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MADRAS RECORD OFFICE.

Government of Madras.

Public Works DEPARTMENT.

G.O. No. <u>203</u>	Press
<u>412-413</u>	~~Mis.~~
Dated <u>19-1-</u>	<u>1864.</u>

Not to be folded or roughly handled

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Proceedings of the Madras Government, Public Works Department,
19th January 1864.

No. 412. Read the following Endorsement of the Superintending Engineer, 8th Division, dated Trichinopoly, 28th December 1863, No. 1,590 :—

Read the following letter from Captain L. PAXTON, Executive Engineer, 1st Range, Tinnevely District, to Captain F. J. MOBERLY, R. E., Superintending Engineer, 8th Division, dated Palamcottah, 7th December 1863, No. 261.

SIR,

1. I have the honor to inform you that in accordance with the instructions of Government, No. 3,066, December 22nd 1862, I have continued my experiments with the horizontal wind-mill on the model, and subsequently with a small machine of working size: the results

I Account

of the latter havenot, I am sorry to say, proved so satisfactory as I had anticipated from the working of the model, and unless further alterations may remove the existing defects, I do not think that the wind-mill can be worked with advantage.

2. In the model first made there were four horizontal arms, 15 inches long, and carrying frames $4\frac{1}{2}$ inches deep, the sails commencing at 3 inches from the central axis; the sails were of light cloth with the apparatus for furling them described in my former report; the arms were straight, the sails being divided in two horizontally, to allow of their opening and closing quickly.

3. This model worked fairly in light winds, but in the south-west monsoon, when the force of the wind was greater, the sail acquired a fluttering motion, which caused great resistance in coming up against the wind; the sails also constantly blew over the back of the arms, to avoid this, rigid sails were tried with somewhat better success, the sails being made of cloth stretched over frames or coated with oil paint, the weight of these sails, however, increased the resistance to their opening, when coming up to the wind. Besides this the wind did not seem to retain its action on the sails for a sufficient time, even when six sails were substituted for four, a slight hesitation taking place before each sail came up to the wind.

4. To obviate this a change was made in the shape of the arms, by bending them, which greatly increased the regularity of the motion, as well as the force. As the weight of the sails still told objectionably in their opening as they came up against the wind, a pulley was placed on the central pole, between each pair of arms, and the sails attached to a cord running over it, of such a length that on one sail closing, the opposite necessarily opened, this did not, however, prove very effectual (except in rendering the motion of the sails more easy, and avoiding wear) as the leverage of the descending sail decreased as the opposite one opened.

5. The model in this stage had considerable working force, and in the strong winds prevailing during the south-west monsoon made from 10 to 40 revolutions per minute, with a weight of $\frac{3}{4}$ of a lb. on a wheel 4 inches in diameter equivalent to from $7\frac{1}{2}$ to 30 lbs. raised 1 foot per minute, the average being probably 20 turns per minute during 10 hours of the day, giving about $5\frac{1}{2}$ cubic yards of water raised 1 foot per diem.

6. I subsequently constructed a machine of twelve times the size of the model, with sails having an area of 144 times those of the model, which would, had the work done by it been proportioned to the areas, as I imagined would be the case, have given about sixty cubic yards per diem raised to a height of twelve feet, an amount more than four times what it proved capable of performing.

7. The mill was constructed of such work as is done by the better class of village Carpenters, good timber being used for the centre post collar, struts, and wheels, the arms being made of jungle wood poles, and bamboos, and the sails of gunny coated with tar, each sail being further strengthened by a light frame of bamboo.

8. The sails were arranged in two sets of four, one above the other, and at an angle of 45° with each other, which appeared to expose a greater amount of surface to the wind's force than six sails of the whole depth, this advantage was, however, apparently more than counterbalanced by the increased quantity of woodwork which caused much resistance coming to the wind and probably was one cause of the mill not working satisfactorily.

9. The great causes of failure, however, appeared to me to be the difficulty of accurately counterpoising the sails, so as to reduce the resistance of the opening of the sails to a minimum, and the great amount of friction caused by the rough work done by common Carpenters not used to the construction of wheel work. To this may be added the stretching of the rope used and the frequent injury done to the sail by sudden gusts of wind.

10. These difficulties might perhaps be got over, but the expense would be so much increased, that I am inclined to believe that the ordinary form of wind-mill might be constructed as cheaply and equally effective.

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114 7 18

Carried over 79 13 10 35 10

*Proceedings of the Madras Government, Public Works Department,
19th January 1864.*

11. To meet the continual change of force to which all wind-mills are liable, I tried a method for regulating the load according to the speed so that even in light winds some work might be done. This arrangement consisted in a valve at the bottom of the buckets closed by the force of the water escaping, the valve itself being made of a light material, capable of floating, so that if the bucket was raised slowly from the water, the valve would remain open until the bucket was nearly out of the water, whilst if withdrawn quickly it would at once close and the bucket come up full, this plan of regulating the quantity of water drawn, according to the speed of the mill, might perhaps be useful with wind-mills of a better class employed in drawing water, but would, I think, be too complicated for ordinary village work.

12. The total expenditure on the experiment has been Rupees 175-9-3 as per accompanying account.

Submitted for the information of Government, with reference to Government Order No 3,066, dated 22nd December 1862.

(Signed) F. J. MOBERLY, Captain, R. E.,
Superintending Engineer, 8th Division.

No. 413. ORDER THEREON, 19th January 1864, No. 203.

1. The Governor in Council regrets that the results of the experiments made by Captain Paxton in pursuance of G. O. No. 3,066, dated 22nd December 1862, have not proved satisfactory.

