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Auteur : F. E. Becker & Co

Auteur secondaire : George, W. & J.

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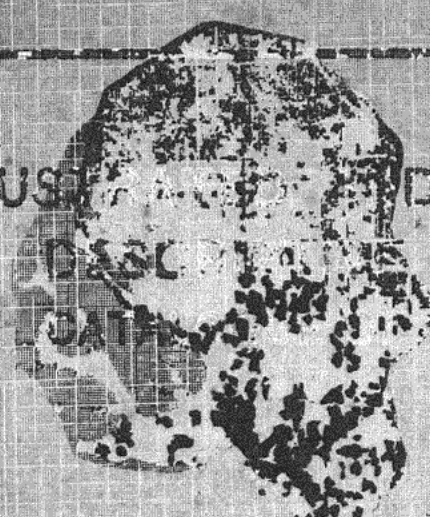
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23<sup>RD</sup>  
EDITION

**CHEMICAL**

**APPARATUS**

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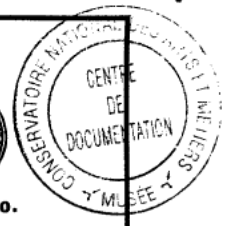
CALCUTTA, 1883-1884.



LONDON, 1884.



ALLAHABAD, 1910.



23rd EDITION.

**ILLUSTRATED AND DESCRIPTIVE  
CATALOGUE OF**

**CHEMICAL APPARATUS**

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Laboratory Fittings,  
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# PHYSICAL APPARATUS CATALOGUE

23rd EDITION

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ELEMENTARY AND  
PRACTICAL PHYSICS  
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ELECTRICITY  
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Having our own Manufactories, in which only experienced men are employed, we are enabled to quote very reasonable prices for all repairs to **GENERAL SCIENTIFIC APPARATUS.**

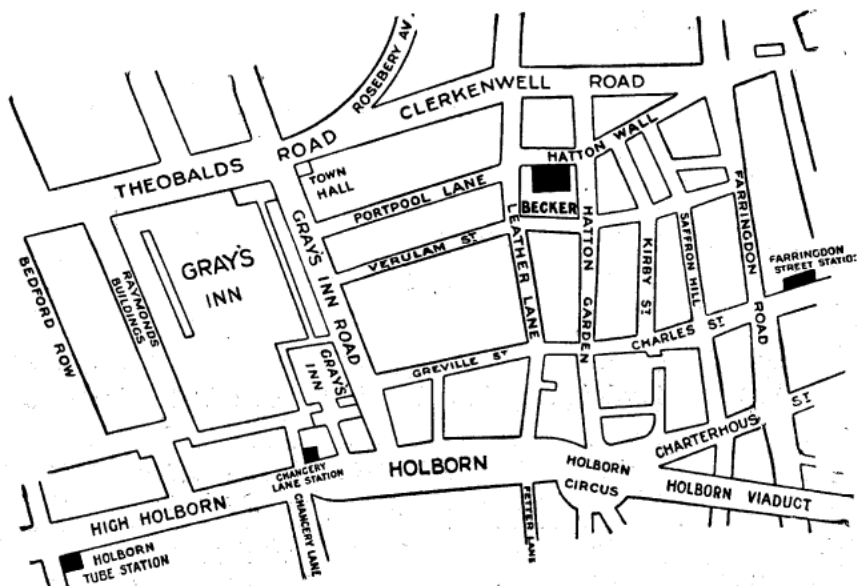
We also repair and adjust  
**BALANCES and WEIGHTS**  
**OF ALL MAKES.**





*Since this photograph was taken we have added considerably to our premises. Additional warehouses and glass-blowing shops are in an extensive block of buildings directly adjoining the extreme right of the premises shown in above photograph.*

How to get  
to our  
Warehouses,  
Showrooms and  
Scientific  
Glass-blowing  
Shops



Droits réservés au Cnam et à ses partenaires

# TERMS

**COUNTRY ORDERS** must be accompanied by a REMITTANCE, or by a reference to some person in London.

**FOREIGN ORDERS** must be accompanied either by a Remittance, or by instructions for payment in London on delivery of the Bills of Lading.

**STOCK.** A Large Stock of the Apparatus, Balances, Weights and Chemicals in this List being kept **ready for immediate delivery**, Shipping Orders for large collections can be executed with promptitude.

