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MADRAS RECORD OFFICE.

Government of Madras.

Public works **DEPARTMENT.**

G.O. No.	483	Press
379-380		~~Mis.~~
Dated	17. 2.	18 71 .

Not to be folded or roughly handled

1A

*Proceedings of the Madras Government, Public Works Department,
17th February 1871.*

Read the following papers —

No. 379 Read the following letter from R SMITH, Esq, Executive Engineer on special duty, Madura District, to the Chief Engineer for Irrigation, dated Camp at Veerapandy, 5th January 1871, No. 310-A

I HAVE the honour to submit the subjoined Report of the progress made with the Perryaur investigations during

3 Diagrams
1 Table of rain-fall and discharge of Perryaur December 1870

2 The 205 and 246-feet saddles

have been carefully examined, and all requisite information regarding the level of the rock has been ascertained by sinking trial pits longitudinally and transversely over both sites The examination of the 248-feet saddle is in progress and will be completed in a few days.

3. As Captain Pennycuick's plan showing the position of the escape tunnel for his arrangement of the head-works has not been received, I went over the ground with Lieutenant Greer, and, in concert with this Officer, decided on the nature and detail of the investigations to be carried out along, and adjacent to, the probable line.

4. By referring to the annexed statement you will observe a commencement was made last month (in accordance with a suggestion made by yourself sometime ago) to ascertain the actual rate of working at the Perryaur The results are satisfactory and tend to prove that the cost of work, in the hill tracts, need not be excessive :—

Description of soils met with in the trial pits	Lead.	COST OF EXCAVATION PER CUBIC YARD				Remarks
		First yard or under in depth.	Second yard in depth.	Third yard in depth.	Fourth yard in depth.	
		RS A. P.	RS A. P.	RS A. P.	RS A. P.	
Black ...	From 20 to 30 feet.	0 1 3	0 1 5	.	.	Easy to excavate No pick required
Black . . .		0 2 2	.	.	...	Stiff soil had to be picked
Red . . .		0 2 5	0 2 8	0 3 0	..	Do do do.
Decomposed rock .		.	0 2 9	0 3 1	0 3 6	Easily worked
Decomposed rock difficult to pick		.	..	.	.	From 3 to 6 Annas per cubic yard
Stony . . .		.	..	.	.	Do. do do.

As the weather was fine during December, it would probably be necessary to add 33 per cent. to the above rates to cover the extra cost of working during the very rainy months.

5 From the information now available, and from calculations made by Lieutenant Greer and myself, it appears the most economical arrangement for storing the required volume of water in the basin of the Perryaur would be secured by tunnelling through the watershed, and constructing an embankment across the Perryaur at site No 2 about 220 in height. According to this plan the normal level of the lake would be about 190 feet, and the head of the tunnel about 100 feet above datum These figures are very nearly accurate, the exact levels will be worked out, and the appliances proposed for regulating the discharge from the reservoir will be explained hereafter if you consider it desirable to estimate in

*Proceedings of the Madras Government, Public Works Department,
17th February 1871.*

detail for this arrangement also. The rock in the 205-foot saddle is particularly favourable for an escape, if the level of the lake is fixed at or about 190 feet above datum.

6. In calculating the approximate cost of the proposed watershed tunnel, I assumed 20.2 feet per second as the maximum velocity to be allowed through it.

7. Diagrams showing the rain-fall at the Perryaur camp, and the discharge of the Perryaur from the 18th October to the 31st December 1870, inclusive, accompany this report. The table of rain-fall and discharge of the Perryaur for December is also enclosed.

8. The ryots in the Cumbum valley are most anxious to extend their wet cultivation, this should I think be encouraged, as any water supplied to them will reduce the cost of the work lower down.

