impossible to say without seeing surveys and levels of the ground, but seeing that the Salu calva has several times breached into the canal in the 78th mile, and judging from the section of the bank at the present open breach, there is every probability of its breaching in again, when, under the influence of flood-gates, the water in the canal is considerably below the flood-level of the river. I am disposed to think the new cut should be extended to meet the northern canal above the site of this breach, although the extension would of course entail additional expenditure. One advantage that the proposed plan has is that the crossing of the river would be made much nearer the bar than at present where there would probably be always deep water.

The surveys and levels should be undertaken at once and designs for the diversion submitted without delay, with full information regarding the Pamanji bar and measures to be adopted to prevent its running northward. Until the diversion is cut, all that can be done is, by continual scraping in the river-bed, to keep a passage open for boats along the river, though of course this will be blocked up by every flood.

9. At 86th mile 2 furlongs the channel has been very much silted up by drainage water which has breached in from the east; there is an opening on the east and also on the west to let in drainage, but these openings are not properly regulated; they should be so wide that the water flows into the canal without getting ponded up and acquiring a head, and eventually they will want a body wall over which the water can pass on to an apron on the canal side; the drainage into this reach is brought in by pipes in places, many of which are broken. The next place at which there is a serious obstacle to navigation is from 88th mile 5 furlongs to 89th mile 6 furlongs; here it is caused by the river-water backing up from the Kundalam in freshes, and until flood-gates are constructed is unavoidable. A diversion cut is proposed, to bring the canal into the river a little above a collection of fishing huts on the banks; but Mr. Ottmann proposes a much longer diversion, which would cut off several awkward bends in the canal, and it seems probable that this plan will be found the most desirable. It is noticeable that a shoal is forming in front of the present opening into the river and the island opposite is extending down stream; but below the fishing huts there will probably always be deep water, and this point is much nearer the canal opening on the other bank of the river than the present opening.

10. *Pennér Crossing.*—The south margin of the river is embanked from the anicut to the canal, and the old courses of the river, through which water used to spread, have thus been closed. In 1882 floods, however, there was a breach in the 13th mile which did a great deal of damage; this has been closed, but there was another breach in the 17th mile which, through some mistake apparently, as to whether it should be closed by the Nellore divisional officer or by the canal officer, is still open; the river-water passing through this breach has brought a great deal of sand into the canal, and therefore the canal, for some distance south of the river, is much silted. The bank having been put up in the interest of irrigation should be, of course, maintained from "agricultural," but if it is convenient that the Buckingham canal officer should carry out the repairs, it can be arranged by a transfer of funds from the Nellore division. A convenient arrangement would be for the Buckingham canal officer to have charge of both embankments for the same distance, and, as he will now have to construct the northern bank up to the Moldevy, he might have the south bank to opposite that point.

The result of the work done for the improvement of the Pennér from the completion estimates is on the whole satisfactory. The embankment across the north branch has stood well and has silted up this branch considerably; and, consequently, a large island, covered with jungle, to the south, has been, to a great extent, washed away; the south branch has deepened, but part of the island, on which the training bank on the north was to be constructed, has been cut away, and there will be some difficulty in making the bank to close the central branch. At the same time there seems to be a tendency, when the river is in high flood, for the water to spill over the lower island towards the south bar, and the best thing to be done at present is to encourage this spill by removing vegetation and, possibly, by a slight excavation at the head. Eventually, I think that, with a good training bank, the river may be led to extend the southern bar and close the central, but it is of no use at present to put up this bank, and we must be contented with coaxing the flood in the direction we want it to take. Meanwhile, the cross bank to the north branch must be carefully maintained, and screw pine should be planted for a considerable width both in front and in rear of the bank. Until the river alters for the better, it will be useless to build the northern flood-gates, but the southern gates should be built before long. At present the canal on the eastern side of the river has been much silted by floods, and since they have subsided, a passage has been maintained by clearing both there and through an island in the bed of the river; but heavily laden boats can only pass at near high water. The flood season being over, the clearing is being pushed on, but there will be great difficulty in getting more than a passsage at half tide.

11. *The Pyderoo* crossing was made without difficulty; the canal near the river passes through swamps, which formerly must have been large oyster-beds, and the masses of shells lying about make it impossible for coolies to tow the boats; the proposed diversion here will be a great convenience and should be among the works to be undertaken at an early date.

12. *The Chippaleru* crossing is the next place that a difficulty occurs; here a long diversion inland was intended, and part of it on the north side has already been excavated but is not opened. I believe that this diversion may answer, but the canal on the south side will need to be strongly embanked through the old river courses, and probably it will be necessary to construct additional cross banks in the still-defined channels. Clearing silt will keep the passage open up to half tide.

13. *Ramapatnam*—The rest-house, store-shed and office here are completed and are good buildings. The rest-house is occupied by the Sub-Engineer in charge of this part of the canal, who pays rent for half of it; but having a family, he actually occupies the whole bungalow. The old toll-sheds on the opposite side of the canal have not yet been entirely cleared away; this should be done and the ground levelled. The old thatched store-shed should also be removed. Near it is a garden which apparently is still kept up from the canal. Besides casuarina, there are cocoanut and guava trees in it and a most objectionable prickly-pear fence round it, which comes on to the top of the bank. As there are several acres of land round the rest-house, which are planted with casuarina which still need watering, it does not seem advisable to keep up this garden. Where there are watchmen, of course, trees should be planted, but gardens with fruit trees are not to be encouraged, and prickly-pear fences on the banks should not be allowed in any case. In many places prickly-pear is to be noticed growing on the bank, and all this should be removed, and on no account must it be allowed to spread.

15. *Mameru.*—The next bad crossing is the Mameru, and this is the worst on the canal. The soil is all loose sand, and three entrances of the canal into the river have already been entirely silted up. In the floods of 1882, the river, which comes to this point in a south-easterly direction and then turns and flows to the north almost parallel to the coast, spilt over the south bank and took an almost direct line to the sea, opening a bar there; this, of course, quite destroyed the canal, and it is with difficulty a passage is now kept up into the river at high-water. It seems to me that the river bar, which has been slowly working up to the north for sometime, has nearly reached its limit, and needs but little coaxing to take a direct course into the sea on the south. I hesitate to do anything to encourage this tendency, because it seems probable that the village of Karadu might suffer considerably, if it was not altogether washed away; and I think we must still keep open the present cut into the river as best we can and wait the next floods. A flood-bank has been put up on the north bank for some distance, but in the high flood it was turned, and the water breached into the canal; the lower end of it also has not been joined to the canal bank. I think this embankment should be carried on to high ground at its upper end, and continued at the lower end to meet the canal bank before next freshes. This will prevent the river spilling to the north, and the more this tendency is checked, the better chance there will be of the river taking to a straight course. Eventually, I think, the canal on the north will have to be carried behind the flood-bank to nearly opposite the present fishing village. For the present nothing can prevent its being a very troublesome place, and all that can be done is to clear the channels into the river by main force.

