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Not to be folded or roughly handled

No. 191. Read the following letter from Mr. R. SMITH, Officiating Superintending Engineer, 2nd Division, to Lieutenant-Colonel J. MULLINS, R. E., Chief Engineer for Irrigation, dated Camp* at Kondapillay, 3rd November 1872, No. 122 :—

I HAVE the honour to submit a copy of Mr. Sage's report on the irrigation experiment carried out at Chebrole in 1871-72 under the orders of Captain Vibart, R.E.

1 Copy of Mr. Sage's letter.
1 ,, of his tabular statement.
1 ,, of his report.

2. As the volume of surplus discharged was not gauged, the quantity of water required to mature an acre of wet cultivation cannot be accurately stated, but it may be fairly assumed from this experiment, and from the results obtained by Lieutenant Campbell, in 1870-71,* that the maximum produce from soil similar to that experimented on would be secured by an average supply, *inclusive* of rainfall, of 1·9 cubic yard per hour per acre.

* Embodied in G. O. No. 872-A of 30th March 1872.

3. The quantity of water used for each plot, *exclusive* of rainfall, is given in table D.

4. The cost of the experiment (Rupees 31-4-3) I propose charging to Minor New Works.

5. A copy of Mr. Executive Engineer Sage's letter No. 296, dated 2nd September 1872, is also submitted for information in connection with the accompanying papers.

From the Executive Engineer in charge of Western Delta Range, Kistna District, to the Superintending Engineer, 2nd Division, dated Chebrole, 2nd September 1872, No. 296.

IN reply to your letter No. 638 of 21st August 1872, I have the honour to inform you the weight of both grain and straw has been shown in my report in lbs, but not the measurement in Madras seers. A candy is 640 mercals* and a mercal is said to be 2 seers, whether Madras or not I do not know ; therefore the yield of Government plot was 13 067 candies, or 16,725·76† seers ; and of the ryots' plot 6·136 candies, or 7,854·08 seers. The quantity of seed used is shown in latter part of paragraph 1 of report. The discharge is shown in table B in cubic yards per hour per acre ; please enter at foot of each column.

For No. 1 ... ... ·0136,125 cubic feet per second.
,, ,, 2 ... ... ·0179,166 ,, ,, ,, ,,
,, ,, 3 ... ... ·0124,866 ,, ,, ,, ,,

The head under which water was discharged to plots was 1 foot 6 inches.

Report on the Irrigation Experiment conducted at Chebrole in Western Delta Range last year (1871-72).

FROM all I can learn nothing was done to the ground except the repairs of banks at a cost of Rupees 31-4-3. It was in exactly the same condition as during the previous year, and therefore the quantity of water run off could not be ascertained ; all the circumstances connected with the experiment were exactly the same. The experiment was under Mr. Overseer Coghlan, a Delta Gumasta, and one lascar ; the water was registered three times a day. The soil is black

* Of 2 seers each or 1,280 seers to the candy, weighing 2,080 lbs.—(Initialed) J. M.
† Weight of this was 27,179·36 lbs., or 1·625 lbs. to the seer.—(Initialed) J. M.

cotton and classed as fourth class by Revenue Authorities. The quantity of seed used was 9 manikas or 29 lbs. 13 oz. per acre. The statement of water used does not contain the quantity used for seed-beds.

2. The water was discharged through diaphragms placed in 6″ square holes in cistern wall, the orifices in which were as follow :—

No. 1—1·03″ diameter, discharge 4· 64 cubic yards per hour.
,, 2—1·18 ,, ,, 6·103 ,, ,, ,, ,,
,, 3—1·32 ,, ,, 7· 63 ,, ,, ,, ,,

3. Owing to the dispute with the owners of the land regarding compensation they had received for previous year 1870-71, which occurred when I tried to get them to agree to carry out the experiment 1872-73, I had to measure the whole of the land in their presence to satisfy them ; nothing had been omitted ; in so doing I find the gross area of land occupied for the experiment is 9·75 acres (instead of 9 acres shown last year), and the net or cultivated area is 9·21 acres, the difference 0·54 acres being occupied by banks and channel.

4. The separate area of each plot (net) is as follows.

No 1—3·24 acres discharge of sluice = 1·432 cubic yards per hour per acre.
,, 2—2·885 ,, ,, ,, = 2·113 ,, ,, ,,
,, 3—3·085 ,, ,, ,, = 2·473 ,, ,, ,,

instead of 1½, 2, and 2½ cubic yards respectively ; further for No. 3 only 1·237 is the real discharge as the sluice was never kept open for more than twelve hours, whilst the others were opened for twenty-four hours.

