No. 891C. 9.5.85
Nos 892C. 9.5.85
" 776C. 11.4.85.

No. 1335 xv d/ 8th June/85.

B

Recorded, with reference to No. 891C d/ 9th May 1885

CS.
27.5.85

3.6.85

(18) Incl 4668

GOVERNMENT OF INDIA.

PUBLIC WORKS DEPARTMENT.

CIVIL WORKS.

Miscellaneous.

To 6 S.C

No. 220M.

Dated Simla, May 7, 1885.

Received 26 —

No. 1335 d/ 8th June/85

Return of useless Mathematical Instruments to the Mathematical Instrument Office, Calcutta.

G. C. B. Press, Simla.—No. 19 P. W. D.—12-5-85—213.

C.E. for ...
S.E.
S. W. Mn. S.
C. R. ...
Engineer in Chg. State Rys.
S. Mn. H. W.
Engineer in chg.

Ms. 144/5
... 27.5.85 ... 2.1.6.85

With order

No. 220M.

GOVERNMENT OF INDIA.

PUBLIC WORKS DEPARTMENT.

CIVIL WORKS.

Miscellaneous.

Simla, May 7, 1885.

The Government of Madras, in the Public Works Department.
The Government of Bombay, in the Public Works Department.
The Government of Bengal, in the Public Works Department.
The Government of North-Western Provinces and Oudh, in the Public Works Department.
The Government of Punjab, in the Public Works Department.
The Chief Commissioners, Central Provinces, British Burma, Assam, and Coorg.
The Resident at Hyderabad.
The Agents to the Governor General for Central India, Rajputana, and Beluchistan.
The Inspector General of Military Works.
The Director General of Railways.
The Director General of Telegraphs in India.

The following is forwarded to the Local Governments, &c., noted in the margin, for information and necessary action.

By order,

G. L. Marshall Major, R.E.,

Under Secy. to Govt. of India.

To The Secy to the Govt of Madras. P.W. Departt

No. 1008, dated Calcutta, 31st March 1885.

From—Officer in Charge, Mathematical Instrument Survey of India Department,

To—Deputy Secretary and Inspector General of Irrigation.

There is at present a great demand for instruments of the kinds mentioned in the accompanying list. and with a view to minimizing the indents for new instruments from England, I should be obliged if you would issue instructions to all officers under your control, to examine their stock and return to this office any instruments of the kinds mentioned which are not absolutely necessary, in order that they may be repaired and issued again.

Documents accompanying.
List of Instruments.
Rules and Regulations.

Published in the Gazette of India, dated 14th March 1885, Part II, pages 112 to 117, under the authority of the Surveyor General of India.

RULES AND REGULATIONS.

The Calcutta Government Mathematical Instrument Office, supplies new and serviceable instruments, &c., and repairs, examines and adjusts, &c., old ones, on book debit, on the public service. *As a general rule new instruments are not supplied, if serviceable instruments of the class required are available for issue.*

2. All applications for instruments on the public service must be submitted in following indent form, *which is not required in duplicate*, the specification of instruments and particular purposes for which required being made as full as possible. Indent forms may be had on application being made to the Mathematical Instrument Office.—

Indent No. *on the Calcutta Mathematical Instrument Office, for instruments required for the use of* *dated* 18 .

Description of Instruments.	Quantity or number in use or in store.	Quantity or number indented for.	Purpose for which required.	Average cost as per printed list. Rs.	As.	How and where to be despatched.
						The address which should be affixed to the parcels or cases to be distinctly given in full. Abbreviations sometimes lead to mistakes.

I do hereby certify that the articles specified in this indent are indispensably necessary for the purposes set forth, according to the best of my knowledge and belief, after the most careful examination.

Recommended.

Countersignature of approving authority. *Signature of Indenting Officer, with designation of appointment in full.*

3. All indents must be duly approved and countersigned by the heads of departments, or of the Government under which indenting officers may be serving, before they can be supplied, *viz.*—

Survey of India Dept., Trig. Branch,	by Deputy Surveyor General
Do. do. Top. do.	,, do. do. } or by Surveyor General.
Do. do. Rev. do.	,, do. do. }
Settlement Department,	,, Boards of Revenue.
Public Works Department,	,, Superintending Engineers or higher authorities.
Telegraph Department,	,, Director General of Telegraphs.
Marine Department,	,, Superintendent of Marine.
Quarter Master General's Dept. and all Military indents except Artillery,	,, Quarter Master General of the Army.
Artillery	,, Officers in command of Batteries and Districts.
All other Civil Officers or Military Officers in Civil employ,	,, Secretary to Governments under which serving, or Secretary to Board of Revenue.
Forest Department,	,, Provincial Conservators.
Meteorological Department,	,, Meteorological Reporter to Government of India

and they should be addressed to the *Officer in charge Government Mathematical Instrument Office, No. 9, Park Street, Calcutta.*

4. The mode of transit and address, or station to which the instruments are to be consigned, must invariably be specified on indents in the proper column. Indents should not be accompanied with forwarding letters, unless more explanation is necessary than can be given on the face of the indent.

5. All officers, to whom instruments and other stores are issued on public service, have to account for them to the officer to whom their accounts are rendered, in such manner as may be by him directed.

6. All instruments, and component parts of instruments, when no longer required, should be at once returned to the Mathematical Instrument Office, *except when the Officer in charge considers that their transit charges may nearly equal, or exceed, their actual value as material;* in which case, he should refer to the Officer in charge, Mathematical Instrument Office, for instructions as to their disposal. No unused instruments should be allowed to accumulate in any office, as if returned they can be utilised for re-issue.

7. When instruments are considered unserviceable by any officer, a survey should be held on them by a committee of Government officers, whose report should be forwarded to the Assistant Surveyor General, Mathematical Instrument Office, who will issue instructions as to which of the articles are to be forwarded to the depot, Calcutta, and which should be sold by public auction to the best advantage. The proceeds of all articles sold by auction must be deposited in the nearest treasury, and the treasury receipt, with auction account sale and copy of the committee report, should be attached to the next cash account current, in which the transaction should appear both on the debit and credit sides.

8. When instruments are received for final deposit in store, a receipt will be granted for them by the Officer in charge, Mathematical Instrument Office, to enable officers, from whom received, to remove them from their debit, by forwarding the receipt to the Comptroller of Indian Treasuries, with the half-yearly or other returns of stores submitted to him.

9. All Government instruments, &c., requiring repair, &c., should be forwarded with an official letter or repair indent. If no longer required and intended to be deposited in store, it should be specifically mentioned.

10. All instruments, &c., received from England and issued on book debit on the public service, will be charged at their invoice cost, *plus* a percentage for landing, storing, and examining and despatching them, &c.

11. Instruments made in the workshops and those purchased locally for issue on book debit, will be charged at the scheduled rates. Instruments purchased locally for officers not entitled to receive them on book debit will be charged at cost price, *plus* 10 per cent. for incidental charges.

12. Instruments, when they can be spared, are sometimes issued to officers in the service of Government on payment of the cost value, *plus* 10 per cent., and instruments, the private property of officers, are repaired, if necessary, on like terms. In such cases the amount must be remitted to the Officer in charge, Mathematical Instrument Office, before the instruments can be despatched.

13. Instruments returned into store will be valued according to their condition.

14. It is particularly requested that sizes and sorts of instruments, length of scales, how divided, and purposes for which required, and generally any information, which will guide this Office in knowing, without further reference, the exact wants of the indenting officer, be put as far as possible on face of indent, instead of in covering letters.

15. The following list shows nomenclature of the various descriptions of instruments ordinarily kept in store of this Office for issue on public service. This nomenclature should be adopted in all indents.

16. To enable the indenting officer, as well as the officer who countersigns and finally passes an indent, to know the cost involved thereby, the average ordinary price of each description of instrument is also given in the annexed list. Indenting officers must invariably enter the value of all instruments required by them in column of indent allotted to the purpose.

17. The supply should be regulated, not according what an officer would like to have, but by what is absolutely necessary.

M. W. ROGERS, *Major, R.E.,*
Assistant Surveyor General,
In charge M. I. O.

CALCUTTA,
MATHL. INSTT. OFFICE,
1st March 1885.

Reg. No. 10, S. I. O.—19-3-85.—1,000.