15. *Paleru and Moosee.*—The crossing of these two rivers is the next difficulty. The canal is, as a matter of course, very much silted before entering the Paleru (the most southern of the two rivers) and nothing but flood-gates can prevent this: the river itself runs in a well-defined channel and the water was deep. Between the Paleru and the Moosee, a distance of about half a mile, the channel was wide and deep, evidently scoured out, as, in the completion estimates, it is referred to as so difficult to keep open that a duplicate cut parallel to it inland was proposed, so that the two canals can be worked alternately. The rivers spill over the low land west of the canal, and in floods their waters no doubt join, and it seems probable that at some future time the river-beds will join at or near the canal. The scouring out of the canal between the rivers is no doubt due to one of the rivers being in flood while the other was low. On the south of the Paleru a flood-bank to high ground is being constructed, and on the north of the Moosee the canal bank forms the flood-bank of the river for some distance and it is then turned inland to meet high ground. These flood-banks must be kept above suspicion, and will no doubt answer, but the difficulty of dealing with the canal between the rivers is a serious one. Flood-gates are allowed for, and if they are built, the island embankment must be made very strong, and I think it will also be necessary to carry banks to the north of the Paleru and the south of the Moosee up to high ground, and the rivers must not be allowed to run together. At present the canal being deep, it is very good except just at the entrances to the river. North of the Moosee the canal is much silted up for nearly two miles, due to the river breaching in and to the tide washing down the sand slopes. These breaches may be prevented and the flood-gates when built will keep out the tide.

16. *Kothapatnam.*—Here a store-shed and office have been built, and it is intended to build a rest-house, but the situation is a very bad one; soil is bad, the whole place is liable to be flooded in high floods, and there is no good water. I do not think it is advisable to construct the rest-house here, and a more convenient place should be selected. The store-room in the present building is quite good enough to put up in in cases of emergency.

The wooden pile bridge is to be replaced by a masonry one, meanwhile the revetments want attending to. There is a basin on one side of the canal which has been faced with cut laterite in-steps, and it is intended to construct another basin on the opposite side of the canal. It is observed that the laterite will not stand where it is sometimes submerged and sometimes exposed to the air; the steps are already crumbling away, and some better material must be used for the new steps. The basin had several boats lying in it, and there is evidently some attempt at traffic which should be fostered.

The basin should be attended to and kept clean, and mud in front of the walls should be removed. A watchman must be kept for the stores, and he should be made to attend to the basin and keep it clean. Opposite the basin several boats are laid up and some are evidently going to pieces. The owners of these boats should be called upon to remove them, and boats not in use should not be allowed to be kept immediately opposite the basin, where a clear space is necessary, but at a little distance. Want of regulation is evidently necessary here. Beyond this the canal is very much silted up, being impassable to boats drawing a little over 1½ feet at low water; this part of the canal is very bad, and it seems probable that some diversion, which has not been provided for in the completion estimates, will have to be made; the soil is very bad.

17. *Gundlacumma River.*—The embankments on both sides have been completed, and thus the water has been kept from spilling over on the north bank and cutting into the canal; the river-crossing itself is good, the channel of the river is well defined, and if the old northern bed of the river is prevented from opening, we shall have an excellent direct line for flood discharge; above this it does not appear that there will be much difficulty in dealing with the canal; a diversion is proposed, and the improvements of the canal and this should be carried out as early as possible.

18. *Uppenkodurvagu Inlet and Outlet.*—Apparently these works are acting well, but the floods of 1882 rose above the revetments at the end and cut away the banks in rear. The banks must now be made, and the revetment repacked to fit the ends and raised well above M.F.L.; there is no difficulty in getting stones here for the purpose. This should be done before next floods.

(Signed) A. S. RUSSELL,
for Ag. Chief Engineer for Irrigation.

29th January 1884.

No. 28 I.

Submitted for the information of Government.

(Signed) A. S. RUSSELL,
for Ag. Chief Engineer for Irrigation.

Chepák,
29th January 1884.

To the Acting Joint Secretary to Government,
Public Works Department, Irrigation Branch.

Order—dated 18th February 1884, No. 200 I., Public Works.

Communicated to the Superintending Engineer, V Circle, for information and guidance.

(True Extract.)

(Signed) J. O. HASTED, Colonel, R.E.,
Ag. Joint Secy. to Govt. P.W.D.,
Irrigation Branch.

To the Superintending Engineer, II Circle.
" " " V "
" Chief Engineer for Irrigation.
" Examiner, Public Works Accounts.
" Revenue Department.

Exd. E. Fernandez.
Spare Copies

IRRIGATION.

Govt. of {1884} Madras

PUBLIC WORKS.

Dated February, 18th.

Recd. Encl.

G.O., 18th Feb. 1884, No. 200 I.

FEBRUARY.

Buckingham Canal

The inspection notes of the Chief Engineer for Irrigation on the —, communicated to the Superintending Engineer, V Circle.

498
24 A

To W.

If sanction be accorded to E. I's proposals, I should endeavour to find at once the additional ... required.

C.J.
12.2.85

It is desirable to do anything calculated to add to the efficiency of the Executive establishment on the Buck: Canal, — and with ~~that object~~ I would sanction E. I.'s proposals

I.S.
12-2-85

1
355 W

E

To await ... ...

... ...

C.J.
12.2

18 EW

498
V

[...]f Chief Engineer for Irrigation,
[...]haut
[...]George, 7 February 1885.

[...]er for Irrigation.

[...]cent inspection of the
[...] Canal, I saw the necessity
[...] the size of the Sub. Divisions,
[...] be carried on properly: at
[...]anal is divided into 3
[...] the Northern, upwards of
[...] being under the Asst.
[...] Wilson; the centre, upwards
[...]ng, under the Executive Engr.
[...] Brockman; and the 3rd, the
[...] of the Canal, under Sub

[...] now to make 4 Sub Divns.
[...]hese are not finally settled,
[...]eferred to the Supg: Engineer
[...]on: this would make each
[...]rather over 60 miles in length,
[...] when new work is in hand,
[...] the speed at which boats
[...]the new Sub Division I would
[...]rge of Sub Engineer Mr. Bond,

Subdivision will be

No 18 EW

A 98
28

E. I. Form No. 18.

OFFICE OF CHIEF ENGINEER FOR IRRIGATION,

~~Fort St. George~~, Chepauk, 7 February 1878.