5. I enclose a table A showing the daily amount of water supplied to each plot, also that supplied by rainfall ; the whole reduced to cubic yards per hour per acre ; from which it appears—

No. 1 received 1·815 cubic yards per hour per acre instead 1· 5 cubic yards.
,, 2 ,, 2·389 ,, ,, ,, ,, 2· 0 ,,
,, 3 ,, 1·665 ,, ,, ,, ,, 1·25 ,,

The ploughing was commenced on 29th August, and planting completed on 14th September ; the quantity of water used is shown in table B.

6. The yield is shown in table C, from which it appears that there is no compensation due to ryots, and, as stated above, the experiment has cost Rupees 31-4-3 to Government.

7. Regarding cost of cultivation, it was shown in last report to be Rupees 17-8-0 per acre, but no manure was used this year ; Rupees 2-8-0 for that purpose have to be deducted, bringing cost to Rupees 15 per acre including sist.

8. We now come to results, taking grain only into account. Table C shows for the ryots' plot of 6 609 acres, the yield, with a supply of about 3 cubic yards per hour per acre, was 6 136 candies, or 12,762 lbs. = 1,931 lbs. per acre ; and on the Government plot of 9·75 acres, the yield, with an average supply of 1·879 cubic yards per acre per hour (*i. e.* 42,984·81 cubic yards supplied for 100 days for 9·75 acres), is 13·067 candies, or 27,179 lbs. = 2,787 lbs. per acre, or as 1·566 to 1, and this is taking the gross area of plot to suit gross area of ryots' plots.

9. With reference to the Government plot alone and taking net areas, table C shows—

				lbs.	lbs.
No. 1 received a supply	1·815	C. yds. per hour	and yielded	10,002·72 grain	= to 3,087 per acre.
,, 2 ,,	2·389	,, ,,	,,	8,136·96 ,,	= to 2,820 ,,
,, 3 ,,	1·665	,, ,,	,,	9,039·63 ,,	= to 2,930 ,,

thus the smallest quantity of water yielded more than the largest, but the mean (so to speak) gives the largest yield, and strangely enough very nearly corresponds with the quantity proved last year to be the best, namely, 1·9 cubic yard per hour per acre ; this year it is 1·815.

Proceedings of the Madras Government, Public Works Department,
14th May 1873.

10. Regarding the quantity of water used for the cultivation at different periods, I am afraid nothing is satisfactorily determined. A reference to table A shows that from 29th August date ploughing commenced to 14th September date transplanting was finished.

Plot No. 1 used, inclusive of rain, 2·682 cubic yards per acre per hour.
,, ,, 2 ,, ,, ,, 3·323 ,, ,, ,, ,,
,, ,, 3 ,, ,, ,, 2·502 ,, ,, ,, ,,

but if only the quantities used on days the ploughing and transplanting were going on are taken, it appears that—

Plot No. 1 used 2·741 cubic yards per hour per acre.
,, ,, 2 ,, 3·673 ,, ,, ,,
,, ,, 3 ,, 2·185 ,, ,, ,,

but a closer look at the table shows that whilst the ryot of No. 2 plot pushed on his work rain or no rain and made an end of it outright, those of Nos. 1 and 3 worked on such days as suited themselves only, and avoided part of the rainfall ; the quantities used by them nearly coinciding with the average of the whole period of seventeen days, and from which I believe that 2 5 cubic yards per hour are required during ploughing and transplanting, and as No. 1 plot gave the best out-turn, I believe that putting rainfall out of the question, 1·5 cubic yard per hour are required for remaining period.

CHEBROLE,
14th August 1872.

(Signed) G. S. SAGE,
Executive Engineer.

A.

Table showing the quantity of water used in the Irrigation Experiment at Chebrole.