List of Instruments generally kept in Store or manufactured at the Government Mathematical Instrument Office, Calcutta.

Names of Instruments.	Approximate rates of issues.			Remarks.
		Rs. As.	Rs. As.	
Anemometers, Robinson's	Each	From 45 0 to	65 0	
„ Whewell's	„	„ 315	....	
Arithmometers	„	„ 200 0 to	325 0	
Balance, Chemical	„	„ 150 0 „	185 0	
Barometers, Aneroid, large, 4½″ diameter	„	„ 40 0 „	75 0	
„ „ pocket	„	„ 35 0 „	65 0	
„ marine	„	„ 50 0 „	75 0	
„ mountain, Fortin's pattern	„	„ 50 0 „	125 0	
„ „ George's „	„	„ 150 0 „	175 0	
„ standard, Fortin's „	„	„ 60 0 „	200 0	
„ „ Newman's „	„	„ 125 0 „	200 0	
„ „ self-compensating	„	„ 125 0 „	275 0	
„ Macneill's, Boylean-Mariotti principle	„	„ 155 0 „	175 0	
Bars, steel, 6 feet	„	„ 16 0 „	25 0	
* Boards, drawing, teak	according to sizes	„ 1 0 „	1 8	Per square foot.
* „ „ deal, fluted, with ebony edges	according to sizes	„ 1 2 „	2 0	Per square foot.
Camera Lucida	Each	22 8 „	45 0	
Cases, sketching, leather	„	„ 5 0 „	10 0	
Chains, iron, measuring 30 feet, with pins complete	„	„ 4 6	....	
„ „ „ 33 „ „ „ „	„	„ 5 10	....	
„ „ „ 50 „ „ „ „	„	„ 8 8	....	
„ „ „ 66 „ „ „ „	„	„ 10 0	....	
„ „ „ 100 „ „ „ „	„	„ 300 0 to	600 0	
Chronometers, box	„	„ 400 0 „	720 0	
„ pocket	„	„ 26 0 „	45 0	
Chronographs	„	„ 1,500 0	....	
Circles, altitude and azimuth	„	„ 500 0	....	
„ reflecting	„	„ 1,250 0	....	
„ repeating, astronomical	„	„ 90 0	105 0	
Circumferentors, including stands	„	„ 2 0 to	20 0	
Clinometers, common	„	„ 20 0 „	42 8	
„ deLisle's	„	„ 30 0	....	
„ Survey Department pattern	„	„ 13 0 to	15 0	
Combs, acre, calculating, metal	„	„ 0 4	....	
„ „ „ card	„	„ 15 0 to	26 0	
Compasses, beam, sliding, tubular, metal	„	„ 8 0 „	20 0	
„ „ wooden bar, of sorts and sizes, plain	„	„ 20 0 „	40 0	
„ „ „ „ „ with adjustment	„	„ 2 8 „	4 0	
„ bow, ink or pencil, brass, single jointed	„	„ 3 0 „	5 0	
„ „ „ „ „ double „	„	„ 3 6 „	5 0	
„ „ „ „ electrum, single „	„	„ 5 0 „	10 0	
„ „ „ „ „ double „	„	„ 2 10 „	4 8	
„ spring, bow, ink, pencil, or dividers	„	„ 6 0 „	10 0	
„ „ „ sets	„	„ 1 0 „	2 8	
„ drawing, common, brass	„	„ 1 8 „	5 0	
„ „ „ electrum	„	„ 3 8 „	5 0	
„ „ hair, brass	„	„ 4 0 „	8 0	
„ „ „ electrum	„	„ 6 14 „	14 0	
„ „ with pen and pencil legs, brass	„	„ 10 0 „	15 0	
„ „ „ „ „ „ electrum	„	„ 4 0 „	10 0	
„ magnetic, pocket, brass cases	„	„ 2 0 „	3 8	
„ „ „ wooden cases	„	„ 7 8 „	30 0	
„ „ „ watch pattern	„	„ 18 0 „	50 0	
„ marine	„	„ 6 0 „	20 0	
„ pocket, Napier's, pillar, or other patterns	„	„ 20 0 „	60 0	About Rs. 11 to Rs. 14 per inch of diameter of cards, exclusive of stand.
„ prismatic card of sizes with stand †	„		90 0	Rs. 11 to Rs. 16 per inch of diameter of ring, exclusive of stand.
„ „ silver ring of sizes with stand †	„	„ 25 0 „	65 0	
„ „ Hunter's pattern†	„	„ 45 0 „	20 0	
„ proportional, brass and electrum, 6″ & 9″	„	„ 12 0 „	15 0	About Rs. 2 per inch of needle.
„ rectangular for plane-tables	„	„ 6 0 „	100 0	
„ subtense, with stand	„	„ 50 0 „	26 8	Inclusive of stands.
„ surveying, Bengali	„	„ 20 0 „	....	
„ „ „ English manufacture	„	„ 35 0		

* Size to be stated on the face of the indent.

† Stands for these instruments are rated separately on page 4.

Names of Instruments.		Approximate rates of issues.			Remarks.
			Rs As.	Rs. As.	
† Scales, offsets, wooden, in sets	Each.	From	4 0 to	5 0	
„ „ single, ivory	„	„	1 4	.....	
„ „ „ wooden	„	„	0 6 to	0 12	
„ plotting, ebonite, in sets of six	„	„	14 0 „	20 0	
„ „ ivory, „	„	„	35 0 „	50 0	
„ „ wooden „	„	„	13 0 „	20 0	
„ „ single, ebonite	„	„	2 0 „	5 0	
„ „ „ ivory	„	„	5 0 „	7 0	
„ „ „ metal	„	„	2 0 „	10 0	Each inch divided into 25 parts for plotting plans on the scale of 2½ chains to the mile.
„ „ single, wooden	„	„	1 12	.....	
* „ standard, metal, 2 feet, 3 feet, and 4 feet in length	„	„	15 0 to	50 0	New from Rs. 10 to Rs. 12 per foot. 2nd-hand from Rs. 7-8 to Rs. 9 per foot.
„ „ diagonal, metal, 3 feet & 4 feet	„	„	75 0 „	120 0	New from Rs. 30 to Rs. 33 per foot. 2nd-hand from Rs. 25 to Rs. 27-8 per foot.
Sectors, ivory	„	„	4 0 „	5 0	
„ wooden	„	„	1 0 „	2 0	
„ zenith, astronomical	„	„	2,000 0	.....	
* Sextants, of sizes in cases	„	„	100 0 to	240 0	A few of these have stands.
„ „ pocket	„	„	50 0 „	75 0	
Slopes and Batters, sets of 8 pieces	„	„	4 0 to	5 0	
Squares, co-ordinate	„	„	30 0 „	50 0	
„ optical	„	„	6 8 „	16 0	
„ set, ebonite, in sets	„	„	7 8	.....	
„ „ metal, single	„	„	1 0 to	1 8	
„ „ wooden, in sets	„	„	5 0 „	7 8	
„ „ „ single	„	„	0 8 „	2 8	
Stands for Compasses, Prismatic, of sizes	„	„	9 6 „	20 0	
„ „ Heliotropes and Heliostats	„	„	9 8 to	20 0	
„ „ Plane tables, various	„	„	8 0 „	18 0	
„ „ Telescopes, wooden	„	„	25 0	.....	
Staves, levelling, common pattern	„	„	12 0 to	13 0	
„ „ G. T. Survey pattern	„	„	16 0 „	25 0	
„ „ Gravatt's	„	„	16 0 „	18 0	
„ „ Roorkee, single	„	„	12 0 „	13 0	Single staff, 21 feet long.
„ „ „ double	„	„	16 0 „	20 0	Two staves, aggregate length 20 feet.
„ „ telescopic - { Sopwith's / Strange's }	„	„	13 0 „	21 0	
„ offset or cross	„	„	5 0	.....	
Sun-dial, universal	„	„	66 0	.....	
Sympiesometers	„	„	25 0 to	42 0	
* T. Squares, metal, of sizes	„	„	20 0 „	52 0	From Rs. 10 to Rs. 12 per foot.
„ wooden „	„	„	1 8 „	7 0	
* { Tapes, measuring 50 feet	„	„	3 6 „	5 0	
* { „ „ 66 „	„	„	3 12 „	7 0	
* { „ „ 100 „	„	„	5 4 „	9 0	
* { „ steel, of sizes	„	„	7 0 „	25 0	
Telemeters, of sorts	„	„	150 0 „	450 0	
Telescopes, astronomical	„	„	150 0 „	270 0	Inclusive of stands.
„ reconnoitring	„	„	30 0 „	110 0	
„ marine	„	„	40 0 „	165 0	
„ terrestrial, 3′ 6″ in length	„	„	150 0 „	220 0	
* Theodolites, Everest's, with vertical arc, 4″ & 4½″	„	„	140 0 „	300 0	From Rs. 35 to Rs. 75 per inch of diameter.
„ „ „ „ 5″, 6″, & 7″	„	„	210 0 „	530 0	From Rs. 42 to Rs. 75 per inch of diameter.
„ „ „ „ 10″ & 12″	„	„	580 0 „	1,240 0	From Rs. 58 to Rs. 100 per inch of diameter.
* { „ „ without vertical arc, 5″	„	„	250 0	.....	
* { „ transit, with vertical circle, 5″, 6″, 7″, & 8″	„	„	375 0 to	750 0	
„ „ without „ „ 5″, 6″, & 7″	„	„	275 0 „	450 0	
Thermometers, boiling, with apparatus complete	„	„	45 0 „	60 0	
„ spare, for above	„	„	18 0 „	20 0	
„ chemical, of sizes	„	„	7 8	.....	
„ common „	„	„	2 0 to	3 0	
„ for solar radiation	„	„	13 0 „	18 0	
„ for terrestrial radiation	„	„	11 0 „	14 0	
„ maximum, common, self registering	„	„	9 0 „	14 0	
„ „ black bulb	„	„	9 0 „	14 0	
„ „ wet „	„	„	9 0 „	14 0	

