

No. 507. Read the following Despatch from the Right Honourable the Secretary of State for India, (Public Works,) to His Excellency the Right Honourable the Governor in Council, Fort St. George, dated India Office, London, 30th November 1871, No. 17 :—

With reference to my despatch in this department, No. 6, dated 7th April 1870, respecting the supply of two graduating machines included in your Indent, dated 30th November 1866, sanction for the provision of which was communicated to you in Sir Stafford Northcote's Despatch, No. 29, of the 14th September 1867, I have now to state that the machines in question are completed, and will shortly be forwarded to Madras.

2. I enclose, for your information, copy of a report by Lieutenant-Colonel Strange on the subject of this supply.

3. With regard to the suggestion made by that officer, that the provision of two engraving machines should be sanctioned for the Mathematical Instrument Department of your Presidency, I have to request that you will, on the return of Mr. Doderet to Madras, decide whether or not it is desirable that such machines should be obtained.

4. Should their supply be deemed expedient, I request that an Indent for them may be forwarded to me.

5. Colonel Strange's recommendations regarding the proper position for the graduating machines, and the transfer from the Public Works Department to the Astronomer of the general supervision of the operations of Mr. Doderet's Mathematical Instruments workshops, will be for your consideration.

Copy of Colonel Strange's report on Graduating Machines for Madras.

In compliance with the Director-General's desire I visited Messrs. Troughton and Simms' Factory with Mr. Doderet. We examined the graduating machines, and Messrs. Simms thoroughly explained to Mr. Doderet how they should be adjusted and used.

2. I beg to annex a copy of a letter from Mr. Doderet on the subject, in which he expresses his satisfaction with these machines.

3. It is right that I should mention that their accuracy of dividing must rest on the sole responsibility of the makers. I have not the appliances necessary for testing the accuracy of such work.

4. I beg to recommend that Messrs. Simms be entrusted with the packing of these machines. I have given them such instructions as seemed to me necessary on the subject. Packing was not included in their tender, but they will be able to secure them better than can be done here by persons less conversant than themselves with such things. They should be sent here and despatched at once, no further inspection being necessary.

5. Mr. Doderet touches on several other subjects in the accompanying letter. I annex my reply to his, which contains my opinion on the points raised by him.

6. I do not know how far the Secretary of State might deem it expedient to move in such matters, but I feel bound to say that I think it a great mistake that the Madras Mathematical Instrument Workshops should be under the Public Works Department. From a long personal acquaintance with that branch of the service, I can say that few Engineer officers have any knowledge of the intimate construction of scientific instruments. This branch of mechanical art, which is quite of a special character, forms no part of an English Engineer's

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26th January 1872.*

education, as I think it should. Mr. Doderet should, in my opinion, be under the scientific authority which is actually available at Madras, namely, that of the Government Astronomer, a post now held by Mr. Pogson, whose high attainments in refined observations and knowledge of scientific appliances would enable him to give serviceable advice and support to Mr. Doderet. Whatever course may be adopted as to this general question, it is certain that the graduating machines will not produce good work if in the vicinity of a steam hammer. There can, I should say, be no better place for them than the grounds of the Observatory with which I am well acquainted. Should the Director-General see fit, I would request that this opinion, and those expressed by me in my letter to Mr. Doderet, may be laid before His Grace the Duke of Argyll.

Mr. Doderet is desirous of obtaining two engraving machines, similar to those he saw at Messrs. Simms' factory. I beg to explain to what he refers.

About eighteen years ago, when an officer of the Great Trigonometrical Survey, I constructed a machine for engraving the numbers on scientific instruments, which had hitherto been always engraved by hand. The following are the advantages of my system:—

- (1.) A given form of figure, of maximum visibility, can be insured, whereas hand-engravers cannot be coerced, as a machine can, into the habit of identical repetition, and they soon deviate from the required form.
- (2.) The peculiar form of figure adopted by me as being according to my view the most visible is one which cannot be executed as well by hand as it can by machinery.
- (3.) The machine engraves at least ten times more rapidly than the hand.
- (4.) Machine engraving costs much less than hand engraving.

It was some years before I succeeded in convincing English makers (whose conservative instincts are very strong) of the above advantages. It is right I should mention that Messrs. Cooke, of York, were the first to recognize the truth of my statements and to act upon them. Since then several have followed, and there are now six leading firms in the trade who largely, if not exclusively, employ engraving machines.

