

MADRAS RECORD OFFICE.

Government of Madras.

Revenue DEPARTMENT.

G.O. No. 1312

Press

~~Mis.~~

154. 155

Dated 11 — 6 — 1867.

Not to be folded or roughly handled

*Proceedings of the Madras Government, Revenue Department,
11th June 1867.*

No. 154. Read the following Proceedings of the Madras Government in the
Public Works Department:—

Communicating reports from Superintending
Engineers of the 2nd and 5th Divisions re-
specting the experiments made in the South
Arcot and Kistna Districts to determine the
quantity of water required to bring an acre
of paddy to maturity. (Here enter 4th June 1867, No. 1,676.)

No. 155. ORDER THEREON, 11th June 1867, No. 1,312.

Miscellaneous.

Communicated to the Board of Revenue.

(True Extract.)

(Signed) J. GROSE,
Under Secretary to Government.

To the Board of Revenue, with Proceedings Public Works Department, No. 1,676.

Exd. S. T. Augustin.

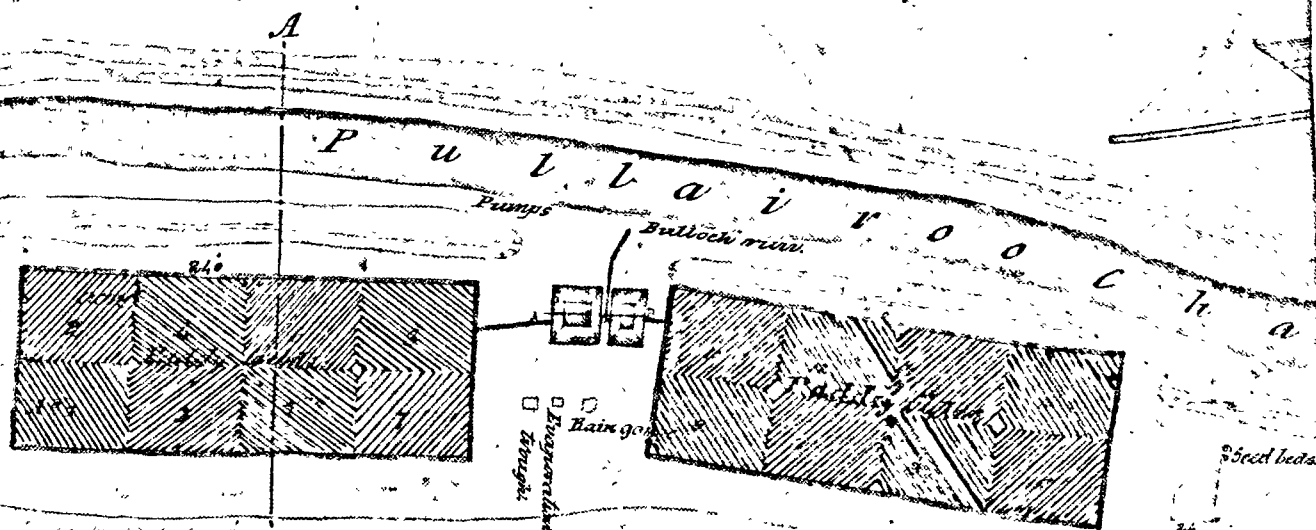
Survey of the Experimental rice field

Cultivated in 1866

by
Mr J. Pierce

Navigation Superintendent

Section thro' the Tanks A.B.



B u n d e r c a n a l

Section on A.B.

Paddy fields

Bunder Canal

C. J. Smith Captain R.E.

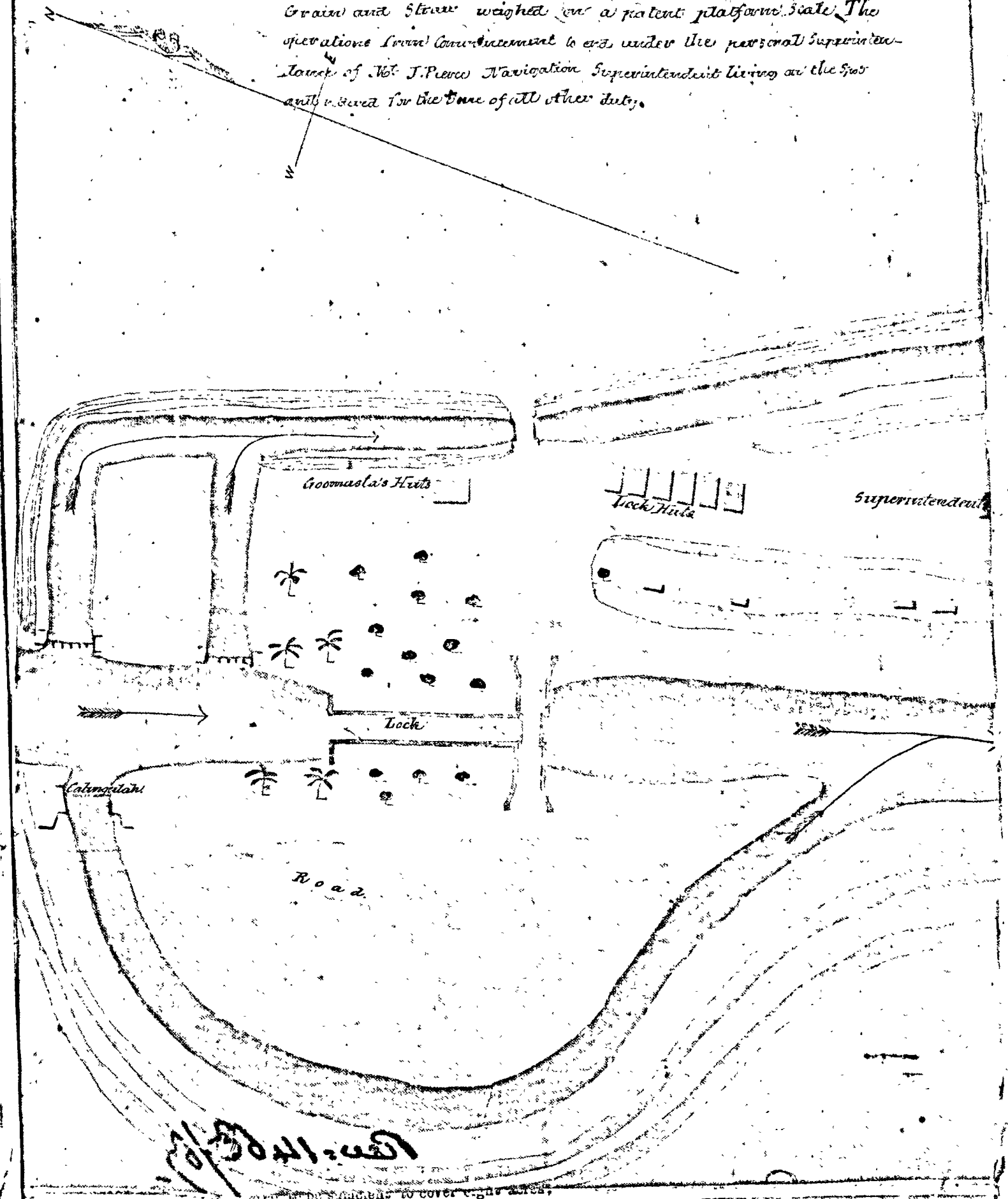
Executive Engineer Madras D.

