

7/18
Educational (1897) Department.

ORDINARY MS.

G.O., No. 445

DATED 7.8.97

INDEXED.

21-34
33/8
9

[Despatch Abstract.]

Considering Parthasarathy Aiyangar
to have joined his appt. as librarian
at the College of Engineering, Madras
on the 11th Nov = 96 & S. Siva Rao
to have reverted to his substantive
appointment.

18/97

BACK PAPERS.

G.O.	No.	Department.	Date.	G.O.	No.	Department.	Date.

FURTHER PAPERS.

G.O.	No.	Department.	Date.	G.O.	No.	Department.	Date.

Lish No III
Educational (1897) Department.

CURRENT No. *815*



224/97
From
 The Dir. of Pub. Instruction,
 Madras.

End Order. *502 7/17 July 1897.*

Referred to the Accountant-General for favour of remarks.

No. 7237 *wh*

Dated 3 July 1897.

Received 12 JUL 1897

Registered 12-7-97

Enclosures *Seven* (*Enclosure (1) has been sent separately in a packet/post.*)

Spare copies

7/97
 TO BE RETURNED
 WITH REPLY.

SUBJECT.

Replying to a reference regarding the joining time of M.R. By. Parthasarathi Aiyangar, Ag. Librarian & Storekeeper, College of Engineering.



BACK PAPERS.

G.O.	No.	Department.	Date.
	224	EdL	21-4-97

FURTHER PAPERS.

G.O.	No.	Department.	Date.

List No III.

List of Workshop Machinery and appliances, of which stock was taken by S. Parthasarathi Aiyangar.

Description	No.	
Bellows, Forge, Portable	1	
Anvil	1	
Bench Drilling Machine with American Twist Drills	1	
Bench Drill with 36 bits, American	1	
Brook Patent drop forged Chain pipe wrench	1	
Chuck 1 1/2"	1	
Cutter grinding Machine	1	
Drilling Machine vertical with steel spindle	1	
Engine Stationary 10 HP with Boiler 12 HP.	1	
Working Drawings of Engine Stationary 1 HP	1	
Fitter's Bench vice	9	
Grindstone	1	
Twist Drill grinder	1	
Lathe Tools assorted for 7" centre	1 set	
Do 6"	1	
Do 4"	1	
Do 5"	1	
Measuring Apparatus for a 100 ton Testing Machine	1 set	
Milling tools	1 set	
Oil Tester, Hurston's	1	
Steel Contraction Rules - Pattern Maker's	1	
Planing Machine	1	
Portable Forge, Gutsavants	1	
Shaping Machine	1	
Slotting Machine	1	
Surface Plate, Whitworth's	2	
Tap, Whitworth's, thread, taper, second plug and master Tap	1 set of 6	

List of class Books handed over by S. Shiva
Raw.

Description	No
Testing Machine - Single lever. Theoretin's Torsionals	1
do. Wicksteed's to test to 100 Tons.	1
Test specimens of Autographic Testing Machine	20
Tool-holder Tangye.	2
Twist-Drills	1 set.

31st May 1897. }
 W. D. M. Major R. E.
 Principal

Description	No
Hutton's Logarithmic Tables	44
Todhunter's Algebra for Schools and Colleges	17
Todhunter's Euclid	21
" Trigonometry for Schools & Colleges	10
Goodwin's Statics	10
Evans' Mensuration	32
Galbraith and Staughton's Hydrostatics	26
Boileau's Traverse Tables	55
Todhunter's Algebra for beginners	18
Todhunter's Trigonometry "	12
" Mechanics "	12
Formula, Rules and Examples in Mensuration	26
Root Books	22
Short Logarithmic and other Tables by Muir	8
Notes and Tables for Engineering Students	17
Roorkee Surveying	28
Architectural and Topographical Drawing	76
C. E. C. Papers No. IX Estimating	23
" " V Hydraulics	49
" " X Engineering 1 st Edn	
Roorkee Papers - Strength of Materials	25
Lardner on the Steam Engine	43
C. E. C. Papers No. VI Canals	21
Roscoe's Elementary Chemistry	30

Books 106 to 108
 31st May 1897

Description	No.
Glennys Diagrams of construction 10 in number	
Specimens of Printing	11
Milnes Adjustment of Levels	21
Roorki Treatise Civil Engineering Vol: I	4
" " " " Vol: II	5
Applied Mechanics by Crofton	2
C.E.C. Papers No I Tamil	17
" " " " IV	18
Builder's Vocabulary Tamil	28
Anglo-Tamil Dictionary	16
Tamil-English Dictionary	3
Popes Tamil Hand book	1
English and Tamil Dictionary by Revd. Knight	1
Examples in Machine Drawing ^{Spanning &c}	39
Brown's English-Telugu Dictionary	1
C.E.C. Papers No II Telugu	15
" " " " VII	21
Telugu-English Dictionary	3
Anglo-Telugu Dictionary	14
Builder's Vocabulary Telugu	31
Brown's Telugu-English Dictionary	5
Campbell's Telugu Grammar	4
Telugu Selections Morris	8
First Lessons in Telugu, Col. Rogers R.E.	12
Arden's Telugu Grammar	2
Hand Book of Topographical Drawing Part I	6
by Capt. Waterhouse	
" " " " Part II	

Description	No.
Rurki Manual No VIII Roads	10
" " IX Bridges	9
" " X Irrigation works	10
" " I Building Materials	9
Rawles Practical Plane Geometry (Baker & Co)	18
Working Drawings of Machine Construction by Busbridge	
Rurki Manual No V Masonry	10
" " VI Construction of Buildings	11
" " XI Carpentry	10
" " XVI Earthwork Estimating	2
College Manual of Building Materials and construction by Serjt Reynolds	10
Telugu Infant Primer	1
Telugu First Standard Reader	1
" Second " "	1
Garnison's Steam Engine	2
Elementary Algebra with answers (Hall & Knight)	5
Third Standard Reader Telugu	1
Fourth " " "	1
Lock's Elementary Statics	16
Chamber's Mathematical Tables	22
Twisden's Practical Mechanics	2
Besant's Hydrostatics	2
Smith's Solid Geometry	2
Steam-Ripper	3
Wilson's Advanced Building construction	3
" Elementary " "	4
College Manual on Irrigation works	10

Description

No.