(with stands.)

* Size to be stated on the face of the indent.

† Many scales require a careful description. If there is the least doubt as to the correct denomination of a scale, the indenting Officer should specify the number of divisions and sub-divisions in a given measurement, and the method of numbering for instance, 12″ divided into 60 parts, numbered successively from 1 to 60, each part to be sub-divided into two.

Names of Instruments.		Approximate rates of issues.		Remarks.
		Rs. As.	Rs. As.	
Compasses, surveying, English, with stand -	Each	From 44 0 to	90 0	
„ triangular - - -	„	„ 12 8	.....	
„ wholes & halves, metal - -	„	„ 5 0 to	20 0	
Curves, French, small, sets of 12 - -	„	„ 3 8 „	5 8	
„ „ large, „ „ 36 - -	„	„ 12 8 „	17 8	
„ Railway, small, „ „ 50 - -	„	„ 14 0	.....	
„ „ large, „ „ 90 - -	„	„ 12 0 to	24 0	
Declinometers, with compasses - -	„	„ 7 8 „	15 0	
Dynameters - - - -	„	.....	50 0	
Eidographs, 2½ feet & 3 feet - - -	„	„ 125 0 to	175 0	
Glasses, binocular, small and large - -	„	„ 35 0 „	125 0	
„ copying or tracing - - -	„	.....	.....	From Rs. 6 to Rs. 8 per square foot of glass.
„ time - - -	„	„ 2 0 to	3 0	
Heliostats, with stands - - -	„	„ 75 0 „	150 0	
Heliotropes † - - -	„	„ 25 0 „	150 0	From Rs. 6 to Rs 12-8 per inch of diameter of glass, exclusive of stand.
Holdalls. - - - -	„	„ 25 0	.....	
Horizons, dark glass, plane - - -	„	„ 31 4	.....	
„ mercurial, ordinary, and Captain George's pattern - - -	„	„ 35 0 to	70 0	
Hydrometers, Sike's, with brass floats - -	„	„ 60 0	.....	
„ „ „ glass „ - -	„	„ 35 0 to	70 0	
Hygrometers, Daniel's - - -	„	„ 43 12	.....	
„ Mason's - - -	„	„ 30 0	.....	
Instruments, drawing, mathematical, brass, 1st sort -	„	„ 35 0 to	52 0	The lower prices quoted refer generally to boxes of instruments which having been repaired in the workshop, may be classed as good second-hand instruments.
„ „ „ „ 2nd „ -	„	„ 25 0 „	33 0	
„ „ „ „ 3rd „ -	„	„ 13 0 „	16 0	
„ „ „ electrum, 1st sort, with needle points -	„	„ 70 0 „	95 0	
„ „ „ electrum, 1st sort - without needle points -	„	„ 60 0 „	80 0	
„ „ „ electrum, 2nd sort -	„	„ 30 0 „	40 0	
„ „ „ electrum, 3rd sort -	„	„ 16 0 „	25 0	
Lamps, reverberatory, with reflectors - -	„	„ 75 0 „	125 0	
„ bull's eye - - -	„	„ 2 8 „	10 0	
„ referring - - -	„	„ 3 0 „	7 8	
Lenses, reading - - -	„	„ 1 2 „	5 10	
Levels, dumpy, of sizes with stands - -	„	„ 135 0 „	300 0	About Rs.1-4 per inch of diameter of glass.
„ Y pattern „ „ - -	„	„ 150 0 „	300 0	From Rs. 14 to Rs. 20 per inch of length of telescope.
* „ spirit, in metal cases -	„	„ 3 12 „	23 0	From Re. 1 to Rs. 1-10 per inch of length.
„ „ in wooden cases - -	„	„ 3 4 „	12 8	From 6 annas to 14 annas per inch of length.
„ reflecting (Abney's) - - -	„	„ 20 0 „	54 0	
Logs, Massey's patent - - -	„	„ 30 0 „	40 0	
Machines, map-printing, Gastrell's pattern -	„	„ 50 0 „	70 0	
„ „ Ordnance „ in boxes -	„	„ 45 0 „	60 0	
Magnetometer, with Dip Circle - -	„	„ 1,100 0	.....	
Magnets, bar or horse shoe - - -	Per pair	„ 5 0 to	10 0	
Meters, air - - -	Each	„ 35 0 „	65 0	
„ current, ordinary, and Moore's patent -	„	„ 50 0 „	180 0	
Micrometers - - -	„	„ 50 0 „	100 0	
Microscopes - - -	„	„ 400 0	.....	
Omnimeters with stands - - -	„	„ 450 0 to	660 0	
Opisometers - - -	„	„ 3 8 „	5 12	
Ozometers - - -	„	„ 18 12	.....	
Pedometers and Passometers - - -	„	„ 25 0 to	75 0	
Pens, drawing, common, ivory handle - -	„	„ 1 8 „	3 0	
„ „ „ steel „ - -	„	„ 1 4 „	1 8	
„ dotting - - -	„	„ 4 0 „	6 0	
„ „ double or road - -	„	„ 5 0 „	6 0	
* Pantagraphs, English of sizes - -	„	„ 70 0 „	145 0	From Rs. 30 to Rs. 50 per foot according to condition.
„ French „ - -	„	„ 270 0	.....	
Perambulators, English pattern - -	„	„ 70 0 to	100 0	
„ Waugh's - - -	„	„ 80 0 „	120 0	
Pins for maps, brass - - -	per doz.	„ 0 12	.....	
„ „ electrum - - -	„	„ 0 14	.....	
„ for measuring chains, iron, of sorts -	Each	„ 0 2 to	0 8	
Plane-tables, deal-wood, with brass plates & clamping screws, with stands † - -	„	„ 16 0 „	20 0	Sizes usually made are— 9″ × 24″ 24″ × 20″ 20″ × 16″
„ teak „ „ „ † -	„	„ 16 0 „	20 0	
„ light, military pattern, with stands † -	„	„ 18 0 „	25 0	
Rules, sight, and Compasses, rectangular, for plane-tables, rated separately.				

* Size to be stated on the face of the indent.

† Stands for these instruments are rated separately on page 4.