Note by the Chief Engineer for Irrigation.

On my recent inspection of the Buckingham Canal, I saw the necessity of decreasing the size of the Sub. Divisions if work is to be carried on properly: at present the Canal is divided into 3 Sub Divisions, the Northern, upwards of 100 miles long, being under the Asstt. Engineer, Mr. Wilson; the centre, upwards of 90 miles long, under the Executive Engr. Major Drake. Brockman; and the 3rd., the Southern part of the Canal, under Sub Engr. Power.

I propose now to make 4 Sub Divns.: the limits of these are not finally settled, but I have referred to the Supg: Engineer for his opinion: this would make each Sub Division rather over 60 miles in length, quite enough when new work is in hand, considering the speed at which boats travel here. The new Sub Division I would place in charge of Sub Engineer Mr. Bond,

Sub division will be

who is at present under Mr Wilson.
The only additional establishment required would be one overseer who should be a man of some experience, and the Southern Division office and overseers establishment. It is suggested that if possible sanction should be accorded to this change and an overseer posted, at once. the Superintending Engineer being called on to report the final limits and designations of the Sub Divisions

I have the
Chief Engineer for Irrigation

To

The Chief Engineer, Rod

428/26

B. I. Form No. 18.

From

The Chief Engineer for Irrigation,

To

The Secretary to Government,

Public Works Department.

Dated
Despatched
Received } 187 .

ENCLOSURE

No.

Subject.

Form No.

No. 355 W PUBLIC WORKS DEPARTMENT,

PROCEEDINGS OF THE MADRAS GOVERNMENT.

Under date the 14 Feby 1885

READ the following:—

Note by the Chief Engr for Irrign (H.E. No 18 Ir dt Feb: 7. 1885)

The proposals of the Chief Engineer for Irrigation are approved.

2. The Supdg Engineer II Circle is authorised to engage the requisite subdivisional Office establishment - An additional Overseer will be posted to the Canal by the Chief Engr P. W. dept -

3. The establishment of the Subdivision will be

SE II Circle
Ex P.W. Accts
CE for Irrigation
CE. P.W. Dept
Dept 21 - 2 - 85

355

permanent, — but the
additional Overseer
and his clerk will be
on the temporary estab-
-lishment

CU
13 · 2 · 85

LL
13-2-85

W
11.2

W
17/2

X 28
28

1236

Govt. of [1885] Madras.

PUBLIC WORKS.

17/2/85

Dated

Recd. Encl.

G.O. 1885, No. 353[illegible]

Buckingham Canal

60/6

GOVERNMENT OF MADRAS.

PUBLIC WORKS DEPARTMENT.

408/28

General.
Account.

Read—the following letter from D. C. GORDON, Esq., Examiner of Public Works Accounts, to the Secretary to Government, Public Works Department, dated Madras, 2nd October 1884, No. 74 W. :—

I have the honor to forward, for information and orders of Government, notes by Mr. Rainier, Deputy Examiner, of his inspection of the office of the Buckingham canal division.

2. The office is in good order.

Enclosure.

Notes of inspection by H. RAINIER, Esq., Deputy Examiner of Public Works Accounts, of the office of the Executive Engineer, Buckingham Canal division, on the 26th and 30th September 1884.

The Executive Engineer, Major R. R. E. Drake-Brockman, R.E., was present, as also the accountant, C. Bhoojanga Row. The office was last examined on the 28th March 1884 (*vide* papers with G.O., No. 932 W., of 5th April 1884).

2. The cash accounts are altogether in order. The balance of the Executive Engineer's drawing account on the 31st August 1884, was proved correct.

3. There are now many works in progress on the departmental system and care will be taken to post up work abstracts *during* the month to which they relate; to do this it will, of course, be necessary to insist on ten-day reports coming up punctually, and not, as at present, long afterwards. The materials at site of the many masonry works now in progress require very careful accounting too. It would be well to see that each work's materials are month by month verified and acknowledged by the sub-divisional officer concerned. The aggregate value of these materials at site of works was, on the 31st August 1884, Rs. 74,298, the materials being placed at twenty-one works. I was assured they are all of good value, and none surplus.

4. The registers of works is very neat. It seems carefully posted and was agreed here and there with the work abstracts, but when there has been no outlay under any sub-head in any particular month, the previous month's outlay up to date should be brought forward all the same.

5. The contractors' accounts appear to be in order, and it is stated that no balance is at all doubtful, or under any sort of dispute. There is nothing long outstanding.

6. With reference to paragraph 8 of the last report, there is now a proper account of floating plant; and with reference to paragraph 9, the form suggested then has been adopted, with good result, and the total month by month credited to direct revenue can be from it very easily and usefully analysed.

7. The office is well looked after, and the accountant is apparently very painstaking.

Order—dated 4th October 1884, No. 2447 W., Public Works.

Communicated to the Superintending Engineer, V Circle.

2. The report is satisfactory.

(True Extract.)

(Signed) J. SHAW-STEWART, Colonel, R.E.,
Secretary to Govt., P.W.D.

To the Superintending Engineer, V Circle.
" Examiner, Public Works Accounts.

Exd. E. Fernandez.

Spare Copies

GENERAL
ACCOUNT.

Govt. of {1884} Madras.

PUBLIC WORKS.

Dated October, 4th.

Recd. Encl.

G.O., 4th Oct. 1884, No. 2447 W.

OCTOBER.

Notes of Inspection

Orders on —, submitted by the Examiner of Public Works Accounts, of the office of the Buckingham Canal division.

K 98/30

Public Works Departt
No 261 dated 7th Septr 1881

Memorandum

Endorsement of the Superintending Engineer 2nd Circle, No 365, dated 25th August 1881 on letter from the Executive Engineer, Coimbatore Division, No 122, dated 22nd Augt 1881.

Endorsement of the Examiner P W Accounts, No 846 & E 2nd dated 26th August 1881.

The Chief Engineer is disposed to agree in the above remarks of the Examiner P W Accounts. He has reason to know from his own experience that, save in very exceptional cases, the transmission of Cheques to Contractors without the intervention of Upper or Lower Subordinates, as laid down in the Code, is quite practicable.

2. Before taking further action, however, the papers will be circulated for the opinions of other Superintending Engineers and Superintendents of Works.

/By Order/
Major R.E.