Thorntons' Book-keeping Exercise books
 Nos. 1 to 5 in case }
 Examination Papers in Book-keeping
 Key to Thorntons " "
 Thorntons' Book-keeping Exercise Book No. 6.
 Hinwins Machine Design of 2 ft.
 do old

2

3.

31st May 1897

Major RE
 Principal

Enclos. to 4 to 6 to 8 to 10 to 12 to 14 to 16 to 18 to 20 to 22 to 24 to 26 to 28 to 30 to 32 to 34 to 36 to 38 to 40 to 42 to 44 to 46 to 48 to 50 to 52 to 54 to 56 to 58 to 60 to 62 to 64 to 66 to 68 to 70 to 72 to 74 to 76 to 78 to 80 to 82 to 84 to 86 to 88 to 90 to 92 to 94 to 96 to 98 to 100

List No. V

List of Stationery Articles handed
 over by S. Thiva Rao.

Names of Articles

Quantity

Ls. & S.

Paper Writing

Imperial, M.M., BL	72 lbs	4-13-20
Royal	44 lbs	6-17-19
Medium	34 lbs	0-16-19
Foolscap H.M.	15 lbs	1-6-19
Double Foolscap M.M., Cr W,	28 lbs	0-7-23
Foolscap	14 lbs	0-2-2
" (Country)		2-0-2
Double Foolscap, Cr Laid	20 lbs	
Foolscap cream Laid	10 lbs	2-7-7
Quarto Post		1/-
Octavo Post		1-3-12
Royal Azure Laid		3-19-17
Medium Laid		1-14-10

Paper Printing &c

Double double pott		0-5-17
" Royal, 50 lbs		8-4-15
" " 35 lbs		1-14-20
" Foolscap (Country) 28 lbs		3-7-18
" " 16 lbs		10-13-0
Brown Cartridge Royal 40 lbs		7-17-17
Blotting paper Europe		0-9-20
" " Country		0-17-11

Names of Articles	Quantity
Basak's paste boards fine	"
Paste boards country rough	4
Card boards white, 8 sheets thick	"
<u>Blank Books</u>	
Leather Bound Medium	"
" Demi	2
" Foolscap	3
Marble cover Demi	2
" Foolscap	5
" Quarto	15
" Octavo	"
<u>Inks and other Articles</u>	
Blue black Ink	5 bottles
Black ink powder	61 packs
Red ink powder	16 tins & 5030
Needles, common, large	3
Needles, 3 cornered	4
Pins ordinary	7 1/2 sheets
Glue	"
Gum Common	1 lb 4 - 6
Sealing wax Europe	7
" Country	1 lb 6 - 4
Wax cloth	7 1/2 - 1 - 6
Tape, Europe, white	5
" Country "	3 1/2 rolls

Names of articles	Quantity
Thread cotton sewing, balls	41
" twisted Country	3030
" " colored	2030
Twine Europe	21 Stains
" Hempen	3 "
" Country	41 - 10 1/2
Pencils, black lead	130
" red	6
" blue	21
Tape tags	24
Quills	1128
Steel rules	1465
Mitchell's Black Swan Quills	-
Gillott's Magnum Bonum	24
Penholders	41
Salamapore cloth	Yds 5 1/2
Ruler	-
Double Royal, bottles	R. & S 0 - 8 - 0
Brass paper fastener	-
<u>Paper Drawing</u>	
Continuous, Mounted, 60" x 48"	-
Double Elephant, 40" x 26 3/4"	0 - 10 - 1
Antiquarian, 53" x 31"	0 - 8 - 21
Imperial 30" x 22"	4 - 15 - 4
Tracing ^{Cloth} paper 60" x 40"	0 - 17 - 4

Names of Articles	Quantity
Section paper	0-5-7
Tracing cloth 24" wide	99-99
<u>Blank Books</u>	
Leveling books, large	7
Surveying books, large	11
" " Small	10
Metallic " large	12
" " Small	5
<u>Pencils Drawing</u>	
B.	23
F.	35
H.B.	216
H	88
H.H	241
H.H.H	181
Pencils small for bow compasses	39
Leads for Pentagraphs	45
<u>Colours</u>	
Gamboge	Cakes 4
Crimson Lake	3
Light red	5
Goebalt	6
Prussian blue	4
Burnt Sienna	4
Payne's grey	5
Burnt Amber	4
Sepia	6
Yellow ochre	--

Names of Articles	Quantity
Neutral Tint	5
Indigo	6
Indian ink	241
<u>Other Article</u>	
Brushes Camel hair, round	11
" Sable hair	24
Sponge, ordinary	1
Rubber, pencil eraser	2 1/2 pieces
" Ink and Pencil eraser	11
Prepared chalk	15
Brown Quills	39
Tracing cloth 36" wide	133-2-3
Holders for brown Quills	3
Color Slates, large	1
Steel pens, hatching	9
Color Saucers	12
Stump brushes of sizes	--
Pentkinives	1
Ink glasses	23
Ink Stands - wooden	2
Rulers - round	7
Wooden flats	14
Slate and Slate pencils	"
Paper cutters	"
Scissors	"
To O. Line.	
31 st May 1897	Major RE
	Principal

List No. VI.

List of College Calendars, Library catalogues and other books, of which stock was taken by S. Parthasarathi Aiyangar.