Names of Instruments.		Approximate rates of issues.		Remarks.
		Rs. As.	Rs. As.	
Planimeters, brass - - -	Each.	From 24 0 to	33 0	
„ electrum - - -	„	„ 35 0 „	50 0	
Plates, metal, graticule - - -	„	„ 25 0 „	50 0	
Pluviometers or rain gauges, country pattern -	„	„ 16 0 „	20 0	Including the stands.
„ „ Glaisher's „ -	„	„ 30 0 „	55 0	
„ „ Symon's „ -	„	„ 10 0 „	50 0	
„ „ self registering -	„	„ 35 0 „	75 0	
Pointers, station, brass and electrum, of sizes -	„	„ 100 0 „	165 0	
Prickers with ivory handles - - -	„	„ 1 4	.....	
Protractors, plain, circular, of sizes, brass -	„	„ 10 0 to	35 0	From Rs. 1-12 to Rs. 3 per inch of diameter.
„ „ „ „ electrum -	„	„ 20 0 „	50 0	From Rs. 3 to Rs. 4 per inch of diameter.
„ „ semi-circular, 6″, brass -	„	„ 10 0 „	13 0	
„ „ „ horn -	„	„ 0 8	.....	From Rs. 2-8 to Rs. 3 per inch of diameter.
„ „ „ of sizes, electrum -	„	„ 12 0 to	24 0	From Rs. 5-8 to Rs. 6 per inch of diameter.
„ with adjustment, circular, brass -	„	„ 35 0 „	48 0	From Rs. 12-8 to Rs. 15 per inch of diameter.
„ „ „ circular, electrum -	„	„ 50 0 to	90 0	
„ „ „ semi-circular, brass, with ¼″ & ½″ scales diagonally divided	„	„ 40 0 „	56 0	From Rs. 6-8 to Rs. 9-8 per inch of diameter.
„ card, circular, 12″ - -	„	„ 0 12	.....	
„ „ „ 5″ (figures in English and vernacular) -	„	„ 0 2	.....	
„ rectangular, ivory of various patterns	„	„ 3 12 to	12 0	
„ „ wood „ „ -	„	„ 1 0 „	5 0	
„ „ metal, 6″ - -	„	„ 9 0 „	12 0	
Pyrometers - - -	„	„ 30 0	.....	
Range Finders, of sorts - - -	„	„ 125 0 to	300 0	
Rods, measuring, wooden, of sizes - -	„	„ 2 0 „	5 0	
* Rules, carpenter's, boxwood, 1 foot, 2 fold & 4 fold	„	„ 1 0 „	2 8	
„ „ „ 2 feet 2 „ & 4 „	„	„ 1 4 „	3 2	
„ flat, ebonite - - -	„	„ 0 6 „	5 12	About 1 anna per inch for smaller sizes, and 1½ annas per inch for the larger sizes.
„ „ „ of sizes - -	„	„ 0 8 „	0 10	
„ „ electrum, of sizes - -	„	„ 16 0 „	30 0	About Rs. 7-8 per foot.
„ „ wooden „ - -	„	„ 0 5 „	4 8	
„ folding, ivory, 1 foot, 4 fold - -	„	„ 3 2	.....	
„ „ „ 2 feet, 2 „ - -	„	„ 10 0 to	15 0	
„ „ „ 2 „ 4 „ - -	„	„ 10 0 „	15 0	
„ parallel bar, ivory, 6 inches - -	„	„ 3 0 „	6 0	
„ „ „ wooden, of sizes - -	„	„ 1 0 „	6 12	From Rs. 1 to Rs. 3 per foot.
„ „ on rollers, brass, „ - -	„	„ 9 0 „	30 0	From about Rs. 9 to Rs. 18 per foot.
„ „ „ electrum, „ - -	„	„ 11 0 „	65 0	From about Rs. 11 to Rs. 22 per foot.
„ „ „ wooden (2½ feet in length) -	„	„ 12 8 „	20 0	
„ sight, for plane-tables, wooden (with fixed metal sights) -	„	„ 3 8 „	5 0	
„ „ „ metal (with folding sights) -	„	„ 10 0 „	20 0	
„ straight edges, steel, of sizes - -	„	„ 17 0 „	45 0	From Rs. 7 to Rs. 8 per foot in length.
Scales, acre, calculating, 16″ to 1 mile -	„	„ 13 8 „	24 0	
„ architect's, boxwood or ebonite, single, 12 inches -	„	„ 1 12 „	3 2	{1/16th, 1/8th, 3/16th, 1/4th, 3/8th, 3/4th, 1/10th, 1/5th.
„ „ „ in sets - -	„	„ 15 0 „	20 0	
„ „ ivory, single, 12 inches -	„	„ 5 8 „	6 8	
„ „ „ in sets - -	„	„ 35 0 „	45 0	½, 1, 1½, 3.
„ Bengali, card board - -	„	„ 0 1	.....	
„ „ metal - - -	„	„ 0 12 to	1 8	
„ common, wooden, 2 feet 6 inches long -	„	„ 2 0 „	3 0	Divided to inches, eighths and sixteenths.
„ diagonal, card board - -	„	„ 0 1 „	0 4	
† „ „ metal, 1 foot long - -	„	„ 3 0 „	10 0	
„ „ wooden, „ - -	„	„ 1 0	.....	
„ engine divided, card board, 18 inches -	„	„ 0 2 to	0 8	
„ engineering, box-wood, in sets -	„	„ 10 0 „	15 0	Each set contains scales of from 100 to 800 to the foot.
„ „ ebonite „ - -	„	„ 14 0 „	20 0	
„ „ ivory, „ - -	„	„ 20 0 „	30 0	
„ Gunter's, metal - - -	„	„ 12 0 „	25 0	
„ „ wooden - - -	„	„ 5 0 „	6 0	
„ Marquois', metal - - -	„	„ 20 0 „	45 0	
„ „ wooden - - -	„	„ 7 0 „	10 0	
„ offsets, card board - -	„	„ 0 1	.....	
„ „ ivory, in sets - -	„	„ 9 0 to	10 0	

* Size to be stated on the face of the indent.

† Many scales require a careful description. If there is the least doubt as to the correct denomination of a scale, the indenting Officer should specify the number of divisions and sub-divisions in a given measurement, and the method of numbering for instance, 12″ divided into 60 parts, numbered successively from 1 to 60, each part to be sub-divided into two.