Leo Amm... 1st Colonel R.E.

First Engineer R.E.D.

Survey 100' to one Inch
Scale
1" = 100'

Fields laid out exactly $\frac{1}{2}$ acre each, exclusive of dividing bunds.
 Water measured by a gauge set up in the centre of each tank, the
 contents up to each inch on gauge tabulated, and the water
 admitted along brick shoots into tank, and lowered to a certain
 figure on gauge for each field according to supply required, and
 carried by small side channels.
 Tanks floored with bricks in mud, water discharged by iron
 piping through tanks, mouth of piping 3 inches below bed of tank.
 Grain and straw weighed on a patent platform scale. The
 operations from commencement to end under the personal supervision
 of Mr. J. Pierce Navigation Superintendent living on the spot
 and relieved for the time of all other duty.



6th or Bezoar Range Officer
 Bezoar 22nd February 1871

Scale
 1/4 1/2 3/4 1 1 1/2 2 2 1/2 3 3 1/2 4 4 1/2 5 5 1/2 6 6 1/2 7 7 1/2 8 8 1/2 9 9 1/2 10

Scale
 1/4 1/2 3/4 1 1 1/2 2 2 1/2 3 3 1/2 4 4 1/2 5 5 1/2 6 6 1/2 7 7 1/2 8 8 1/2 9 9 1/2 10

Read the following papers:—

No. 80. From the Superintending Engineer, 5th Division, to the Secretary to Government, Department Public Works, dated Cuddalore, 12th March 1867, No. 189:—

1. With reference to G. O. No. 2,154, of the 9th of July 1866, I have the honour to forward the papers connected with the experiment made in the South Arcot District, to determine the quantity of water required to bring an acre of paddy to maturity.

1 Letter from Mr. R. E. Norfor.
1 Particulars of water-supply.
1 Experimental observations.

2. The piece of ground selected for the experiment was exactly one acre in extent, situated on the south bank of the Vellaur, opposite Porto Novo. The water was supplied to it from a cistern, which was filled from one of the channels from the Coleroon. A daily register was kept of the quantity of water taken from the cistern and of the rain-fall. The quantity of water used daily varied considerably, but the average for the 147 days, over which the observations extended, was 49.59 cubic yards, or 2.06 cubic yards per hour for one acre.

From the Assistant Engineer, No. 4 Range, South Arcot, to the Superintending Engineer, 5th Division, dated Virdachellum, 5th March 1867, No. 628.

1. I have the honour to report on the experiment made by me of the quantity of water required for one crop of paddy.
2. The piece of ground selected is situated on the south bank of the Vellaur river near Porto Novo, an extent of one acre of the highest ground was chosen for the experiment, from a holding of 40 acres; and a masonry cistern (30 feet $\times$ 24 feet $\times$ 3 feet) was constructed on the west side of the acre of ground selected, the cistern, when full, holds 80 cubic yards, generally supposed to be a sufficient supply for two acres per diem, but as this may have proved insufficient, only one acre was irrigated, and experimented upon.
3. The cistern was supplied by picottah, from an irrigation channel from the Coleroon lower anicut, which runs parallel with one side of it.
4. The piece of ground chosen was amongst other paddy fields; I had the acre accurately marked out, and a good turf ridge thrown all round it, and being higher than the adjoining fields it was easily drained, and admitted of no percolation into, or from it.
5. The nature of the soil is sandy, with a moderate amount of alluvial deposit in it.
6. The season was on the whole good, though the sowing of the seed paddy was a month behind time, owing to the lateness of the freshes in the Coleroon, and consequently a want of proper supply of water in August.
7. The seed paddy was sown on the 1st September 1866, but the cistern not being ready till the end of September, the experiment properly relates only to the time from which the ground was prepared to receive the transplanted paddy to the time the crop was cut.
8. I have however roughly estimated the quantity of water used in the seed paddy during its thirty days' growth, in September, to be 905 cubic yards as follows:—

Rain-fall 5.49 inches	...	...	...	...	Cubic yards	605.00	
Channel supply	...	...	...	...	"	300.00	
						Total Cubic yards	905.00
9. This quantity, however, was used to supply one acre of seedlings, which when transplanted it proved to be sufficient to cover eight acres of land, one-eighth of this quantity only should be taken into our calculations, viz., 113 cubic yards.

Rev. 1462/63

*Proceedings of the Madras Government, Public Works Department,
4th June 1867.*

10. Only once in October it was found necessary to drain off a small quantity of water (605 cubic yards). The paddy has been growing on an average in a depth of three inches of water.

11. The supply of water and rain-fall was as follows:—

September	...	...	...	Cubic Yards	113-00
October, Cistern	...	...	...		705-33
Rain-fall 12 inches...	...	...	...		1,613-33
November, Cistern...	...	...	...		547-00
Rain-fall 10-25 inches...	...	...	...		1,378-03
December, Cistern...	...	...	...		697-00
Rain-fall 13-15 inches...	...	...	...		1,767-00
January, Cistern	...	...	...		1,007-66
Rain-fall 0-50 inches...	...	...	...		67-22
					1,074-88

Or from the 1st Sept. to 25th January, when the last supply was received, 7,895-57 cubic yards.
From which deduct what it was necessary to discharge in October ... 605-00 cubic yards.

