

(1) Number of pages _____

(2) Date of repair _____

(3) Initials of the Referencer _____

MADRAS RECORD OFFICE

Government of Madras

Public Works DEPARTMENT

G.O. No.	3441	Press	<i>Original</i>
B.P. No.		Mis.	
Dated	3-12	1875	195

Not to be folded or roughly handled

*Proceedings of the Madras Government, Public Works Department,
3rd December 1875.*

No. 53. Read the following despatch from the Most Honorable the Secretary of State for India:—

Public Works.
No. 19.

INDIA OFFICE, LONDON,
28th October 1875.

On the recommendation of Major-General Strachey orders have been given for the supply of a certain number of Moore's Patent Current Meters for trial on Indian rivers and canals. One of these instruments has been forwarded to your Government by the S.S. *Duke of Lancaster*, which sailed on the 25th instant.

2. Copies of a report by General Strachey, and of directions for using the instrument, are forwarded herewith.

I have, &c.,
SALISBURY.

His Excellency the Honorable

The Governor in Council, Fort St. George.

Copy of a Report by Major-General Strachey, dated 14th November 1874.

I HAVE lately seen an instrument which would, I think, be useful to the Canal Officers in India, and to those Public Works Officers who have to deal with works, the regulation or construction of which requires a knowledge of velocities of rivers.

2. A good current meter has long been a desideratum, and I have for some time been hoping to hear of something that would be likely to supply the want. I think that Mr. Moore's instrument will probably do it. It is simple and not likely to get out of order, and gives the means of ascertaining the velocity of a stream at any depth with facility, which has hitherto been very difficult to arrive at with satisfactory accuracy.

3. I have shown the instrument to Sir W. Baker, who, I think, was satisfied that it gave sufficient promise of success to justify the purchase of a few to be sent to India for trial.

4. I would suggest that three or four of the instruments should be ordered. I annex a letter

Two to Calcutta.
One to Madras.
One to Bombay.

from Mr. Moore (a Civil Engineer), the inventor of the apparatus, who offers to supply that number of instruments at £12 a-piece, which

seems to be what is paid to the makers now without any profit.

5. I wrote to Mr. Moore, pointing out some particulars in which I thought the instruments and cases should be improved. He assents to do what I suggested. If the order is given it might be said that the instruments should be accepted subject to my approval. I know Mr. Moore personally, and am satisfied that he will do all that is necessary to supply proper workmanship.

14th November 1874.

(Signed) R. STRACHEY.

From B. J. MOORE, Esq. to General STRACHEY, dated Spring Grove, Isleworth, 4th November 1874.

In reply to your letter I shall be happy to supply three or four of my current meters at £12 each. This price has been fixed as one at which it *ought* to be sold. At present it barely covers expenses. I look to the future for my remuneration when I hope to get the instrument made more cheaply.

2. The spring shall be made much stronger than in the sample which you have, and shall be steady and not liable to turn about the screw which holds it. The dials shall be metal, and the train of wheels of a better class of work. The boxes shall be of mahogany and finished as you

*Proceedings of the Madras Government, Public Works Department,
3rd December 1875.*

suggest. The instruments will be rated so as to give the velocity in feet per minute, from the reading of the dials. In the specification which I send you with this, you will see a simple, self-acting, starting, and stopping gear, intended to be used in *deep sea* current meters. A similar thing can be applied to the fresh water current meter, but in the small depths and both in fresh water streams I prefer the spring clamp or stop, and I think I understood you to say you also would prefer it. It gives ample time for the instrument to settle itself, and enables you to start and stop it with more precision as to time.

Directions for using Moore's Patent Current Meters.

The instrument is to be lowered into water to the required depth by a light chain, or a cord which has no tendency to twist, attached to the swivel at the top of the stirrup.

A lighter cord (and for this purpose Salmon line is most suitable) passes through the hole in the small bracket behind the swivel on the stirrup, and is attached to the end of the spring which strides across the revolving cylinder.