Description	No.
Calendars: —	
For 1890	5
1891	13
1892	9
1893	29
1894 (3 copies bound in calf)	13
1895 (1 copy do.)	17
1896.	3
Library Catalogues: —	
In calf.	8
In brown holland	7
In stiff covers	39
College Manual of Building Materials	
Construction 3	97
do. do of Irrigation Works.	288.
Gold Medal.	1
Silver do.	1
Bronze do.	2
Prizes: —	
Kick's Rotameter	1
Footrule	1
Anglin's Design of Structures	1
Mullins' Irrigation Manual	4
Model of College Medal in lead	1
Die of the College Seal	1
	W. D. Lane.
	Major R.E.
31 st May 1897	Principal

837
845
8497

Includes 4th c. to 845 & 8497

List No VII.

List of Articles of Students' Deposit Account, of which Stock was taken by Parthasarathi Aiyangar.

Description	No.
Levelling Field Books.	83
Surveying . do.	28
Sketch Books.	82
College Manual of Hydraulics	8
Notes on Practical Chemistry	43
C. & C. Paper No. IX. Estimating	3
Lock's Elementary Statics	4
Jamieson's Steam Engine	2
Todhunter's Elementary Trigonometry	6
Rurki Treatise on Civil Engineering Vol I	1
" Memoirs on Earthwork Estimates	8
" Irrigation Works.	5
" Treatise on Buildings	1
Section Note books. quarto size	54
Saucers, each six	8
Colours. half cakes. Payne's Grey.	33
do. Prussian blue	1
do. Burnt Umber	5
do. Crimson Lake	4
Quill pens - cards of one dozen	4
Compass Leads. boxes of six	10
Ebony parallel rolling miler 18"	1
Plotting scales 10 x 50 with offsets	7
do 10 x 50 do.	39
do 50 x 50 without offset	1
Cardboard scales	22
Bow pen	1
Set of vulcanite set squares	2 sets
Two squares Rosewood	13

No. 7257.

From

J.B. Bilderbeck Esqr. M.A.
THE HONOURABLE MR. D. DUNCAN, M.A., D.Sc.

AG. DIRECTOR OF PUBLIC INSTRUCTION,

Madras,

To

The Secretary to Government,

Local & Municipal Department.

SIR,

Adverting to paragraph 2 of G.O. No 224 Educational,

dated 21st April last, I have the honour to submit the enclosed

statements of stock taken over by M.R. By. Parthasarathi Aiyangar,

Acting Librarian and Storekeeper, College of Engineering.

2. Major Love considers that five weeks would have been

sufficient if the relieved librarian and storekeeper could

have devoted his whole time to handing over the stock, but as he

had to do also the current work of his substantive appointment

of First Assistant clerk to which he reverted, the time actually

occupied viz- from 11th November 1896 to 6th January 1897- was by

no means unreasonable.

3. As Parthasarathi Aiyangar actually joined the College and

commenced his current duties on the 11th November 1896 and as

pay was drawn for him as acting librarian and storekeeper from

the above date, it seems to me that he must be considered to

Description

No.

Drawing pins large

Small

3 1/2 doz.

3 doz

Brushes camel hair - 8

table hair, Albata ferrules - 11

do. Cedar handles - 6

old - 12

37

Black lead pencils 1/4 H.

16

do. HB.

26

Foot rule 2' fourfold

14

College Manual of Building Materials & Construction - 22

do. of Irrigation Works. - tin 3 2

To the Hon.

Major R.E.

Principal.

31st May 1897

Enclosed 2 doz to the Hon. Major R.E. Principal.

have joined his acting appointment on the same date and that

consequently no extension of joining time can be claimed on

his behalf.

I have the honour to be,

Sir,

Your most obedient servant,

J. B. Ridenhall

Ag. Director of Public Instruction.

Local & Munl. (1897) Department.

Educational

CURRENT No.

859

From

*The Accountant General
Madras.*

Order

No. 2261

Dated 23 July 1897

Received 24 JUL 1897

Registered 24 7-97

Enclosures 7 (C 815 + 6 enclos. xtd)

Spare copies.

SUBJECT.

Stating that if Parthasarathy
Aiyangar was doing his duty as
Librarian and stockkeeper whilst
taking over stock, he may be held
to have joined the apptl on 11 Nov
96 & S. Siva Rao to have reverted
to his own substantive appointment
on the same date.

Enc. 61 to C. 859 25/9/97

BACK PAPERS.

G.O.	No.	Department.	Date.

FURTHER PAPERS.

G.O.	No.	Department.	Date.

Presidency Audit DEPARTMENT.

Fort St. George,
Accountant-General's Office,
23rd July 1897.

No. 2261

From

J. C. Harrison Esq.,

Offg: ACCOUNTANT-GENERAL TO THE

GOVERNMENT OF MADRAS,

To

THE Secretary to Government,
Local and Municipal Department.

SIR.

With reference to your Endorsement No. 1502, dated the 17th July 1897, referring for my remarks letter from the Director of Public Instruction No. 7237, dated the 3rd July 1897 (herewith returned), I have the honour to state that if Parthasarathy Aiyangar was doing his duty as Librarian and Storekeeper whilst taking over stock he may be held to have joined his appointment on the 11th November 1896, the date of his arrival at College, and S. Siva Rao (the officer relieved by him) to have reverted to his own substantive appointment on the same date.

I have the honour to be,

Sir,
Your most obedient servant,

J. C. Harrison

Offg: Accountant General.

(189) DEPARTMENT.

From

THE ACCOUNTANT-GENERAL,

MADRAS,

To

THE

No.

Dated

Received

No

SUBJECT.

[G.]
24.
1,000-14-6-97.

Ed DEPARTMENT.

Papers to be read in proceedings :—

Again G.O., No. 224 dated 21st April 1897.

Again G.O., No. dated 189 .

Current No. 215 of 1897, dated 3rd July , from the D.P.I.

" " 259 " 1897, " 23rd July , " the A.G.

" " " 189 , " " " "

ORDER.
mis.

N^o. 445877-8-97

Parthasarathi Aiyangar will
accordingly be considered to have
joined his appointment at the
College of Eng. on the 11th Nov. 1896
and S. Siva Rao to have reverted
to his own ~~permanent~~ substantive
appointment on the same date.