As in the case of all other machine tools, a certain amount of work is required to render their use economical. Mr. Doderet has a great deal of engraving work to do, not only for scientific but for miscellaneous purposes, and I have no doubt the introduction of the engraving machine into his factory would be in every way advantageous.

I think, therefore, that his requisition for two machines, one for fine scientific work, and the other for large miscellaneous purposes, should be complied with, and that Messrs. Simms should be requested to estimate for them.

I beg to add that though the figure engraving system might have been made the subject of a patent, I have in no way secured my right to the idea, which I worked out solely in the interests of science without any hope of personal benefit from it.

I would beg to draw the Director-General's attention to the last two paragraphs but one on the subject of the improvement in instruments supplied under the present system, and I would particularly contrast the opinion of a thoroughly practical man like Mr. Doderet regarding Messrs. Cooke's work with the sweeping condemnation it received some time ago from Major McDonald at Calcutta.

(Signed) A. STRANGE, Lieut-Colonel,
Inspector of Scientific Instruments.

From F. DODERET, Esq., to Colonel A. STRANGE, dated 8, Stock Orchard Villas, Caledonian Road, London, 9th October 1871.

BEFORE my departure to duty at Madras I beg to offer you and Messrs. Troughton and Simms my most sincere thanks for having been permitted to see the two dividing machines which have

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26th January 1872.*

been constructed by those gentlemen, by order of the Madras Government, for the use of the Mathematical Instrument Department, and for having been instructed how to use them. Perhaps it is barely necessary for me to say that I am quite satisfied with them in every respect, having met with the approval of so competent a judge as yourself.

2. But I hope, Sir, you will pardon me if I still further impose on your kindness and knowledge to ask your advice and directions as to their erection.

3. In the first place I must inform you that the workshop for the repair and alterations of scientific instruments is incorporated with the Mechanical Engineering Workshops, where heavy machinery is constantly at work; in the work-yard is a large steam hammer, a wood-sawing machine, as also an Iron Foundry.

4. I believe you will agree with me that it is very objectionable to set up these splendid machines, which have to do the most delicate work, in the immediate vicinity of anything creating tremor.

5. I would, therefore, most respectfully ask if you would not advise that the machines should be erected in the grounds of the Madras Observatory. Mr. Pogson, as you well know, is a highly scientific gentleman, and has at all times assisted me with advice, and he will no doubt do so in the future, as he takes a great interest in all relating to science. I am sure that that gentleman would not object to have the machines in his compound. You well know that to many of the Continental Observatories is a Mathematical Instrument workshop attached, as many improvements can be executed under the direction of a gentleman of high scientific standing. If you are of the same opinion, would it be asking too much of you to use your influence so as to induce His Grace the Duke of Argyll to permit me to set up the machines at the Madras Observatory.

6. I am almost afraid you will think me imposing on your influence when I ask you to assist me in getting two of the engraving machines of which Messrs. Simms informed me you are the inventor, and which those gentlemen also kindly showed me how to use. I think the dividing machines are incomplete without one, but as we have a great deal of other engraving work to do in the workshops another machine for miscellaneous work would be of great service.

7. I beg to say that in this as well as the other matter I shall be guided by you.

8. As I have already mentioned I shall leave England in a few days, may I request you to have the machines carefully packed and directed that they will not be opened except in my presence.

9. As I in all probability shall be sooner at my post at Madras than the dividing machines will arrive, I shall make it my duty to go on board the vessel and see them landed.

10. In conclusion, I beg to make a few remarks about instruments which have of late years been supplied to the Madras Government, and I hope I may not be out of place in doing so, but should I be I beg to be pardoned; but having some years back complained about the inferior instruments which were then in the Madras Presidency, and which were still being sent out, I think I would neglect my duty did I not say that the instruments of late years supplied are of a superior description. The workmanship as well as the construction do hardly bear comparison with the former supply of instruments, and I am glad to say that I am not alone in that assertion. Instruments of the old pattern are invariably returned with a request that the Madras Public Works Store Department will send those of a newer make in their place, and if none in store to alter the old instruments as near as possible to the new.

11. I really do think Government can have no better instruments in every respect than those supplied of late; the ninety levels lately received at Madras made by Messrs. T. Cooke and Sons are perfect.

