M.R.O. 14-5,459—22-10-25.

MADRAS RECORD OFFICE.

Government of Madras.

Revenue DEPARTMENT.

G.O. No. 1583 ~~Mis.~~ Press

Dated 28-6- 1866

Not to be folded or roughly handled

Proceedings of the Madras Government, Revenue Department,
28th June 1866.

No. 590. Read the following Proceedings of the Madras Government in the Public Works Department :—

Communicating correspondence with reference to the question of the quantity of water needed to bring a crop to maturity, and requesting to consider whether the experiments proposed by the Superintending Engineers of the 2nd and 5th Divisions should be made in the current year, and whether the funds applied for can be allotted from the Reserve. } (Here enter 12th June 1866, No. 1,836.)

No. 591. ORDER THEREON, 28th June 1866, No. 1,583.

Land Revenue.

The Government think it desirable that the experiments proposed in the 2nd and 5th Divisions should be carried out.

(True Extract.)

(Signed) W. HUDLESTON,
Acting Secretary to Government.

To the Public Works Department.
,, the Board of Revenue, with Proceedings Public Works Department, No. 1,836.

Exd. S. T. Augustin.

Read the following papers:—

No. 232. From the Superintending Engineer, 5th Division, to the Secretary to Government, Public Works Department, dated Cuddalore, 1st June 1866, No. 35.

1. With reference to the Order of Government of the 17th June 1865, No. 1,686, I have the honor to state that I have received from Mr. R. E. Norfor an estimate of Rupees 300, for building a cistern and employing a Maistry for six months, for determining the quantity of water required to bring an acre of paddy to maturity.

2. The piece of ground selected for the experiment is two acres in extent, near Porto Novo, and is watered by one of the channels from the Coleroon Annicut. The owner of the ground has promised to give all the assistance in his power.

3. I have the honor to request that the sum of three hundred Rupees, sanctioned for this experiment last year, but not expended, may be again granted this year from the "Reserve," under "Agricultural."

No. 233. From the Superintending Engineer, 1st Division, to the Secretary to Government, Public Works Department, dated Waltair, 20th April 1866, No. 3,241.

1. I have the honor to report that I entrusted the experiments ordered in G. O., dated 17th June last, to the late Captain Philipps in Ganjam, and Mr. Rundall in the Godavery. The death of the first named Officer and the absence on privilege leave of the latter prevented any definite result being arrived at, which, moreover, could not have been exact, as the irrigation season had commenced before the order was received.

No. 1,686.

2. To mature a crop of paddy in the Godavery or Kistna Deltas, the works must have the command of $2\frac{1}{4}$ cubic yards, per hour, per acre, of the gross area; the supply to individual village sluices and channels should be at the rate of $2\frac{1}{2}$ to $2\frac{3}{4}$ cubic yards per acre, per hour.

3. If Government wish it, I will have the experiments taken up for the season now coming on, but the results obtained will not have much practical value, first, because the accurate measurement of the water used, which must necessarily be left to a Native subordinate, cannot be relied upon; secondly, because a Ryot cultivating a farm of 20 or 30 acres cannot devote the necessary amount of care to the uniform distribution of the water.

4. The best way of determining the quantity of water required is to register the water supply in masses to separate areas, and note if failure of crops, by want of water or reduction of area of irrigation from the same cause, occurs, the acreage being compared with the water supply; similarly, a maximum limit is obtained by noting if the drainages take off much water. It is in this way that I have arrived at the result stated in paragraph 2.

No. 234. From the Superintending Engineer, 2nd Division, to the Secretary to Government, Public Works Department, dated Masulipatam, 8th May 1866, No. 2.

1. With reference to G. O., No. 1,686, dated 17th June 1865, I much regret to report that the experiments which I ordered to be made by the Officer in charge of the Nellore Range, as per letter* copy of which I subjoin, have failed in furnishing any satisfactory information on the question of the quantity of water needed to bring a crop to maturity.

* No. 199, dated 15th August 1865.

2. The reason of the failure is that the lands chosen by the Range Officer lay amongst other paddy fields, and it was found impossible to prevent the water of one percolating into that of another till all became the same level. Also, Major Ritherdon left the Range soon after the commencement of the experiment, and Mr. R. Smith, whom I was obliged to put in charge of both the Nellore and Centro Ranges, has been so fully occupied ever since that he has had no time to personally attend to the matter.