Names of Instruments.	Approximate rates of issues.			Remarks.
		Rs. As.	Rs. As.	
† Scales, offsets, wooden, in sets	Each.	From 4 0 to	5 0	
„ „ single, ivory	„	„ 1 4	.....	
„ „ „ wooden	„	„ 0 6 to	0 12	
„ plotting, ebonite, in sets of six	„	„ 14 0 „	20 0	
„ „ ivory, „	„	„ 35 0 „	50 0	
„ „ wooden „	„	„ 13 0 „	20 0	
„ „ single, ebonite	„	„ 2 0 „	5 0	
„ „ „ ivory	„	„ 5 0 „	7 0	
„ „ „ metal	„	„ 2 0 „	10 0	
„ „ single, wooden	„	„ 1 12	.....	Each inch divided into 25 parts for plotting plans on the scale of 2½ chains to the mile.
* „ standard, metal, 2 feet, 3 feet, and 4 feet in length	„	„ 15 0 to	50 0	New from Rs. 10 to Rs. 12 per foot. 2nd-hand from Rs. 7-8 to Rs. 9 per foot.
„ „ diagonal, metal, 3 feet & 4 feet	„	„ 75 0 „	120 0	New from Rs. 30 to Rs. 33 per foot. 2nd-hand from Rs. 25 to Rs. 27-8 per foot.
Sectors, ivory	„	„ 4 0 „	5 0	
„ wooden	„	„ 1 0 „	2 0	
„ zenith, astronomical	„	„ 2,000 0	.....	
* Sextants, of sizes in cases	„	„ 100 0 to	240 0	A few of these have stands.
„ „ pocket	„	„ 50 0 „	75 0	
Slopes and Batters, sets of 8 pieces	„	„ 4 0 to	5 0	
Squares, co-ordinate	„	„ 30 0 „	50 0	
„ optical	„	„ 6 8 „	16 0	
„ set, ebonite, in sets	„	„ 7 8	.....	
„ „ metal, single	„	„ 1 0 to	1 8	
„ „ wooden, in sets	„	„ 5 0 „	7 8	
„ „ „ single	„	„ 0 8 „	2 8	
Stands for Compasses, Prismatic, of sizes	„	„ 9 6 „	20 0	
„ „ Heliotropes and Heliostats	„	„ 9 8 to	20 0	
„ „ Plane tables, various	„	„ 8 0 „	18 0	
„ „ Telescopes, wooden	„	„ 25 0	.....	
Staves, levelling, common pattern	„	„ 12 0 to	13 0	
„ „ G. T. Survey pattern	„	„ 16 0 „	25 0	
„ „ Gravatt's	„	„ 16 0 „	18 0	
„ „ Roorkee, single	„	„ 12 0 „	13 0	Single staff, 21 feet long.
„ „ „ double	„	„ 16 0 „	20 0	Two staves, aggregate length 20 feet.
„ „ telescopic - { Sopwith's / Strange's }	„	„ 13 0 „	21 0	
„ offset or cross	„	„ 5 0	.....	
Sun-dial, universal	„	„ 66 0	.....	
Sympiesometers	„	„ 25 0 to	42 0	
* T. Squares, metal, of sizes	„	„ 20 0 „	52 0	From Rs. 10 to Rs. 12 per foot.
„ wooden „	„	„ 1 8 „	7 0	
* Tapes, measuring 50 feet	„	„ 3 6 „	5 0	
* „ „ 66 „	„	„ 3 12 „	7 0	
* „ „ 100 „	„	„ 5 4 „	9 0	
„ steel, of sizes	„	„ 7 0 „	25 0	
Telemeters, of sorts	„	„ 150 0 „	450 0	
Telescopes, astronomical	„	„ 150 0 „	270 0	Inclusive of stands.
„ reconnoitring	„	„ 30 0 „	110 0	
„ marine	„	„ 40 0 „	165 0	
„ terrestrial, 3′ 6″ in length	„	„ 150 0 „	220 0	
* Theodolites, Everest's, with vertical arc, 4″ & 4½″	„	„ 140 0 „	300 0	From Rs. 35 to Rs. 75 per inch of diameter.
„ „ „ „ 5″, 6″, & 7″	„	„ 210 0 „	530 0	From Rs. 42 to Rs. 75 per inch of diameter.
„ „ „ „ 10″ & 12″	„	„ 580 0 „	1,240 0	From Rs. 58 to Rs. 100 per inch of diameter.
* „ „ without vertical arc, 5″	„	„ 250 0	.....	
„ transit, with vertical circle, 5″, 6″, 7″, & 8″	„	„ 375 0 to	750 0	
„ „ without „ „ 5″, 6″, & 7″	„	„ 275 0 „	450 0	
Thermometers, boiling, with apparatus complete	„	„ 45 0 „	60 0	
„ spare, for above	„	„ 18 0 „	20 0	
„ chemical, of sizes	„	„ 7 8	.....	
„ common „	„	„ 2 0 to	3 0	
„ for solar radiation	„	„ 13 0 „	18 0	
„ for terrestrial radiation	„	„ 11 0 „	14 0	
„ maximum, common, self registering	„	„ 9 0 „	14 0	
„ „ black bulb	„	„ 9 0 „	14 0	
„ „ wet „	„	„ 9 0 „	14 0	

* Size to be stated on the face of the indent.

† Many scales require a careful description. If there is the least doubt as to the correct denomination of a scale, the indenting Officer should specify the number of divisions and sub-divisions in a given measurement, and the method of numbering for instance, 12″ divided into 60 parts, numbered successively from 1 to 60, each part to be sub-divided into two.

List of Instruments generally kept in Store or manufactured at the Government Mathematical Instrument Office, Calcutta.

Names of Instruments.	Approximate rates of issues.			Remarks.
		Rs. As.	Rs. As.	
Anemometers, Robinson's	Each	From 45 0 to	65 0	
„ Whewell's	„	„ 315	....	
Arithmometers	„	„ 200 0 to	325 0	
Balance, Chemical	„	„ 150 0 „	185 0	
Barometers, Aneroid, large, 4½″ diameter	„	„ 40 0 „	75 0	
„ „ pocket	„	„ 35 0 „	65 0	
„ marine	„	„ 50 0 „	75 0	
„ mountain, Fortin's pattern	„	„ 50 0 „	125 0	
„ „ George's „	„	„ 150 0 „	175 0	
„ standard, Fortin's „	„	„ 60 0 „	200 0	
„ „ Newman's „	„	„ 125 0 „	200 0	
„ „ self-compensating	„	„ 125 0 „	275 0	
„ Macneill's, Boylean-Mariotti principle	„	„ 155 0 „	175 0	
Bars, steel, 6 feet	„	„ 16 0 „	25 0	
* Boards, drawing, teak	according to sizes	„ 1 0 „	1 8	Per square foot.
* „ „ deal, fluted, with ebony edges	according to sizes	„ 1 2 „	2 0	Per square foot.
Camera Lucida	Each	22 8 „	45 0	
Cases, sketching, leather	„	„ 5 0 „	10 0	
Chains, iron, measuring 30 feet, with pins complete	„	„ 4 6	....	
„ „ „ 33 „ „ „ „	„	„ 5 10	....	
„ „ „ 50 „ „ „ „	„	„ 8 8	....	
„ „ „ 66 „ „ „ „	„	„ 10 0	....	
„ „ „ 100 „ „ „ „	„	„ 300 0 to	600 0	
Chronometers, box	„	„ 400 0 „	720 0	
„ pocket	„	„ 26 0 „	45 0	
Chronographs	„	„ 1,500 0	....	
Circles, altitude and azimuth	„	„ 500 0	....	
„ reflecting	„	„ 1,250 0	....	
„ repeating, astronomical	„	„ 90 0	105 0	
Circumferentors, including stands	„	„ 2 0 to	20 0	
Clinometers, common	„	„ 20 0 „	42 8	
„ deLisle's	„	„ 30 0	....	
„ Survey Department pattern	„	„ 13 0 to	15 0	
Combs, acre, calculating, metal	„	„ 0 4	....	
„ „ „ card	„	„ 15 0 to	26 0	
Compasses, beam, sliding, tubular, metal	„	„ 8 0 „	20 0	
„ „ wooden bar, of sorts and sizes, plain	„	„ 20 0 „	40 0	
„ „ „ „ „ with adjustment	„	„ 2 8 „	4 0	
„ bow, ink or pencil, brass, single jointed	„	„ 3 0 „	5 0	
„ „ „ „ „ double „	„	„ 3 6 „	5 0	
„ „ „ „ electrum, single „	„	„ 5 0 „	10 0	
„ „ „ „ „ double „	„	„ 2 10 „	4 8	
„ spring, bow, ink, pencil, or dividers	„	„ 6 0 „	10 0	
„ „ „ sets	„	„ 1 0 „	2 8	
„ drawing, common, brass	„	„ 1 8 „	5 0	
„ „ „ electrum	„	„ 3 8 „	5 0	
„ „ hair, brass	„	„ 4 0 „	8 0	
„ „ „ electrum	„	„ 6 14 „	14 0	
„ „ with pen and pencil legs, brass	„	„ 10 0 „	15 0	
„ „ „ „ „ electrum	„	„ 4 0 „	10 0	
„ magnetic, pocket, brass cases	„	„ 2 0 „	3 8	
„ „ „ wooden cases	„	„ 7 8 „	30 0	
„ „ „ watch pattern	„	„ 18 0 „	50 0	
„ marine	„	„ 6 0 „	20 0	
„ pocket, Napier's, pillar, or other patterns	„	„ 20 0 „	60 0	About Rs. 11 to Rs. 14 per inch of diameter of cards, exclusive of stands.
„ prismatic card of sizes with stand †	„	„ 25 0 „	90 0	Rs. 11 to Rs. 16 per inch of diameter of ring, exclusive of stand.
„ „ silver ring of sizes with stand †	„	„ 45 0 „	65 0	
„ „ Hunter's pattern†	„	„ 12 0 „	20 0	
„ proportional, brass and electrum, 6″ & 9″	„	„ 6 0 „	15 0	About Rs. 2 per inch of needle.
„ rectangular for plane-tables	„	„ 50 0 „	100 0	
„ subtense, with stand	„	„ 20 0 „	26 8	Inclusive of stands.
„ surveying, Bengali	„	„ 35 0	....	
„ „ „ English manufacture				

* Size to be stated on the face of the indent.

† Stands for these instruments are rated separately on page 4.