**BREAKAGES.** We do not hold ourselves responsible for any breakages. Experienced Packers are employed, and every care is taken to ensure the safe delivery of all goods to their destination. In the event of breakages, the carriers should be notified immediately. Damage in transit is entirely the carriers' responsibility, but they will repudiate liability unless notified in writing within three days of delivery. **Always sign carriers' sheet "Goods unexamined."**

**EMPTY PACKAGES.** Full value allowed when returned in good condition (carriage paid) within fourteen days from date of invoice.

**PLATINUM.** The prices of all apparatus in the making of which Platinum is used are subject to the current market price of Platinum.

**QUALITY.** Unless otherwise stated we shall in all cases send apparatus of the best quality.

**GLASS BLOWING.** We have our own Glass Blowing Shop at Hatton Wall, London, in which we employ only the most experienced glass blowers, and we can make up any special piece of apparatus to customers' own specifications and drawings.

**ILLUSTRATIONS.** Although in most cases the Illustrations in this list have been taken from actual photographs of the apparatus, the figures are not to be taken as binding in detail, owing to the necessity for making improvements as occasion arises.

**The Prices in this Catalogue cancel all of an earlier date, and are subject to fluctuation without notice.**

*Quantities of less than half-dozen will be charged at "each" rate.*

*Quantities of less than half-gross will be charged at "dozen" rate.*

**A COMPREHENSIVE INDEX AND LIST OF CHEMICALS  
WILL BE FOUND AT THE END OF THIS CATALOGUE.**

1924.

# **CAUTION**

**We regret we cannot hold ourselves responsible for Apparatus ordered through other houses. Please send all orders direct to us.**

**Colonial clients ordering through Merchants should state on their Indents that the Apparatus, etc., must be obtained from**

**F. E. BECKER & CO., Hatton Wall, LONDON, E.C.**

**W. & J. GEORGE (London), Ltd.**

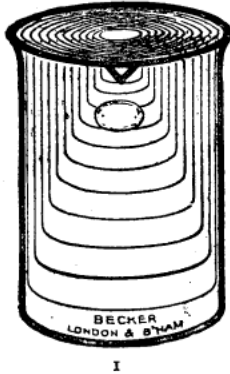
A



# LABORATORY GLASSWARE

## 1.—Resistance Glass Beakers.

Squat form, with spout. Best quality. Standard sizes.



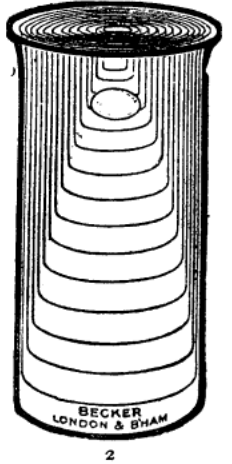
Size No.	1	2	3	4	5
Capacity	25	40	60	100	150 c.c.
Each ..	7d.	8d.	9d.	9d.	10d.
Per doz.	7/3	7/10	8/5	8/5	9/-

Size No.	6	7	8	9	10
Capacity	250	400	600	900	1300 c.c.
Each ..	11d.	1/1	1/6	2/-	2/5
Per doz.	10/3	12/7	16/3	21/-	25/6

Size No.	11	12	13	14
Capacity	2000	3000	4000	5000 c.c.
Each ..	3/7	4/9	6/-	5/5
Per doz.	38/9	52/-	67/6	75/6

## 2.—Resistance Glass Beakers.

Tall form, without spout. Best quality. Standard sizes.



Size No.	0	1	2	3	4
Capacity	25	40	60	100	150 c.c.
Each ..	7d.	8d.	9d.	9d.	10d.
Per doz.	7/3	7/10	8/5	8/5	9/-

Size No.	5	6	7	8	9
Capacity	250	400	600	1000	1500 c.c.
Each ..	11d.	1/1	1/6	2/-	2/5
Per doz.	10/3	12/7	16/3	21/-	25/6

Size No.	10	11	12
Capacity	2000	3000	4000 c.c.
Each ..	3/7	4/9	6/-
Per doz.	38/9	52/-	67/6

## 3.—Resistance Glass Flasks.

Flat bottom. Best quality.



Capacity	50	100	175	250 c.c.
Each ..	8d.	9d.	10d.	11d.
Per doz.	7/10	8/6	9/6	10/3

Capacity	350	500	750	1000 c.c.
Each ..	1/-	1/4	1/10	2/2
Per doz.	11/9	14/3	19/3	23/-

Capacity	1500	2000	3000	5000 c.c.
Each ..	2/8	3/4	4/6	6/4

## 4.—Resistance Glass Flasks.

Round bottom. Best quality.