Date.	1st Plot.—Area, Acres 3 24. Diameter of Orifice 1" 03. Number of Cubic yards supplied from Cistern.	Rainfall in Cubic yards.	Total number of Cubic yards in 24 hours.	Average number of Cubic yards per acre per hour.	Remarks.	2nd Plot.—Area, Acres 2·685. Diameter of Orifice 1"·18. Number of Cubic yards supplied from Cistern	Rainfall in Cubic yards.	Total number of Cubic yards in 24 hours.	Average number of Cubic yards. per acre per hour	Remarks.	3rd Plot.—Area, Acres 3 085. Diameter of Orifice 1 83. Number of Cubic yards supplied from Cistern.	Rainfall in Cubic yards.	Total number of Cubic yards in 24 hours.	Average number of Cubic yards per acre per hour	Remarks.
1871															
29th August.	69·41	.....	69·41	0·692	Commenced ploughing.	91·30	.....	91 30	1 318	Commenced ploughing.	57·14	.....	57 14	0 771	Commenced ploughing.
30th ,,	82·59	200 12	282 71	3 635	Ploughing ...	108 65	178·37	287 02	4 145	Ploughing ...	61·10	190 80	251 90	3 402	Ploughing.
31st ,,	97·65	413 30	510 95	6·571	Do. ...	128·46	368·38	496 84	7 175	Do. and transplanting.	71 67	394 05	465 72	6 290	Do.
1st Sept	96 19	326 53	[illegible] 72	9 294	Do. ..	126·54	558·48	685 02	9 893	Nothing doing.	83·47	597 34	680 81	9 195	Nothing doing.
2nd ,,	113·26	.. ..	113·26	1·456	Nothing doing...	118·97	.....	118 97	2 151	Ploughing ...	94 80	.... ..	94·80	1·280	Do
3rd ,,	112·90	365 48	478 88	6 152	Do. ...	118·49	325·76	474 25	6 849	Ploughing and transplanting	94 21	348·45	442 66	5 978	Do.
4th ,,	99·07	....	99·07	1 285	Do. ...	131 51	... .	131 51	1·899	Do. do.	82 30	.. ..	82 30	1 111	Do.
5th ,,	100·49	21 72	122·21	1 571	Do. ...	143·20	19 35	151 55	2 188	Transplanting...	82 03	20 70	102 73	1 309	Do.
6th ,,	100·92	.....	100 92	1 295	Ploughing and transplanting.	132 76	.....	132·76	1 917	.....	83 72	.....	83 72	1 130	Ploughing and planting.
7th ,,	106·75	.....	106 75	1 373	Do. ...	140·42	.....	140 42	2·028	.....	89 56	.....	89 56	1·209	.....
8th ,,	111 36	.....	111 36	1·432	Transplanting...	146 47	.....	146·47	2 115	.....	91·66	.....	91 66	1 238	.....
9th ,,	111·36	.....	111·36	1 432	Do ...	146 47	.....	146 47	2·115	.....	91 66	.....	91 66	1·238	.....
10th ,,	111·36	.. ..	111 36	1 432	Do ...	146 47	.....	146·47	2 115	.....	91 66	.....	91·66	1 238	.....
11th ,,	111 36	164·98	276·34	3 554	.....	146 47	146 98	293 45	4·238	.....	91·66	157 30	248 96	3·362	.....
12th ,,	111 36	.....	111·36	1 432	.....	146 47	. .....	146 47	2 115	.....	91 66	.. ..	91·66	1 238	Ploughing.
13th ,,	111 36	.....	111 36	1 432	Transplanting....	146 47	.....	146·47	2 115	.....	91 66	.....	91 66	1 238	Transplanting.
14th ,,	105·90	.....	105·90	1 362	.....	145·96	.....	145·96	2·109	.....	91 05	.. ..	91 05	1 229	Do.
	1,754 19	1,792·13	3,546 32	2 682	.....	2,314 08	1,597 32	3,911 40	8 323	.....	1,441 01	1,705 64	3,149 65	2·502	.....
15th Sept.	111·36	.....	111 36	1·442	.....	146·47	.....	146 47	2 115	.....	91 66	... .	91·66	1 238	.....
16th ,,	111·36	43·49	154 85	1·991	.....	146 47	38 76	185·23	2 675	....	91 66	41·46	133 12	1 708	.....
17th ,,	109 80	.....	109 80	1 412	Wind north-westerly.	141·43	.....	141 43	2 086	.....	91 66	.....	91·66	1 238	.....
18th ,,	111 36	.....	111 36	1·432	Do ...	146 47	.....	146·47	2 115	.....	91·66	.. ..	91 66	1·238	.....
19th ,,	111 36	.....	111 36	1·432	Do ...	146 47	....	146 47	2 115	.....	91·66	....	91 66	1·238	.....
20th ,,	111 36	.....	111·36	1 432	Do. ...	146 47	. .....	146 47	2 115	.....	91 66	.....	91·66	1 238	.....
21st ,,	112·36	556·67	667·03	8 589	Wind northerly.	146 47	496·09	642 56	9 280	.....	91 66	530 64	622 30	8 405	.....
22nd ,,	111·36	.....	111·36	1·432	Do. ...	146 47	.....	146 47	2 115	.....	91 66	.....	91 66	1 238	.....
23rd ,,	111·36	21 72	133·08	1·711	Do. ...	111 36	19 35	130·71	1·887	.....	91 66	20 70	112 36	1 517	.....
24th ,,	8.	.....	.....	.....	Orifice closed do.	.....	....	.....	.....	Pipes closed ...	.....	... .	... .	.....	Pipes closed.
25th ,,	.....	34 77	34 77	0 447	Do. N. E.	.....	30 99	30 99	0 447	Do ...	.....	33.15	33 15	0·447	Do.