12. Thanking you, Sir, again for your valuable advice in different matters and your great consideration to me, I beg you will permit me to remain with the highest respect, etc.

Proceedings of the Madras Government, Public Works Department
26th January 1872.

From Lieutenant-Colonel A. STRANGE, Inspector of Scientific Instruments, to F. DODERET, Esq., Superintendent, Mathematical Instrument Department, Madras, dated India Store Depot, 20th October 1871.

I HAVE the honour to acknowledge your letter of 9th instant, and am glad to find that you are satisfied with the dividing engines made by Messrs. Troughton and Simms, under my instructions, for your factory. I should observe that the guarantee of that firm must be taken for the accuracy of their performance, as time does not admit of my subjecting them to the elaborate tests necessary for the formation of a judgment on this point. But from the assurances I have received from the makers, I have the fullest confidence that they will turn out satisfactorily.

2. These machines will be shortly despatched to Madras with directions that they should be unpacked by no one but yourself. This is most essential, as you alone know how they are to be put together, and it is a most fortunate circumstance that you have had an opportunity of receiving instructions personally from the makers on this head.

3. In reply to the question you ask me, I have no hesitation in saying that these machines cannot have justice done them if used in the vicinity of a steam hammer. Your suggestion that they should be set up in the grounds of the Observatory seems to me a very good one; indeed, I think it admits of being extended to the whole of your workshops, the efficiency of which would, I think, be increased if it formed part of the establishment of a gentleman of high scientific attainments like the Government Astronomer, whilst its incorporation therewith would, I apprehend, be most advantageous to the Observatory itself, in which demands for refined workmanship must be of constant occurrence.

4. With respect to the engraving machines to which you allude, I consider your workshops would be much improved by their possession. The effect of substituting machine for hand engraving is, 1st, to produce without variation a standard form of figure on scientific instruments designed with a view to maximum visibility; 2nd, to diminish the cost of engraving.

5. It was a long time before I could persuade English makers to adopt this system, which I had myself first introduced in India about seventeen years ago. But now five or six of the principal firms have done so with entire satisfaction to themselves, and with marked improvement to the instruments engraved.

6. I am doubtful whether these machines can be supplied to you without an application from the Madras Government, but I shall advise that you should have them.

7. I wish here to mention that I have no patent or other interest whatever in these machines.

8. I am glad to find that the instruments generally supplied under my superintendence for service in the Madras Presidency have the approval of so competent a judge as yourself. Hearing, as you must do, the opinions of officers using scientific instruments as to the modifications introduced by me, you are in a position to aid me materially in my endeavours to improving them by freely communicating to the Director-General for my guidance any practical observations that may have occurred to them or to yourself. Hitherto I have been favoured with very little help of that kind from any one, and I shall always be thankful for it.

No. 508.

ORDER THEREON, 26th January 1872, No. 263.

ACCOUNT, No. 42.

THE General Superintendent of Public Works Stores and Workshops will report, after communication with

Mr. Doderet, the purpose for which the two engraving machines are required. Mr. Grainger will also report what effect the removal of the Mathematical Instrument Department to the Observatory would have on the Public Works Workshop; what extent of workshop Mr. Doderet would require at the Observatory; and if

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26th January 1872.

any clerks or other establishment in addition to the usual workmen would be necessary. The Government Astronomer will be requested to state if any room is available as a workshop for the purpose, and if so, how much, and whether the transfer of the Mathematical Instrument Workshop to the Observatory premises would involve any additional charge.

(True Extract.)

Colonel, R.E.,
Secretary to Government.

To the General Superintendent of Public Works Stores and Workshops,
Government Astronomer.

Exd. S. T. Augustin.

Letter from
Mr. Rodest
to
Col. Skiff

8 Stock Richard Villas Calcutta Rd.

London

October 9th - 1871

Sir,

Before my departure to duty at Madras, I beg to offer you and Messrs Troughton & Simms my most sincere thanks for having been permitted to see the two Dividing Machines, which have been constructed by those gentlemen, by order of the Madras Government for the use of the Mathematical Instrument Department and for having been instructed how to use them. Perhaps it is barely necessary for me to say that I am quite satisfied with them in every respect, having met with the approval of so competent a judge as yourself.

But I hope Sir you will pardon me if I still further impose on your kindness and knowledge to ask your advice and direction as to their erection.