Names of Instruments.	Approximate rates of issues.			Remarks.
		Rs. As.	Rs. As.	
Thermometer maximum and minimum on the same board, 6″ and 9″ -	Each.	From 22 0	to 36 0	
„ minimum - -	„	„ 10 0	„ 15 0	
„ „ black bulb - -	„	„ 7 8	„ 16 0	
„ „ wet „ - -	„	„ 10 0	„ 15 0	
„ standard ½ degree - -	„	„ 15 0	„ 22 0	
„ „ ⅕ „ - -	„	„ 15 0	„ 32 0	
„ spare, for Syke's hydrometer -	„	„ 5 5	.....	
Trammel heads for beam compasses - -	„	„ 10 0	to 15 0	
Transit Instruments, astronomical - -	„	„ 200 0	„ 500 0	
Vanes, wind, iron, small and large - -	„	„ 3 0	„ 30 0	
Watches, common, pinchbeck & travellers -	„	„ 25 0	„ 250 0	

Books.	Approximate rates of issues.			Remarks.
		Rs. As.	Rs. As.	
Manual of Surveying for India - -	Each	From 12 0		
Nautical Almanacs - - -	„	„ 1 4		
Navigation, Norie's - - -	„	„ 10 0		
„ Raper's - - -	„	„ 10 0		
Tables, auxiliary, for facilitating computations of a trigonometrical survey, Hennessey's -	„	„ 3 0		
„ Glaisher's - - -	„	„ 0 10		
„ for hydrometer, by Casella - -	„	„ 3 0		
„ for aneroid Barometers, Mackesy's -	„	„ 1 12		
„ logarithmic, Chambers' - -	„	„ 2 0	to 3 0	
„ „ Hutton's - -	„	„ 8 0		
„ „ Shortrede's, with sines, &c. -	„	„ 16 8		
„ „ „ numbers -	„	„ 5 0		
„ lunary and horary, Thomson's - -	„	„ 5 0		
„ traverse, Boileau's, - - -	„	„ 3 0		
„ „ Gurden's - - -	„	„ 15 0		
„ „ Shortrede's - - -	„	„ 10 0		
Hints to Travellers, Galton's - - -	„	„ 1 10		

Reg. No. 10, S. I. O.—17-3-85.—1,000.

o/a No. 4668/85

Office, Calcutta.

No. 892 Ca 9th May/85

To

The Officer in Charge

Mathematical Instruments Department

Calcutta.

(5)

Sir,

In acknowledging the receipt of your letter No. 1005 dated 31st March 1885, I have the honour to state that there are no instruments in this Presidency available for transfer to the Calcutta Mathematical Instrument Office.

No. 891 Ca 9-5-85

" 892 Ca do

CS. 30.4.85

D 14/5 — 2.5.83

Supply Survey C.A. Wright Supt. Survey Z. [illegible] 14/5

O.S. 10/5

19/5

Ca 1-5-85

Ca 1-5-85

Public Works Department.

No. 891 Cap 9th May 85

Memorandum

Letter from the officer in charge Mathematical Instt: office } No. 1005 of 31st March 1885

From the Supg: Engr. 5 Circle No. 331 of 28th April 1885

Superintending Engineers will direct the returns into the P. W. Stores of all ~~repairable~~ surplus instruments in the several divisions.

2. The following letter will be despatched to the officer in charge Mathematical Instrument Office,

From

THE SUPERINTENDING ENGINEER,

(5) 5TH CIRCLE,

To

THE Chief Engineer P. W. Deptt.

Dated 28 } April 1885.
Recd. 29

ENCLOSURES. 2

No. 891 Cap 9-5-85

" 892 Cap do

No. 331

Instruments.

Reports that the present stock of — in the P.W. Stores is very low & it is advisable that all surplus instruments in the Divisions which can be repaired should be sent as heretofore to the P.W. Stores and it is not advisable that any instruments, that cannot be utilized in this Presidency, should be sent direct from Divisions to Calcutta.

D.S. 10/5

C. 1-5-85

No. 331

SUPERINTENDING ENGINEER'S OFFICE,
5TH CIRCLE, MADRAS,
Chepauk, 28th April 1885.

From

THE SUPERINTENDING ENGINEER,
5TH CIRCLE,

To

THE Chief Engineer
P. W. Deptt.

SIR,

Enclosures. 2

In returning your Endorsement No. 776C dated 11th Instant, I have the honor to report that the present Stock of Instruments in the P.W. Stores is very low, and it is advisable that all Surplus Instruments in the Divisions which cannot be repaired, should be sent as heretofore, to the P. W. Stores. If there should be any Instruments that cannot be utilized in this

Presidency

8-4-85

Presidency, they may be sent on by the General Superin=
=tendent P. W. Stores to the Calcutta Depôt. But it is not advisable that any should be sent direct from the Divisions to Cal=
=cuttah.

I have the honor to be
Sir
Your most Obed^t Servant

Hew Prendergast

Coll R.E.

Superin^tg Eng^r
5^th Circle

Rec No. 153
13-4-85

No. Dated, 188

Inch 3152
3782/85

Chepâk
11th April/85

No. 776C

Referred to the Supdg Engineer II Circle, for report as regards instruments in the P.W. Stores, Madras, & for opinion whether Executive Engineers may be called upon to send to the Calcutta depôt, surplus instruments in their division

(By order)

C. Crowe.
Major R.E.
Under-Secretary to Govt, P.W.D.

Recd 6/4/85
En 1 (11 A.C)

SECRETARY TO GOVERNMENT
6 APL 85
P.W. DEPARTMENT

J.S.
8.4.85

Referred

No. 1005

Survey of India Department,
MATHEMATICAL INSTRUMENT OFFICE,

Calcutta, 31st. March 1885.

From

OFFICER IN CHARGE MATHL. INSTT. OFFICE,

To

The Secretary,
Public Works Department
Madras

Sir,

There is at present a great demand for Instruments of the kinds mentioned in the accompanying list, and with a view to minimizing the indents for new instruments from England, I should be obliged if you would issue instructions to all officers under your Control to examine their Stock and return to this office any instruments of the Kind mentioned which are not absolutely necessary, in order that they may be repaired and issued again.

I have the honor to be,
Sir,
Your most obedient servant,

W. Rogers
Major, R.E.,
In charge Mathl. Instt. Office.

Accompaniments
12 Copies of Mecd lists

Ju 126

OW Ju+ 2 / ~~3152~~ 3782 / 85

List of Instruments generally kept in Store or manufactured at the Government Mathematical Instrument Office, Calcutta.