Date.	Number of Cubic yards supplied from Cistern.	Rainfall in Cubic yards.	Total number of Cubic yards in 24 hours.	Average number of Cubic yards per acre per hour.	Remarks.	Number of Cubic yards supplied from Cistern	Rainfall in Cubic yards.	Total number of Cubic yards in 24 hours.	Average number of Cubic yards. per acre per hour	Remarks.	Number of Cubic yards supplied from Cistern.	Rainfall in Cubic yards.	Total number of Cubic yards in 24 hours.	Average number of Cubic yards per acre per hour	Remarks.
26th ,,	... ...	347 72	347 72	4·472	Do. S. W.	.....	309 94	309·94	4·476	Do. ...	.....	331·53	331·53	4 477	Do.
27th ,,	108 89	....	108·89	1·400	Wind northerly.	143·23	....	143·23	2 068	.....	87·54	.....	87 54	1 182	.....
28th ,,	....	382·71	382 71	4 923	Orifice closed S.	.....	341 11	341·11	4·926	Pipes closed ...	.....	361·17	361 17	4 878	Pipes closed.
29th ,,	.....	13 05	13·05	0·168	Do. S.	.....	7 93	7·93	0·114	Do. ..	.....	12·44	12·44	0·168	Do.
30th ,,	.....	.....	.....	.....	Pipes closed S.	.....	.....	.....	.....	Do. ...	.....	.....	.....	.....	Do.
	1,109·57	1,400 03	2,509 60	2 017	.....	1,424·31	1,244·17	2,668·48	2 409	.....	913·48	1,331·09	2,243 57	1 893	.....
1st October.	.....	.....	.....	.....	Orifice closed ...	.....	. .....	....	.....	Pipes closed ...	.....	.....	.....	.....	Pipes closed.
2nd ,,	111·36	.....	111·36	1 432	.....	146 47	.. ..	146·47	2 115	.....	91·66	.....	91·66	1 238	.....
3rd ,,	111 36	104·42	215·78	2 774	Wind northerly.	146·47	92 07	238·54	3 445	.....	91 66	99·55	191·21	2·582	.....
4th ,,	111 36	.....	111 36	1·432	Do. ...	146·47	.....	146·47	2·115	.....	91 66	.....	91·66	1·238	.....
5th ,,	111·36	.....	111·36	1·432	Wind southerly.	146 47	.....	146·47	2·115	.....	91 66	.....	91·66	1 238	.....
6th ,,	111·36	.....	111·36	1·432	Wind northerly.	146·47	.....	146 47	2·115	.....	91 66	.....	91 66	1·238	.....
7th ,,	111 36	.....	111·36	1 432	Wind south-easterly.	146·47	.....	146·47	2 115	.....	91 66	.....	91·66	1 238	.....
8th ,,	111·36	.....	111 36	1 432	Wind northerly.	146·47	.....	146·47	2·115	.....	91 66	.....	91·66	1·238	.....
9th ,,	111·36	.....	111 36	1·432	Do. ...	146·47	.....	146 47	2 115	.....	91 66	.....	91·66	1·238	.....
10th ,,	111·36	.....	111·36	1 432	Orifice closed N. E.	146 47	.....	146·47	2·115	.....	91·66	.....	91·66	1·238	.....
11th ,,	111 36	.....	111·36	1·432	Wind northerly.	146·47	.....	146 47	2 115	.....	91 66	.....	91·66	1 238	.....
12th ,,	109·80	.....	109 80	1·412	Wind easterly...	144·43	.....	144·43	2 086	.....	88·97	.....	88·97	1 201	.....
13th ,,	111·36	34·77	146 13	1·879	Wind northerly.	146 47	30·99	177·43	2·562	.....	91·66	33 15	124 81	1·685	.....
14th ,,	111·36	... .	111 36	1·432	Do. ...	146·47	.....	146·47	2 115	.....	91·66	.....	91 66	1 238	.....
15th ,,	[illegible]		111·36	1 432	Wind north-easterly.	146 47	.....	146·57	2 115	.....	91 66	.....	91·66	1·238	.....
			111·36	1·432	Wind northerly.	146·47	... ..	146·47	2 115	... .	91 66	.. ..	91·66	1·238	.....
			111 36	1 432	Do. ...	146·47	.....	146·47	2·115	... .	91·66	.....	91·66	1·238	.....
	110·58	.....	110 58	1 422	Wind north-easterly.	145 45	.....	145·45	2·100	.....	90 81	.....	90 31	1 219	.....
19th ,,	111·36	.....	111·36	1 432	Wind northerly.	146 47	.....	146·47	2·115	.....	91·66	.....	91 66	1·238	.....
20th ,,	111·36	.....	111·36	1 432	Wind north-easterly.	146·47	.....	146·47	2·115	.....	91 66	... .	91·66	1·238	.....
21st ,,	111·36	.....	111 36	1·432	Wind easterly...	146 47	.....	146·47	2·115	....	91·66	.....	91 66	1·238	.....
22nd ,,	111 36	.....	111 36	1·432	Do. ...	146 47	.....	146·47	2·115	. .....	91 66	.....	91 66	1·238	.....
23rd ,,	111·36	....	111 36	1·432	Wind northerly.	146 47	.....	146·47	2·115	.....	91 66	.....	91·66	1·238	.....
24th ,,	111·36	.....	111 36	1 432	Do. ...	146 47	.....	146·47	2·115	.....	91·66	.....	91·66	1·238	.....
25th ,,	111 36	.....	111·36	1·432	Do. ...	146 47	.....	146·47	2 115	.....	91·66	.....	91·66	1 238	.. ..
26th ,,	111 36	.....	111·36	1 432	Do. ...	146·47	.....	146·47	2·115	.....	91·66	... .	91·66	1·238	.....
27th ,,	111·36	.....	111 36	1·432	Do. ...	146·47	.....	146·47	2 115	.....	91·66	.....	91·66	1·238	.....
28th ,,	111·36	.....	111·36	1·432	Wind easterly...	146·47	.....	146·47	2·115	. .....	91·66	. .....	91·66	1 238	.....
29th ,,	111 36	... ...	111 36	1·432	Wind northerly.	146 47	....	146 47	2·115	.....	91 66	.....	91·66	1·238	.....
30th ,,	111 36	.....	111·36	1 432	Do. ...	146·47	.....	146·47	2·115	.....	91·66	.....	91 66	1·238	.....
31st ,,	111·36	....	111·36	1·432	Wind easterly ..	146 47	.....	146·47	2 115	.....	91·66	.....	91 66	1 238	.....
	3,338 46	139 19	3,477·65	1·413	.....	4,391 04	123·06	4,514·10	2·103	.....	2,745 76	132 70	2,878·46	1·251	.....
1st Nov.	111·36	.....	111 36	1·432	Wind easterly...	146 47	.....	146·47	2·115	.....	91·66	.....	91·66	1 238	.....
2nd ,,	111 36	.....	111 36	1 432	Do. ...	146·47	.....	146·47	2·115	.....	91·66	.....	91·66	1·238	.....
3rd ,,	111·36	....	111·36	1 432	Wind northerly.	146·47	....	146·47	2·115	.....	91 66	....	91 66	1·238	.....
4th ,,	111·36	... .	111·36	1 432	Wind easterly...	146·47	.. ..	146·47	2 115	.....	91·66	.....	91·66	1 238	.....
5th ,,	111 36	.....	111 36	1·432	Do. ...	146·47	....	146·47	2·115	.. . .	91 66	.....	91·66	1 238	.....