To
Supg. Engineer 1st & 3rd Circles
Supdt of Works
Exr P W Accounts

Dy. Chief Engineer P.W.D.

Thro' Supg. Engineer.

Executive Engr's Office
Camp Satyamungalam
22nd Augt. 1881.

No 122.

498/31

From The Executive Engineer
Coimbatore Division

To
The Examiner
Public Works Accounts
Madras

Sir,

I have the honor to state that it will cause great delay to works and much inconvenience to contractors if the provisions of para 1556 of new P.W. Code are to be carried out in the present extensive Divisions comprising the entire Districts. In the case of Coimbatore of 7432 square miles.

Enclosures 1 Form.

Prior to the late reorganization when each District was divided into several Divisions payment of cheques direct to contractors was found to be attended with such difficulty that the system of paying contractors who are working at a distance from Head Quarters through the upper Subordinates was established and the Examiner had to issue a printed form for the purpose- Vide enclosed Examiner's Form No 318.

Under these circumstances I have the honor to request you will be good enough to take steps to modify the para in question so that the payment of cheques to contractors at a distance from Head Quarters may be made through the upper Subordinates as heretofore.

I have the honor to be
Sir
Your Most Obedient Servt
/Sgd:/ J. Hannan
Executive Engineer.

/True Copy/
Major R.E.
Dy. Chief Engineer P.W.D.

Through the Examiner P.W. Accounts.

No 365.

Forwarded to the Chief Engineer for consideration.

The Superintending Engineer considers it is necessary that para 1556 of the Code should be modified as it is impracticable for Executive Engineers themselves personally to hand over all cheques to contractors without making great and serious delay in payments. It must be remembered that the Sub Divisions are now much larger than the old Ranges were.

Enclosure 2. 1. Letter & 1. Form.

2. The Superintending Engineer would propose that Executive Engineers and others with drawing accounts should be ordered to hand over Cheques personally to Contractors as much as possible and also told to appoint one day at least in each month on which day they will be at Head Quarters ready to give Cheques direct to contractors to whom payments are due and who attend on that day.

But that they be authorized when requested by the Contractor to make use of the old form Examiner Works No 3 and send the Cheque with this for receipt to an Upper Subordinate for delivery to the Contractor. The Contractor being informed through the post that the Cheque has been so sent.

3. It must be remembered that the Cheque cannot be sent direct by post to contractors because they are not always residing in one place or a postal Station and the Executive Engineer has no means of obtaining his receipted bill in proper form (prepared as a rule in the Office) for of being certain that the Cheque which is payable to the Contractor was received and cashed by him himself.

Coimbatore 25th Augt. 1881

(Sigd.) H. R. Mead Major R.E.
Supg. Engineer 2nd Circle.

(True Copy)

Major R.E.
Dy. Chief Engineer P.W.D.

Endorsement No 846 S.E. 2nd dated 26th August 1881.

4288/32

Forwarded to the Chief Engineer Public Works Dept. with the following remarks.

2. The Superintending Engineer, 2nd Circle, urges the modification of the Code rule, para 1556, to permit of cheques payable to Contractors being delivered to them by Upper Subordinates, and assigns the following reasons for his request.

1st that contractors are not always at a Postal Station or at any one place.

2nd that receipts or acknowledgements in prescribed forms cannot be obtained.

3rd that it is uncertain whether the cheque is received and cashed by the Contractor himself

3. As regards the first point Contractors must surely at all times be within reach of a Postal Station. Their temporary migrations must be known to the officer in charge of the works, and it is easy for Contractors to arrange to what Stations their postal communications must be addressed.

4. As to the second point there should be no difficulty. The proper form, whether prepared by the Contractor himself, or by the Sub Divisional Office, or by the Divisional Office, is so prepared before issue of the cheque, and the posting of the form with the cheque should result in the receipt being given and the form returned to the Sender.

5. As to the third point the Cheque is as a rule payable to "order" and should be sent under registered cover. An acknowledgement from the addressee is obtainable by affixing a one anna Stamp in addition to the ordinary postage and registration fee Whether the cheque is, or is not, cashed by the original payee, cannot be ascertained except by inspection of the cheque itself after payment at the Treasury.

6. It ought to be a rule in every division to pay for contract work on certain prescribed dates thereby saving the time and inconvenience which promiscuous and desultory payments involve and it would be probably as easy for a Contractor to be at a Postal Station away from Divisional Head Quarters as at those Head Quarters on prescribed dates.

7. I am

7. I am therefore opposed to the proposal to allow subordinates to intervene, for it paves the way for possible irregularities and is moreover opposed to the spirit of Chief Engineers (Public Works Department) Circular No 289 of 19th July 1881.

/Sigd./ D. F. Gordon
Examiner P. W. Accounts.

(True copy)

Major R. E
Dy. Chief Engineer P.W.D.

H&R/33

[C. No. 2.]

N.B.—In any future communication on this subject, the number and date of this letter should be quoted.

No. 124 & 1098/34

From

THE EXAMINER,
PUBLIC WORKS ACCOUNTS,
MADRAS,

To

The Secretary to Government,
Public Works Department.

Madras, 20 February 1886.

Sir,

I have the honor to submit for information and orders of Government, notes by Mr. Rainier, Dy. Examiner, of his inspection of the Office of the Buckingham Canal Division.

2. As regards the state of the Accounts work, the Office is in fair order, but more care is evidently necessary in the preparation of Work Abstracts and ten day reports, and greater punctuality is requisite in the submission of daily and ten-day reports.

3. The Executive Engineer should be required to explain the transaction connected with the Cheque for Rs. 200 referred to in para 5. The Cheque was drawn on 5th. February and was uncashed at date of inspection (10th. Idem); it was represented to be required for a remittance to the Treasury, and yet was endorsed payable to a lascar.

4. The Superintending Engineer should enquire into the delay in payments for labor employed; on an average a month seems to ~~have~~ elapse between the dates of employment and payment - see para 9.

5. The very unusual procedure mentioned in para 10 is brought to notice of Government. In my opinion it is irregular and unnecessary.

6. The orders of Government are desirable on the matter noticed in para 12.

7. The Superintending Engineer's notice is necessary to the several points in para 13 (in connection with para 9 clause i). It is not clear why, in the absence of authority cheques were made payable to, or acknowledgments accepted from, other than Messrs. Master and Co. The absence of recorded measurement sheets in the Executive Engineer's Office, and the employment of establishment contrary to the conditions of Code para 1090, require attention.

I have the honor to be,

Sir,

Your Most Obedient Servant.

O. C. Caraons

Examiner P. W. Accounts.