* Rupees 175-9-3.

2. The expenditure* incurred will be charged against the current year's Reserve.

(True Extract.)

(Signed) CHARLES A. ORR, Colonel, R. E.,
Secretary to Government.

To the Superintending Engineer, 8th Division.
" Controller and Auditor of Public Works Accounts.
" Accountant General.

Exd. S. T. Augustin.

Memorandum of expenditure incurred in making a horizontal mill.

<i>No.</i>	<i>Items</i>	<i>Rate</i>	<i>Amount</i>	<i>Total</i>
	<u>Labour.</u>			
13 1/2	Coolies	" 3	2 8 6	
9	Do	" 2 4	1 6 6	
15	Do	" 2	1 14	
59	Carpenters	" 5	18 7	
18 1/2	Do	" 4	4 10	
1	Do	" 3 4	" 3 4	
7	Smiths	" 5	2 3	
10	Do	" 4	2 8	
5	Hammermen	" 3 4	1 8	
4	Bellows boys	" 1	" 4	
1	Stone Cutter	" 4	" 4	
1	Bricklayer	" 5	" 5	35 10
	<u>Materials</u>			
3	Wheels	10	" 30	
4	Lineal yards of timber	" 12	3	
3	Do Do	2	" 6	
4 1/2	Do Do	2 8	11 4	
18	Lineal feet of Saw plate	"	2	
	Churns	"	3 5	
	Paddy husk	"	3 8	
	Churns	"	12	
	Jaggery	"	1 6	
	Glue	"	1	
	Grease	"	2 4	
	Swine	"	2 9	
20	Lineal yards of Margo planks	"	11 4	
11	Gallons of tar	" 11 4	7 1 8	
				<i>Carried over 79 13 10 35 10</i>

	Brought forward	79	13	10	35	10
45	Shs of Iron	1	2	13		
12	Solaw of S.	1		8		
16	Bamboos	7	7			
17	Jungle wood poles		8	5		
5	Pieces of wood		4	13		
16 1/2	Sees of rope	10	10	5		
	Spike nails		3			
	Screws		11	11		
	Lead		11			
10	Pieces of gummy	1	6	13	12	
	low rope			9	8	
	Hire for stitching sails		3	13	1	
	Reeds		4			
	Cart hire and sundries		6	4	6	139 15 3
	Total Rupees		175	9	3	

Signed, L. Paxton Captain
Sr. Engineer 1st Range.

(True Copy)

J. Moberly Captain R.C.
Superintending Engineer 8th Division

49764/1006

No 261.

Palamcottah

7th December 1863

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From,

Captain L. Paxton

Executive Engineer 1st Range Sumerly

Captain J. Moberly

Superintending Engineer 8th Division

Sir,

I have the honor to inform you that in accordance with the instructions of Govt No 3066 December 22nd 1862, I have continued my experiments with the horizontal windmill on the model, and subsequently with a small machine of working size: The results of the latter have not I am sorry to say proved so satisfactory as I had anticipated from the working of the model, and unless further alterations may remove the existing defects, I do not think that the windmill can be worked with advantage.

In the model first made there were four horizontal arms, 15 inches long and carrying frames 1 1/2 inches deep, the sails commencing at three inches from the central axis. The sails were of light cloth with the apparatus for furling them described in my former report. The arms were straight the sails being divided in two horizontally, to allow of their opening and closing quickly.

This model worked fairly in light winds, but in the S.W. monsoon, when the force of the wind was greater, the sail acquired a fluttering motion, which caused great resistance in coming up against the wind. The sails also constantly blew over the back of the arms. To avoid this, rigid sails were tied with some what better success; the sails being made of cloth stretched over frames or coated with oil paint, the weight of these sails however increased the resistance to their opening, when coming up to the wind.

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Bamboos.

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This arrangement consisted in a valve at the bottom of the buckets closed by the force of the water escaping, the valve itself being made of a light material, capable of floating, so that if the bucket was raised slowly from the water, the valve would remain open until the bucket was nearly out of the water, whilst if with drawn quickly it would at once close and the bucket come up full. This plan of regulating the quantity of water drawn, according to the speed of the mill, might perhaps be useful with windmills of a better class employed in drawing water, but would I think be too complicated for ordinary village work.

The total expenditure on the experiment has been Rs 175-9-3 as per accompanying Account.

Signed / S Payton Captain.

Scientific Engineer 1st Range

N. 1590. *Lieutenant Engineer 1st Range*
Submitted for the information of Government,
with reference to Govt Order N. 3066 dated 22nd December
1862.

F. Lieber Captain U.S.
Superintending Engineer 8th Division.

Sup^y Enquiries Office
8th Division - Sriehmopoly }
28th December 1863

To
The Colonel A. A. Orr R.R.
Secretary to Government D.P.W.


 { 14981 Entered 4/1
 1979
 E. J. Van Hook

The duty of the
 citizen is to
 be a good
 citizen.

2. The expenditure incurred, will be charged against the current year's

Machine and Iron Works

No 203. The Governor in Council approve
that the results of the experiment made by the
Auctioneers on 4.8.0.18306 be data 25.12.18306/67

5-6-8/10/11

17412.413.

*9-7-77 18664 gms 1890
Waco: of Gaudin's Canyon
Shamus 8-72*

Shipping Engineer

Handing to Government
P. W. D. B.

Dated 28th Aug / 63
 Paid 80 Camp / 64
 B.
 P.
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I enclose a report from
 Captain Barton on the ex-
 periments made by the
 Geological Household
 lately set up at Winemul-

88-208-191#Lamont

W. D. Miller