Capacity	50	100	175	250 c.c.
Each ..	8d.	9d.	10d.	11d.
Per doz.	7/10	8/6	9/6	10/3

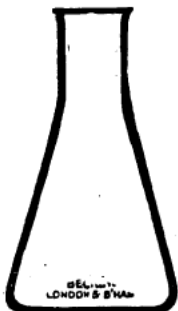
Capacity	350	500	750	1000 c.c.
Each ..	1/-	1/4	1/10	2/2
Per doz.	11/9	14/3	19/3	23/-

Capacity	1500	2000	3000	5000 c.c.
Each ..	2/8	3/4	4/6	6/4

[For Hard Combustion Glass Round-bottom Flasks for Oxygen, see No. 7 below.]

## 5.—Resistance Glass Flasks.

Conical, for titrations, etc. Best quality.



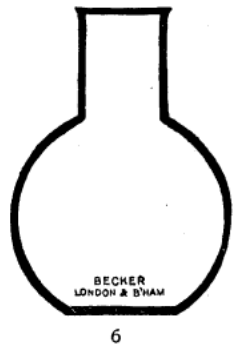
Capacity	50	100	175	250 c.c.
Each ..	8d.	9d.	10d.	11d.
Per doz...	7/10	8/6	10/6	10/9

Capacity	350	500	750	1000 c.c.
Each ..	1/-	1/4	1/10	2/2
Per doz..	11/9	14/3	19/3	23/-

Capacity	1500	2000	5000 c.c.
Each ..	2/8	3/4	6/4

## 6.—Resistance Glass Flasks.

Wide necked for CO<sub>2</sub> experiments, Fat extractions, etc. Best quality.



Capacity	60	100	150 c.c.
Each ..	9d.	9d.	11d.
Per doz.	7/10	7/10	9/-

Capacity	180	250	500 c.c.
Each ..	11d.	1/-	1/4
Per doz.	9/-	10/3	14/6

Supplied also with round bottom same prices.

## 7.—Combustion Round-bottom Glass Flasks,

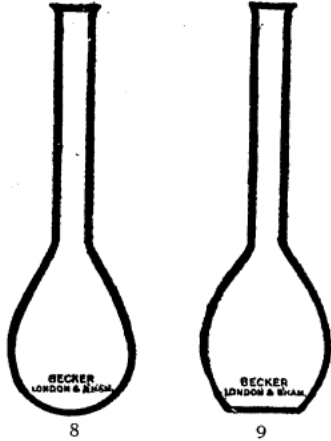
as No. 4, but very hard, infusible glass for preparing Oxygen.

Capacity, 350 c.c.	Each	2/9
Per doz.	32/-	

For School Quality Beakers and Flasks see page 5.

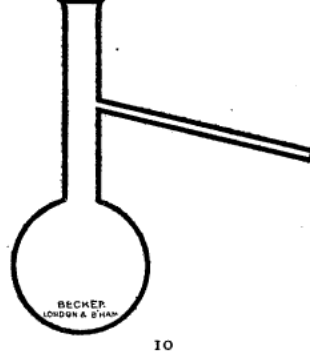
Every requisite for Chemical, Physical, and Bacteriological work supplied, from a test tube to the complete furnishing of the largest laboratory.

# LABORATORY GLASSWARE



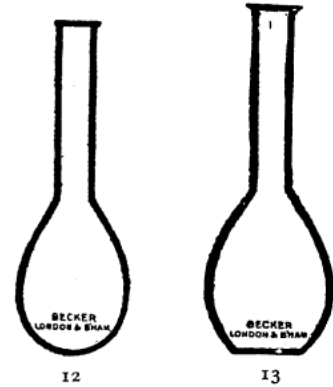
**8.—Resistance Glass Kjeldahl Flasks.** Long neck, round bottom. Best quality.  
 Capacity 100 200 300 500 800 c.c.  
 Each.. 1/- 1/2 1/6 1/10 2/5  
 Dozen 11/5 14/5 17/9 21/9 28/10

**9.—Resistance Glass Kjeldahl Flasks.** Long neck, flat bottom. Best quality.  
 Capacity 100 200 300 500 800 c.c.  
 Each.. 1/- 1/2 1/6 1/10 2/5  
 Dozen 11/5 14/5 17/9 21/9 28/10



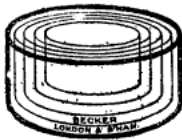
**10.—Resistance Glass Distillation Flasks.** Round bottom, with side tube in middle of neck. Best quality.  
 Cap. 30 50 100 125 175 c.c.  
 Each rod. 1/- 1/1 1/2 1/6  
 Doz. 9/9 10/6 12/9 13/9 17/9  
 Cap. 250 350 500 750 1000 1500 c.c.  
 Each 1/9 2/- 2/3 3/- 3/6 4/6  
 Doz. 20/6 23/6 26/6 35/- 41/- 53/-