Total supply in 147 days, cubic yards ... 7,290-57

Or 49-59 cubic yards per diem for one acre, or 2-03 cubic yards per hour per acre.

In September the supply was at the rate of 0-15 cubic yards per hour per acre.			
" October	...	3-11	do. ... do.
" November	...	2-67	do. ... do.
" December	...	3-31	do. ... do.
" January	...	1-77	do. ... do.

12. The ground to receive the seedlings was ploughed up on the 1st and 2nd October and planted out on the 3rd, and on the 25th January we ceased supplying water. The cistern was emptied, and allowed to dry, and on the 20th February the crop was cut and threshed inside of the cistern. The produce of the acre proved to be a very fair cut-turn indeed, viz., 24½ collums, or 594 Madras measures of paddy, and 35 bundles of straw.

The value of this crop at the current market rates may be put down as follows:—
24½ collums paddy at Rupees 1 7 0 per collum, Rupees 25 9 3
35 bundles straw at " 0 4 0 per bundle " 8 12 0

Rupees 44 5 3

(True Copy.)

(Signed) E. A. FOORD, Lieut.-Colonel, R. E.,
Superintending Engineer, 5th Division.

*Proceedings of the Madras Government, Public Works Department,
4th June 1867.*

Experimental observations to determine the quantity of water per acre per hour required for paddy cultivation.

District.	Talook.	Village.	Approximate Latitude.	Longitude.	Months and dates of observations.	Duration of observations.	Quantity of water used.	Source of supply.	Area irrigated.	Soil.	Date or average date of planting of crops.	Mean temperature.	Mean Rain-fall.	General character of weather.
South Arcot District.	Chellambaram.	Mannabady.	11° 30' N.	79° 45' E.	1st September to 25th January.	3,528 hours.	7,290-57 cubic yards.	Cistern filled from the Kuan Sseb Channel.	1 Acre.	Sand with alluvial deposit.	3rd October.	73	40-39	Wind chiefly from north-east.

(Signed) R. E. NORFOLK,
Assistant Engineer, No. 4 Range, South Arcot.
(Signed) E. A. FOORD, Lieut.-Colonel, R. E.,
Superintending Engineer, 5th Division.

(A true Copy.)

VINDACELLY,
5th March 1867.

Proceedings of the Madras Government, Public Works Department,
4th June 1867.

Particulars of water-supply to one Acre of land in the South Arcot District, Chellumbarum Talook, Manambady village.

Month.	Date.	Water-supply.	Rain-fall.	Mean temperature.	Mean evaporation.	Direction of wind.	Clear or cloudy.	Soil.	Remarks.
OCTOBER.	1	C. Yds.	...	82°	...	S. E.	Cloudy.		Ploughed up the land.
	2	32	...	84°	...	do.	do.		Transplanted paddy
	3	53½	...	84°	...	do.	Clear.		seedlings.
	4	53½	...	84°	...	do.	Cloudy.		2 inches drained off
	5	...	2-00	86°	...	do.	do.		the field.
	6	53½	0-01	86°	...	do.	do.		
	7	...	0-72	86°	...	do.	do.		½ inch drained off the
	8	40	...	86°	...	do.	Clear.		field.
	9	...	...	86°	...	N. W.	Cloudy.		
	10	53½	...	86°	...	do.	do.		
	11	46½	0-40	84°	...	do.	do.		
	12	...	0-14	84°	...	do.	do.		1 inch drained off the
	13	40	0-26	84°	...	do.	do.		field.
	14	...	...	84°	...	do.	do.		
	15	53½	...	84°	...	do.	do.		
	16	...	2-91	84°	...	do.	Clear.		1½ inch drained off the
	17	...	...	84°	...	do.	Cloudy.		field.
	18	...	1-96	82°	...	do.	do.		
	19	...	0-46	82°	...	do.	do.		
	20	33½	0-80	82°	...	S. E.	do.		
	21	...	0-03	82°	...	E.	Clear.		
	22	33½	...	84°	...	N. E.	do.		
	23	...	...	84°	...	do.	Cloudy.		
	24	40	0-28	84°	...	do.	Clear.		
	25	26½	...	84°	...	do.	do.		
	26	40	...	84°	...	do.	do.		
	27	53½	...	82°	...	do.	do.		
	28	53½	...	82°	...	do.	Cloudy.		
	29	...	2-68	82°	...	do.	do.		
	30	...	0-04	82°	...	do.	do.		
	31	...	...	...	...	...	...		
Total.		705½	12-00	84°				9 Clear. 22 Cloudy.	4½ inches drained off the field in the month, or 605 cubic yards.
C. Yds.		705½	1,613½						

705½
1,613½

2,318½ Total.
605 Drained off.

Balance 1,713½ Quantity used.

Proceedings of the Madras Government, Public Works Department,
4th June 1867.

Particulars of water-supply to one Acre of land in the South Arcot District, Chellumbarum Talook, Manambady village.

Month.	Date.	Water-supply.	Rain-fall.	Mean temperature.	Mean evaporation.	Direction of wind.	Clear or Cloudy.	Soil.	Remarks.
NOVEMBER.	1	C. Yds.	...	82°	...	N. E.	Clear.	...	
	2	...	...	82°	...	do.	do.	...	
	3	46½	...	82°	...	do.	do.	...	
	4	53½	...	82°	...	do.	Cloudy.	...	
	5	...	0-55	82°	...	do.	do.	...	
	6	...	...	82°	...	do.	Clear.	...	
	7	...	9-35	82°	...	do.	do.	...	
	8	46½	...	82°	...	N. W.	do.	...	
	9	...	...	82°	...	N. E.	do.	...	
	10	46½	...	82°	...	do.	do.	...	
	11	...	...	82°	...	do.	do.	...	
	12	53½	...	82°	...	do.	do.	...	
	13	33½	...	82°	...	do.	do.	...	
	14	...	...	82°	...	do.	do.	...	
	15	53½	...	81°	...	do.	Cloudy.	...	
	16	...	3-04	80°	...	do.	do.	...	
	17	...	1-45	80°	...	do.	do.	...	
	18	...	1-04	80°	...	do.	do.	...	
	19	...	0-48	80°	...	do.	do.	...	
	20	53½	0-37	80°	...	do.	do.	...	
	21	...	0-10	80°	...	do.	do.	...	
	22	...	0-16	80°	...	do.	do.	...	
	23	60½	...	80°	...	do.	do.	...	
	24	...	1-07	80°	...	do.	do.	...	
	25	...	0-70	78°	...	do.	do.	...	
	26	...	0-73	80°	...	do.	do.	...	
	27	...	...	76°	...	do.	do.	...	
	28	53½	...	76°	...	do.	do.	...	
	29	40	0-22	76°	...	do.	do.	...	
	30	...	...	...	...	...	...	...	
C. Yds.		547	10-25	80°			12 Clear. 18 Cloudy.		Drained nothing off the field.
C. Yds.		547	1,378½						

Cistern supply ... 547
Rain-fall 10-25 ... 1,378½
Cubic yards ... 1,925½

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Particulars of water-supply to one Acre of land in the South Arcot District, Chellumbarum Talook, Manambady village.