Table showing the Quantity of water used in the Irrigation Experiment at Chebicle.

Date.	1st Plot.—Area, Acres 3·24. Diameter of Orifice 1"·03. Number of Cubic yards supplied from Cistern.	Rainfall in Cubic yards	Total number of Cubic yards in 24 hours.	Average number of Cubic yards per acre per hour	Remarks.	2nd Plot.—Area, Acres 2·887. Diameter of Orifice 1"·18. Number of Cubic yards supplied from Cistern.	Rainfall in Cubic yards.	Total number of Cubic yards in 24 hours.	Average number of Cubic yards per acre per hour	Remarks	3rd Plot.—Area, Acres 3·085. Diameter of Orifice 1·32. Number of Cubic yards supplied from Cistern	Rainfall in Cubic yards.	Total number of Cubic yards in 24 hours.	Average number of Cubic yards per acre per hour	Remarks.
1871.															
6th Nov	167·99	.....	167·99	1·388	Wind north-easterly	142·03	.....	142·03	2·071	....	91·66	.....	91·66	1·238	.....
7th ,,	55·68	500·78	556·46	7·156	Orifice closed 6 P. M., to N. E. 6 A. M.	73·23	426·56	499·79	7·218	Closed 6 P. M. to 6 A. M	91·66	456·27	547·93	7·190	.....
8th ,,	.....	.....	.....	.....	Orifice closed N. E.	.....	.....	.....	.....	Pipes closed ...	.....	.....	.....	.....	Pipes closed.
9th ,,	55·68	86·67	142·35	1·830	Orifice closed 6 P. M., to easterly 6 A. M.	73·23	77·21	150·18	2·173	Closed 6 P. M. to 6 A. M.	91·66	82·63	174·29	2·353	.....
10th ,,	.....	52·21	52·21	0·671	Orifice closed easterly.	.....	46·54	46·54	0·672	Pipes closed ...	.....	43·78	43·78	0·672	Pipes closed
[illegible]	...	[illegible]	[illegible]	[illegible]	Do. ...	[illegible]	[illegible]	[illegible]	[illegible]	Do. ...	[illegible]	[illegible]	41·32	0·559	Do.
12th ,,	111·36	.....	111·36	1·432	Wind south-easterly	146·47	.....	146·47	2·115	....	91·66	.....	91·66	1·238	....
13th ,,	111·36	.....	111·36	1·432	Do. ...	146·47	.....	146·47	2·115	.....	91·66	.....	91·66	1·238	.....
14th ,,	111·36	.....	111·36	1·432	Do. ...	146·47	.....	146·47	2·115	....	91·66	.....	91·66	1·238	.....
15th ,,	111·36	.....	111·36	1·432	Wind southerly	146·47	.....	146·47	2·115	....	91·66	.....	91·66	1·238	.....
16th ,,	111·36	.....	111·36	1·432	Do. ...	146·47	.....	146·47	2·115	....	91·66	.....	91·66	1·238	.....
17th ,,	111·36	.....	111·36	1·432	Do. ...	146·47	.....	146·47	2·115	....	91·66	.....	91·66	1·238	.....
18th ,,	111·36	.....	111·36	1·432	Do. ...	146·47	.....	146·47	2·115	....	91·66	.....	91·66	1·238	.....
19th ,,	111·36	.....	111·36	1·432	Wind easterly...	146·47	.....	146·47	2·115	....	91·66	.....	91·66	1·238	.....
20th ,,	111·36	.....	111·36	1·432	Do. ...	146·47	.....	146·47	2·115	....	91·66	.....	91·66	1·238	.....
21st ,,	111·36	.....	111·36	1·432	Do. ...	146·47	.....	146·47	2·115	....	91·66	.....	91·66	1·238	.....