**11.—Resistance Glass Flasks for Oil Distillation, Engler's Standard Pattern.**  
 Each .. .. 2/9  
 Per doz. .. .. 32/-



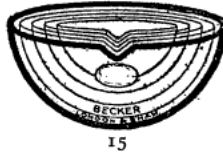
**12.—Resistance Glass Kjeldahl Flasks.** Short neck, round bottom. Best quality.  
 Cap. 100 200 300 500 800 1300 c.c.  
 Ea. iid. 1/2 1/5 1/9 2/4 2/11  
 Dz. 10/3 13/3 16/10 20/5 28/- 35/-

**13.—Resistance Glass Kjeldahl Flasks.** Short neck, flat bottom. Best quality.  
 Cap. 100 200 300 500 800 1300 c.c.  
 Ea. iid. 1/2 1/5 1/9 2/4 2/11  
 Dz. 10/3 13/3 16/10 20/5 28/- 35/-



**14.—Resistance Glass Crystallising Dishes.** Flat bottom, without spout, light glass. Best quality.  
 Diam. 5 6 7 8 9 10 11 cm.  
 Each 8d. 8d. 9d. iid. 1/2 1/3 1/5  
 Doz. 7/4 7/6 8/- 9/6 12/11 13/- 15/-

Diam. 13 14½ 16 19 20 cm.  
 Each 1/11 2/3 3/- 4/3 5/5  
 Doz. 20/- 25/- 32/- 46/- 58/4



**15.—Resistance Glass Basins.** Light glass, round bottom, with spout. Best quality.  
 Diameter 4 5 6 7 8 cm.  
 Each .. 9d. 10d. 11d. 1/1  
 Per doz. 6/11 7/6 8/1 9/3 11/6

Diameter 9 10 11 12 cm.  
 Each 1/3 1/5 1/7 1/11  
 Per doz. 12/8 13/10 16/2 20/2



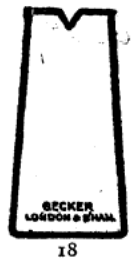
**16.—Resistance Glass Crystallising Dishes.** Flat bottom, with spout, light glass. Best quality.  
 Diam. 5 6 7 8 9 10 cm.  
 Each 8d. 9d. iid. 1/1 1/3 1/4  
 Doz. 7/- 8/- 9/8 10/8 12/3 13/4

Diam. 11 13 14½ 16 19 22 cm.  
 Each 1/8 2/- 2/6 3/6 5/6 6/6  
 Doz. 17/3 20/9 27/6 39/- 51/- 67/-



**17.—Resistance Glass Beaker Flasks.** With spout. Best quality.  
 Capacity 50 100 200 250 c.c.  
 Each .. rod. iid. 1/- 1/-  
 Per doz. 9/7 10/3 11/5 12/-  
 Capacity 400 600 800 1000 c.c.  
 Each .. 1/3 1/6 1/10 2/2  
 Per doz. 13/10 17/5 21/7 25/9

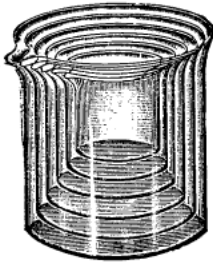
**18.—Resistance Glass Conical Beakers.** Phillips' form, with spout. Best quality.  
 Capacity 125 175 300 400 c.c.  
 Each .. rod. iid. 1/- 1/2  
 Per doz. 9/7 10/3 12/- 13/2  
 Capacity .. 500 600 1000 c.c.  
 Each .. 1/4 1/5 2/-  
 Per doz. 15/7 16/10 24/-



Our Balances and Weights have achieved World-wide Reputation; *vide* Opinions of the Leading Scientific Press.