Month.	Date.	Water-supply.	Rain-fall.	Mean temperature.	Mean evaporation.	Direction of wind.	Clear or Cloudy.	Soil.	Remarks.
DECEMBER.		C. Yds.							
	1	...	0.36	77°	...	N. E.	Cloudy	...	
	2	...	0.24	77°	...	do.	do.	...	
	3	...	4.64	75°	...	do.	do.	...	
	4	...	1.10	77°	...	do.	do.	...	
	5	...	1.45	76°	...	do.	do.	...	
	6	...	1.17	78°	...	do.	do.	...	
	7	...	0.25	77°	...	do.	do.	...	
	8	...	0.57	78°	...	do.	do.	...	
	9	...	0.75	78°	...	do.	do.	...	
	10	66½	...	78°	...	do.	do.	...	
	11	...	0.10	80°	...	do.	do.	...	
	12	...	0.52	78°	...	do.	do.	...	
	13	...	0.47	78°	...	do.	do.	...	
	14	53½	...	77°	...	do.	do.	...	
	15	40	...	79°	...	do.	do.	...	
	16	...	0.28	78°	...	do.	do.	...	
	17	...	0.65	78°	...	do.	do.	...	
	18	53½	0.05	78°	...	do.	do.	...	
	19	53½	...	77°	...	do.	do.	...	
	20	53½	0.14	77°	...	do.	do.	...	
	21	53½	...	77°	...	do.	do.	...	
	22	...	0.36	77°	...	do.	Clear.	...	
	23	53½	...	77°	...	do.	do.	...	
	24	53½	0.05	78°	...	do.	do.	...	
	25	...	...	78°	...	do.	do.	...	
	26	53½	...	78°	...	do.	do.	...	
	27	...	...	77°	...	do.	do.	...	
	28	53½	...	77°	...	do.	do.	...	
	29	53½	...	78°	...	do.	do.	...	
	30	53½	...	78°	...	do.	do.	...	
	31	...	...	80°	...	do.	do.	...	
		697	13.15						
C. Yds.		697.00	13.15						

Cistern supply ... 697.00
Rain-fall ... 1.767.00
Total used ... 2,464.00 Cubic yards.

*Proceedings of the Madras Government, Public Works Department
4th June 1867.*

Particulars of water-supply to one Acre of land in the South Arcot District, Chellumbarum Talook, Manambady village.

Month.	Date.	Water-supply.	Rain-fall.	Mean temperature.	Mean evaporation.	Direction of wind.	Clear or Cloudy.	Soil.	Remarks.
JANUARY.		C. Yds.							
	1	53½	...	78°	...	N. E.		...	
	2	53½	...	77°	...	do.		...	
	3	...	...	77°	...	do.		...	
	4	53½	...	78°	...	do.		...	
	5	45	...	78°	...	do.		...	
	6	...	...	78°	...	do.		...	
	7	53½	...	79°	...	do.		...	
	8	53½	...	79°	...	do.		...	
	9	45	...	78°	...	do.		...	
	10	...	...	78°	...	do.		...	
	11	53½	...	77°	...	do.		...	
	12	...	...	77°	...	do.		...	
	13	40	30	77°	...	do.		...	
	14	46½	20	79°	...	do.		...	
	15	46½	...	78°	...	do.		...	
	16	53½	...	79°	...	do.		...	
	17	46½	...	78°	...	do.		...	
	18	53½	...	78°	...	do.		...	
	19	53½	...	78°	...	do.		...	
	20	53½	...	78°	...	do.		...	
	21	...	...	78°	...	do.		...	
	22	40	...	76°	...	do.		...	
	23	53½	...	76°	...	do.		...	
	24	53½	...	76°	...	do.		...	
	25	53½	...	77°	...	do.		...	
	26	...	...	...	...	do.		...	
	27	...	...	...	...	do.		...	
	28	...	...	...	...	do.		...	
	29	...	...	...	...	do.		...	
	30	...	...	...	...	do.		...	
	31	...	...	...	...	do.		...	
		1,007½	0.50						
C. Yds.		1,007½	67½						

Cistern supply... 1007.66
Rain-fall ... 67.22

Total used ... 1074.88 cubic yards.

(Signed) R. E. NORFOR,
Asst. Engineer, No. 4 Range, South Arcot.

(True Copy.)

(Signed) E. A. FOORD, Lieut.-Colonel, R. E.,
Superintending Engineer, 5th Division.

Proceedings of the Madras Government, Public Works Department.
4th June 1867.

No. 81. From the Superintending Engineer, 2nd Division, to the Secretary to Government, Department Public Works, dated Masulipatam, 15th May 1867, No. 20.

1. With reference to G. O. No. 1,336, dated 12th June 1866, and No. 2,154, dated 9th July, I have the honour to forward tabulated records of the experiments made in the Kistna district by Captain Smith, R. E., to determine the quantity of water to bring an acre of paddy to maturity, also a sketch explanatory of the method adopted to carry out the experiment.

2. I also append a Memorandum by myself on the subject. It is much to be regretted that owing to the devastations of rates, and to the fact that the beds were raised from plants and not from a measured quantity of seed, the results are unsatisfactory; especially as Captain Smith and his Assistant, Mr. Pearse, the Navigation Superintendent, took much trouble to ensure an accurate result. At the same time I would remark, as I before did, in paragraph 5 of my letter No. 234 of 8th May 1866, that such isolated experiments are not likely to be productive of real value as regards a system of irrigation. If successful, they would be still true only as regards themselves, and although a number of favourable and accurate results when put together would give a general approximation to the quantity of water that should be provided, I think that in such a question as that of deciding what

capacity the main channels of the Irrigation Company should have,* conclusions should be drawn from examinations of broader and more comprehensive facts than any that can be furnished by petty experiments.