22nd ,,	111·36	.....	111·36	1·432	Do. ...	146·47	.....	146·47	2·115	....	91·66	.....	91·66	1·238	.....
23rd ,,	56·03	204·45	260·18	3·345	Orifice closed 6 P. M., to easterly 6 A. M	73·23	182·24	255·47	3·089	Pipes closed 6 P. M. to 6 A. M.	91·66	164·53	256·19	3·870	.....
24th ,,	.....	.....	.....	.....	Orifice closed easterly	.....	.....	.....	.....	Pipes closed ...	.....	.....	.....	.....	.....
25th ,,	111·36	.....	111·36	1·432	Wind easterly...	146·47	.....	146·47	2·115	....	91·66	.....	91·66	1·238	.....
26th ,,	111·36	.....	111·36	1·432	Do. ...	146·47	.....	146·47	2·115	....	91·66	.....	91·66	1·238	.....
27th ,,	111·36	.....	111·36	1·432	Do. ...	146·47	.....	146·47	2·115	....	91·66	.....	91·66	1·238	.....
28th ,,	111·36	.....	111·36	1·432	Do. ...	146·47	.....	146·47	2·115	....	91·66	.....	91·66	1·238	.....
29th ,,	111·36	.....	111·36	1·432	Wind north-easterly.	146·47	.....	146·47	2·115	.....	91·66	.....	91·66	1·238	.....
30th ,,	111·36	.....	111·36	1·432	Do. ...	146·47	.....	146·47	2·115	....	91·66	.....	91·66	1·238	.....
	2,013·59	887·45	3,701·04	15·00	....	3,487·59	771·22	4,208·81	2·026	....	2,291·50	824·93	3,116·43	1·403	.....
1st Dec.	111·36	....	111·36	1·432	Wind easterly ...	146·47	.....	146·47	2·115	.....	91·66	....	91·66	1·238	
2nd ,,	111·36	.....	111·36	1·432	Do. ...	146·47	.....	146·47	2·115	....	91·66	.....	91·66	1·238	
3rd ,,	111·36	.....	111·36	1·432	Wind north-easterly.	146·47	.....	146·47	2·115	.....	91·66	.....	91·66	1·238	
4th ,,	111·36	117·91	229·27	3·551	Wind easterly ...	146·47	132·81	278·31	4·019	.....	91·66	141·02	232·68	3·142	
5th ,,	111·36	261·05	372·41	4·789	Wind north-easterly.	146·47	232·65	379·12	5·475	.....	91·66	247·89	339·55	4·586	
6th ,,	111·36	... .	111·36	1·432	Wind easterly ...	146·47	.....	146·47	2·115	.....	91·66	.....	91·66	1·238	
	669·16	408·96	1,677·12	2·309	.....	878·82	364·49	1243·31	2·992	....	549·96	388·91	938·87	2·113	
100	9,433·97	4,637·76	1,4111·73	1·815	.....	12,445·84	4,100·26	16,546·10	2·389	.....	7,940·71	4,386·27	12,326·98	1·665	

B.

Period.	No. 1. Cubic yards of water delivered.	No. 1. Cubic yards of water per acre per hour.	No. 2. Cubic yards of water delivered.	No. 2. Cubic yards of water per acre per hour.	No. 3. Cubic yards of water delivered.	No. 3. Cubic yards of water per acre per hour.
29th August to 14th September	3,546·32	2·662	[illegible]	3·323	[illegible]	2·602
15th September to 30th do.	2,509·60	2·017	8,668·48	2·409	2,243·07	1·893
1st to 31st October	3,477·65	1·443	4,514·10	2·103	2,878·46	1·254
1st to 30th November	3,501·04	1·500	4,208·81	2·026	3,116·43	1·403
1st to 6th December	1,077·12	2·309	1,243·31	2·992	9,33·87	2·113
	14,111·73	1·815	16,546·10	2·389	12,326·98	1·665

C.