MA
27/7/97

14/8/97

To
The D.P.I. qado
-- A.G. -agto.

14/8/97
Adm. Secy.
D.P.I.
A.G.
S. Siva Rao
Parthasarathi Aiyangar

College of Engineering, Madras.

LIST OF MODELS AND APPARATUS FOR USE IN IN-DOOR INSTRUCTION.

When models are to be inspected, the class instructor should, as a rule, take the students into the Model room, where measurements and sketches can be made. Small portable models, instruments, and other apparatus may be obtained from the Model room by indent on the store-keeper. Such apparatus must be invariably returned to the store-keeper on the day of issue.

I.—BUILDING MATERIALS.

Catalogue Number.	
13. Building stones used on Madras Railway, 12 samples, of $3\frac{1}{2}$ " cubes, in case.	12
98. Building stones used on South Indian Railway, 25 samples, of $3\frac{1}{2}$ " cubes, in 3 cases.	25
14. Limestones, specimens of, in case.	1 case
12. Mineralogical specimens, in case.	1 "
15. Pugmill. Scale 1" to 1'.	1
16. Tile-moulding table. Scale 2" to 1'.	1
17. Brick-moulding table. Scale 2" to 1'.	1
99. Clayton's brick and tile-making machine. Scale 2" to 1'.	1
18. Bricks and tiles, models of. Scale 6" to 1'.	1
19. Shell lime kiln, rectangular. Scale 1" to 1'.	1
19(a). Shell lime kiln, Madras Railway pattern. Scale 1" to 1'.	1
20. Sifter, Stoney's. Scale 2" to 1'.	1
101. Indian timber, 39 specimens of, each 12" x 4" x 4".	39
102. Indian timber, 42 specimens of, each 4" x 3" x 1" in case.	42
342. Sections of rolled iron joists, 4 in number.	4
343. Sections of bar iron, 27 in number.	27
344. Specimens of tests of iron, 43 in number.	43

II.—CARPENTRY.

103. Joints in hardwood, 100 specimens, in case.	100
21. Scarfed and fished joints, 14 examples.	14
23. King post truss, strapped, rise one-third span.	1
24. King post truss, strapped, rise one-sixth span.	1
25. Truss with 3 verticals, rise one-third span.	1
22. Trussed beam travelling on gantry. Scale 1" to 1'.	1
104. Trussed beam for traveller.	1
105. Trussed partition. Scale $1\frac{1}{2}$ " to 1'.	1
26. Venetian frame.	1
27. Staircase, dog legged. Scale 2" to 1'.	1
28. Stair-case, geometrical. Scale 2" to 1'.	1
29. Stair-case, circular. Scale 2" to 1'.	1

III.—MASONRY, INCLUDING WALLS, FOUNDATIONS, ARCH- ING AND CENTRES.

Catalogue
Number.

- | | |
|--|---------|
| 30. Model bricks, 5 cases. | 5 cases |
| 31. Lewis. | 2 |
| 32. Masonry foundations, 3 examples. | / |
| 33. Cofferdam. Scale 1" to 1'. | / |
| 34. Pile driver. Scale 1" to 1'. | / |
| 35. Stoney's helical excavator, enlarger and undercutter.
Scale 2" to 1'. | / |
| 36. Bull's hand dredger. Scale 3" to 1'. | / |
| * 37. Arch ring. | / |
| * 38. Arch ring, semi-circular, with 2 doorways, showing flat
and relieving arches. Scale 2" to 1'. | / |
| * 39. Skew arch. | / |
| 40. Centering, solid, clay. Scale 1" to 1'. | / |
| 41. Centering, ribbed, semi-circular. Scale 1" to 1'. | / |
| 42. Elliptic rib. | / |
| 43. Centering on temporary pillars. Scale 1" to 1'. | 4 |
| 44. Sand boxes, 4. Scale 6" to 1'. | 4 |
| 45. Wedges, 4. Scale 6" to 1'. | / |
| 46. Centre for skew arch, 2 ribs, and 15 pieces lagging. | / |
| 106. Centre, Best's. | / |

IV.—BUILDINGS, INCLUDING ROOFS.

- | | |
|--|---|
| 47. Bungalow, Madras terrace roof, Bengal terrace verandah.
Scale 1" to 3'. | / |
| 48. Bungalow, trussed roof, terrace verandah. Scale 1" to
3'. | / |
| 49. Bungalow, hipped roof. Scale 1" to 2'. | / |
| 50. Bungalow, terrace roof. Scale 1" to 3'. | / |
| 51. Terrace roof covering. Scale 1" to 1'. | / |
| 52. Roof timbering over shed, king post trusses. Scale
1" to 1'. | / |
| 53. Roof timbering, Chisholm's trusses. Scale 1" to 1'. | / |
| 54. Roof timbering, combination trusses with ventilator, for
span of 48 feet. Scale 1" to 1'. | / |
| 55. Coupled and hipped roof for store shed. | / |
| 56. Ventilator roof timbering (trusses not shown). Scale
1" to 1'. | 4 |
| 56(a). Iron-roof joints for light 25-foot span, 4 in number.
Full size. | 5 |
| 56(b). Iron-roof joints for 35-foot span, 5 in number. Full
size. | 6 |
| 100. Iron-roof joints, 7 in number. | / |
| 107. Double arch, English bond. | / |
| 108. Elevation of 14" wall, Flemish bond. | / |
| 310. Do. do. English bond. | / |

* These models are executed in masonry.

Catalogue
Number.

- | | |
|------------------------------|---|
| 317. Model of C.I. beam. | / |
| 318. Do. rolled W.I. beam. | / |
| 319. Do. built up W.I. beam. | / |

V.—BRIDGES.