* G. O. No. 162, 31st January 1865.

3. An observation to this end can at present be made in the Kistna, viz:— It is generally acknowledged by all the Engineer Officers as well as by the local Civil authorities, that the present discharge at Bezoarah, during the month of December, is just sufficient for the irrigation of the Masulipatam portion of the delta. During December last the average discharge for the month was very nearly 1,44,000 cubic yards per hour, and 67,4½ acres were cultivated by the water. This gives a result of 2.13 cubic yards per hour per acre. In this I have not included some 5,000 or 6,000 acres cultivated in the Godavery division from Kistna water. If they be added, the water needed will be very close indeed upon two cubic yards per hour, and I believe that *two cubic yards may be taken as the quantity absolutely necessary to ensure healthy crops.*

4. Colonel Anderson recorded an observation in 1864, which I consider very valuable. In October of that year the water available barely kept the crops alive, and much anxiety was experienced concerning them. They were beginning to languish on all sides. By his measurement of the discharge of the Sectanagram canal he found that 64,428 cubic yards were passing down to the Guntur side of the delta, and as the area irrigated (deducting tank irrigation) was about 48,000 acres, *1½rd cubic yards per hour may be taken as just sufficient to prevent crops from perishing.*

5. I beg respectfully to suggest that no more of these isolated small experiments be undertaken, as independently of the expense incurred by them, and the extreme probability of their failure, they can but furnish (unless in very large numbers) special and not general results.

Proceedings of the Madras Government, Public Works Department.
4th June 1867.

MEMORANDUM.

1. I fear that the experiments for ascertaining the quantity of water needed to bring a crop into maturity, ordered in G. O. No. 350, dated 7th February 1865, have in this division failed in securing the knowledge desired, though considerable credit is due to Captain Smith and Mr. Pearse for the laborious care they have taken in the matter.

2. An acre was divided off into sixteen equal beds of which beds, [1, 2] [3, 4] [5, 6] [7, 8] were treated with 4, 3, 2, and 1 cubic yard per hour respectively, and watered daily.

The produce was as follows:—

		Seers.	Seers.	Seers.	Seers.
In Paddy	...	163	162½	160½	165.
		lbs.	lbs.	lbs.	lbs.
In Straw	...	270	290	278	281.

I fear nothing can be deduced from such equal results under such unequal watering. Moreover, though trouble seems to have been taken to plant out regularly, the plants were not counted; and it further appears that 136 seers of paddy were disinterred from rat holes, whilst, of course, we cannot say from what beds it was robbed, and what quantity had been eaten by the rats, and which cannot be considered at all. Bed No. 9 contained saline soil, and the stubble testifies that many of the plants died off. Beds 10, 11, 12 were watered once in four days at the rate of 3, 2, and 1 yard per hour respectively. The paddy produced was 84½, 96, 86½ seers respectively, or if doubled for comparison with [3, 4] [5, 6] [7, 8]—169, 192, 172½ seers, which would, on the whole, tend to show that watering once in four days was better than daily; but then the questions of the rats and the quality of the soil creep in.

3. Beds 13, 14, 15, were watered every other day, and are markedly superior to all the others, and the results are much more what should be expected. Doubling the amount of the beds for the sake of comparison with [1, 2] [3, 4] [5, 6] and [7, 8], the paddy obtained was 252, 246, 202, 143½ seers respectively. This would appear to demonstrate that *the most remunerative quantity of water to supply is about two and a half cubic yards per hour.*

4. The following table shows at a glance the results obtained:—

	Beds watered with 4 yards per hour.		Beds watered with 3 yards per hour.		Beds watered with 2 yards per hour.		Beds watered with 1 yard per hour.	
	Out-turn.		Out-turn.		Out-turn.		Out-turn.	
	Paddy. Seers.	Straw. lbs.	Paddy. Seers.	Straw. lbs.	Paddy. lbs.	Straw. lbs.	Paddy. Seers.	Straw. lbs.
Beds watered daily...	163	270	162½	290	160½	278	165	281
Beds watered once in 4 days ...	failure ...		169	296	192	318	172½	396
Beds watered every other day ...	252	458	246	442	202	406	143½	376

5. The total out-turn on the acre, including what was recovered from the rats, is 1,537½ seers of paddy, 2,421 lbs. = 1 ton and 181 lbs.,* and 2,574 lbs. of straw, which sold at auction for 56 Rupees. The total quantity of water supplied including rain-fall was 9,232 cubic yards during 114 days, or 3.4 cubic yards per hour. Deducting the rain-fall the Kistna water amounted to 7,825 cubic yards, or an average of 2.8 cubic yards per hour, the cost of the experiment was Rupees 346-4-8.

* Nearly the same as the produce mentioned by Mr. Newill in paragraph 21 in his proposal of 12th September 1859, for assessing the Godavery and Kistna Irrigated lands.

Proceedings of the Madras Government, Public

Tabular Statement of results of the

Number of beds.	Rate per hour allowed.	Total cubic yards given from tanks.	Cubic yards of rain-fall.	Total.	Periods of watering.	Date of transplanting.	Date of commencement of watering as per column No. 2.	Date of shutting off water.	Date of reapings.
1	Cubic yards per hour.	637.50	87.96	725.46	Daily	1866. 21st Sept.	1866. 13th Oct.	1867. 5th Jan.	1867. 17th Jan.
2	4	637.50	87.96	725.46					
3	3	525	87.96	612.96	do.	19th do.	do.	18th do.	
4		525	87.96	612.96					
5	2	485	87.96	572.96	do.	17th do.	do.	do.	do.
6		500	87.96	587.96					
7	1	337.50	87.96	425.46	do.	15th do.	do.	do.	do.
8		352.50	87.96	440.46					
9	4	696	87.96	783.96	Each 4th Aug.	17th do.	14th do.	31st Dec. 1866.	do.
10	3	549	87.96	636.96	do.	16th do.	do.	do.	do.
11	2	435	87.96	522.96	do.	16th do.	do.	do.	do.
12	1	288	87.96	375.96	do.	18th do.	do.	do.	do.
13	4	825	87.96	912.96	Each 2nd day.	12th do.	13th do.	do.	do.
14	3	637	87.96	774.96	do.	12th Sep. 1866.	13th do.	do.	do.