Number of Plot.	Acres.	Grain.	Grain per Acre.	Weight of Grain.	Weight of Grain per Acre.	Value of Grains.	Weight of Straw.	Weight of Straw per Acre.	Value of Straw.	Total Value.
		CANDIES.	CANDIES.	LBS.	LBS.	RS. A. P.	LBS.	LBS.	RS. A. P.	RS. A. P.
1...	3·24	4·809	1·484	10,002·72	3,087	139 7 5	6,720	2,074	13 3 6	152 10 11
2...	2·835	3·912	1·356	8,136·96	2,820	113 7 2	6,720	2,329	13 3 6	126 10 8
3...	3·085	4·340	1·409	9,039·68	2,930	125 13 9	7,680	2,489	15 2 10	141 0 7
		13·067	1·416	27,179·36	2,787	378 12 4	21,120	2,293	41 9 10	420 6 2
	6·609	6·136	0·928	12,762	1,930	177 15 1	14,880	2,251	29 6 1	207 5 2
						For experiment of 9·75 acres, per acre. ...			... ...	43 1 10
						For ryots' fields of 6·609 acres, per acre...			... ...	31 5 10

(Signed) C. S. SAGE,
Executive Engineer, W. D. Range.

D.

Quantity of water used in the Irrigation Experiment at Chebrole (exclusive of Rainfall).

Period.	No. 1 Plot.	No. 2 Plot.		No. 3 Plot.	
	C. yds. of water delivered.	C. yds. of water delivered.	C. yds. per Acre per Hour.	C. yds. of water delivered.	C. yds. per Acre per Hour.
29th August to 14th September	1,754·19	2,314·08	1·966	1,441·01	1·144
15th September to 30th September	1,109·57	1,424·31	1·285	912·48	0·761
1st to 31st October	3,338·46	4,301·04	2·045	2,745·76	1·196
1st to 30th November	2,613·59	3,437·59	1·654	2,291·50	1·031
1st to 6th December	668·16	878·82	2·115	549·96	1·237
Total 100 days ..	9,488·97	12,445·84	1·797	7,940·71	1·072

(Signed) R. SMITH,
Offg. Supg. Engineer, 2nd Division.

CAMP AT KONDAPILLY,
3rd November 1872.

Proceedings of the Madras Government, Public Works Department,
14th May 1873.

No. 180.

Note by the Chief Engineer for Irrigation.

THE experiments carried out at Chebrole from August to December 1871 on the quantity of water required for rice cultivation are not as complete as they might have been, owing to the omission of any record of the quantity of water run to waste from the land experimented upon. Nevertheless the results are of considerable interest, as the arrangements were in other respects complete, and the out-turn was not only good, showing that the cultivation was successfully carried on, but it has been compared with that obtained from ordinary cultivation with very favourable results. The gross area of the land made use of was 9·75 acres, and that of the fields, exclusive of bunds and water course, 9·21 acres. It was divided into three plots and supplied with varying quantities of water; the average supply was in cubic yards per acre per hour to—

	Exclusive of Rain.	Including Rain.
No. 1 plot	1·219	1·815
,, 2 ,, ...	1·797	2·389
,, 3 ,, ...	1·072	1·665

2. The supply to the land under ordinary cultivation is supposed to have been greater than either of the above. The results in produce are subjoined:—

	Lbs. of Grain.	Lbs. of Straw.	Value of Produce. Average.	Value of Produce of Plot.
			RS. A. P.	RS. A. P.
No. 1 plot per acre	3,087	2,074		152 10 11
,, 2 ,, ,, ...	2,820	2,329	43 1 10	126 10 8
,, 3 ,, ,, ...	2,930	2,489		141 0 7
Ryots' land	1,930	2,251	31 5 10	...

The plots are the same as were under experiment the year before, and then the value of the produce, G. O., 30th March 1872, No. 872-A, was—

	RS. A. P.
No. 1 plot	102 5 5
,, 2 ,, ...	89 6 0
,, 3 ,, ...	94 3 7

The weights of grain and straw in the two years were—

	1871.		1870.	
	Grain.	Straw.	Grain.	Straw.
	lbs.	lbs.	lbs.	lbs.
No. 1 plot	10,003	6,720	6,890	11,250
,, 2 ,, ...	8,137	6,720	5,882	10,750
,, 3 ,, ...	9,040	7,680	6,337	10,550

The weight of seed grain used is reported to have been lbs. 29 oz. 13 per acre, so that the crop produced was on the average of the three plots 99 fold nearly.

3. As the experimental produce was considerably in excess of that obtained by the ryots, no compensation had to be paid and the cost of the experiment amounted to Rupees 31-4-3 only.