# LABORATORY GLASSWARE

**FINEST BOHEMIAN MAKE (KAVALIER'S) or FINEST CZECHO-SLOVAKIAN MAKE (R BRAND).**



19

**19.—Beakers, Squat Form with spout.**

Capacity	20	40	80	140 c.c.
Each..	6d.	6d.	7d.	8d.
Dozen	<b>4/7</b>	<b>5/2</b>	<b>5/7</b>	<b>6/8</b>
Gross	52/3	58/11	63/-	76/-

Capacity	240	350	550	750 c.c.
Each..	9d.	11d.	1/3	1/7
Dozen	<b>8/-</b>	<b>9/9</b>	<b>13/5</b>	<b>17/-</b>
Gross	91/3	111/2	153/-	193/10

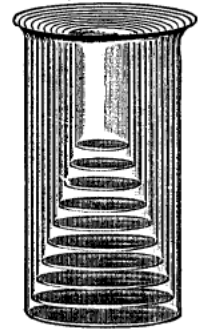
Capacity ..	1000	1400	1850 c.c.
Each..	2/3	2/9	3/2
Dozen ..	<b>24/6</b>	<b>29/2</b>	<b>34/6</b>

**20.—Beakers, Medium Form without spout.**

Capacity	20	40	75	110 c.c.
Each ..	5d.	5d.	6d.	7d.
Dozen ..	<b>3/8</b>	<b>4/3</b>	<b>4/7</b>	<b>5/10</b>
Gross ..	41/10	48/6	52/3	66/6

Capacity	170	270	380	550 c.c.
Each ..	8d.	10d.	1/1	1/4
Dozen	<b>6/9</b>	<b>9/-</b>	<b>11/1</b>	<b>14/6</b>
Gross	77/-	102/8	126/5	165/4

Capacity	800	1100	1600	2250 c.c.
Each ..	1/8	2/3	2/7	3/-
Dozen	<b>17/10</b>	<b>24/6</b>	<b>28/-</b>	<b>32/-</b>



20



21

**21.—Flasks, Flat Bottom.**

Cap.	35	50	75	100	150	200 c.c.
Each	5d.	7d.	7d.	7d.	8d.	9d.
Dozen	<b>4/6</b>	<b>5/7</b>	<b>5/7</b>	<b>5/10</b>	<b>6/8</b>	<b>8/-</b>
Gross	51/4	63/-	63/-	66/6	76/-	91/3

Capacity	250	300	400	500	600 c.c.
Each	10d.	1/-	1/2	1/3	1/5
Doz.	<b>8/11</b>	<b>10/2</b>	<b>12/6</b>	<b>13/3</b>	<b>14/9</b>
Gross	101/8	115/11	142/6	151/-	160/-

Cap.	750	1000	1500	2000	3000	5000 c.c.
Each	1/5	1/10	2/5	2/6	3/2	4/11
Doz.	<b>14/9</b>	<b>19/4</b>	<b>23/8</b>	<b>26/8</b>	<b>33/8</b>	<b>53/4</b>

**22.—Flasks, Round Bottom.**

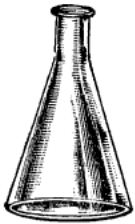
Capacity	35	50	100	200 c.c.
Each ..	5d.	7d.	7d.	9d.
Dozen	<b>4/6</b>	<b>5/7</b>	<b>5/10</b>	<b>8/-</b>
Gross..	51/4	63/-	66/6	91/3

Capacity	250	400	500	600 c.c.
Each ..	10d.	1/2	1/3	1/5
Dozen ..	<b>8/11</b>	<b>12/6</b>	<b>13/3</b>	<b>14/9</b>
Gross ..	101/8	142/6	151/-	160/-

Capacity	750	1000	1500	2000 c.c.
Each..	1/5	1/10	2/5	2/6
Dozen	<b>14/9</b>	<b>19/4</b>	<b>23/8</b>	<b>26/8</b>



22

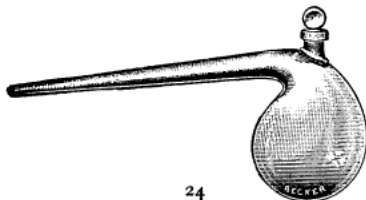


23

**23.—Flasks, Conical or Erlenmeyer.**

Capacity	..	35	50	75	100	150	200 c.c.
Each	..	5d.	7d.	7d.	7d.	8d.	9d.
Dozen	..	<b>4/6</b>	<b>5/7</b>	<b>5/7</b>	<b>5/10</b>	<b>6/8</b>	<b>8/-</b>
Gross	..	51/4	63/-	63/-	66/6	76/-	91/3

Capacity	..	250	300	400	500	750	1000 c.c.
Each	..	10d.	1/-	1/2	1/3	1/5	1/10
Dozen	..	<b>8/11</b>	<b>10/2</b>	<b>12/6</b>	<b>13/3</b>	<b>14/9</b>	<b>19/4</b>
Gross	..	101/8	115/11	142/6	151/-	168/-	220/-