Works Department, 4th June 1867.

Experimental Rice cultivation.

Name of Villages whence seed procured.	Seers of Paddy.	lbs. of Paddy.	lbs. of Straw.	lbs. of husk waste on the whole Acre.	Gathered, threshed, and weighed in presence of	
Govt. Seed.	81½	124½	135	...	Captain Smith.	The appearance of the stubble offers no clue whatever to the extremely curious results with these beds; their yield is so nearly alike that I must confess, had I not myself seen the rice gathered, threshed and weighed, I should have suspected a mistake; it may be noted that Nos. 3 and 4 lay further from the tanks, and the wastage in their supply was probably more than in that of Nos. 1 and 2, but since no leakage was apparent, I can hardly think this would account for the similarity in out-turn.
...	81½	124½	135	...	...	
Bodla-paud.	81½	130½	145	...	Capt. Smith.	The Government seed was sown on 28th July 1866; received 191 cubic yards of water on an area equal to ½ of an acre; plants were picked on the 21st September 1866, the greater part of the bed was a failure; it is supposed from nature of soil, and perhaps insufficiency of water at times.
	81½	130½	145	...	Mr. Pearse.	
do.	80½	126½	139	...	Mr. Pearse.	The beds bracketed; viz., Nos. 1 and 2; 3 and 4, 5 and 6; 7 and 8 were treated throughout as single beds of ¼th acre each, and the results halved.
	80½	126½	139	...	...	
do.	82½	130½	140½	...	...	The small out-turn here is, I think, fully accounted for by the appearance of the stubble after reaping, at least ¼th of the bed had scarcely any plants on it; the ground being sour, but from the commencement the Superintendent had nicknamed the bed as one which no supply would satisfy.
do.	82½	130½	140½	...	Mr. Pearse.	
do.	62	97	109	214	...	There was nothing peculiar in the position or appearance of these beds to account for their varying out-turn; they were watered once in four days instead of once in two. As with the others abovementioned, were transplanted four days only later, with the same seeds as the rest, and lay nearer to the tank.
do.	84½	133	148	...	Captain Smith.	
do.	96	151	159	...	Mr. Pearse.	
do.	86½	135	198	...	Captain Smith.	
1th do. Kunkepad.	126	193½	229	...	Mr. Pearse.	Nos. 13 and 15 were the only beds in which the crop was laid to any extent, and that only at the side where the surface of the field being a little lower the water stood for some hours after watering a belt of about ¼rd; the width of the bed grew much stronger and higher, and, I have little doubt, yielded more grain in proportion than the remainder which did not to the eye appear better than the crop in the other fields.
Bodla-paud.	123	196	221	...	Captain Smith.	This bed, after reaping, contrasts greatly with the other beds in its regularity of stubble; it may have derived some benefit from the fact that for some days, while each bed was receiving a supply sufficient to leave water standing on the bed for the rest of the day, the supply for beds Nos. 15, 16, and 13 was passed over it, afterwards when the rates of supply were adhered to, each bed received from the channels independently.

Proceedings of the Madras Government, Public

Tabular Statement of results of the

Number of beds.	Rate per hour allowed.	Total cubic yards given from tanks.	Cubic yards of rain fall.	Total.	Periods of watering.	Date of transplanting.	Date of commencement of watering as per column No. 2.	Date of shutting off water.	Date of reapings.
15	2	567	87.96	654.96	Each 2nd day.	1866. 13th Sep.	1866. 13th Oct.	1866. 31st Dec.	1867. 17th Jan.
16	1	378	87.96	465.96	do.	do.	do.	do.	do.
Total out-turn for one Acre									

In addition to the above 136 Seers of Paddy were disinterred from rats' holes in the one acre.

EZORA,
21st February 1867.

Works Department, 4th June 1867.

Experimental Rice cultivation.

Name of Villages whence seed procured.	Seers of Paddy.	lbs. of Paddy.	lbs. of Straw.	lbs. of husk waste on the whole Acre.	Gathered, threshed, and weighed in presence of	
Bodlapaud.	101	162	203	...	Mr. Pearse.	No. 15 was manured, but the out-turn was not so good as No. 13 or 14 (see above remarks of No. 13 bed.) I attribute the bad crop in this bed entirely to want of water. There are no patches of sour soil to account for it; the crop, on the whole, as appears from the stubble after reaping, had grown tolerably uniformly over the whole beds, the plants used for that bed were, in the opinion of numbers of Ryots, full old for transplanting, as evidenced by the formation of the knot in the blade, but about 1/4th of No. 13 was planted with some of the same lot of plants, and the out-turn from that bed was the largest of any. It will be noted that whereas in No. 13=126 Seers, weighed 193 1/2 lbs.; in No. 14=123 Seers, weighed 196 lbs.; this was carefully tested by me, and found to be no mistake, as at first supposed, the grain was evidently lighter or perhaps winnowed in less wind in the one case than in the other. Which fetched at Public Auction— Paddy, ... Seers, 1,401 1/2, Rupees 44. Straw... ... lbs. 2,574 .. 12.
Kunkapad.	71 1/2	116	188	...	Mr. Pearse.	
...	1,401 1/2	2,207 1/2	2,574			

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

(True Copy.)

(Signed) G. V. WINSCOM, Lieut.-Colonel, R. E.,
Superintending Engineer, 2nd Division.

KISTNA DISTRICT.
6TH OR BEZOARAH RANGE.
Statement showing daily supply of water to and rain-fall on the Experimental Rice field.

[illegible]

*Proceedings of the Madras Government, Public Works Department,
4th June 1867.*

[illegible]

Proceedings of the Madras Government, Public Works Department,
4th June 1867.

Statement showing daily supply of water to and rain-fall, &c.—(Continued.)