Encs: One

1888/33

Fully 1.05

No 2447 W. 4.10.84
766 W. 30.3.85
461 - 7.9.81.
3557 W. 14.2.85
974 W. 10.1.83
2765 W. 6.11.84
200 J. 18.2.84
160 J. 9.2.84.

From,

The Examiner P.W. Accounts,

Madras.

To,

The Secretary to Government,

P.W. Department.

22 FEB

No. 124

Dated 20 February 1886.

Recd. 22

Enclo. 1.

Notes of inspection of the Office of the Buckingham Canal Division by Mr. Rainier Dy. Examiner Forwards with remarks.

Enclosure

NOTES OF INSPECTION BY H.RAINIER ESQ, DEPUTY EXAMINER P.W.ACCOUNTS MADRAS, OF THE OFFICE OF THE EXECUTIVE ENGINEER BUCKINGHAM CANAL DIVISION, ON THE 8TH. 9TH. AND 10TH.FEBRUARY 1886.

MAJOR DRAKE-BROCKMAN R.E. THE EXECUTIVE ENGINEER; AND C.BHOOJUNGA ROW THE ACCOUNTANT WERE PRESENT. THE OFFICE WAS LAST EXAMINED ON THE 26TH. AND 30TH.OF SEPTEMBER 1884, SEE G.O. NO.2447 W. OF 4TH.OCTOBER 1884.

2. THERE ARE 4 SUB-DIVISIONS. THE 'SOUTHERN' UNDER CONDUCTOR J.A.POWER SUB-ENGINEER EXTENDS FROM THE SOUTHERN END OF THE CANAL TO THE 11TH MILE NORTH OF MADRAS: THE 'PULICAT' UNDER THE EXECUTIVE ENGINEER, FROM THE 11TH MILE TO THE 79TH MILE NORTH OF MADRAS: THE 'ESCAPALLY' UNDER MR.H.M.BOND SUB-ENGINEER, FROM THE 79TH TO THE 139TH MILE: AND THE 'NORTHERN' UNDER MR.F.J.WILSON ASSISTANT ENGINEER, FROM THE 139TH MILE TO THE NORTHERN END OF THE CANAL AT 196 MILES. EACH SUB-DIVISIONAL OFFICER HAS A DRAWING ACCOUNT.

3. THE HEAD QUARTERS OF THIS DIVISION WERE REMOVED FROM MADRAS TO NELLORE BY G.O. NO.2765 W. OF 6TH.NOVEMBER 1884 AND AGAIN FROM NELLORE TO PULICAT BY G.O. NO.766 W. OF 30TH.MARCH 1885, AT WHICH LATTER DATE THE SUB-DIVISIONS WERE ARRANGED ACCORDING TO PARA 2.

4. THERE ARE THREE IMPREST HOLDERS UNDER MR.WILSON,

1. MR.J.PEREIRA, OVERSEER.....RS.400
2. D.VENCATASWAMI NAIDU.....RS.200
3. T.MUTHUCUMARASWAMI MOODELLIAR.....RS.300

RS.900

ONE UNDER THE EXECUTIVE ENGINEER.

MR.R.ENRIGHT SUPERVISOR.....RS.300

THREE UNDER CONDUCTOR POWER:-

1. P.NARAINASAWMY NAIDU.....RS.500
2. P.MANUVALOO PILLAY.....RS.300
3. B.SARANGAPONY NAIDU.....RS. 50

RS.850

5. THE IMPREST ACCOUNTS OF THREE MONTHS AND THE CASH BOOKS OF TWO MONTHS WERE CHECKED. THE CASH BALANCE IN THE EXECUTIVE ENGINEER'S OFFICE WAS TESTED, WITH THE FOLLOWING RESULT:-

BALANCE AS PER CASH BOOK.....RS.583-10-0

DEDUCT IMPRESTS.....RS.350- 0-0

RS.233-10-0

COUNTED

CASH.....RS. 33-12-0

CHEQUE.....RS.200- 0-0 RS.233-12-0

SURPLUS CASH..... ANNAS 2.

THE CHEQUE FOR RS.200 WAS EXPLAINED TO HAVE BEEN DRAWN ON 5TH.FEBRUARY 1886 FOR PAYMENT INTO TREASURY OF MISCELLANEOUS RECEIPTS. THE AMOUNT HAD BEEN ENTERED IN THE CASH BOOK ON THE CREDIT SIDE IN THE COLUMN 'BANK OR TREASURY' AND AGAIN ON THE DEBTOR SIDE, IN THE 'CASH' COLUMN AS 'CASH FROM TREASURY', AND FORMED A PORTION OF THE CASH BALANCE. THE IRREGULARITY OF THIS IS OBVIOUS. IF THE CHEQUE HAD BEEN TRANSACTED AT ALL SO AS TO WARRANT ITS APPEARANCE IN THE CASH BOOK IT WOULD NOT HAVE BEEN THERE IN THE CASH CHEST. IF IT HAD BEEN PAID INTO THE TREASURY FOR CERTAIN MISCELLANEOUS RECEIPTS, AS STATED IN THE CASH BOOK, IT WOULD NOT HAVE BEEN CASHED, SO AS TO APPEAR AS 'CASH FROM TREASURY' ON THE DEBTOR SIDE; NOR SHOULD IT - IF INTENDED AS 'MISCELLANEOUS RECEIPTS PAID INTO TREASURY' - HAVE BEEN ENDORSED AS IT WAS 'PAY TO LASCAR KUPPUSAWMY' UNLESS THE ACCOUNTANT'S EXPLANATION THAT ALL PAYMENTS INTO TREASURY OF MISCELLANEOUS RECEIPTS ARE MADE BY CHEQUE SO ENDORSED, IS CORRECT - IN WHICH CASE THE PRACTICE IS OPEN TO OBJECTION.