This cord should have a double knot in it *below* the hole in the bracket, and so placed that when the knot is drawn up to the hole the spring may be lifted clear of the cylinder, but may not be overstrained.

When the instrument has been lowered to the required depth by means of the stronger cord or chain, the lighter one is to be drawn up until the weight of the instrument comes upon it.

The spring at that instant frees the cylinder and the running water sets it in rotation by acting upon its fans.

The rotation is stopped by letting go the lighter cord and bringing the weight of the instrument upon the stronger one, and it is to be drawn up out of water by means of the stronger cord alone.

A little practice will make this operation easy.

The instrument is so constructed that when suspended in running water, its axis necessarily becomes parallel to the direction of the stream; and, when descending or ascending in water, it travels point foremost or nearly so.

The cylinder should revolve easily and freely upon its pivots with a *little* end play. This adjustment is made by the back pivot and its tightening screw.

The spring which strides across the cylinder, and controls its rotation, may turn freely upon its screw, or be screwed tight upon the frame.

When the instrument is in running water the stirrup always leans forward and the cord tends to draw the spring forward also, so that when let go it will engage the pin upon the cylinder and stop the rotation. The proper action of the spring may perhaps be more certain if screwed tight upon the frame, but it is rather more convenient when loose to turn back free of the cylinder.

The instrument will always be drawn back from the vertical through the point of suspension through a small horizontal distance depending on the velocity of the water. This will diminish slightly the depth at which the instrument works, but this small difference of depth will seldom be of any importance.

In a very fast stream the instrument should be loaded by a lead weight suspended about 12 inches or more below it from the two small holes made for this purpose in the extremities of the stirrup.

To read the dials: put back the stirrup upon the frame, take the instrument in both hands, the right hand holding the frame near the back pivot with the thumb covering the stirrup, and the left hand supporting the front portion and raise the instrument to the level of the eyes.

The dials will then appear clearly through the glass tube. There are five dials, that on the extreme right indicating units, and the others tens, hundreds, thousands, and tens of thousands. Thus the dials will go through a complete period in 100,000 revolutions of the cylinder, and will then recur.

*Proceedings of the Madras Government, Public Works Department,
3rd December 1875.*

To find the number of revolutions in a given time, take the reading of the dials before the instrument is lowered into the water, and again after it is drawn up, the difference will be the number of revolutions in the time required, and from this the velocity of the water becomes known when the "rate" of the instrument has been determined.

The alternate dials revolve in opposite directions, the "units," "hundreds," and "tens of thousands" dials in the direction of the hands of a watch and the other two in the contrary direction. A little practice will make it easy to read these dials correctly.

Care should be taken to exclude water from the compartment of the cylinder which contains the recording machinery. Should a few drops leak in, the leather rings at the ends of the glass cylinder should be oiled, and the joint screwed up water-tight.

The less the recording machinery is touched the better, so long as it works freely and easily. A little gum or machine-oil *occasionally* is all that it requires.

The suspended frame containing the wheel work should hang freely from the spindle, and the connection between the first wheel and the endless screw on the spindle should be loose and easy, so that there may be no risk of the frame revolving *with* the spindle. The more the instrument is used the smoother this part will work.

After using the instrument, remove the cylinder from the frame and dry all parts with a soft rag, oil the two end pivots of the cylinder, and see that no water has entered the glass tube. Nothing more is required.

23rd September 1875.

(Signed) B. J. MOORE.

No. 54.

ORDER THEREON, 3rd December 1875, No. 3,441.

ACCOUNT, No. 2-AAA.

The current meter will be made over to the Chief Engineer for Irrigation, who will arrange for its being thoroughly tested.

(True Extract.)

Major-General, R.E.,
Secretary to Government.

To the Chief Engineer for Irrigation.

„ District Engineer, Presidency.

Exd. S. T. Austin.