- | | |
|--|---|
| 57. Spar bridge, single sling. | / |
| 58. Timber-trussed foot-bridge, struts and straining piece.
Scale 1" to 1'. | / |
| 59. Timber-trussed bridge, struts and vertical tension rod.
Scale 1" to 1'. | / |
| 109. Timber-trussed bridge, 2 vertical tension rods. Scale
1" to 1'. | / |
| 60. Timber lattice bridge, iron trussing. Scale 2" to 3'. | / |
| 110. Timber lattice bridge. Scale 1" to 1'. | / |
| 61. Masonry bridge, segmental arches, straight wings.
Scale 1" to 3'. | / |
| 62. Do. do. do. do. | / |
| 63. Masonry bridge, elliptic arches, sectional model. Scale
1" to 5'. | / |
| 64. Masonry bridge, skew arches. Scale 1" to 2'. | / |
| * 65. Bridge pier, face wall, spandril filling, dentil cornice,
perforated parapet. | / |
| 66. Iron plate girder railway bridge of 30 feet span. Scale
1" to 1'. | / |
| 291. Iron girder railway bridge of 140' span over Pennér,
double system of bracing, iron cylinder foundations.
Scale 1" to 4'. | / |
| 67. Equilibrium draw-bridge. | / |
| 111. Suspension bridge joints, 3 in number. | 3 |
| 82. Road culvert. Scale 1" to 1'. | / |
| 83. Railway culvert. Scale 1" to 2'. | / |
| 292. Abutment, showing skew-back and cut-water. | / |

VI.—IRRIGATION WORKS.

- | | |
|--|---|
| 68. Kistna anicut and head works. Scale 1" to 40'. | / |
| 70. Regulating dam, with bridge of 30 arches, and 4 sets of
sluices. Scale 1" to 10'. | / |
| 71. Anicut and lock (Sadikuppam, Buckingham canal).
Scale 1" to 2'. | / |
| 72. Head sluice of 2 vents. Scale 1" to 4'. | / |
| 73. Head sluice of 3 vents. Scale 1" to 4'. | / |
| 74. Head sluice of Central Delta, Gódávári. Scale 1" to 2'. | / |
| 75. One vent of Central Delta, enlarged, with shutters and
gearing. Scale 1" to 1'. | / |
| 76. Sluice vent with revolving shutter. Scale 3" to 2'. | / |
| 77. Lock. Scale 1" to 2'. | / |
| 78. Tank sluice, 1 plug. Scale 1" to 1'. | / |
| 79. Tank sluice, 6 plugs. Scale 1" to 2'. | / |
| 69. Tank sluice, with screw shutter. | / |

Catalogue
Number.

80. Tank escape, with dam stones. Scale 1" to 1'.
 81. Siphon sluice. Scale 2" to 3'.
 80(a). Small tank escape. Scale 1" to 2'.
 113. Large tank escape (Nellore tank). Scale 1" to 2'.

VII.—DRAWING INSTRUMENTS AND APPARATUS.

114. Drawing instruments, cases of. 49
 115. Parallel rules, 12" to 24". 62
 116. Straight edges, 36" to 42". 11
 117. Tee squares, 32", 42" and 54". 24
 118. Set squares, 45° and 60°. sets 19
 119. Stencil plates for alphabets. boxes 5
 120. Drawing boards. 191
 121. Curves, French. boxes 7
 122. Railway curves, cardboard, radius 1½" to 120", set of 50
 in case. boxes 3
 123. Protractors, ivory, 6", 8" and 12". 22
 124. Protractors, ivory, Aldershot, with scale of shade. 3
 125. Protractors, boxwood, with scale of shade. 6
 126. Protractors, circular, 12" divided on silver to 20 minutes. 1
 127. Protractors, circular, 6", 9", and 12", cardboard. 32
 128. Beam compass. 4
 129. Drawing compass, Brooks'. 7
 130. Triangular compass. 10
 131. Compass for black board, 24". 1
 132. Ellipsograph. 4
 133. Pantagraph. 2
 134. Eidograph. 1
 135. Centrolineads. pair 24
 136. Marquois scales. 19
 137. Plotting scales, decimally divided. 17
 138. Plotting scales, Architects' or Engineers'. 4
 139. Scales, cardboard, Holtzapfel's for machine drawing. 3
 140. Spring bows. 1
 112. Topographical model of contoured ground.
 1. (i) Geometrical solids (for mensuration), comprising—
 Cylinder oblique and right; sphere and segment;
 circular ring; pyramid, triangular; pyramid,
 regular pentagonal, and frustum; pyramid,
 irregular pentagonal, forming three triangular
 pyramids; cone and frustum; parallelopiped
 oblique; prisms, triangular; prism, triangular,
 forming three equal pyramids; prism, right tri-
 angular, forming wedge; prism, quadrilateral,
 oblique or right; prism, hexagonal.
 (ii) Regular solids, consisting of tetrahedron, cube, octahe-
 dron, dodecahedron, icosahedron.
 (iii) Geometrical solids (for model-drawing), consisting
 of sphere, skeleton cube, solid crosses, square pyra-
 mid, ring, cone, octagonal prism, solid cube.

Catalogue
Number.

295. Cone, showing conic sections.
 311. Models for orthographic projection, set of six.
 312. Do. do. set of four.
 307. Contoured models of hilly ground, set of six.