1888
37

6. THE RULES FOR PAYMENT IN TO TREASURY OF MISCELLANEOUS RECEIPTS ARE THAT THE EXECUTIVE ENGINEER UNLESS PAYING IN SUCH ITEMS AS THEY COME TO HAND, SHOULD (CODE PARA 1894 AS MODIFIED BY STANDING ORDER NO.199 OF 1884) BY THE END OF THE MONTH COVER ALL SUCH ITEMS BY A CHEQUE WHICH HE SHOULD MAKE PAYABLE TO HIMSELF AND ENDORSE IT WITH THE WORDS 'RECEIVED PAYMENT BY TRANSFER CREDIT TO THE P.W.DEPARTMENT'. THE CHEQUE SHOULD NOT BE ENTERED IN THE EXECUTIVE ENGINEER'S CASH BOOK TILL ACTUALLY PAID AWAY (VIDE DIRECTION 5 AT BACK OF FORM M.8) BUT AS SOON AS PAID AWAY, IT WOULD APPEAR IN THE CREDITOR COLUMN 'BANK OR TREASURY' AND THE ENTRY IN THE COLUMN 'HEAD IN CASH ABSTRACT BOOK' WOULD BE 'PAYMENT INTO TREASURY'. IT WOULD NOT APPEAR ON THE DEBTOR SIDE OF THE CASH BOOK. IN THE CASE OF THIS DIVISION THE NEAREST TREASURY IS PONAIRY, ABOUT 12 MILES OFF, AND THE CHEQUE AFTER BEING DRAWN AT PULICAT WAS NO DOUBT AT ONCE ENTERED IN THE CASH BOOK PENDING ITS INTENDED DESPATCH BY KUPPUSAWMY LASCAR TO THE TREASURY.

7. THE TWO ANNAS SURPLUS CASH (PARA 5) WAS EXPLAINED BY THE ACCOUNTANT TO HAVE ARISEN FROM INCOMPLETE PAYMENT OF VOUCHER NO.11 (OF FEBRUARY 1886) FOR DIETING THE OFFICE CAT - ANNAS 8 FOR THIS HAD BEEN ENTERED IN THE CASH BOOK AS PAID, BUT TWO ANNAS OF THIS REMAINED UNPAID. THE REASON COULD NOT BE EXPLAINED.

8. THE USUAL CASH BALANCE IS ABOUT RS.50, AT PULICAT. THE SUB-DIVISIONAL OFFICERS' CASH BOOKS ARE RECEIVED IN THE DIVISIONAL OFFICE WITH FAIR PUNCTUALITY. THE CASH BOOKS ARE GENERALLY NEAT AND WELL KEPT, AND APPEAR TO BE CHECKED, BUT THE ACCOUNTANT SHOULD LEAVE NO DOUBT OF HIS HAVING DONE THIS HIMSELF, BY INITIALING AND DATING EVERY VOUCHER EXAMINED.

9. CERTAIN PAYMENTS FOR PETTY SUPERVISION AND FOR LABOR CRME UNDER NOTICE, VIZ:-

(A). 2ND. CLASS REST HOUSE AT KANPARTHY - OCTOBER 1885. CARPENTER, AS PER VOUCHER NO.71, PAY FROM 21ST. TO 31ST. AUGUST 1885, PAID ON THE 25TH.OCTOBER 1885.

(B). FLOOD GATE LEFT BANK, PALAR RIVER - OCTOBER 1885. TEMPORARY ESTABLISHMENT CHARGED TO THIS WORK FOR SEPTEMBER, PAID ON 21ST.OCTOBER 1885.

(N.B. DATE OF PAYMENT NOT STATED ON THE VOUCHER.)

(C). DIVERSIONS TO CANAL FROM COROMANDEL TO THETTUPET - SEPTEMBER 1885 - LABOR FROM 25TH. TO 31ST.JULY 1885, PAID ON 30TH.AUGUST 1885.

(D). FLOOD GATE AT ROMPERA SEPTEMBER 1885 - LABOR FROM 1ST. TO 10TH.AUGUST 1885, PAID ON THE 14TH.SEPTEMBER 1885 - STONE-CUTTERS FOR JULY 1885, PAID ON 13TH.SEPTEMBER 1885.

(E). FLOOD GATE NORTH BANK OF GUNDLACUMMAH SEPTEMBER 1885 LABOR FROM 21ST. TO 31ST.JULY 1885 PAID ON 5TH.SEPTEMBER 1885.

(F). CONSTRUCTING FLOOD GATE ON SOUTH BANK OF MOODLGUNDY RIVER-SEPTEMBER 1885 - LABOR 11TH.TO 20TH.AUGUST 1885 PAID ON 10TH.SEPTEMBER 1885.

(G). CONSTRUCTING 2 OUTLETS AT 191 MILES-SEPTEMBER 1885 - LABOR 1ST. TO 10TH.AUGUST PAID ON 9TH.SEPTEMBER 1885.

(H). 2ND. CLASS REST HOUSE AT KANUPARTHY - LABOR EMPLOYED 11TH. TO 20TH.NOVEMBER PAID ON 24TH.DECEMBER 1885, LABOR ON 21ST. TO 30TH. NOVEMBER PAID FOR ON 16TH.JANUARY 1886.

(I). CONSTRUCTING FLOOD GATES SOUTH BANK OF ENNORE BACKWATER CONTRACT CERTIFICATE FOR WORK DONE UP TO 24TH.DECEMBER 1884, PAID ON THE 5TH.AUGUST 1885.

N.B. IN THE MEMO PAYMENTS MADE (OFFICE COPY) THERE ARE ALTERATIONS INCREASING THE ORIGINAL FIGURES, INITIALLED ONLY BY A MR.MOSCROP SAID TO BE AGENT FOR THE CONTRACTORS, NOT BY THE EXECUTIVE ENGINEER.

10. THE SYSTEM OF OBTAINING ACQUITTANCE FROM PETTY CONTRACTORS OR PIECE-WORKERS IN THIS DIVISION IS PERHAPS OPEN TO OBJECTION. THE SUB-DIVISIONAL OFFICER PREPARES THE BILL FOR THE CONTRACTOR AS REGARDS TOTAL VALUE OF WORK DONE, AND GETS THE CONTRACTORS STAMPED RECEIPT AFFIXED BEFORE ANY PAYMENT IS ENTERED - THE BILL IS THEN SENT TO THE EXECUTIVE ENGINEER'S OFFICE WHERE IT IS CHECKED AND THE PARTICULARS OF PAYMENT ARE INSERTED. THE CHEQUE IS THEN DRAWN AND POSTED TO THE CONTRACTOR'S ADDRESS UNDER REGISTERED COVER. IT SEEMS VERY DOUBTFUL WHETHER THE BLANK RECEIPT BY CONTRACTORS AS ABOVE DESCRIBED IS A LEGAL ACQUITTANCE: IT IS AT ALL EVENTS QUITE INSUFFICIENT. THE EXECUTIVE ENGINEER STATED THAT HE HAS ADOPTED THIS METHOD IN ORDER TO PAY CONTRACTORS DIRECT, AND WITHOUT THE AID OF SUB-DIVISIONAL OFFICERS (MEMORANDUM OF THE CHIEF ENGINEER PUBLIC WORKS DEPARTMENT NO.461 OF 7TH. SEPTEMBER 1881); AND AT PRESENT THE ASSISTANT ENGINEER IN CHARGE OF NORTHERN SUB-DIVISION IS THE ONLY SUB-DIVISIONAL OFFICER WHO PAYS CONTRACTORS. A PROPER ACKNOWLEDGMENT BY A CONTRACTOR SHOULD SHOW THE SUM OF MONEY IN WRITING AS WELL AS IN FIGURES AND SHOULD WHEN THE PAYEE SIGNS IN THE VERNACU-