3. The only observations of any value are those I now forward. The ground was higher than the adjoining fields, but as the man in charge did not regularly supply the field with the same quantity of water, the question, of how much per hour per acre is needed, remains unsolved; all the information we get is that an average of 2·59 cubic yards per hour, per acre, produced on a certain soil, and under certain circumstances, rather more than nine times the seed sown, and about the same weight in straw as of paddy.

4. The expenses attending the experiment amounted to Rupees 189-13-8, leaving a balance of Rupees 110-2-4 on 300 Rupees allotted for the purpose.

5. Whilst regretting much that I am unable to furnish more information on this specific subject, I would beg very respectfully to remark that as no land requires one continued equable supply of water every day, but rather a varying quantity according to the soil, the temperature, the rain fall, the evaporation, and its own approach to maturity, the question should not be, as regards main works at least, what amount per acre is needed on an average, but what is the maximum amount at any time really necessary for average land and crops under unfavorable circumstances; and all principal masonry works, main distribution channels, &c., should be designed to meet this want, though, of course, possessing the means for regulating and diminishing the supply, according to the state of the crops, season, &c., for there are few distribution channels of large size which do not supply a variety of lands, at such a distance from their heads that the rain-fall and climate may be at times very different. As regards the designing of minor works and distribution channels for the irrigation of lands having the same quality of soil throughout, the maximum supply for that soil is, I think, the sole question to be considered, means being taken for diminishing that maximum supply according to the circumstances of the day.

6. Delta Range Officers are so heavily worked, that they have not time for a long continued series of experiments, but, as Lieutenant Coaker has now joined the Division, I propose employing him under myself and Captain Smith, during the next season, on the investigation of many subjects of great interest connected with irrigation and hydraulics, as applied to large channels and rivers, which I am sanguine may lead to a more thorough acquaintance with the subject. Amongst others, the matter of the quantity of water needed shall meet with due attention. For expenses connected with these investigations, such as assistants, gauges, &c., I request Government will be pleased to place Rupees 500 at my disposal from the Reserve Fund.

From the Superintending Engineer, 2nd Division, to the Executive Engineer, dated Masulipatam, 15th August 1865, No. 199.

1. Government having, in G. O. No. 1,686, dated 17th June 1865, allotted Rupees 300 to this division, in order that special experiments may be made to ascertain the quantity of water per acre required to bring a rice crop to maturity, I have the honor to request that you give the matter your best consideration.

2. I enclose a form of register which should be daily filled in by the person in charge of the experiments. I would suggest that you enter into communication with the Collector on the matter of the land you will need. I have this day addressed Mr. Dykes on the subject. The quantity of water you use may be measured, either by the construction of small tanks of fixed capacity to be daily filled, or by baling from sheet iron baskets of known dimensions.

3. I fear that the money allotted will not enable you to make satisfactory experiments on more than two different kinds of soil. The ground should, I think, be divided into three portions (one acre each would probably be a convenient size), one of which should be watered by 2½ cubic yards per hour per acre, the second 2 cubic yards, and the third 1½ cubic yards. The quantity of seed (which should be of the same description in each case) being known, the yield would testify which is the proper amount of water for that particular soil.

4. I enclose a sketch of the kind of tanks which might suit; they should be close to the main supplying tank or channel, to save expense.

5. The temperature, rain-fall, evaporation, and cloudy days, all affecting the growth of the crops, their particulars should be noted.

6. It would be interesting, also, to know whether the paddy thrived better from a constant stream of water quietly flowing, or from one wetting daily and allowing the water to sink in to the ground.

7. An intelligent person should be engaged by you to superintend the experiments. He can be employed on fixed monthly pay from commencement till the gathering of the crop.

8. It may also be in your power to note the quantity of water which flows into the Nellore tank. Measurements of the discharge through the head sluices, and of the channel below the said sluices would serve as checks to each other. If you can deduct the quantity discharged over the Calingulas, the amount used for cultivation under the tank would be known, and the quantity supplied per acre easily calculated; but if there are other supply channels besides that from the river, I fear the observations would become too numerous; other situations might, however, be found for similar observation.

9. Hoping that you will give the matter your special attention, I have &c.

(True Copy.)