VIII.—SURVEYING INSTRUMENTS.*

141. Chains, 50', 66' and 100'. 50
 142. Tapes, 100'. 19
 143. Perambulator. 4
 144. Plane table. old. 3
 145. Plane table, S.M.E. pattern. 18
 146. Clinometer rule. 9
 147. Clinometer, for ghat tracing. 14
 148. Clinometer, De Lisle's. 1
 149. Quadrant, Gunner's. 1
 150. Quadrant, for ghat tracing. 1
 151. Prismatic compass. 24
 152. Surveying compass. 6
 153. Sextant, Box. 11
 154. Sextant, astronomical, with artificial horizon. 1
 155. Optical square, 2". 6
 156. Circumferenter. 1
 157. Angle meter. 1
 158. Reflecting semi-circle. 4
 159. Acre combs, 8" and 16" to 1 mile. 3
 160. Computing scales, Stanley's, 4", 8", and 16" to 1 mile.
 161. Theodolite, Everest's double arc, 5" to 7". } 15
 162. Theodolite, common, 6".
 163. Theodolite, transit, 5".
 164. Theodolite, transit, 6" with lantern, and fitted with } 1
 Dalrymple-Hay's curve ranger.
 165. Level, Troughton's. }
 166. Level, Y. } 27
 167. Level, Dumpy. }
 169. Level, reversible. } 13
 170. Abney's level. 3
 198. Water-level, French. 32
 199. Levelling staves. 1
 308. Level, field service. 7
 200. Cross staff. 12
 201. Offset rods. 1 set of 3
 309. Boning rods, set of three. 114
 202. Surveying poles. 1
 323. Telemeter, Labbez'. 6
 Ceylon Ghat Tracer.

IX.—MEASURING INSTRUMENTS.

203. Planimeter, Amsler's, for measuring plane areas. 4
 306. Planimeter, Hohmann Ceradi's precision. 1

* Instruments used for out-door instruction, such as chains, prismatic compasses, levels, theodolites, &c., are not required to be returned daily into store.

Catalogue
Number.

204. Integrator, Amsler-Laffon, with 5' steel guide, for areas, centres of gravity, and moments of inertia (with pamphlet). /
205. Measuring instrument, Morris', rolling. /
206. Vernier, large size, in wood. /
207. Verniers on circular arc. 4
208. Measure, steel, 20', for testing survey chains. /
209. Rules, 2', fourfold. /2
210. Slide rule, Fuller's cylindrical, calculating (with pamphlet). /
211. Spherometer, measuring to .0001". /
212. Standard gauge, electrum, measuring to .001". /
213. Wire gauge, measuring to .001". /
214. Calculating scales, Gunga Ram's, for roofs, bridges, and retaining walls, 3 in number (with pamphlet). 3
215. Cement-testing apparatus, Michaele's double lever, to test to 1,000 lb. per square inch, consisting of— /

	NO.
Machine, with zinc shot bucket ...	1
Spring balance to show breaking strain ...	1
Automatic shot run ...	1
Brass moulds (section of briquette 1" x 1") ...	6
Brass sieve box, 625 meshes to the square inch. ...	1
Brass sieve box, 5,800 meshes to the square inch. ...	1

320. Torsional testing machine, Thurston's. /
321. Wire tester, Bailey's. /
338. Speed indicator in case, Young's. /

*Rotameter***X.—MECHANICS.**

3. Parallelogram of forces. /
4. Lever, 4', with weights. /
216. Centre of gravity board. /
217. Wheel and axle. /
218. Train of toothed wheels. /
219. Capstan. /
220. Windlass. /
221. Forge or tilt hammer. /
5. Pulleys, 3 systems. /
222. Concentric pulleys, White's. /
6. Inclined plane, adjusting, brass surface. /
7. Inclined plane, adjusting, teak surface. /
223. Screw. /
8. Screw jack. Scale 3" to 1'. /
224. Hydraulic jack, Tangye's, for 3 tons. /
9. Mechanical powers.—Professor Willis' apparatus in case, illustrating composition and resolution of forces; resultant of parallel forces; principle of moments; levers, simple and compound; wheel and axle; inclined plane; wedge; screw. Case/

Catalogue
Number.

10. Sheers, Triangle and Derrick, apparatus to illustrate, with cardboard diagrams of stresses, in case. /
168. Attwood's machine, with pulleys, weights and pendulum. /
84. Testing machine, for tension and compression. /
85. Testing machine, for deflexion. /
86. Vertical shearing stress in beams, apparatus to show— /
325. Apparatus for measuring centrifugal force. /
326. Apparatus for measuring the efficiency of screws. /
297. Apparatus for determining moment of inertia of a heavy wheel. /
339. Apparatus for determining the laws of torsion. /
340. Apparatus for determining the coefficient of friction. /
341. Apparatus for determining the efficiency of toothed gearing. /
301. Gyroscope. /
313. Cycloidal pendulum. /
225. * Natural philosophy, large built up apparatus for lecturers and experimenters in, comprising—

	NO.
Adapters ...	2
Balances, spring, 25 to 500lb. ...	8
Balances, spring, $\frac{1}{4}$ to 15lb. ...	2
Balances, spring, $\frac{1}{4}$ to 20lb. ...	2
Bars, graduated, iron, 5 $\frac{1}{2}$ ' and 6' long ...	2
Bars, graduated, wood, 4' long ...	1
Beds, slotted, deal, from 2' to 9' in length ...	13
Bell, shutter ...	1
Blocks, single sheave ...	5
Blocks, two sheave ...	4
Blocks, three sheave ...	2
Blocks, four sheave ...	2
Block, epicycloidal, Eade's, to carry 10 cwt. ...	1
Block, Weston's differential pulley, 10 cwt. ...	1
Block, sole ...	1
Boss, turned, wrought iron ...	2
Board, base ...	1
Bolts, coach, $\frac{3}{8}$ " with thumbscrew and plate washer, from 4 $\frac{3}{4}$ " to 8 $\frac{1}{4}$ " in length ...	26
Bolts, $\frac{3}{4}$ " with hexagonal nuts, from 2 $\frac{3}{4}$ " to 3 $\frac{1}{2}$ " in length ...	8
Bolts, bent hook, $\frac{3}{8}$ ", 8" in length ...	3
Bolts, $\frac{3}{8}$ " (assorted lengths) ...	12
Bolt, eye ...	2
Brackets, C.I. slotted, with $\frac{5}{8}$ " hole and binding screw, various patterns ...	25
Chain, crane, $\frac{3}{16}$ ", length 15' ...	1
Chain, crane, $\frac{3}{16}$ ", length 60' ...	1

* This apparatus is described in Willis' *Apparatus for Lecturers and Experimenters in Natural Philosophy*—Weale; and applications of it will be found in Ball's *Experimental Mechanics*. Macmillan.