LAR BEAR IN HIS HANDWRITING IN THE VERNACULAR THE SUM OF MONEY HE ACKNOWLEDGES; MOREOVER PAYMENTS OF THIS KIND SHOULD GENERALLY BE WITNESSED. THE ACKNOWLEDGMENT NOW OBTAINED THROUGH THE POST OFFICE FOR REGISTERED COVERS SENT TO CONTRACTORS MIGHT PROVE INSUFFICIENT IN THE EVENT OF LEGAL PROCEEDINGS.

11. AT PULICAT, DOORAJPATAM, MYPAUD, ISCAPALLY, TAMMALAPENTA AND RAMAPATAM, THE LOADING AND UNLOADING OF BOATS IS RESTRICTED TO A CERTAIN PART OF THE CANAL BANK, AND A TAX OF ONE ANNA PER TON ON ALL TRAFFIC IS LEVIED UNDER RULE 17 OF THE CANAL NAVIGATION RULES, THE OBJECT BEING TO ERECT WHARVES AT PLACES WHERE THE TRAFFIC PROVES SUCH AS TO JUSTIFY THE EXPENSE. THE TAX IS COLLECTED BY A CLERK ON RS.10 PER MONTH, WHO KEEPS A REGISTER. THE RECOVERIES AT PULICAT IN JANUARY RS.58-10-0 WERE CHECKED. THE SYSTEM IN ~~FORCE~~ force FOR REMITTING SUCH COLLECTIONS TO SUB-DIVISIONAL OFFICERS WAS EXAMINED AND FOUND SUFFICIENT.

12. THERE IS A REGISTER OF CONTRACT AND PIECEWORK AGREEMENTS. WITH REFERENCE TO CODE PARAS 1605 AND 1606 IT IS NOT SURELY WITHIN RULE FOR AN EXECUTIVE ENGINEER TO HIMSELF ACCEPT TENDERS FOR A SCHEDULE CONTRACT (FORM M.174) RUNNING UP TO RS.80,000 SIMPLY BECAUSE THE CONTRACT IS NOT FOR ANY SPECIFIC LUMP SUM AND CAN BE CUT SHORT AT ANY TIME BY THE EXECUTIVE ENGINEER: THE CONTRACT FOR IMPROVEMENTS TO THE CANAL BASIN AT MADRAS RS.81,243 WAS ~~PROPOSED TO BE~~ SUBMITTED UNDER THE ABOVE PARAS TO THE CHIEF ENGINEER PUBLIC WORKS DEPARTMENT FOR APPROVAL, BUT THE SUPERINTENDING ENGINEER 2ND. CIRCLE IN HIS LETTER NO.87 S.C. OF 11TH.MAY 1885 RULED THAT NO SUCH APPROVAL IS NECESSARY *in future*.

THE CONTRACT FOR A LUMP SUM, FORM M 176 GIVES THE EXECUTIVE ENGINEER ALMOST AS MUCH POWER TO STOP THE CONTRACTORS WORK AT ANY TIME, SEE PARAS 14 AND 20 OF THAT FORM.

13. THE WORK ACCOUNTS (WORK VOUCHERS) RENDERED TO THE EXAMINER FOR TWO MONTHS IN 1885 WERE COMPARED WITH THE REGISTER OF WORKS; MEASUREMENT OF WORK DONE AS FAR AS RECORDED WAS EXAMINED WITH BILLS FOR SUCH WORK ABOUT ONE HUNDRED IN NUMBER; WORK ABSTRACTS FOR SEVERAL MONTHS WERE OVERHAULED; AND VOUCHERS FOR PAYMENTS SCRUTINISED; THE FOLLOWING POINTS BEING NOTED:-

(1). CERTAIN PAPERS SAID TO BE IN SUPPORT OF WORK ON THE ENNORE DIVERSION CANAL BY MASTERS AND CO. CONTRACTORS SHEW MEASUREMENTS, BUT NO DATE OF MEASUREMENT OR PAGE OF MEASUREMENT BOOK: OR SYMPTOM OF HAVING BEEN CHECKED OR COMPARED WITH ANYTHING ELSE, NOR ANY DATE - THOUGH THE FIGURES WERE FOUND TO REFER TO MARCH 1885.

(2). MESSRS MASTERS AND CO'S WORK ON THE FLOOD GATE AT SOUTH BANK OF ENNORE BACKWATER, AS ALSO OTHER WORK BY THAT FIRM, APPEAR TO HAVE BEEN PAID FOR TO MR.MOSCROP, THE AGENT OF ABOVE FIRM; BUT THOUGH MR.MOSCROP'S AUTHORITY BY POWER OF ATTORNEY TO SO RECEIVE MONEY AND TO REPRESENT MASTERS AND CO. WAS ASKED FOR BY THE EXECUTIVE ENGINEER ON THE 5TH.NOVEMBER 1885, AND AGAIN ON THE 11TH.JANUARY 1886, IT WAS NEVER SENT, AS ~~REGISTERED~~ promised, FOR REGISTRATION IN THE EXECUTIVE ENGINEER'S OFFICE. EXCEPT IN THE CASE OF WELL KNOWN FIRMS IT WOULD BE WELL IN FUTURE TO INSIST MORE STRICTLY UPON THE PRODUCTION OF SUCH AUTHORITY, FAILING WHICH, OR THE FIRMS' KNOWN SIGNA-

TURES THE SIGNATURESOF ALL THE PARTNERS WOULD APPEAR NECESSARY TO THE FINAL SETTLEMENT.

(3). MEASUREMENT SHEETS FOR WORK PAID FOR IN THE NORTHERN SUB-DIVISIONAL OFFICE, DO NOW COME UP TO THE EXECUTIVE ENGINEER'S OFFICE; THIS SEEMS TO CUT OFF THE EXECUTIVE ENGINEER FROM AN IMPORTANT MEANS OF CHECK.

(4). STANDING ORDER NO.158 OF 1885 AFFECTING RULE NO.3 AT BACK OF FORM M.19 IS NOT YET ADOPTED and SHOULD BE ATTENDED TO NOW.