9. Annexed is an abstract of the surveying and levelling done during the month under review :—

Branch channels set out in miles	Lineal miles of country surveyed	LEVELLING OPERATIONS	Number of permanent bench-marks fixed	Number of trial pits sunk to the full depth
		Aggregate length of longitudinal and transverse sections in miles		
24½	77½	86½	13	72

PEPPIAUE PROJECT
Table of Rain-fall and Discharge of Peppyaue during December 1870

Date,	Rain-fall at Perryaur.	Hours,	Water level	DISCHARGE	
				Cubic feet per second	1,000 Cubic yards per day.
DECEMBER	INCHES.		FEET		
1st	0 20 {	6 A M. 6 P M	0 42 0 50	426 451	} 1,402
2nd .. .	0 10 {	6 A M. 12 NOON 6 P M	1 75 2 00 1 50	981 1,139 845	
3rd	0 01 {	6 A M. 6 P M	1 75 1 50	981 845	} 2,922
4th	0 01 {	6 A M. 6 P M	0 75 0 50	536 451	
5th	0 00 {	6 A M. 6 P M	0 50 0 50	451 451	} 1,443
6th	0 00 {	6 A M. 6 P M	0 42 0 42	426 426	
7th .. .	0 02 {	6 A M. 6 P M	0 25 0 25	389 389	} 1,245
8th . ..	0 00 {	6 A M. 6 P M	0 25 0 20	389 372	
9th	0 12 {	6 A M. 6 P M	0 12 0 12	354 354	} 1,133
10th	0 15 {	6 A M. 6 P M	0 12 0 35	354 408	
11th .. .	0 15 {	6 A M. 6 P M	0 35 0 82	408 561	} 1,550
12th	0 08 {	6 A M. 6 P M	1 30 0 62	702 490	

*Proceedings of the Madras Government, Public Works Department,
17th February 1871.*

Table of Rainfall and Discharge of Ferryaur during December 1870 —(Concluded)

Date	Rain-fall at Perryaur	Hours	Water level	DISCHARGE	
				Cubic feet per second	1,000 Cubic yards per day
DECEMBER	INCHES		FEET		
13th ...	0 15 {	6 A. M.	0 50	451	} 1,760
		6 P. M.	1 05	619	
14th ...	0 02 {	6 A. M.	1 75	981	} 2,773
		6 P. M.	1 30	752	
15th	0 00 {	6 A. M.	1 10	669	} 2,141
		6 P. M.	1 10	669	
16th . ..	0 02 {	6 A. M.	0 50	451	} 1,443
		6 P. M.	0 50	451	
17th ...	0 00 {	6 A. M.	0 62	490	} 1,557
		6 P. M.	0 60	483	
18th . .	0 01 {	6 A. M.	0 52	457	} 1,453
		6 P. M.	0 50	451	
19th	0 01 {	6 A. M.	0 50	451	} 1,443
		6 P. M.	0 50	451	
20th ...	0 00 {	6 A. M.	0 48	444	} 1,421
		6 P. M.	0 48	444	
21st ...	0 00 {	6 A. M.	0 25	384	} 1,229
		6 P. M.	0 25	384	
22nd ...	0 00 {	6 A. M.	0 10	349	} 1,117
		6 P. M.	0 10	349	
23rd ..	0 00 {	6 A. M.	0 05	339	} 1,067
		6 P. M.	0 00	313	
24th ..	0 02 {	6 A. M.	— 0 04	320	} 1,024
		6 P. M.	— 0 04	320	
25th	0 00 {	6 A. M.	— 0 04	320	} 1,024
		6 P. M.	— 0 04	320	
26th .	0 00 {	6 A. M.	— 0 10	308	} 986
		6 P. M.	— 0 10	308	
27th . .	0 00 {	6 A. M.	— 0 16	296	} 947
		6 P. M.	— 0 16	296	
28th ...	0 05 {	6 A. M.	— 0 20	289	} 909
		6 P. M.	— 0 25	279	
29th . .	0 01 {	6 A. M.	— 0 30	269	} 845
		6 P. M.	— 0 35	259	
30th	0 01 {	6 A. M.	+ 0 35	408	} 1,374
		6 P. M.	+ 0 50	451	
31st	0 00 {	6 A. M.	+ 0 10	349	} 1,117
		6 P. M.	+ 0 10	349	
Total ...	1 14				45,853

Depth run off from Catchment Basin of 250 square miles = 2 13 inches

Mean Discharge . . { 1,479,129 Cubic yards per day
 61,630 ,, ,, per hour
 462 ,, feet per second.

Discharge of Perryaur in December 1869	.	...	...	Cubic yards	100,160,000
Do do in do. 1870	...	.	..		45,853,000

Difference 54,307,000 -
(Signed) R SMITH,
Executive Engineer on special duty

MADURA,
10th January 1871

*Proceedings of the Madras Government, Public Works Department,
17th February 1871.*

No. 14.