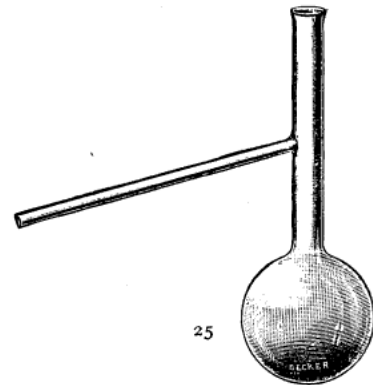


24

**24.—Retorts, Stopped.**

Capacity..	150	250	400 c.c.
Each ..	1/5	1/10	2/4
Dozen ..	<b>15/2</b>	<b>19/4</b>	<b>25/-</b>

Capacity	..	500	750	1000	1500	2000	3000 c.c.
Each ..	..	2/5	2/9	3/-	3/8	3/11	5/-
Dozen ..	..	<b>25/6</b>	<b>30/-</b>	<b>32/-</b>	<b>40/-</b>	<b>42/3</b>	—



25

**25.—Distillation Flasks. Round Bottom with side tube in neck.**

Capacity	..	50	100	125	175 c.c.
Each	..	1/-	1/1	1/2	1/6
Dozen	..	<b>10/6</b>	<b>12/9</b>	<b>13/9</b>	<b>17/9</b>

Capacity	250	350	500	750	1000	1500 c.c.
Each	1/9	2/-	2/3	3/-	3/6	4/6
Dozen	<b>20/6</b>	<b>23/6</b>	<b>26/6</b>	<b>35/-</b>	<b>41/-</b>	<b>53/-</b>

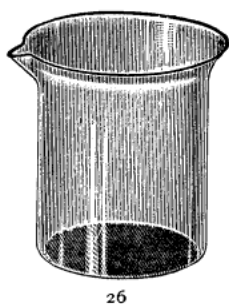
**Our stock of pure Chemicals and Acids is very considerable; hence all orders are executed with the utmost despatch. See comprehensive list at end of Catalogue.**



# LABORATORY GLASSWARE

## SCHOOL QUALITY BEAKERS AND FLASKS

AN EXCELLENT GLASSWARE FOR ALL ORDINARY PURPOSES:



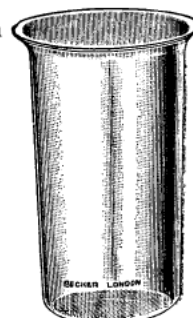
**26.—Beakers.** Squat form with spout. School quality.

Capacity..	100	175	250	c.c.
Each ..	6d.	8d.	9d.	
Dozen ..	5/-	6/6	7/-	
Capacity..	350	500	700	c.c.
Each ..	10d.	1/1	1/4	
Dozen ..	8/6	10/9	14/-	
Capacity..	1000	1350	1750	c.c.
Each ..	1/8	2/3	2/6	
Dozen ..	17/6	22/-	27/6	

26

**27.—Beakers.** Tall form, plain without spout. School quality.

Capacity ..	100	200	300	c.c.
Each ..	6d.	8d.	9d.	
Dozen ..	5/-	6/9	7/-	
Capacity ..	450	550	700	c.c.
Each ..	11d.	1/1	1/3	
Dozen ..	9/6	11/-	13/6	
Capacity..	1000	1250	1650	c.c.
Each ..	1/8	1/10	2/3	
Dozen ..	17/6	19/6	23/-	



27



**28.—Flasks.** Ordinary, flat bottom. School quality.

Capacity ..	50	100	150	c.c.
Each ..	5d.	6d.	6d.	
Dozen ..	4/-	4/6	5/-	
Capacity ..	250	350	500	c.c.
Each ..	8d.	9d.	11d.	
Dozen ..	7/-	7/6	10/-	
Capacity ..	750	1000	1500	c.c.
Each ..	1/2	1/5	1/10	
Dozen ..	12/-	15/-	19/6	

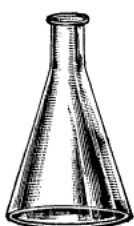
28

**29.—Flasks.** Ordinary, round bottom. School quality.

Capacity ..	50	100	250	c.c.
Each ..	5d.	6d.	8d.	
Dozen ..	4/-	4/6	7/-	
Capacity ..	500	750	1000	c.c.
Each ..	11d.	1/2	1/5	
Dozen ..	10/-	12/-	15/-	
Capacity ..	..	..	1500	c.c.
Each..	..	..	1/10	
Dozen ..	..	..	19/6	