	NO.
Chain, crane, $\frac{5}{16}$ ", length 15' ...	1 ✓
Chain, crane, $\frac{5}{16}$ ", length 60' ...	1 ✓
Chain, 8' 4" in length ...	1 ✓
Collar, 1", loose, turned ...	2 ✓
Coupler, brass ...	1 ✓
Cramps, 3" to 6" ...	14 ✓
Disc, iron, 18" diameter ...	1 ✓
Drum, flanged, $4\frac{1}{2}$ " ...	2 ✓
Fly wheel, 18" diameter ...	1 ✓
Frame, single ...	2 ✓
Frame, side ...	2 ✓
Handles ...	1 ✓
Jack, screw, for 2 tons ...	3 ✓
Knife edge, with 2 hexagonal nuts ...	1 ✓
Lengthener, brass ...	9 ✓
Hoops, angle ...	7 ✓
Hoops, straight ...	4 ✓
Pedestals, with brass steps ...	5 ✓
Pine, pieces ...	1 ✓
Pulley, 5" fixed ...	1 ✓
Pulley, wood ...	1 ✓
Pulley, brass ...	2 ✓
Pulleys, clamp, wood ...	1 ✓
Pulley bearing, adjustable W.I. slotted ...	5 ✓
Rectangles, C.I. slotted, 6" x 9" ...	1 ✓
Screw, tension wood, with block ...	1 ✓
Screw, W.I. square thread, $1\frac{1}{4}$ " diameter ...	3 ✓
Shaft ring, W.I. ...	3 ✓
Shafts, turned, 12", 18", 24" ...	3 ✓
Shafts, $\frac{3}{4}$ ", length 1' to 3' with carriage ...	2 ✓
Sockets and nuts, brass reducing ...	2 ✓
Sockets, brass ...	2 ✓
Socket, C.I. and brass nut, with set screw ...	2 ✓
Socket, double, C.I., and two brass nuts ...	6 ✓
Spanners ...	2 ✓
Spindles, with brass pulley and thumb screw ...	2 ✓
Spindles, with hexagonal nuts ...	2 ✓
Spur wheels, 20, 21, 24, 25, 30, 40, 60, 100, 120 teeth ...	9 ✓
Strainer, wire, $8\frac{1}{4}$ " with fly nuts ...	1 ✓
Studs and nuts, W.I. ...	5 ✓
Stud and nut, reducing, W.I. ...	2 ✓
Stud for lever ...	4 ✓
Table, slit, wood ...	1 ✓
Tables, stand, $2\frac{1}{2}' \times 2\frac{1}{2}' \times 1\frac{3}{4}'$...	3 ✓
Tube fittings, brass, $\frac{3}{4}$ " with shaft rings and binding screws ...	8 ✓
Tube fittings, special ...	2 ✓
Washers, split pins, S hooks, nuts, $\frac{1}{4}$ " rope ...	
Weights, iron, viz., 8 of 56lb, 6 of 28lb, 3 of 14lb, 3 of 7lb, 1 of 6lb, 1 of 5lb, 2 of 4lb, 1 of 3lb, 2 of 2lb, 2 of 1lb. ...	29 ✓

	NO.
Weight, lead, 3-1lb ...	1 ✓
Weights, set of, $\frac{1}{4}$ lb to 14lb ...	7 ✓
Wheel, grooved, carrying pinion of 20 teeth ...	1 ✓
Winch ...	1 ✓
Wrench ...	1 ✓

XI.—HYDROMECHANICS.

Catalogue
Number.

171. Water pressure, apparatus to illustrate.	/
172. Flotation apparatus.	/
173. Specific gravity bottle.	/
174. Hydrometer, Sykes'.	/
175. Hydrometer, Nicholson's.	/
176. Hydrometer, universal.	/
177. Hydrometer, common.	/
178. Siphon, glass.	/
179. Lift pump, glass.	/
180. Force pump, glass.	/
111. Lift pump, sectional working model.	/
181. Hydrostatic bellows, 12".	/
182. Boyle's law, apparatus to illustrate.	/
183. Air-pump, oscillating, double acting.	/
184. Water-wheels, overshot and undershot, small working models with tank.	/
185. Water-wheel, overshot. Scale 1" to 1'.	/
186. Water-wheel, breast. Scale 1" to 1'.	/
187. Scoop wheel. Scale 1" to 1'.	/
188. Chain pump and windmill.	/
189. Centrifugal pump Gwynne's.	/
190. Turbine, inward flow.	/
191. Current meter.	2
322. Electric current meter, Harlacher's.	/
345. Turbine, $8\frac{1}{2}$ " diameter with regulating sluice.	/

XII.—MECHANISM AND MACHINE CONSTRUCTION.

87. Steam engine, horizontal, with governor.	/
88. Boiler for do. do.	/
89. Steam engine, horizontal.	/
192. Steam engine, horizontal, portable, with boiler.	/
90. Steam engine, vertical, oscillating cylinder.	/
91. Steam engine, beam.	/
92. Steam engine, sectional working model.	/
93. Link motion and reversing gear.	/
94. Pump, oscillating cylinder.	/
95. Mortising machine.	/
96. Quick return motion, Whitworth's.	/
97. Shifting slides and cams.	/
193. Winnowing machine.	/
194. Winnowing machine, sectional model.	/
195. Screw press for cotton.	/

Catalogue
Number.

196. Punkah wheel, Stoney's self-lubricating.
197. Kinematic models of Professor Reuleaux, comprising—

(A). *Lower Pairs of Elements.*

1. Twisting or screw pair.
2. Turning or cylinder pair.
3. Sliding or prism pair.

(B). *Higher Pairs of Elements.*

1. Equilateral duangle in triangle.
2. Equilateral curve triangle in square.
3. Equilateral curve triangle in rhombus.
4. Isosceles curve triangle in square.