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

No. 235. From the Superintending Engineer, 3rd Division, to the Secretary to Government, Public Works Department, dated Camp Bellahoonsey, Hoovinhudgully Táluq, Bellary District, 4th May 1866, No. 1.

With reference to G. O. No. 1,686, dated 17th June 1865, I have the honor to forward an extract of a letter from Mr. J. L. Wilson, Assistant Engineer in

charge of the Anantapoor Range, whom I had depated to carry out the observations. His letter has only been received this morning, and is not, I regret to say, so full as I had wished. Last year was unfavorable in one respect, viz., the small quantity of rain that fell during the time the crops were on the ground; but, in another respect—that it showed more clearly the quantity of water really necessary per acre for a crop—I think it was favorable. Mr. Wilson's experiments show that, even in an unfavorable year, as regards fall of rain, a cubic yard of water per acre, per hour, is more than sufficient.

From the Assistant Engineer, in charge of Anantapoor Range, Bellary District, to the Superintending Engineer, 3rd Division, dated Camp, Anantapoor, 29th April 1866, No. 163.

The past year has been most unfavorable for carrying out any experiments on a large scale, and I have not therefore done so, but from the Anantapoor tank there is a channel which, for about 50 yards, runs through masonry built walls, and is well adapted to take the necessary measurements. This I have done in several places and obtained a mean. I have also carefully surveyed the land, and levelled the channel. The particulars are, viz :—

2. Channel twenty inches broad; water flowing on the average seven inches deep, and a fall of two feet per mile. The amount of land cultivated this year is 12·3 acres. The discharge is 136·6 cubic yards per hour. This is more than one yard per hour per acre; but, when the well known carelessness of the Ryots is taken into consideration, not only in their waste of water, but also using more than they absolutely require, it will be seen that in this instance, at least, the rate of one cubic yard per hour, per acre, is sufficient. The lands cultivated are high and are chiefly red soil. Since the tank filled and cultivation commenced, no rain has fallen, with the exception of one or two slight showers. As I had not a Barometer or Thermometer, I cannot give you any information on these points.

(A true Extract)

(Signed) A. S. MOBERLY, Major, R. E.,
Superintending Engineer, 3rd Division.

No. 236. From the Superintending Engineer, 5th Division, to the Secretary to Government, Public Works Department, dated Cuddalore, 10th April 1866, No. 114.

I have the honor to report, with reference to the Order of Government of the 17th January 1865, No. 1,686, that I have not been able to obtain any information regarding the quantity of water required to bring an acre of paddy to maturity. During the past eleven months, one Sub-Engineer, one Supervisor, and three Taluq Overseers, of this Division, have died, and one Assistant Engineer has been transferred to another Division. There has, therefore, been great difficulty in getting the ordinary works of the Division carried out. I hope to be able to furnish some reliable information on the subject during the present year.

No. 237. From the Superintending Engineer, 6th Division, to the Secretary to Government, Public Works Department, dated Trivady, 17th March 1866, No. 1,996.

No. 1,232, dated 12th June.
" 2,697, " 14th September.

1. With reference to the G. Os. noted marginally, I regret to inform you that the experiment made by Captain

Hasted in his compound, relative to the supply of water required by rice lands, has been a failure, and will, I fear, be of no assistance in forming an opinion on the subject.

2. The ground was unfavorably situated, being ¾ yard below the level of the garden which bounded it on three sides, where it was sheltered by cocoanut trees within one yard of its edge or margin; the fourth side was bounded by other paddy fields, and an irrigating channel ran within ten yards of it on that side; while a tank, from which the land was supplied, was within twelve yards of it on the south side. The soil was of a sandy nature mixed with alluvial deposit. The experiment commenced on the 15th September, when the land was prepared to receive the young plants from the seed bed; it does not, therefore, show what water is required for the crop, from the time of planting till the removal of the paddy from the seed beds.

3. The supply was as follows :—

In September.	From tank	196	cubic yards.
	From rain 6"	201·66"	
		——— 397·66	
In October.	From tank	344	cubic yards.
	From rain 2⅞"	96·63"	
		——— 440·63	
In November.	From tank	112	cubic yards.
	From rain 14⅛"	487·36"	
		——— 599·36	
In December.	From tank	20	cubic yards.
	From rain 1⅜"	46·21"	
		——— 66·21	

Or, from 15th September to 30th December, when the last supply was received, ...	1,503·86 cubic yards.
From which deduct what it was necessary to discharge owing to the heavy fall of rain in November 10th	·336·1
Total supply in 107 days	1,167·76

Or 10·913 cubic yards per diem for ¼ of an acre.
Or 43·652 cubic yards per acre, or 1·82 cubic yards, per hour, per acre.
In September the supply was at the rate of 4·14 cubic yards per hour per acre.