29



**30.—Flasks.** Conical, Erlenmeyer. School quality.

Capacity ..	..	50	100	150	250	c.c.
Each ..	..	5d.	6d.	6d.	8d.	
Dozen ..	..	4/-	4/6	5/-	7/-	
Capacity ..	..	350	500	750	1000	c.c.
Each ..	..	9d.	11d.	1/2	1/5	
Dozen ..	..	7/6	10/-	12/-	15/-	

30

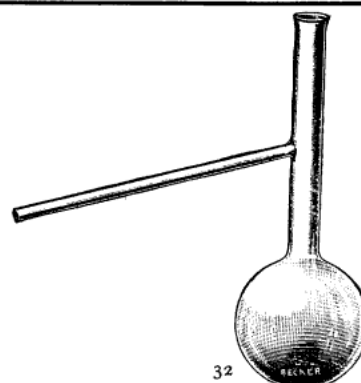


**31.—Flasks,** with short wide neck. Flat bottom. School quality.

Capacity ..	..	60	100	180	250	c.c.
Each ..	..	6d.	7d.	8d.	9d.	
Dozen ..	..	5/-	6/-	6/9	8/-	

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*For Flasks with short wide neck but ROUND BOTTOM see footnote under No. 6, page 2.*



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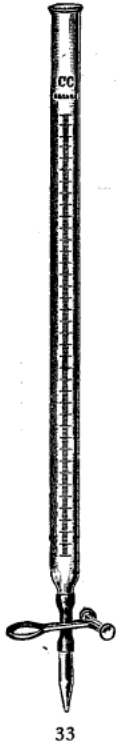
**32.—Flasks.** Distilling, with side tube fused in neck. School quality.

Capacity ..	50	100	150	250	c.c.
Each ..	1/-	1/1	1/2	1/9	
Dozen ..	10/6	12/9	13/9	20/6	
Capacity ..	400	500	750	1000	c.c.
Each ..	2/-	2/3	3/-	3/6	
Dozen ..	23/6	26/6	35/-	41/-	

Every requisite for Chemical, Physical, and Bacteriological work supplied, from a test tube to the complete furnishing of the largest laboratory.

# GRADUATED LABORATORY GLASSWARE

Calibrated on the basis of the standard litre, i.e., 1000 grammes of distilled water at 4° C. in vacuo=1000 cubic centimetres, and corrected to a temperature of 15° C.



### 33.—Burettes, with Mohr's Clip, Glass Jet and Rubber Tubing.

	A	B	C	D	E
Capacity ..	10	25	50	100	100 c.c.
Divided into	$\frac{1}{10}$	$\frac{1}{10}$	$\frac{1}{10}$	$\frac{1}{2}$	$\frac{1}{10}$ c.c.
Each ..	1/4	2/-	3/-	4/9	6/6
Per dozen	15/-	22/-	31/-	55/-	70/-

### 34.—Burettes, as No. 33, but Schelbach's, with white enamel back and blue line. (For illustration see No. 51, page 8.)

	A	B	C	D	E
Capacity ..	10	25	50	100	100 c.c.
Divided into	$\frac{1}{10}$	$\frac{1}{10}$	$\frac{1}{10}$	$\frac{1}{2}$	$\frac{1}{10}$ c.c.
Each ..	2/3	3/-	4/6	6/-	7/6
Per dozen	24/-	33/-	50/-	65/-	82/-

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### 35.—Burettes, with Straight Glass Stopcock.

	A	B	C	D	E
Capacity	10	25	50	100	100 c.c.
Divided into	$\frac{1}{10}$	$\frac{1}{10}$	$\frac{1}{10}$	$\frac{1}{2}$	$\frac{1}{10}$ c.c.
Each ..	2/9	3/6	4/3	5/9	6/9
Per dozen	29/6	37/6	46/-	62/-	74/-

### 36.—Burettes, as No. 35, but Schelbach's, with white enamel back and blue line. (For illustration see No. 51, page 8.)

	A	B	C	D	E
Capacity	10	25	50	100	100 c.c.
Divided into	$\frac{1}{10}$	$\frac{1}{10}$	$\frac{1}{10}$	$\frac{1}{2}$	$\frac{1}{10}$ c.c.
Each ..	3/6	4/3	5/9	8/-	8/9
Per dozen	40/-	46/-	64/-	87/-	96/-



35

### 37.—Burettes, with Three-way Glass Stopcock, for connecting to reservoir for constant filling.

	A	B
Capacity ..	50	100 c.c.
Divided into	$\frac{1}{10}$	$\frac{1}{2}$ c.c.
Each ..	5/6	7/9
Per dozen ..	60/-	85/-