4. It will be noticed that in 1870 the weight of straw greatly exceeded, while that of grain fell short of, the out-turn of 1871. It seems probable that too much water would tend to increase the stalk at the expense of the ear, and, as the actual quantity of water supplied to No. 1 plot in the two years did not greatly differ, it would seem that different atmospheric conditions were present in the two seasons, or perhaps the manure applied in the earlier year and omitted in the later was not advantageous.

5. If the experimental cultivation at Chebrole for the season of 1872 has been carried on with due attention to the observations made on that of 1870, it will not be necessary to repeat the experiment again in this locality, but it will be advisable to select plots of somewhat similar area and of the same class of land under one of the delta canals, in order that the difference between the produce of tank and canal irrigation may be ascertained; it will be well also to employ the subordinate establishment, which has at Chebrole acquired considerable experience of what is required to be done to ensure success.

6. It will be seen that from the time of commencing field cultivation, apart from that occupied in growing seedlings, the water supply was required for 104 days in 1870 and 100 days in 1871. Also that for the 3·24 acres of plot 1, which in both years was evidently quite sufficiently supplied, the consumption of water was—

		1870.	1871.
Artificial supply	C. yds.	9,755	9,484
Rainfall ,, ...	,,	5,805	4,628

Reducing these to terms of one acre the result becomes—

Artificial supply		3,011	2,927
Rainfall ,, ...		1,792	1,428

The actual quantity of water artificially supplied is much below what has been considered necessary; and, without supposing that it will be practicable to economize water to the extent indicated by these experiments, there can be little doubt of the advantage which in the course of time may be derived by checking waste where investigation may show that the quantity used is much in excess of that which as here indicated, can beneficially be applied to the crops. Moreover, the artificial supply in these two years was manifestly larger than was necessary. Turning to table A of 1870, this supply might have been reduced, or perhaps discontinued on the 10th, 11th, 15th, 16th, 21st, and 22nd September, on the 11th, 12th, 13th and 18th to 24th October, and on the 14th November; while similarly in 1871 the rainfall probably rendered the artificial supply in excess of requirements on the 30th and 31st August, the 1st to 4th, 11th, 21st September, and the 4th and 5th December, though in this latter year rainfall supplies were taken into account, and the orifice closed at several periods.

7. Measures will be taken, as opportunities occur, to ascertain the quantity of water in tanks at the beginning of the season, the quantity received during that

Proceedings of the Madras Government, Public Works Department, 14th May 1873.

season, and that left at its close, and then the areas cultivated will be compared. It is believed that the discrepancies will be found to be very remarkable. The discharge from sluices will also be gauged, and some valuable data will thus be obtained. In the end probably the revenue will benefit greatly from these inquiries.

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

20th March 1873.

No. 192. ORDER THEREON, 14th May 1873, No. 1,337.

IRRIGATION, No. 8.

THE Government view with much interest the information which is being obtained from these experiments upon the water-supply required for rice cultivation. Not only is such information of importance in order that the large outlay on Irrigation works may yield a proper return, but in carrying them out considerable light will be thrown upon the out-turn of produce to be obtained from different soils and upon their relative suitability to this description of cultivation. It is hoped, therefore, that much care will be taken by all officers conducting these experiments to ensure the utmost accuracy of record.

2. It is satisfactory to notice that the produce obtained from the experimental cultivation at Chebrole in 1871 contrasted very favourably with that from land close by which was entirely under the management of the owner.

3. The Government will be glad to receive information as early as it may be procurable regarding the consumption of water for irrigation under tanks. Nothing reliable is at present known on this subject, and much good may result from inquiries which will enable the irrigating power of a given quantity of water under different tanks to be compared, for without such data waste can neither be detected nor prevented.

4. All grain should be measured as well as weighed; the measure should be the Madras seer of 100 cubic inches, which is that used by the Revenue Settlement Department, and weight should be recorded in lbs. avoirdupois as has been done in the experiments at Chebrole.

(True Extract.)

Colonel, R.E.,
Secretary to Government.

To the District Engineer, Kistna.
To all other District Engineers.
To the Chief Engineer for Irrigation.
,, Officiating Controller of Public Works Accounts.
,, Manager of the Madras Irrigation and Canal Company.
,, Revenue Department.

Exd. E. C. Shunker.

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Subl. of 1873 Statutes.

PUBLIC WORKS.

To

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[illegible]

Read May 11th 73

Read May 26 73

[illegible]

G. O. 144 [illegible] 1870, No. [illegible]

XLIX.

Nos. 101-102

11 Feb. 1873 Ord Aug 30
5th Dec Ord Aug Ord Sale Dec 29

No 166 26th May 1873.

[illegible]—Resolution to [illegible] proceedings of the Superintendent [illegible] granting [illegible] Quantity of water [illegible] the Cultivation of Church [illegible] District.

J. Whitcomb