NOTE by the Chief Engineer for Irrigation

THE results of the endeavours made to ascertain at what rates work near the
Vide G O, No 2,466, dated 28th July 1869 Perryaur can be done are, I think, very
satisfactory. The daily rates of pay have
been reduced 25 per cent, and the working rates much more since 1869, and these
reductions will have an important effect upon the amount of the estimate.

2 It will be seen that Mr. R. Smith proposes, instead of raising the level of
the lake to somewhere between 200 and 220, in order to obtain storage above the
then intended level of the sill of the cutting through the watershed, to tunnel the
watershed on a much lower level, namely, at 100, instead of 155, and to reduce the
lake surface proportionately. The alteration will be beneficial if it can be carried
out at a moderate expense, and the alternative arrangements should therefore each
be estimated for. If the watershed tunnel be in rock of the description found on
the surface of these hills, the velocity of 20 2 feet per second through it suggested
by Mr. Smith will be moderate, and anything not exceeding 25 feet a second would
be admissible. I proposed 45 feet a second as the velocity through the embank-
ment tunnel, but that was a maximum which would seldom be reached, and would
never be long maintained.

3. I have Captain Pennycuick's report on the estimates for the head-works
with me, and it will be submitted for the orders of Government so soon as I have
seen the plans.

(Signed) J. MULLINS, Major, R. E.,
Chief Engineer for Irrigation.

29th January 1871.

No. 380.

ORDER THEREON, 17th February 1871, No. 483.

IRRIGATION, No. 17.

THE Government notice with satis-
faction the results of the efforts made to
reduce the cost of the work at the
Perryaur.

2. The alternative arrangements proposed by Mr. R. Smith, for getting
storage capacity with a comparatively low lake surface, appear to be worthy of
investigation, and if successfully worked out may materially facilitate the execu-
tion of the project.

(True Extract)

Colonel, R. E.,

Secretary to Government.

To the Chief Engineer for Irrigation
To R. Smith, Esq
To the Superintending Engineer, 8th Division

E. d E. C Shunker

N^o 310A Special Executive Engineers Office
Camp Veerapandy 5th January
1871

From,
R. Smith Esq^{re}
Executive Engineer, On Special duty
Madura District

Major J. Mullins R.E.
Chief Engineer for Irrigation
Madras
Sir

Enclosures 4
3 Diagrams
1 Table of run-fall
and discharge of Perryaur

I have the honor to submit
the subjoined Report of the progress made,
with the Perryaur investigations, during
December 1870.

2. The 205 and 246 feet saddles
have been carefully examined and all the
requisite information regarding the level
of the rock, has been ascertained by sinking
trial pits longitudinally and transversely
over both sites. The examination of the
248' saddle is in progress and will be
Completed.

Completed in a few days -

3. As Captain Pennycook's plans showing the position of the escape Tunnel, for his arrangement of the Head works, has not been received I went over the ground with Lieutenant Greer, and in concert with this Officer, decided on the nature and detail of the investigations to be carried out along, and adjacent to, the probable line.

4. By referring to the annexed statement you will observe a commencement was made last month (in accordance with a suggestion made by yourself some time ago) to ascertain the actual rate of working at the Perryaur. The results are satisfactory and tend to prove that the cost of work in the Mill track, need not be excessive.

excessive. 2 7A

Description of soils met with in the Gravel pits	Lead.	Cost of Excavation per Cubic yard				Remarks
		First yard or under in depth	Second yard in depth	Third yard in depth	Fourth yard in depth	
		Annas Pies	Annas Pies	Annas Pies	Annas Pies	
Black	From 20 to 30 feet	1	3	1	5	Easy to excavate - 50 picks required
Black		2	2			Stiff soil - had to be picked
Red		2	5	2	8	3 0 0
Decomposed Rock			2	9	3	1 3 6 Easily worked
Decomposed rock difficult to pick		"	"	"	"	From 3 to 6 annas per cubic yard
Stone						0 0 0

As the weather was fine, during December, it would probably be necessary to add 33 per cent, to the above rates, to cover the extra cost of working during the very rainy months.