Month and date.	NUMBER OF THE BEDS.																Cubic yards on 1 st of rain-fall, acre per month equivalent to	Remarks.
	1. Acre 1 st .	2. Acre 1 st .	3. Acre 1 st .	4. Acre 1 st .	5. Acre 1 st .	6. Acre 1 st .	7. Acre 1 st .	8. Acre 1 st .	9. Acre 1 st .	10. Acre 1 st .	11. Acre 1 st .	12. Acre 1 st .	13. Acre 1 st .	14. Acre 1 st .	15. Acre 1 st .	16. Acre 1 st .	Rain-Cents.	
October 1866	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	111	
2	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	73	
3	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	47	
4	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	31	
5	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	5	
6	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	23	
7	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	9	
8	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	93	
9	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	5	
10	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	11	
11	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	5	
12	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	11	
13	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	5	
14	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	11	
15	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	5	
16	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	11	
17	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	5	
18	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	11	
19	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	5	
20	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	11	
21	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	5	
22	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	11	
23	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	5	
24	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	11	
25	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	5	
26	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	11	
27	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	5	
28	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	11	
29	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	5	
30	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	11	
31	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	5	

Proceedings of the Madras Government, Public Works Department,
4th June 1867.

Total Cubic yards for rain.	Total Cubic yards for month.	Average per acre in Cubic yards per hour during the month.																Total.
		1. Acre 1 st .	2. Acre 1 st .	3. Acre 1 st .	4. Acre 1 st .	5. Acre 1 st .	6. Acre 1 st .	7. Acre 1 st .	8. Acre 1 st .	9. Acre 1 st .	10. Acre 1 st .	11. Acre 1 st .	12. Acre 1 st .	13. Acre 1 st .	14. Acre 1 st .	15. Acre 1 st .	16. Acre 1 st .	
36804	429	791	1181	1121	1421	701	821	1301	1421	368	368	368	368	368	368	368	368	36804
		1163	1553	1493	1793	1073	1193	1673	1793	368	368	368	368	368	368	368	368	
		24387	30387	33987	35787	16287	20787	18387	22887	368	368	368	368	368	368	368	368	
		36017	45917	48917	53717	27017	32717	35117	40817	32567	31067	37417	35917	30017	31367	31367	31367	
		250	334	321	385	230	256	359	383	196	196	258	258	303	364	364	364	

Statement showing daily supply of water to and rain-fall, &c.--(Continued.)

[illegible]

						Average per acre in Cubic yards per hour during the month.	
						1-284	2-284
						3-284	4-284
						1-217	2-100
						30-84	4-017
						1-284	1-284
						2-284	2-284
						3-284	3-284
						4-284	506-44
						506-44	506-44
Brought forward.	Total.	Total Cubic yards for rain.	Total Cubic yards for month.				

Proceedings of the Madras Government, Public Works Department,
4th June 1867.

Statement showing daily supply of water to and rain fall, &c.—(Continued.)

Month and date.	NUMBER OF THE BEDS.																Remarks.
	1. Acre $\frac{1}{16}$.	2. Acre $\frac{1}{16}$.	3. Acre $\frac{1}{16}$.	4. Acre $\frac{1}{16}$.	5. Acre $\frac{1}{16}$.	6. Acre $\frac{1}{16}$.	7. Acre $\frac{1}{16}$.	8. Acre $\frac{1}{16}$.	9. Acre $\frac{1}{16}$.	10. Acre $\frac{1}{16}$.	11. Acre $\frac{1}{16}$.	12. Acre $\frac{1}{16}$.	13. Acre $\frac{1}{16}$.	14. Acre $\frac{1}{16}$.	15. Acre $\frac{1}{16}$.	16. Acre $\frac{1}{16}$.	
Dec. 1866 ...	1	12	9	..	9	..	3	..	24	18	12	6	..12	..9	..6	..3	..
	2	12	9	..	9	..	3	..	..	..	..	..	..	..	..	..	..
	3	12	9	..	9	..	3	..	..	..	..	..	..	..	..	..	..
	4	12	9	..	9	..	3	..	24	18	..	..	..	..	..	..	..
	5	12	9	..	9	..	3	..	..	..	..	..	..	..	..	..	..
	6	12	9	..	9	..	3	..	..	..	..	..	..	..	..	..	..
	7	12	9	..	9	..	3	..	..	..	..	..	..	..	..	..	..
	8	12	9	..	9	..	3	..	24	18	12	..	..	..	..	..	..
	9	12	9	..	9	..	3	..	..	..	..	..	..	..	..	..	..
	10	12	9	..	9	..	3	..	..	..	..	..	..	..	..	..	..
	11	12	9	..	9	..	3	..	..	..	..	..	..	..	..	..	..
	12	12	9	..	9	..	3	..	24	18	12	..	..	..	..	..	..
	13	12	9	..	9	..	3	..	..	..	..	..	..	..	..	..	..
	14	12	9	..	9	..	3	..	..	..	..	..	..	..	..	..	..
	15	12	9	..	9	..	3	..	24	18	12	..	..	..	..	..	..
	16	12	9	..	9	..	3	..	..	..	12	..	..	..	..	..	..
	17	12	9	..	9	..	3	..	..	..	12	..	..	..	..	..	..
	18	12	9	..	9	..	3	..	24	18	12	..	..	..	..	..	..
	19	12	9	..	9	..	3	..	..	..	..	..	..	..	..	..	..
	20	12	9	..	9	..	3	..	..	..	..	..	..	..	..	..	..
	21	12	9	..	9	..	3	..	24	18	12	..	..	..	..	..	..
	22	12	9	..	9	..	3	..	..	..	..	..	..	..	..	..	..
	23	12	9	..	9	..	3	..	..	..	..	..	..	..	..	..	..
	24	12	9	..	9	..	3	..	24	18	12	..	..	..	..	..	..
	25	12	9	..	9	..	3	..	..	..	..	..	..	..	..	..	..
	26	12	9	..	9	..	3	..	..	..	..	..	..	..	..	..	..
	27	12	9	..	9	..	3	..	..	..	..	..	..	..	..	..	..
	28	12	9	..	9	..	3	..	24	18	12	..	..	..	..	..	..
	29	12	9	..	9	..	3	..	..	..	12	..	..	..	..	..	..
	30	12	9	..	9	..	3	..	..	18	..	..	..	..	..	..	..
	31	12	9	..	9	..	3	..	24	18	..	..	..	..	..	..	..

Proceedings of the Madras Government, Public Works Department.
4th June 1867.