Names of Instruments.	Approximate rates of issues.			Remarks.
		Rs. As.	Rs. As.	
Anemometers, Robinson's	Each	From 45 0 to	65 0	
„ Whewell's	„	„ 315	....	
Arithmometers	„	„ 200 0 to	325 0	
Balance, Chemical	„	„ 150 0 „	185 0	
Barometers, Aneroid, large, 4½″ diameter	„	„ 40 0 „	75 0	
„ „ pocket	„	„ 35 0 „	65 0	
„ marine	„	„ 50 0 „	75 0	
„ mountain, Fortin's pattern	„	„ 50 0 „	125 0	
„ „ George's „	„	„ 150 0 „	175 0	
„ standard, Fortin's „	„	„ 60 0 „	200 0	
„ „ Newman's „	„	„ 125 0 „	200 0	
„ „ self-compensating	„	„ 125 0 „	275 0	
„ Macneill's, Boylean-Mariotti principle	„	„ 155 0 „	175 0	
Bars, steel, 6 feet	„	„ 16 0 „	25 0	
* Boards, drawing, teak	according to sizes	„ 1 0 „	1 8	Per square foot.
„ „ deal, fluted, with ebony edges	according to sizes	„ 1 2 „	2 0	Per square foot.
Camera Lucida	Each	22 8 „	45 0	
Cases, sketching, leather	„	„ 5 0 „	10 0	
Chains, iron, measuring 30 feet, with pins complete	„	„ 4 6	....	
„ „ „ 33 „ „ „ „	„	„ 5 10	....	
„ „ „ 50 „ „ „ „	„	„ 8 8	....	
„ „ „ 66 „ „ „ „	„	„ 10 0	....	
„ „ „ 100 „ „ „ „	„	„ 300 0 to	600 0	
Chronometers, box	„	„ 400 0 „	720 0	
„ pocket	„	„ 26 0 „	45 0	
Chronographs	„	„ 1,500 0	....	
Circles, altitude and azimuth	„	„ 500 0	....	
„ reflecting	„	„ 1,250 0	....	
„ repeating, astronomical	„	„ 90 0	105 0	
Circumferentors, including stands	„	„ 2 0 to	20 0	
Clinometers, common	„	„ 20 0 „	42 8	
„ deLisle's	„	„ 30 0	....	
„ Survey Department pattern	„	„ 13 0 to	15 0	
Combs, acre, calculating, metal	„	„ 0 4	....	
„ „ „ card	„	„ 15 0 to	26 0	
Compasses, beam, sliding, tubular, metal	„	„ 8 0 „	20 0	
„ „ wooden bar, of sorts and sizes, plain	„	„ 20 0 „	40 0	
„ „ „ „ „ with adjustment	„	„ 2 8 „	4 0	
„ bow, ink or pencil, brass, single jointed	„	„ 3 0 „	5 0	
„ „ „ „ „ double „	„	„ 3 6 „	5 0	
„ „ „ „ electrum, single „	„	„ 5 0 „	10 0	
„ „ „ „ „ double „	„	„ 2 10 „	4 8	
„ spring, bow, ink, pencil, or dividers	„	„ 6 0 „	10 0	
„ „ „ sets	„	„ 1 0 „	2 8	
„ drawing, common, brass	„	„ 1 8 „	5 0	
„ „ „ electrum	„	„ 3 8 „	5 0	
„ „ hair, brass	„	„ 4 0 „	8 0	
„ „ „ electrum	„	„ 6 14 „	14 0	
„ „ with pen and pencil legs, brass	„	„ 10 0 „	15 0	
„ „ „ „ „ electrum	„	„ 4 0 „	10 0	
„ magnetic, pocket, brass cases	„	„ 2 0 „	3 8	
„ „ „ wooden cases	„	„ 7 8 „	30 0	
„ „ „ watch pattern	„	„ 18 0 „	50 0	
„ marine	„	„ 6 0 „	20 0	
„ pocket, Napier's, pillar, or other patterns	„	„ 20 0 „	60 0	
„ prismatic card of sizes with stand †	„	„ 25 0 „	90 0	About Rs. 11 to Rs. 14 per inch of diameter of cards, exclusive of stand.
„ „ silver ring of sizes with stand †	„	„ 45 0 „	65 0	Rs. 11 to Rs. 16 per inch of diameter of ring, exclusive of stand.
„ „ Hunter's pattern†	„	„ 12 0 „	20 0	
„ proportional, brass and electrum, 6″ & 9″	„	„ 6 0 „	15 0	About Rs. 2 per inch of needle.
„ rectangular for plane-tables	„	„ 50 0 „	100 0	
„ subtense, with stand	„	„ 20 0 „	26 8	Inclusive of stands.
„ surveying, Bengali	„	„ 35 0	....	Inclusive of stands.
„ „ „ English manufacture				

* Size to be stated on the face of the indent.

† Stands for these instruments are rated separately on page 4.

Names of Instruments.		Approximate rates of issues.		Remarks.
		Rs. As.	Rs. As.	
Compasses, surveying, English, with stand -	Each	From 44 0 to	90 0	
„ triangular - - -	„	„ 12 8	.....	
„ wholes & halves, metal - -	„	„ 5 0 to	20 0	
Curves, French, small, sets of 12 - -	„	„ 3 8 „	5 8	
„ „ large, „ „ 36 - -	„	„ 12 8 „	17 8	
„ Railway, small, „ „ 50 - -	„	„ 14 0	.....	
„ „ large, „ „ 90 - -	„	„ 12 0 to	24 0	
Declinometers, with compasses - -	„	„ 7 8 „	15 0	
Dynameters - - - -	„	.....	50 0	
Eidographs, 2½ feet & 3 feet - - -	„	„ 125 0 to	175 0	
Glasses, binocular, small and large - -	„	„ 35 0 „	125 0	
„ copying or tracing - - -	„	.....	.....	From Rs. 6 to Rs. 8 per square foot of glass.
„ time - - -	„	„ 2 0 to	3 0	
Heliostats, with stands - - -	„	„ 75 0 „	150 0	
Heliotropes † - - -	„	„ 25 0 „	150 0	From Rs. 6 to Rs 12-8 per inch of diameter of glass, exclusive of stand.
Holdalls. - - -	„	„ 25 0	.....	
Horizons, dark glass, plane - - -	„	„ 31 4	.....	
„ mercurial, ordinary, and Captain George's pattern - - -	„	„ 35 0 to	70 0	
Hydrometers, Sike's, with brass floats - -	„	„ 60 0	.....	
„ „ „ glass „ - -	„	„ 35 0 to	70 0	
Hygrometers, Daniel's - - -	„	„ 43 12	.....	
„ Mason's - - -	„	„ 30 0	.....	
Instruments, drawing, mathematical, brass, 1st sort-	„	„ 35 0 to	52 0	The lower prices quoted refer generally to boxes of instruments which having been repaired in the workshop, may be classed as good second-hand instruments.
„ „ „ „ 2nd „ -	„	„ 25 0 „	33 0	
„ „ „ „ 3rd „ -	„	„ 13 0 „	16 0	
„ „ „ electrum, 1st sort, with needle points-	„	„ 70 0 „	95 0	
„ „ „ electrum, 1st sort - without needle points-	„	„ 60 0 „	80 0	
„ „ „ electrum, 2nd sort -	„	„ 30 0 „	40 0	
„ „ „ electrum, 3rd sort-	„	„ 16 0 „	25 0	
Lamps, reverberatory, with reflectors - -	„	„ 75 0 „	125 0	
„ bull's eye - - -	„	„ 2 8 „	10 0	
„ referring - - -	„	„ 3 0 „	7 8	
Lenses, reading - - -	„	„ 1 2 „	5 10	About Rs.1-4 per inch of diameter of glass.
* Levels, dumpy, of sizes with stands - -	„	„ 135 0 „	300 0	From Rs. 14 to Rs. 20 per inch of length of telescope.
* „ Y pattern „ „ - -	„	„ 150 0 „	300 0	From Re. 1 to Rs. 1-10 per inch of length.
* „ spirit, in metal cases - -	„	„ 3 12 „	23 0	From 6 annas to 14 annas per inch of length.
* „ „ in wooden cases - -	„	„ 3 4 „	12 8	
* „ reflecting (Abney's) - - -	„	„ 20 0 „	54 0	
Logs, Massey's patent - - -	„	„ 30 0 „	40 0	
Machines, map-printing, Gastrell's pattern -	„	„ 50 0 „	70 0	
„ „ Ordnance „ in boxes -	„	„ 45 0 „	60 0	
Magnetometer, with Dip Circle - -	„	„ 1,100 0	.....	
Magnets, bar or horse shoe - - -	Per pair	„ 5 0 to	10 0	
Meters, air - - -	Each	„ 35 0 „	65 0	
„ current, ordinary, and Moore's patent -	„	„ 50 0 „	180 0	
Micrometers - - -	„	„ 50 0 „	100 0	
Microscopes - - -	„	„ 400 0	.....	
Omnimeters with stands - - -	„	„ 450 0 to	660 0	
Opisometers - - -	„	„ 3 8 „	5 12	
Ozometers - - -	„	„ 18 12	.....	
Pedometers and Passometers - - -	„	„ 25 0 to	75 0	
Pens, drawing, common, ivory handle - -	„	„ 1 8 „	3 0	
„ „ „ steel „ - -	„	„ 1 4 „	1 8	
„ dotting - - -	„	„ 4 0 „	6 0	
„ „ double or road - -	„	„ 5 0 „	6 0	
* Pantagraphs, English of sizes - -	„	„ 70 0 „	145 0	From Rs. 30 to Rs. 50 per foot according to condition.
* „ French „ - -	„	„ 270 0	.....	
Perambulators, English pattern - -	„	„ 70 0 to	100 0	
„ Waugh's - - -	„	„ 80 0 „	120 0	
Pins for maps, brass - - -	per doz.	„ 0 12	.....	
„ „ electrum - - -	„	„ 0 14	.....	
„ for measuring chains, iron, of sorts -	Each	„ 0 2 to	0 8	
Plane-tables, deal-wood, with brass plates & clamping screws, with stands † - -	„	„ 16 0 „	20 0	Sizes usually made are— 37″ × 24″ 24″ × 20″ 20″ × 16″
„ teak „ „ „ † -	„	„ 16 0 „	20 0	
„ light, military pattern, with stands † -	„	„ 18 0 „	25 0	

Rules, sight, and Compasses, rectangular, for plane-tables, rated separately.