In October	2·368	cubic yards.
In November.	3·33	do.
or deducting the 336·1 drained off in December	1·46	do.
In December	·368	do.

4. There are, it will be observed, very great differences in the supply afforded to the lands in the various months. It is perhaps hardly fair to divide the supply month by month, as it is not shown what depth of water stood on the land at

the end of each month, but it is clear that late in November, and early in December, the depth of water over the land was very considerable and was unnecessarily high. This, and perhaps the fact of the land receiving only clear water from the tank, instead of water rich with deposit, the unseasonableness of the rain-fall, and the fact of the land being much shaded by the trees in its neighbourhood, caused the failure of the crop, the out-turn from which was only one-third of what it should have been; the ear did not swell though the paddy promised well. The out-turn was better than that on the neighbouring lands.

5. The cultivation was attended to by a man who has had some experience in paddy cultivation, and the crop was reaped on the 4th February, or 4½ months from the date of transplanting.

6. The experiment was evidently tried with what is called the six months paddy. It requires a smaller supply of water daily than the paddy which comes to maturity more rapidly. For the latter, ½" of water over the entire surface daily, for 72 days, is, I believe, about what is required; this may perhaps be spread over three months. A cubic yard of water for every square yard of land for the entire season is, as far as I can judge, the ordinary supply required, or allowing for wastage and absorption and evaporation in long channels three cubic yards per hour, per acre, may be regarded as an ample supply from the time the paddy is transplanted till it ceases to require water.

No. 162, 12th February.

7. Captain Hasted's original report is enclosed.

From the Executive Engineer, No. III Range, to the Superintending Engineer, 6th Division, dated Tranquebar, 12th February 1866, No. 162.

I have the honor to report on the experiment made in my compound of the quantity of water required for one crop of paddy.

1. The ground was situated in a garden sheltered by trees more or less on all sides, and was a quarter of an acre accurately laid out, bounded on three sides by the garden, about ½ of a yard higher than the level of the paddy field, having a row of cocoanut trees planted within a yard or so of the field, and on the 4th side by other paddy fields; on the west side a channel supplying other fields ran parallel to the ground, at a distance of about 10 yards; and on the south side, at a distance of about 12 yards, was a small tank from which the water was baled into a masonry basin measuring 6' × 6' × 3' = 4 cubic yards, and supplied to the field. The basin was furnished with a notch as surplus, exactly 3 feet above its floor, and supplied water through a small sluice on a level with its floor.

2. The tank was supplied by water from the channel abovementioned, so that there was never much difference between the level of the water in it and the surface of the paddy field.

3. The soil is sandy with apparently a rather larger amount of alluvial deposit in it than is generally met with hereabouts.

4. The season was, I believe, an exceptional one, the fall of rain in October being very small—only 2½ inches. The rain that fell in November, 14½ inches, was apparently too late to do much good. The crop is, therefore, a very short one; the paddy, though promising well, not having cared properly. The yield for the quarter acre is about ¾ calams, only one-third of a full crop, as I am informed. It is however better than most of the paddy about here.

5. The cultivation was attended to by a man who has had some experience in paddy cultivation, and was looked after in my absence by the Accountant of the Range office.

Proceedings of the Madras Government, Public Works Department,
12th June 1866.

6. During the very hot weather in September and October, when there was no supply of water to the other paddy fields, I had water baled from a tank to the neighbouring paddy fields, which prevented the water baled on the quarter acre of ground draining off to these fields.

7. The experiment relates only to the time from which the ground was prepared to receive the transplanted paddy to the time the crop was cut. The ground was ploughed on the 15th September 1865, and on the 16th the paddy was planted out. Between the 6th and 15th of September, 2½ inches of rain fell; the ground required therefore only 28 cubic yards of water for ploughing. Had the weather before been very hot, it would have required two or three times as much. The crop was cut on the 4th of February 1866.