In the first place I must inform you that the Workshop for the Repair and alterations of Scientific Instruments is incorporated with the Mechanical Engineering Workshops where heavy machinery is constantly at work, in the Workyard is a large Steam hammer, a Wood-sawing Machine as also an Iron Foundry.

I believe you will agree with me, that it is very objectionable to set up these splendid machines, which have to do the most delicate work, in the immediate

vicinity.

vicinity of anything creating Tremor.

I would therefore most respectfully ask if you would not advise, that the machines should be erected in the grounds of the Madras Observatory. Mr. Pofson as you well know is a highly scientific gentleman and has at all times assisted me with advice and he will no doubt do so in the future, as he takes a great interest in all relating to Science. I am sure that that gentleman would not object to have the machines in his compound. You well know that to many of the Continental Observatories is a Mathematical Instrument Workshop attached as many improvements can be executed under the direction of a gentleman of high scientific standing. If you are of the same opinion, would it be asking too much of you, to use your influence, so as to induce His Grace the Duke of Argyll to permit me to set up the machines at the Madras Observatory.

I am almost afraid you will think me imposing on your influence, when I ask you to assist me in getting two of the Engraving Machines, of which Messrs. Simms informed me you are the inventor and which those gentlemen also kindly showed me how to use. I think the Dividing Machines are incomplete without me, but as we have a great deal of other engraving work to do in the workshops another machine for miscellaneous work would be of great service.

I beg to say

I beg to say that in this as well as the other matter I shall be guided by you.

As I have already mentioned, I shall leave England in a few days, may I request you to have the machines carefully packed and directed that they will not be opened except in my presence.

As I in all probability shall be sooner at my post at Madras, than the Dividing Machines will arrive, I shall make it my duty to go on board the vessel and see them landed.

In conclusion I beg to make a few remarks about Instruments, which have of late years been supplied to the Madras Government and I hope I may not be out of place in doing so, but should I be I beg to be pardoned, but having some years back complained about the inferior instruments, which were then in the Madras Presidency, and which were still being sent out, I think I would neglect my duty did I not say that the Instruments of late years supplied are of a superior description. The workmanship as well as the construction do hardly bear comparison with the former supply of Instruments, and I am glad to say that I am not alone in that assertion. Instruments of the old pattern are invariably returned with a request that the Madras P. W. Store Department will send those of a newer make in their place, and if none in store to alter the old Instruments as near

as possible

as possible to the new.

I really do think Government
can have no better instruments in every
respect than those supplied of late; the
90 levels lately received at Madras made
by Messrs J. Cooke & Sons are perfect.

Cooke's
Levels.

Thanking you Sir again for
your valuable advice in different matters
and your great condescension to me I beg
you will permit me to remain with the
highest respect

Sir

Your most obedient servant

(Ed.)

J. Doderet

India Store Depot
1871 October 20

From
Strang
to
Doderet

To
J. Doderet Esq.
Superintendent Mathematical Instt Dept.
Madras.

Sir,
I have the honor to acknowledge
your letter of 9th Inst. and am glad to find
that you are satisfied with the Dividing
Engines made by Messrs Troughton & Simms,
under my instructions, for your Forestry. I
should observe that the guarantee of that
firm must be taken for the accuracy of
their performance, as time does not admit
of my subjecting them to the elaborate tests
necessary for the formation of a judgement
on this point. But from the assurances I
have received from the makers I have the
fullest confidence that they will turn
out satisfactorily.

These machines will be shortly
despatched to Madras, with direction that
they should be unpacked by no one but yourself.
This is most essential, as you alone know how
they are to be put together, and it is a most
fortunate circumstance that you have had an
opportunity of receiving instructions personally
from the Makers on this head.

In reply to the question you ask me
I have no hesitation in saying that these machines
cannot have justice done them if used in the

Vicinity

vicinity of a Steam Hammer. Your suggestion that they should be set up in the grounds of the Observatory seems to me a very good one, - indeed I think it admits of being extended to the whole of your Workshops, the efficiency of which would I think be increased if it formed part of the Establishment of a gentleman of high Scientific attainments like the Government Astronomer, whilst its incorporation therewith would, I apprehend, be most advantageous to the Observatory itself, in which demands for refined workmanship must be of constant recurrence.