Spare Copies

Copy of a Report by Major General
Strachey, dated 14th November 1874.

I have lately seen an instrument which would I think be useful to the Canal Officers in India, and to those Public Works Officers who have to deal with works the regulation or construction of which requires a knowledge of velocities of rivers.

A good current meter has long been a desideratum and I have for some time been hoping to hear of something that would be likely to supply the want. I think that Mr. Moore's instrument will probably do it. It is simple and not likely to get out of order, and gives the means of ascertaining the velocity of a stream at any depth with facility, which has hitherto been very difficult to arrive at with satisfactory accuracy.

I have shown the instrument to Sir W. Baker, who I think was satisfied that it gave sufficient promise.

promise of success to justify the purchase of a few to be sent to India for trial.

I would suggest that 3 or 4 of the instruments should be ordered }
I annex a letter from Mr Moore (a } 2 to Calcutta
Civil Engineer, the inventor of } 1 - Madras
the apparatus, who offers to supply } 1 - Bombay
that number of instruments at £12 a piece which seems to be what is paid to the makers now without any profit.

I wrote to Mr Moore pointing out some particulars in which I thought the instruments and cases should be improved. He assents to do what I suggested. If the order is given it might be said that the instruments should be accepted subject to my approval. I know Mr Moore personally and am satisfied that he will do all that is necessary to supply proper workmanship.

(signed) R. Strachey
14/11/44.

Spring Grove
Fleworth
4th November 1844

Dear General Strachey,

In reply to your letter I shall be happy to supply 3 or 4 of my current meters at £12 each. This price has been fixed as one at which it ought to be sold. At present it barely covers expenses. I look to the future for my remuneration when I hope to get the instrument made more cheaply.

The spring shall be made much stronger than in the sample which you have, and shall be steady and not liable to turn about the screw which holds it. The dials shall be metal, and the train of wheels of a better class of work. The boxes shall be of mahogany and finished

as

as you suggest. The instruments will ~~not~~ be rated, so as to give the velocity in feet per minute, from the reading of the dials. In the specification which I send you with this, you will see a simple selfacting starting and stopping gear, intended to be used in deep sea current meters. A similar thing can be applied to the fresh water current meter, but in the small depths and both in fresh water streams I prefer the spring clamp or ^{stop} and I think I understood you to say you also would prefer it. It gives ample time for the instrument to settle itself, and enables you to start and stop it with more precision as to time.

Believe me &c

(signed) B. S. Moore

To General Strachey

Directions for using Moore's Patent Current Meters

The instrument is to be lowered into water to the required depth by a light chain, or a cord which has no tendency to twist, attached to the swivel at the top of the stirrup.

A lighter cord (and for this purpose Salmon line is most suitable) passes through the hole in the small bracket behind the swivel on the stirrup, and is attached to the end of the spring which strides across the revolving cylinder.

This cord should have a double knot in it below the hole in the bracket and so placed that when the knot is drawn up to the hole the spring may be lifted clear of the cylinder, but may not be overstrained.

When the instrument has been lowered to the required depth by means of the stronger Cord or Chain, the lighter one is to be

drawn

drawn up until the weight of the instrument comes upon it.

The spring at that instant frees the cylinder and the running water sets it in rotation by acting upon its fans.

The rotation is stopped by letting go the lighter cord and bringing the weight of the instrument upon the stronger one, and it is to be drawn up out of water by means of the stronger cord alone.

A little practice will make this operation easy.

The instrument is so constructed that when suspended in running water, its axis necessarily becomes parallel to the direction of the stream; and, when descending or ascending in water, it travels point foremost or nearly so.

The cylinder should revolve easily and freely upon its pivots with a little end play. - This adjustment is made by the back pivot and its tightening screw.

The

The spring which strides across the cylinder, and controls its rotation, may turn freely upon its screw, or be screwed tight upon the frame.