5. From the information now available, and from calculations made by Lieutenant Greer and myself, it appears the most economical arrangement, for storing the

the required volume of water in the basin of the Perryaur, would be secured by tunnelling through the Watershed and constructing an embankment across the Perryaur, at site No. 2, about 220 in height. According to this plan the normal level of the lake would be about 190 feet and the head of the Tunnel about 100 feet above datum. These figures are very nearly accurate - the exact levels will be worked out, and the appliances proposed for regulating the discharge from the Reservoir, will be explained hereafter, if you consider it desirable to estimate in detail, for this arrangement also. The rock, in the 205 saddle, is particularly favourable for an escape if the level of the lake is fixed at, or about, 190 feet above datum.

10. In calculating the approximate Cost.

³
Cost of the proposed watershed Tunnel ^{9A}
I assumed 20.2 feet per second, as the maximum velocity to be allowed through it.

7. Diagrams showing the rain-fall at the Perryaur Camp and the discharge of the Perryaur, from the 18th October to the 31st December 1890, inclusive, accompany this Report. The table of rain-fall, and discharge of the Perryaur, for December is also enclosed.

8. The Ryots in the Amburn valley are most anxious to extend their wet Cultivation; this should I think be encouraged as any water supplied to them will reduce the cost of the work lower down.

9. Annexed is an Abstract of the Surveying and Levelling done during

during the month under review:-

Branch Channels Set out in Miles	Linear miles of Country Surveyed	Levelling operations Aggregate length of Longitudinal and Transverse Sections in miles	Numbers of permanent bench marks fixed	Numbers of trial pits sunk to the full depth
24 $\frac{1}{2}$	44 $\frac{1}{4}$	86 $\frac{3}{4}$	13	72

I have the honor to be
Sir

Your Most Obedient Servant

G. Smith

Executive Engineer
On Special duty
Madura District

N:310A
 To The Executive Engineer
 One Special duty
 Madras Dist.

To The Chief Engineer
 for Irrigation
 Madras

Dated 3rd January 1871
 Despatched 10th Jan 1871
 Received 15th Jan 1871
 W 457/1
 Enclosures 4

Submits the Report of the
 progress made with the
 Perryaur investigations
 during December 1870.

Perryaur Project
 Table of rainfall and discharge of Perryaur during
 December 1870. 13A

Date	Rainfall at Perryaur			Water Discharge			Date	Rainfall at Perryaur			Water Discharge		
	Inches	Hours	level	Cubic feet per second	1000 Cubic feet per day			Inches	Hours	level	Cubic feet per second	1000 Cubic feet per day	
December 1	0.20	6 a.m.	0.42	426	1402		14	1.03	6 a.m.	0.62	490	28340	
2	0.10	6 p.m.	0.50	451	3162		15	0.00	6 p.m.	0.60	480	1557	
3	0.01	12 noon	1.75	981			16	0.01	6 a.m.	0.52	457	1453	
4	0.01	6 p.m.	1.50	845	2922		17	0.01	6 p.m.	0.50	457	1443	
5	0.00	6 a.m.	0.75	536	1581		18	0.00	6 a.m.	0.48	444	1421	
6	0.00	6 p.m.	0.50	451	1443		19	0.00	6 p.m.	0.48	444	1229	
7	0.02	6 a.m.	0.42	426	1363		20	0.00	6 a.m.	0.25	384	1117	
8	0.00	6 p.m.	0.25	389	1245		21	0.00	6 p.m.	0.25	384	1024	
9	0.12	6 a.m.	0.20	372	1216		22	0.00	6 a.m.	0.10	349	1024	
10	0.15	6 p.m.	0.12	354	1133		23	0.00	6 p.m.	0.05	339	980	
11	0.15	6 a.m.	0.12	354	1219		24	0.02	6 a.m.	-0.04	320	947	
12	0.08	6 p.m.	0.35	408	1550		25	0.00	6 p.m.	-0.04	320	909	
13	0.15	6 a.m.	0.82	561	1987		26	0.00	6 a.m.	-0.10	308	845	
14	0.02	6 p.m.	0.62	490	1760		27	0.00	6 p.m.	-0.16	296	1374	
15	0.00	6 a.m.	0.50	451	2773		28	0.05	6 a.m.	-0.20	289		
16	0.02	6 p.m.	1.05	649	2141		29	0.01	6 p.m.	-0.25	279		
		6 a.m.	1.75	981			30	0.01	6 a.m.	-0.30	269		
		6 p.m.	1.30	752			31	0.00	6 p.m.	-0.35	259		
		6 a.m.	1.10	669					6 a.m.	+0.35	408		
		6 p.m.	0.50	451					6 p.m.	+0.50	451		
		6 a.m.	0.50	451	1443				6 a.m.	+0.10	349		
		6 p.m.	0.50	451					6 p.m.	+0.10	349		
Total 1.03				28,340			Total 1.14				45,853		