* Size to be stated on the face of the indent.

† Stands for these instruments are rated separately on page 4.

Names of Instruments.		Approximate rates of issues.		Remarks.
		Rs. As.	Rs. As.	
Planimeters, brass - - -	Each.	From 24 0 to	33 0	
„ electrum - - -	„	„ 35 0 „	50 0	
Plates, metal, graticule - - -	„	„ 25 0 „	50 0	
Pluviometers or rain gauges, country pattern -	„	„ 16 0 „	20 0	Including the stands.
„ „ Glaisher's „ -	„	„ 30 0 „	55 0	
„ „ Symon's „ -	„	„ 10 0 „	50 0	
„ „ self registering -	„	„ 35 0 „	75 0	
Pointers, station, brass and electrum, of sizes -	„	„ 100 0 „	165 0	
Prickers with ivory handles - - -	„	„ 1 4	.....	
Protractors, plain, circular, of sizes, brass -	„	„ 10 0 to	35 0	From Rs. 1-12 to Rs. 3 per inch of diameter.
„ „ „ „ electrum -	„	„ 20 0 „	50 0	From Rs. 3 to Rs. 4 per inch of diameter.
„ „ semi-circular, 6″, brass -	„	„ 10 0 „	13 0	
„ „ „ horn -	„	„ 0 8	.....	From Rs. 2-8 to Rs. 3 per inch of diameter.
„ „ „ of sizes, electrum -	„	„ 12 0 to	24 0	From Rs. 5-8 to Rs. 6 per inch of diameter.
„ with adjustment, circular, brass -	„	„ 35 0 „	48 0	From Rs. 12-8 to Rs. 15 per inch of diameter.
„ „ „ circular, electrum -	„	„ 50 0 to	90 0	
„ „ „ semi-circular, brass, with ¼″ & ½″ scales diagonally divided	„	„ 40 0 „	56 0	From Rs. 6-8 to Rs. 9-8 per inch of diameter.
„ card, circular, 12″ - -	„	„ 0 12	.....	
„ „ „ 5″ (figures in English and vernacular)-	„	„ 0 2	.....	
„ rectangular, ivory of various patterns	„	„ 3 12 to	12 0	
„ „ wood „ „ -	„	„ 1 0 „	5 0	
„ „ metal, 6″ - -	„	„ 9 0 „	12 0	
Pyrometers - - -	„	„ 30 0	.....	
Range Finders, of sorts - - -	„	„ 125 0 to	300 0	
Rods, measuring, wooden, of sizes - -	„	„ 2 0 „	5 0	
* Rules, carpenter's, boxwood, 1 foot, 2 fold & 4 fold	„	„ 1 0 „	2 8	
* „ „ „ 2 feet 2 „ & 4 „	„	„ 1 4 „	3 2	
„ flat, ebonite - - -	„	„ 0 6 „	5 12	About 1 anna per inch for smaller sizes, and 1½ annas per inch for the larger sizes.
„ „ „ of sizes - -	„	„ 0 8 „	0 10	
„ „ electrum, of sizes - -	„	„ 16 0 „	30 0	About Rs. 7-8 per foot.
„ „ wooden „ - -	„	„ 0 5 „	4 8	
„ folding, ivory, 1 foot, 4 fold - -	„	„ 3 2	.....	
„ „ „ 2 feet, 2 „ - -	„	„ 10 0 to	15 0	
„ „ „ 2 „ 4 „ - -	„	„ 10 0 „	15 0	
„ parallel bar, ivory, 6 inches - -	„	„ 3 0 „	6 0	
„ „ „ wooden, of sizes - -	„	„ 1 0 „	6 12	From Rs. 1 to Rs. 3 per foot.
„ „ on rollers, brass, „ - -	„	„ 9 0 „	30 0	From about Rs. 9 to Rs. 18 per foot.
„ „ „ electrum, „ - -	„	„ 11 0 „	65 0	From about Rs. 11 to Rs. 22 per foot.
„ „ „ wooden (2½ feet in length) -	„	„ 12 8 „	20 0	
„ sight, for plane-tables, wooden (with fixed metal sights) -	„	„ 3 8 „	5 0	
„ „ „ metal (with folding sights) -	„	„ 10 0 „	20 0	
„ straight edges, steel, of sizes - -	„	„ 17 0 „	45 0	From Rs. 7 to Rs. 8 per foot in length.
Scales, acre, calculating, 16″ to 1 mile -	„	„ 13 8 „	24 0	
„ architect's, boxwood or ebonite, single, 12 inches -	„	„ 1 12 „	3 2	⅟16th, ⅛th, 3/16th, ¼th, ⅜th, ½th, ¾th, 1/16th, ⅛th.
„ „ „ in sets- -	„	„ 15 0 „	20 0	
„ „ ivory, single, 12 inches -	„	„ 5 8 „	6 8	
„ „ „ in sets - -	„	„ 35 0 „	45 0	½, 1, 1½, 3.
„ Bengali, card board - -	„	„ 0 1	.....	
„ „ metal - - -	„	„ 0 12 to	1 8	
„ common, wooden, 2 feet 6 inches long -	„	„ 2 0 „	3 0	Divided to inches, eighths and sixteenths.
„ diagonal, card board - -	„	„ 0 1 „	0 4	
† „ „ metal, 1 foot long - -	„	„ 3 0 „	10 0	
† „ „ wooden, „ - -	„	„ 1 0	.....	
„ engine divided, card board, 18 inches -	„	„ 0 2 to	0 8	
„ engineering, box-wood, in sets -	„	„ 10 0 „	15 0	Each set contains scales of from 100 to 800 to the foot.
„ „ ebonite „ - -	„	„ 14 0 „	20 0	
„ „ ivory, „ - -	„	„ 20 0 „	30 0	
„ Gunter's, metal - - -	„	„ 12 0 „	25 0	
„ „ wooden - - -	„	„ 5 0 „	6 0	
„ Marquois', metal - - -	„	„ 20 0 „	45 0	
„ „ wooden - - -	„	„ 7 0 „	10 0	
„ offsets, card board - - -	„	„ 0 1	.....	
„ „ ivory, in sets - -	„	„ 9 0 to	10 0	

* Size to be stated on the face of the indent.

† Many scales require a careful description. If there is the least doubt as to the correct denomination of a scale, the indenting Officer should specify the number of divisions and sub-divisions in a given measurement, and the method of numbering for instance, 12″ divided into 60 parts, numbered successively from 1 to 60, each part to be sub-divided into two.

Public Works Department.

No. 891 C dated 9th. May 1885.

M E M O R A N D U M .

Letter from the Officer in charge Mathematical Instrument Office No. 1005 dated 31st. March 1885.
From the Superintending Engineer V Circle No. 331 dated 28th. April 1885.

Superintending Engineers will direct the return into the Public Works Stores of all repairable surplus instruments in the several divisions.

2. The following letter will be despatched to the Officer in charge Mathematical Instrument Office, Calcutta.

(By Order)

C. Owen Major R. E.
Dy. Chief Engineer P. W. D.

To

The Suptg. Engineers.
Consg. Archt. to Govt.
Supt. of Works T. M. Scheme.

1885.

P. W. DEPARTMENT.

Current No. 3152

From
The Officer in Charge
Mathl. Instt. Office
Calcutta

Enclos.— 1

No. 1005
Dated 31st March } 1885
Received 6th April }

Subject.
Instruments — Forwarding list of — and asking their return to his office for their being repaired and issues again.

Disposal.

No. 776 Dated 11th April

Refers to the S. E. V Circle, for report as regards instruments in the P. W. Stores, Madras, & for opinion whether Executive Engineers may be called upon to send to the Calcutta depot, surplus instruments in their division.

(B. O.)
(Sd) C. B.
11/4
(Sd) D. W.
8-4-85