When the instrument is in running water the stirrup always leans forward and the cord tends to draw the spring forward also, so that when let go, it will engage the pin upon the cylinder and stop the rotation. The proper action of the spring may, perhaps be more certain if screwed tight upon the frame, but it is rather more convenient when loose to turn back free of the cylinder.

The instrument will always be drawn back from the vertical through the point of suspension through a small horizontal distance depending on the velocity of the water. This will diminish slightly the depth at which the instrument works, but this small difference of depth

will

will seldom be of any importance -

In a very fast stream the instrument should be loaded by a lead weight suspended about 12 inches or more below it from the two small holes made for this purpose in the extremities of the stirrup.

To read the dials: put back the stirrup upon the frame, take the instrument in both hands, the right hand holding the frame near the back pivot with the thumb covering the stirrup, and the left hand supporting the front portion, and raise the instrument to the level of the eyes -

The dials will then appear clearly through the glass tube - There are five dials, that on the extreme right indicating units, and the others tens, hundreds, thousands and tens-thousands. Thus the dials will go through a complete period in 100,000 revolutions of the cylinder, and will then recur -

To find the number of revolutions in a given time, take the reading of

of the dials before the instrument is lowered into the water, and again after it is drawn up, the difference will be the number of revolutions in the time required and from this the velocity of the water becomes known when the "rate" of the instrument has been determined.

The alternate dials revolve in opposite directions the "units," "hundreds," and "ten-thousands" dials in the direction of the hands of a watch and the other two in the contrary direction. A little practice will make it easy to read these dials correctly.

Care should be taken to exclude water from the compartment of the cylinder which contains the recording machinery - Should a few drops leak in, the leather rings at the ends of the glass cylinder should be oiled, and the joint screwed up water tight.

The less the recording machinery is touched the better, so long as it works freely and easily. A little
gun

gun or machine oil. occasionally
is all that it requires.

The suspended frame containing
the wheel work should hang freely
from the spindle, and the connection
between the first wheel and the
endless screw on the spindle should
be loose and easy so that there
may be no risk of the frame
revolving with the spindle. The
more the instrument is used the
smoother this part will work.

After using the instrument,
remove the cylinder from the frame
and dry all parts with a soft
rag, oil the two end pivots of the
cylinder, and see that no water
has entered the glass tube. Nothing
more is required.

(signed) B. S. Moore

23rd September 1875.

No 2.
Copies of Report &c.

Referred to Public Works, Madras,
No 19, dated 28th Feb 1875.
Para 2.



Public Works
No 19

India Office, London
20th October, 1875.

Sir,
On the recommendation
of Major General Strachey
orders have been given
for the supply of a
certain number of Moore's
Patent Current Meters
for trial on Indian
rivers and Canals. One
of these Instruments
has been forwarded
to your Government
by the S. S. "Duke of
Lancaster" which

Yr
M

His Excellency,
The Honorable,
The Governor in Council
Fort St George

sailed

sailed on the 25th Instant.

2 Copies of a Report
by General Strachey, and
of directions for using
the instrument are
forwarded herewith.

I have the honor to be,

Sir,

Your most obedient
humble servant,

Salisbury

desk 102

Col. of 18701 18702
PUBLIC WORKS

Chief Regt for Prigs

5/11/79

31.11

53-54

From St. John's Island
to the island of St. John's
received from St. John's
to the island of St. John's
to the island of St. John's
to the island of St. John's

S. W. 1895 Defat.
192

Public Works
D. 284 Oct. 1875 }
D. 285 Nov. 1875 }

26
Letter to Fort St. George

19

30 Dec 75

Forwarding Copies of a
Report by General Strachey
and of directions for using
Moore's Patent Current
meters

S.O. No 3441. 3.12.75.
Recd. 21st Nov 1875.

Chief Engineer for England.
R. S. Moody.

The current meter will be made over to the Chief Engineer for England
who will arrange for its being thoroughly tested.

By 17/11

Recd. 14-12-75