(C). *Simple Kinematic Chains and mechanisms.*

1. Quadric cylinder crank chain.
2. Slider crank chain.
3. Quadric conic crank chain.
4. Reduced slider crank chain.
5. Do. do.
6. Reduced conic crank chain.
7. Simple spur-wheel chain with annular wheel.
8. Simple spur-wheel chain.
9. Endless screw.

(D). *Crank Trains.*

1. Slider cranks.
2. Swinging block (slider crank).
3. Turning block (slider crank).
4. Swinging slider crank.
5. Double crank (drag-link coupling with reduced centroids).
6. Turning block (slider crank) with reduced centroids.
7. Double slider crank with curved side
8. Double slider crank.
9. Turning block (slider crank).
10. Elliptic chuck.
11. Swinging slider crank.
12. Swinging slider crank (ellipsograph).
13. Swinging skew double slider.
14. Quadric crank chain with slot and sector.

(E). *Crank Trains with Expansion.*

1. Slider crank with pin expansion, 2 within 1.
2. Do. do. do. 1 " 2.
3. Do. do. do. 3 " 2.
4. Do. do. do. 2 " 3.
5. Do. do. do. 2 " 3, annular expansion.

6. Slider crank with pin expansion, 1 within 2 within 3.
7. Do. do. do. 3 " 2 " 1, 2

(F). *Chamber Crank Gear adapted for Inversion.*

1. Chamber crank gear, Simpson and Shipton.
2. Chamber crank gear, Cochrane.
3. Chamber crank gear, Beale.
4. Chamber crank gear, Ramelli.
5. Chamber crank gear, Wedding.
6. Chamber crank gear, Davies.

(G). *Toothed-wheel Train adapted for Inversion.*

1. Returning spur-wheel trains $a = 20$, $b = 21$, $c = 30$, $d = 31$, with 6 exchangeable, gives 10 mechanisms.
2. Returning spur-wheel train with annular wheel, &c.
3. Do. do. do.
4. Do. do. do. 2 annular wheels.
5. Do. do. do.
6. Do. do. with intermediate wheel.
7. Do. do. do.

(H). *Subsidiary Apparatus.*

1. Stand for carrying the above models when in use.
2. Same as No. 1, otherwise arranged.

Catalogue
Number.

226. Indicator, Richard's, with Darke's parallel motion.
227. Lap and butt joints.
228. Lap joint, single riveted.
229. Butt joint, single riveted.
230. Lap joint, double riveted.
231. Three plates, riveted.
232. Four plates, riveted.
233. Two plates and angle.
234. Tee joint.
235. Four cast plates.
236. Junction of cast plates.
237. Knuckle joint.
238. Keys.
239. Cotters.
240. Gib and cotters.
241. Hydraulic joint.
242. Crank shaft.
243. Flange coupling.
244. Disengaging clutch.
245. Strap connecting rod end.
246. Box connecting rod end.
247. Forked connecting rod end.
248. Coupling rod joint.
249. Piston.

Catalogue
Number.

250. Cylinder cover. /
 251. Slide valve. /
 277. Axle-box, railway carriage— /
 278. Spur wheel. /
 279. Pinion. /
 280. Bevel wheels, two in number. 2
 281. Ratchet wheel. /
 282. Belt pulley. /
 233. Plummer block. /
 284. Connecting rod end. /
 285. Connecting rod end, small. /
 286. Eccentric rod end. /
 287. Safety valve, with weight. /
 288. Crosshead of valve spindle. /
 289. Pipe elbow. /
 290. Water valve. /
 296. Rail, chair, and key. /
 329. Boiler punch. /
 330. Cam. /
 331. Screw returning into itself. /
 332. Hoop and pin wheel. /
 333. Hooke's joint. /
 334. Twelve forms of iron bolt. /
 335. Wall plate and bracket. /
 336. Hanger pedestal. /
 337. Solid bottom tap. /
 314. Eccentric. /
 315. Slide bars and crosshead. /
 316. Lift or puppet valve. /

NOTE.—Numbers 277 to 290 are full-size specimens.

XIII.—METEOROLOGICAL INSTRUMENTS.

298. Anemometer, Biram's colliery. /
 252. Barometer, Mountain. 2
 253. Barometer, Aneroid. 4
 254. Barometer, Aneroid, with autographic record. /
 299. Barometer, Standard, Fortin's. /
 255. Rain gauge. /
 256. Rain gauge, Howard's. /
 257. Thermometers, standard maximum and minimum, and /
 Mason's hygrometer. /
 258. Cup anemometer Robinson's. /

XIV.—PHOTOGRAPHIC APPARATUS.

259. Cameras NO. 5
 260. Camera stands 2
 261. Lenses, landscape and portrait 5
 262. Scales and weights, sets of 2

Catalogue
Number.

NO.

263. Argentometer 1
 264. Printing frames, set of 1

XV.—MISCELLANEOUS.

2. Binomial square and cube. 2
 265. Spirit level. 2
 266. Telescope, 1½" object glass. /
 267. Telescope, astronomical, 3" object glass. /
 268. Mariner's compass. 3
 269. Optical lantern, with 25 large and 20 small slides. /
 270. Sun-dial. /
 271. Compound bar of iron and brass to illustrate inequality /
 of expansion. /
 272. Copying press. /
 273. Microscope. /
 274. Spectroscope, Bunsen and Kirchhoff. /
 275. Field glasses, binocular. 2
 276. Oil stone. 3
 302. Thermopile. /
 303. Galvanometer. /
 304. Tuning forks and resonance boxes. 2
 324. Armillary sphere, Slater's. /
 327. Le Clanché's battery (12 cells). 12 cells
 328. Grove's battery (6 cells). 6 cells

1896.

H. D. LOVE, Major, R.E.,
 Principal, College of Engineering.

31st May 1897

Major RE

Principal