8. Twice during the month of December, it was necessary to drain off some of the water. The paddy had been growing in a considerable depth of water for some time, and it was necessary to drain it off, and supply fresh water once more, before leaving the crop to ripen. On the 7th and 23rd December, 10 inches were drained off; and on the 30th December 20 cubic yards were let in. This was the last supply.

9. The supply of water and rain was as follows:—

			Cubic yards.	
In September 1865.	Supplied from tank 49 basins		196	
Do. do.	Rain-fall 6 inches on ¼ acre		202·60	398·60
In October	Supplied from tank 86 basins		344	
Do. do.	Rain-fall 2½ inches on ¼ acre		96·63	440·63
In November	Supplied from tank 28 basins		112	
Do. do.	Rain fall 14½ inches on ¼ acre		487 35	599·35
In December	Supplied from tank 5 basins		20	
Do. do.	Rain-fall 1 ⅝ inches on ¼ acre		46·21	66 21
				1,504·79
	Total supply			336·10
Deduct discharged in December 10 inches on ¼ acre				
	Actual supply used			1,168·69

10. From the day the ground was ploughed, 15th September 1865, therefore, to the day the crop was reaped, 4th February 1866—in all 143 days—1,168·69 cubic yards of water were consumed. This is at the rate of 8·17 cubic yards a day per ¼ acre, or 1·36 cubic yards, an hour, an acre.

11. From the situation of the ground, I believe few sites would have been more satisfactory as regards drainage, for it is almost impossible to find a piece of ground not affected by percolation either into, or from it, during the wet season, but surrounded as it is by trees, the amount of evaporation was very small to what it must have been in situations exposed to both sun and wind. Again, the amount required to make the ground sufficiently moist for ploughing would have been much greater in exposed situations where the cultivation is commenced immediately after the hot weather and before any rain has fallen. Black cotton soil at such a time absorbs an immense quantity of water.

12. The supply, according to this experiment, shows that one acre required 4674·76 cubic yards of water during the season. Taking into account the situation of the ground as above described, I think 5,000 cubic yards may be estimated as the amount required on an average during the season. Taking the season to be four months (after the space of which time from transplanting no water would be required) this would be 1·73 cubic yards, per hour, per acre, or say 1¾ cubic yards. Supposing the rain-fall to be 15 inches during the cultivation season, 3,000 cubic yards might suffice, or rather more than 1 cubic yard, per hour, per acre.

13. The largest supply in any one month, it will be seen, was 599·35 cubic yards for the whole month; this would be a supply of 3¼ cubic yards, per hour, per acre. This is much more than

would absolutely be required in any month, and it was necessary to let off 336·1 cubic yards from the quarter acre to keep the paddy alive.

14. The water required for seed beds is not included in the above amount. The beds are usually planted again, and in estimating for the amount of water required for any given extent of land, say seven acres, I believe the plan would be to allow for the whole extent 1¾ cubic yards an hour an acre, for four months, and, in addition, 1¾ cubic yards an hour an acre for one acre, for two months, for seed beds.

No. 238. From the Superintending Engineer, 7th Division, to the Secretary to Government, Public Works Department, dated Coonoor, 2nd May 1866, No. 3.

1. With reference to your Memorandum, No. 91, of 24th March, I have the honor to state that I was not under the impression that G. O., No. 1,686, of 17th June 1865 called for a reply. On receipt of that Order, I communicated at once to the Consulting Engineer for Irrigation what steps I had taken with reference to the previous Order, No. 350, of 7th February, and I will now report on the same for the information of Government.

Enclosure 1.

2. Under date the 14th April 1865, I addressed the Executive Officers of the Department in charge of the five Irrigation Ranges of the Coimbatore District, inviting their co-operation in carrying out the object in view, and authorizing them, in anticipation of Government sanction, to incur such expenses as might be necessary for the purpose. Lieutenant Morris, R. E., alone, in charge of Pollachy Range, responded to the call, and an estimate of Rupees 120, for the construction of a cistern, which he submitted, having been duly worked out, the experiment commenced. I had occasion, however, to remove him to another Range, but hoped that the small opportunity for practical research afforded by it would not be lost by his successor, Lieutenant H. C. Smith, R. E.