Total Cubic yards for month.	Total Cubic yards for rain.	Total.	Brought forward.	Average per acre in Cubic yards per hour during month.			
				1	2	3	4
				465-96	654-96	774-96	912-96
				375-96	522-96	636-96	783-96
				432-96	417-96	572-96	693-46
				417-96	561-94	686-94	729-94
				51-02	89-02	147-02	189-02
				324-94	423-94	487-94	588-94
				188-02	188-02	188-02	188-02
				98-02	98-02	98-02	98-02
				48	96	144	192
				3-02	3-02	3-02	3-02
				3-02	3-02	3-02	3-02
				46 1/2	46 1/2	93	93
				3-02	3-02	3-02	3-02
				49-52	49-52	96-02	96-02
				383-44	368-44	476-94	461-54
				142-52	142-52	142-52	142-52
				189-02	189-02	189-02	189-02
				506-44	506-44	506-44	506-44
				506-44	506-44	506-44	506-44
				186	186	186	186
				372	279	186	186
				36	45	90	135
				3-02	3-02	3-02	3-02
				417-94	561-94	686-94	729-94
				48-02	98-02	138-02	188-02
				3-02	3-02	3-02	3-02
				36	45	90	135
				3-02	3-02	3-02	3-02

Proceedings of the Madras Government, Public Works Department,
4th June 1867.

Statement showing daily supply of water to and rain-fall, &c.—(Continued.)																			
Month and date.	NUMBER OF THE BEDS.																Remarks.		
	1. Acre $\frac{1}{16}$.	2. Acre $\frac{1}{16}$.	3. Acre $\frac{1}{16}$.	4. Acre $\frac{1}{16}$.	5. Acre $\frac{1}{16}$.	6. Acre $\frac{1}{16}$.	7. Acre $\frac{1}{16}$.	8. Acre $\frac{1}{16}$.	9. Acre $\frac{1}{16}$.	10. Acre $\frac{1}{16}$.	11. Acre $\frac{1}{16}$.	12. Acre $\frac{1}{16}$.	13. Acre $\frac{1}{16}$.	14. Acre $\frac{1}{16}$.	15. Acre $\frac{1}{16}$.	16. Acre $\frac{1}{16}$.		Rain-Cent.	Cubic yards on $\frac{1}{16}$ th acre per month equivalent to rain-fall.
January 1867	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12
1	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12
2	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12
3	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12
4	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12
5	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12
Total Cubic yards for month.	30	30	22½	22½	15	15	7½	7½	15	15	15	15	15	15	15	15	15	15	15
	30	30	22½	22½	15	15	7½	7½	15	15	15	15	15	15	15	15	15	15	15
Total Cubic yards for rain.	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
Total	30	30	22½	22½	15	15	7½	7½	15	15	15	15	15	15	15	15	15	15	15
	30	30	22½	22½	15	15	7½	7½	15	15	15	15	15	15	15	15	15	15	15
Brought forward.	695-46	695-46	590-46	590-46	557-96	572-96	417-96	432-96	783-96	636-96	522-96	373-96	912-96	771-96	654-96	465-96	...	...	...
	695-46	695-46	590-46	590-46	557-96	572-96	417-96	432-96	783-96	636-96	522-96	373-96	912-96	771-96	654-96	465-96	...	...	...
Grand Total.	725-46	725-46	612-96	612-96	572-96	587-96	425-46	410-46	783-96	636-96	522-96	373-96	912-96	774-96	654-96	465-96	...	...	...
	725-46	725-46	612-96	612-96	572-96	587-96	425-46	410-46	783-96	636-96	522-96	373-96	912-96	774-96	654-96	465-96	...	...	...
Total days.	4-47	4-47	3-71	3-71	3-47	3-43	2-46	2-55	4-70	3-93	3-16	2-34	5-15	4-41	3-82	2-74	...	...	...
	4-47	4-47	3-71	3-71	3-47	3-43	2-46	2-55	4-70	3-93	3-16	2-34	5-15	4-41	3-82	2-74	...	...	...

Proceedings of the Madras Government, Public Works Department,
4th June 1867.

GENERAL REMARKS.

1. The seed was sown at least six weeks later than is usual in the Northern District; the soil is entirely removed from all drainage water, and deprived entirely of any moisture due to other lands; the proximity to the neighbouring channels would probably tend to increase the quantity of water required to mature the rice; the soil contains more sand than in the delta lands further from the river. Owing to the distance of the further fields from the tanks, a per-centage of supply may be supposed to have been absorbed *en route*; a small per-centage must also be allowed for accumulation of silt, although the tanks were frequently cleared out. The land had not been cultivated before. The fields were laid out to measure exactly 1st acre each, exclusive of dividing funds; the water was raised by a bullock-run, and admitted to the tanks (which were of rammed earth turfed) by brick troughs, the floors of tanks were paved with brick; the water was discharged through iron piping, and carried along open channels to the fields, it was measured out by gauges placed in the middle of the tank; the contents up to each inch on the gauge being tabulated, and the water lowered to a certain figure on the gauge according to the supply required.

2. The grain and straw for each field was carefully threshed out and weighed by itself on patent platform scale. The proceedings have been from the commencement under the superintendence of the Navigation Superintendent, Mr. Pearse who was relieved, for the time, of all other duty, and lived on the spot.

BEZOARAH,
21st February 1867.

(Signed) C. J. SMITH, Captain, R. E.,
Executive Engineer, Bezohra Range.

(True Copy.)
(Signed) G. V. WINSCOM, Lieut.-Colonel, R. E.,
Superintending Engineer, 2nd Division.

No. 82.

ORDER THEREON, 4th June 1867, No. 1,676.

IRRIGATION, No. 3.

Ordered that the foregoing reports be communicated to the Revenue Department, with reference to the Proceedings of Government

No. 1,836, 12th 1866.
" 2,154, 9th "
" 3,526, 5th "

(True Copy.)

Colonel, R. E.,

Secretary to Government.

To the Revenue Department, with one Plan.
Superintending Engineers, 2nd and 5th Divisions.
Consulting Engineer, for Madras Irrigation and Canal Company.

Ed. S. T. Augustin.

1275
1000-11-10 321 1822

Proceedings in the
S. P. C. P. Court

Ordered 11th of June
Received 7th 1867.

18-1676.

Co-1.

Communicating re-
ports from Sup^y C. of the
5th Division respecting the
improvements made in the South
and Kistiah Districts to
determine the quantity of
water required to bring an
acre of paddy to maturity.

N^o 1312

Communicated to the
Board of Revenue.

11 June 67

N^o 151 & 155

1000-11-10 321 1822

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