(5). WITH REFERENCE TO STANDING ORDER NO.146 OF 1885 CERTAIN PETTY SUPERVISION HAS BEEN EMPLOYED CONTRARY TO THE CONDITIONS NOS. 1 & 2 (CODE 1090) UNDER WHICH ESTABLISHMENT CAN BE CHARGED TO WORKS. THERE ARE 14 MEN SO EMPLOYED AND THEIR SALARIES AGGREGATE RS.500 PER MONTH AND THE SUPERINTENDING ENGINEER HAS BEEN APPLIED TO TO SANCTION THE ARRANGEMENT AS IT STANDS. BUT THERE IS APPARENTLY NOTHING FOR IT BUT TO APPLY FOR SANCTIONED TEMPORARY ESTABLISHMENT SUFFICIENT TO COVER ALL PETTY SUPERVISION OTHER THAN ALLOWED UNDER ABOVE PARA.

(6). CONSTRUCTING FLOOD GATE SOUTH BANK OF PYDERU, SEPTEMBER 1885. RS.574-15-11 IS STATED IN THE PART II OF WORK VOUCHER TO BE FOR DAILY LABOR, BUT WAS FOUND TO BE SOME PORTION OF IT (RS.37-9-6) FOR MATERIALS PURCHASED.

(7). WORK ABSTRACTS IN MANY CASES ARE NOT WELL PREPARED; AND IN MOST OF THESE DOCUMENTS PART IV HAS NOT BEEN VERIFIED BY THE PARTY RESPONSIBLE FOR THE MATERIALS.

(8). TEN-DAY REPORTS REQUIRE MUCH MORE CARE, AND PUNCTUALITY, PARTICULARLY AS REGARDS THE NORTHERN SUB-DIVISION.

DAILY REPORTS FOR SEVERAL WORKS HAD NOT AT THE DATE OF INSPECTION, BEEN RECEIVED FOR ANY PERIOD OF JANUARY 1886, HENCE THE LATENESS OF WORK VOUCHERS RECEIVED IN THE EXAMINER'S OFFICE.

(9). THERE ARE PERHAPS FEW WORKS FOR WHICH THE NORMAL COST SYSTEM OF ACCOUNTING COULD BE USED, BUT IT HAS NOT YET BEEN TRIED.

14. THE RATE BOOK CONTAINS RATES REVISED UP TO SEPTEMBER 1885.

15. THE BUDGET REGISTERS ARE IN FAIR ORDER.

16. IN THE SCHEDULE OF BUILDINGS RENTED AND AVAILABLE THE EXECUTIVE ENGINEER'S OFFICE, RENTED FOR RS.40 PER MONTH, SHOULD NOW APPEAR.

17. RS.2-6-11 IS DUE TO M.MUNUSAMMY A CONTRACTOR, A LONG TIME, THE MAN BEING LOST SIGHT OF. EFFORTS ARE BEING MADE TO FIND HIM, MEANWHILE THE MONEY IS IN THE DEPOSIT ACCOUNT. THE PASS BOOKS FOR ALL SAVINGS BANK DEPOSITS WERE EXAMINED.

18. THE SCHEDULE OF MISCELLANEOUS ADVANCES CONTAINS NOTHING NOTEWORTHY.

19. THE ACCOUNTANT IS SUFFICIENTLY ASSISTED.

16TH.FEBRUARY 1886.

DY.EXAMINER P.W.ACCOUNTS.

No. 498 W

P. W. Department

Proceedings of the Madras Government

Under date the

February 24th 1886.

Read the following

Letter from the Exc:

P.W. Accts: No. 124 W. dy 20th Feby: 86.

Communicated

to the Supdg: Engineer,

II Circle, for the informa-

tion of the Executive

Engineer, Buckingham

Canal Division, and for

such further action as may be

necessary. ~~in connection~~

~~with the various matters~~

~~brought to notice by the~~

~~Examiner P.W. Accounts.~~

The Executive

Engineer will explain

the transaction

connected with the
cheque for ~~Rs~~ 200 re=
=ferred to in paras
5 & 6 of the notes. of
para 3 of the Examiner's
~~let~~ter, and will report
the circumstances under
which the sum of
eight annas was en=
=tered in the ~~[illegible]~~
cash book as paid for
feeding the office cat
whereas in reality only
six annas had been
paid.

Explanation should also be given respecting the surplus cash noticed in para 7 of the notes.

3. ~~The Government~~
~~[illegible]~~ from para 9 of
the notes, ~~that in~~
~~cases~~ considerable
appears to have
delay ~~had~~ occurred in
payments for labour

The Suptg: Engineer will enquire into the matter, and take the necessary steps ~~to~~ to ensure more speedy payments. ~~in future.~~

4. The system adopt=
=ed for obtaining ac=
=quittances from petty
contractors or piece-workers,
which is brought to
notice in para 10 of the
notes, is irregular
and should be dis=
=continued. The Suptg:
Engineer ~~will see that~~
~~this is done, and he~~
will submit a report
on the subject of para 12
of the notes.

5. The Suptg: Engrs
attention ~~will be~~

[…]ially directed to the
[…]rious matters enu=
=merated in para 7
of the Examiner's letter,
and he will submit
the Executive Engr's
explanation of the
circumstances under
which payments were
made to Mr. Mosorop ~~on~~
~~account of Messrs~~
~~Mathew & Co.~~ in the
absence of ~~that gentle~~ the necessary
=~~man's~~ authority. ~~to~~
~~act for the firm~~.

6. The state of
~~affairs in~~ the Divisional accounts,
as disclosed by the
foregoing report, cannot
be considered ~~favour~~ satisfactory.
More care and punc=
=tuality are necessary

S.E. II Circle

p 10

in the accounts work,
and room for im=
=provement exists in
other matters. 428/483

Sd.
24 Feb 86

24.2.86

1405

Govt. of 1886 Madras.

PUBLIC WORKS.

Recd 7-3-86

Dated

Recd.

G.O. 24 Feby 1886, No. 498 W.

Office of the Southern Circle Canal Division

Passing orders on the rules of inspection of the — by the Dy Exam[?] Acc[?]

50

3

DC 242

(1) Number of pages 22

(2) Date of repair 11-11-86

(3) Initials of the Referencer Lang

TAMIL NADU ARCHIVES

GOVERNMENT OF TAMIL NADU

P. W DEPARTMENT

G.O. No. / ~~B.P. No:~~	512-13 W	Press. / ~~Mis.~~
Dated	25-2-1886	~~198~~ .

Not to be folded or roughly handled

BSL

Archives I--10,006 I -80.