3. Whether owing to its not having been commenced by himself, or from its not having been on a sufficiently large and scientific scale to command his interest, that Officer has rather disappointed me by neglecting to give the detailed account I called for of all that had been done; having contented himself with sending Tabular Statements without note or comment, save that it was a mistake that the experiment was ever made in the Pollachy Range. I am, therefore, left to my own conjectures to account for the site of the cistern having been chosen under the Vadakaloor Channel near Annamallay, instead of more immediately in the vicinity of the Range Officer or one of his Overseers, who had much more time to devote to such observations than any others of the 7th Division, of which Pollachy is the Range in which least money is spent and work done. As it was, the observations were left entirely to a Lascar, from which Lieutenant Smith concludes that they are valueless. But he never applied for any portion of the Government grant of Rupees 300 to secure the services of a more competent person; and I have to be content with such papers as I can get.

4. It may suffice to keep them at the disposal of the Consulting Engineer for Irrigation should he wish to have them, and to abstract their apparent results for the information of Government. Briefly summed up, they would appear to show

that the average daily supply per acre was 115 cubic yards, 24,480 cubic yards per acre (in addition to a rain-fall of 36½ inches) purporting to have been supplied during the 213 days over which the observations extend, viz., from one month before the sowing till nine days before the cutting of the crop, which lose the proportion of 470 seers produce to 82½ of seed per acre, or about six to one only. The Abstract Statement appended gives a few more particulars.

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

District.	Taluq.	Village.	Approximate Lat.	Approximate Long.	Month and Date.	Duration of observations.	Quantity of water used.	Source of supply	Area irrigated.	Soil.	Mean temperature.	Mean evaporation.	Rain-fall.	General character of weather.
Coimbatore.	Pollachy.	Annamallay.	10° 40′ North.	77° 3′ East.	July 1865. 13th to 31st	Days. 13	C. yards 7,640	Cistern under channel, 40 cubic yards in capacity.	Four acres.	Sandy loam.	84·55	...	0·70	Five days cloudy, the rest clear. Wind from south-west during the whole period. Ploughing commenced on 24th.
					August.	31	16,440				80·55	...	7·85	Six days raining, seven days cloudy, the rest clear. Wind from south-west. Paddy was sown 19th.
					September.	30	14,720				83·80	...	0·75	Four days cloudy, the rest clear. Wind westerly.
					October.	31	14,360				81·19	...	16·13	Fourteen days raining and cloudy, rest clear. Direction of wind westerly up to 15th; thereafter easterly.
					November.	30	11,560				80·72	...	5·25	Four days cloudy, the rest clear. Wind easterly all the month.
					December. 1865.	31	12,560				80·84	...	5·90	Four days cloudy, the rest clear. Wind easterly.
					January. February. 1st to 16th.	31	13,600				87·71	...	...	Clear all the month. Wind easterly.
						16	7,240				92·11	...	...	Clear all the month. Wind easterly. The land was sown on 15th August 1865, and cropped on 25th February 1866. Extent of land sown 4 acres. Paddy sown 350 pucka measures No. harvested 1,880 do.
						213	97,920						36·58	

(Signed) G. W. WALKER, Lieut.-Colonel, R. E.,
Superintending Engineer, 7th Division.

CAMP, COONOOR,
2nd May 1866.

No. 239. From the Officiating Superintending Engineer, 8th Division, to the Secretary to Government, Public Works Department, dated Cockaracolum, 10th April 1866, No. 2,597.

1. With reference to G. O., No. 1,686, of the 17th June 1865, I have the honor to report on the experiment made by Major Paxton, in Tinnevelly, to ascertain the quantity of water required for wet cultivation.

2. The tank selected for the experiment was the Ellendacolum, to the south of the Palamcottah Fort, which is conveniently situated for observation, and of sufficient size to give a good idea of the requirement of a second class tank. The area which was planted was *thirty* acres. The arrangements made for measuring the water discharged from the sluices were as follows:—Two square wooden troughs were constructed, twelve feet in length, 8,485 inches in width and height, so as to give a section of half a square foot, and were placed below the sluices of the tank. The velocity of the water was obtained by allowing a float, adjusted in the centre of the trough, to pass through ten feet of the trough, and, the time taken being noted, the discharge was calculated. The troughs were arranged in such a manner that, by slightly altering the slope, the water could be made to run even with the top of the trough throughout. Owing to the very insufficient monsoon, the results of the experiment were not so satisfactory as could be wished; the crops being withered entirely during the early part of January. Still, the results are of some value, as showing the least quantity of water capable of keeping up a crop of paddy.