With respect to the Engraving Machines to which you allude I consider your Workshops would be much improved by their possession. The effect of substituting Machine for hand Engraving is 1st To produce without variation a standard form of figure on Scientific Instruments designed with a view to maximum visibility, 2nd To diminish the cost of Engraving.

It was a long time before I could persuade English makers to adopt this system which I had myself first introduced in India about 17 years ago. But now five or six of the principal Firms have done so, with entire satisfaction to themselves and with marked improvement to the Instruments engraved.

I am doubtful whether these Machines can be supplied to you without an application from the Madras Government

but I

but I shall advise that you should have them -

I wish here to mention that I have no Patent or other interest whatever in these machines.

I am glad to find that the Insts. generally supplied under my superintendence for service in the Madras Presidency have the approval of so competent a judge as yourself. Hearing, as you must do, the opinions of Officers using Scientific Insts. as to the modifications introduced by me, you are in a position to aid me materially in my endeavours to improve them by freely communicating to the Director General for my guidance any practical observation that may have occurred to them or to yourself. Hitherto I have been favored with very little help of that kind from any one, and I shall always be thankful for it.

I have the honor to be,

Sir,

Your most obedient Servant,

(Ed) A. Strange Lt. Col.

Inspector Sci^l Instruments.

He.

1325

Public Works.
No. 17.

India office
London 30th November 1871

My Lord,

With reference
to my Despatch in this
Department, No. 6, dated
7th April 1870, respecting
the supply of two
graduating Machines
included in your Indent
dated 30th November
1866, sanction for the
provision of which was
communicated to you
in Sir Stafford
Northcote's Despatch,
No. 29, of the 11th
September 1864. I have
now to state that the
machines in question
are completed, and will
shortly be forwarded to

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

29/11/71

to Madras.

2. I enclose for your information, copy of a report by Lieutenant Colonel Strange on the subject of this supply.

3. With regard to the suggestion made by that officer, that the provision of two Engraving Machines should be sanctioned for the Mathematical Instrument Department of your Presidency, I have to request that you will, on the return of Mr. Doderet to Madras, decide whether or not it is desirable that such Machines should be obtained.

4. Should their supply be deemed expedient, I request that an indent for them may be forwarded to me.

5. Colonel

5. Colonel Strange's recommendations regarding the proper position for the Graduating Machines, and the transfer from the Public Works Department to the Astronomer, of the general supervision of the operations of Mr. Doderet's Mathematical Instruments workshops, will be for your consideration.

I have the honor to be,
My Lord,

Your Lordship's most obedient,
humble servant,

[Signature]

Public Works
 Dir. of Port for Supply
 30th Novr 1871.
 The Recd 4th January 1872.
 Letter to Port St George
 No 17.

Intimating that two
Graduating Machines will
be despatched shortly &
enquiring whether Engrav-
ing Machines are required

Aug 28 - 26th Decy/72

4507

6/7 Jan/72 A. 190

S. H. Department
 No 263.
 Proceedings of the Illadras Government.
 Read the following
 despatch
 from
 The Home Govt.
 (H. B. No. 17 of 30 October 1911)

The general Supt. of P. W.
Shops & Workshops will report
after Communication with
Mr. Dodderet, the purpose
for which the two engraving
Machines are required. Mr.
Grainger will also report
what effect the removal
of the Mathematical In-
strument Dept. to the
Observatory would have
on the P. W. Workshops,
what expense of Workshop
Mr. Dodderet would require
at the Observatory, and
if any Clerk or

other establishment in addition to the usual workshop would be necessary. The Government Astronomer was requested to state if any room is available as a Workshop for the purpose, & if so how much and whether the transfer of the Mathematical Instrument workshop to the Observatory premises would involve any additional charge.

16 Jan

To The Secy of Pub Works
 " Govt Stores & Workshops
 " Govt Astronomer -
 Dated 30-1-72

6/7 Jan/72-1972

W. H. D. N. 61
 Govt. of 1872 Madras.
 PUBLIC WORKS.

To The General Superintendent of
 Stores & Workshops

Dated
 Recd.
 Encl. 2
 G. O. 26 Jan 1872 No. 263.

Nos. 577 & 578

Grinding Machines. Taking
 orders on the despatch from
 the Secy. of State for India
 intimating that two grinding
 machines will be despatched
 shortly & enquiring whether
 grinding machines are
 required.