Depth run off from Catchment basins of 250 square miles = 2.13 inches

Means Discharge { 1,479,129 Cubic yards per day
 61,630 " " " per hour
 462 " " " feet per second

Discharge of Perryaur in December 1869. ———— 10,160,000 Cubic yards
 Discharge of ———— D: ———— 1870 ———— 45,853,000
 Difference ———— 54,307,000

Spec. Sec. Engr. office
 Madras 10 January 1871
 Compt. Engr. 122

Amittu
 Executive Engineer
 One Special duty, Madras Dist.

B

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Note by the Chief Engineer for Irrigation

Inclos: 5

The results of the endeavours made to ascertain; at what rates work near the Perry can be done are, I think, very satisfactory. The daily rates of hay have been reduced 25 per cent, and the work made by 2466 big rates much more since 1869, and dated 20 July/69. These reductions will have an important effect upon the amount of the estimate.

2. It will be seen that Mr. R. Smith proposes instead of raising the level of the lake to somewhere between 200 and 220, in order to obtain storage above the then intended level of the sill of the cutting through the watershed, to tunnel the watershed on a much lower level viz at 100 instead of 155, and to reduce the lake surface proportionately. The alteration will be beneficial if it can be carried out at a moderate expense, and the alternative arrangements should therefore each be estimated for. If the watershed tunnel be in rock of the description found

Enclosure of 14 in a section from the Cascade Engineer One Special duty of blackness District, dated 5th January 1871. To Mr. Chief Engineer for Irrigation. J. W. 45871. Respectfully Submitted Table of Rain-fall and discharge of Perry during December 1870

found on the surface of these hills, the velocity of 20.2 feet per second through it suggested by Mr Smith, will be moderate, and anything not exceeding 25 feet a second would be admissible. I proposed 45 feet a second as the velocity through the embankment tunnel, but that was a maximum which would seldom be reached, and would never be long maintained.

3. - I have Captain Pennsylvania's report on the estimates for the head works with me, and it will be submitted for the orders of Government as soon as I have seen the plans.

20th January 1871. Signed / John Williams Major R.E.
Chf Engr for Irrigation

The Secretary to Govt P.W.D.

1871, Dec 1
From the Chief Engineer for Irrigation
To the Secretary to Govt
P. H. Dept.

Dated 20th January 1871
Recd 2-31

N-14. 2-6 P.D.

Encl- 5

Note on the progress report of the Peryaur investigation for Decr/70-

N: 483-17 Feb 1/71

Ch 379

6/6 Feb 1/71 R 67

From

The Chief Engineer for Irrigation { (H. C. & H. J. 20th January 1871.)

The Government notice with satisfaction the results of the efforts made to reduce the cost of the work at the Peryaur.

The alternative arrangements proposed by Mr. R. Smith, for getting storage capacity with a comparatively low lake surface, appears to be worthy of investigation, and if successfully worked

worked out may ma-
-terially facilitate the
execution of the project.

(6)

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[Signature]

[Faint, mostly illegible handwritten notes]

19
3

3 The Chief Engineer for Irrigation
2 R. Smith Esq.

Desp'd 18/2/71

6/2/71 O.A.B.

224 1/2 458
Govt of 1871. Madras.
PUBLIC WORKS.

to the Chief Engr for Irrigation

Date

Recd

Vol. 5

G O 17 July 1871, No. 1483.

Nos. 379 & 380

Perruam Project Paper
orders on the note by the Chief
Engr for Chief on the proper
Report of the investigation
of the Perruam Project
for the 70.