3. Light rains prevailed from the 21st to 26th October, during which time about two-thirds of the area under the tank was planted, but no water accumulated in the tank. The young plants however appeared healthy, and went on well till the 19th November (one intermediate shower having fallen on the 31st October), when a heavy fall of rain took place, giving a depth of two feet of water in the tank, and the remaining area was then planted. Occasional showers fell between the 10th and 20th November, during which time the crops were watered as required, but the sluices were not allowed to discharge water throughout the day. From the 20th, the sluices were opened partly, but the troughs not being ready, measurements were not made at first. The discharge of the northern sluice was noted from the 27th November; that of the southern sluice, from the 8th December; and the water was allowed to flow from both sluices until the 19th, when the south sluice was closed for want of water. After this, no rain fell sufficient to store any water in the tank, and the crops gradually failed.

4. On the 11th December, with a total discharge of 1,230 cubic feet per hour, or rather more than $\frac{1}{4}$* inch depth of water over the whole area per diem, the crops appeared to thrive, and but little water ran to waste; hence it is considered that, under similar conditions of temperature and evaporation, $\frac{1}{4}$ths of an inch per diem would bring a crop to perfection. The Ellandacolum tank received only two feet of water in the past monsoon; but when full it would contain water to a depth of six feet; and with a view to making fresh and more continued observations in another monsoon, when a heavier fall of rain would be expected, Major Paxton commenced taking a series of contours, to ascertain the exact contents of the tank.

*1230 Cubic feet per hour, or 29,520 cubic feet in 24 hours, distributed over 30 acres, gives a depth of ·27 inches.

He was however obliged to desist from ill health, which has obliged him to proceed to England.

5. I observe that Captain Mullins, in his letter, No. 16, 29th May 1865, asking for observations of the quantity of water used, mentions 2¼ cubic yards, per hour, per acre, as considered not more than sufficient on the Godavery channels; whereas the experiment noted above, gives a result of only 1¼ cubic yards, per hour, per acre.

1,230 cubic feet, per hour, over 30 acres.
41 Do. do. 1 do.
1¼ cubic yards, per hour, per acre.

No. 240. ORDER THEREON, 12th June 1866, No. 1,836

CIVIL WORKS, No. 37.

Revenue Department No. 1,282, 12th June 1865.
Public Works No. 1,686, 17th June 1865.

1 The papers above recorded will be communicated to the Revenue Department and to the Consulting Engineer for the Madras Irrigation and Canal Company, with reference to the Orders noted in the margin.

2. The Superintending Engineer of the 4th Division has not yet reported the result of the experiments which have been made under his orders, and his attention will now be drawn to the subject.

3. It will be considered in the Revenue Department whether the experiments which are proposed by the Superintending Engineers of the 2nd and 5th Divisions should be made during the current year; as, if so, the funds* which are applied for will be allotted from the Reserve.

* Rupees 500 in the 2nd Division.
„ 300 in the 5th do.

(True Extract.)

Colonel, R. E.,
Secretary to Government.

To the Revenue Department.
„ Consulting Engineer for the Madras Irrigation and Canal Company.
„ Superintending Engineer, 4th Division.
To all other Superintending Engineers.

Exd. J. H. Burns.

$7583 8

In Secy's Minute
it desirable that the
Experiments proposed
in the 2nd & 5th Divisions
should be carried out.

Work
N.
28 June 1866

21 To the B. W. Dept 29 June
14 The Board of Revenue Bo. Proc. 1896

Pro-31 Jany 1865 N°332-3
12 June ——— 237-8
23 ——— 492-3
19 Sept ——— 379-380

Rev. 1866 Dispatch
Fr. Govt for June
No. 1693.

Proceedings of the
Madras Govt in
the P. W. Depart.

Dated 12th } June
Received 18th } 1866

No 583 28 June 1836.
With Order—
Communicating
correspondence with ref
-erence to the question
of the quantity of paddy re
-q to bring a crop to ma-
turity, & requesting to con
-sider whether the Sepa
-rate proposals by the Ex
-tract of the 2d & 6th Inst c.
should be made in the cur
-rent year, & whether the fun
-ds applicable for can be allotte
from the Reserve.—

N:590-591.