### 38.—Burettes, with Straight Glass Stopcock, and with side tube for rubber connection.

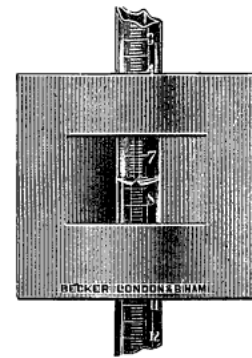
	A	B	C
Capacity ..	25	50	100 c.c.
Divided into	$\frac{1}{10}$	$\frac{1}{10}$	$\frac{1}{2}$ c.c.
Each ..	4/-	4/9	6/6
Per dozen	42/-	51/-	69/-



37



38



39

### 39.—Antiparallax Cards.

These cards act in the same way as the more expensive Schelbach Burettes. They are furnished with two slits to fix on the Burette. Owing to refraction, the blue line appears in the form of a point at the surface of liquid, thus obviating all errors due to optical parallax.

We shall be pleased to send these cards gratis and post free to bona-fide Science Teachers or Works Chemists, etc., on receipt of postcard.

Our Balances and Weights have achieved World-wide Reputation: *vide* Opinions of the Leading Scientific Press.

# GRADUATED LABORATORY GLASSWARE



## 40.—Measuring Cylinders, graduated, with lip.

Capacity ..	10	25	50	100	200 c.c.
Divided into	$\frac{1}{10}$	$\frac{1}{8}$	$\frac{1}{4}$	$\frac{1}{2}$	$\frac{2}{3}$ c.c.
Each..	1/2	1/3	1/4	1/8	2/-
Per dozen ..	12/-	13/-	15/-	19/-	22/-

Capacity ..	250	500	1000	2000 c.c.
Divided into	$\frac{2}{3}$	$\frac{5}{1}$	$\frac{10}{1}$	$\frac{20}{1}$ c.c.
Each..	2/6	3/3	5/-	10/6
Per dozen ..	27/6	37/6	57/6	120/-

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## 41.—Measuring Cylinders, graduated and stoppered.

Capacity ..	10	25	50	100 c.c.
Divided into	$\frac{1}{10}$	$\frac{1}{8}$	$\frac{1}{4}$	$\frac{1}{2}$ c.c.
Each ..	1/8	1/10	2/-	2/5
Per dozen ..	18/-	20/-	22/-	26/-

Capacity ..	200	250	500	1000	2000 c.c.
Divided into	$\frac{2}{3}$	$\frac{5}{1}$	$\frac{10}{1}$	$\frac{20}{1}$	$\frac{20}{1}$ c.c.
Each ..	3/-	3/3	4/6	7/6	13/-
Per dozen ..	33/-	40/-	50/-	80/-	150/-

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## 42.—Measuring Cylinders, graduated in both English and Metric Systems, tall form with lip.

Capacity (English).	Capacity (Metric).	Price, each.
4 oz.	100 c.c.	3/6
10 "	250 "	4/6
20 "	500 "	6/9
35 "	1000 "	12/6

42

For other Graduated Glassware see following pages and refer to Index.

## 43.—Measuring Flasks, without stopper, one mark on neck.

Capacity ..	25	50	100	150	200 c.c.
Each ..	10d.	11d.	1/-	1/3	1/4
Per dozen	9/-	9/6	10/9	13/-	14/-

Capacity ..	250	500	1000	2000 c.c.
Each ..	1/6	2/-	2/4	4/-
Per dozen ..	16/6	21/-	26/-	45/-

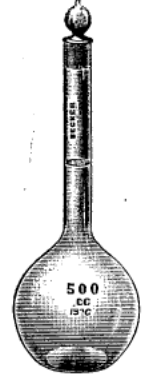


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## 44.—Measuring Flasks, with stopper, one mark on neck.

Capacity ..	25	50	100	200 c.c.
Each ..	1/3	1/4	1/6	1/10
Per dozen ..	14/-	15/-	17/-	21/-

Capacity ..	250	500	1000	2000 c.c.
Each ..	2/-	2/8	3/3	5/6
Per dozen ..	23/-	31/-	36/-	60/-



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## 45.—Flasks, with two marks on neck.

A. Marked at 50 and 55 c.c.	each	1/6
B. " 100 " 110 "	"	2/-
C. " 200 " 220 "	"	2/9
D. " 500 " 515 "	"	3/9



45

## 46.—Giles' Stoppered Measuring Flasks; the top bulb, as shown in the illustration, being one-tenth the capacity of the body of the flask.

Capacity of body..	$\frac{1}{2}$	1	2 litres.
Price ..	5/-	7/6	11/- ea.

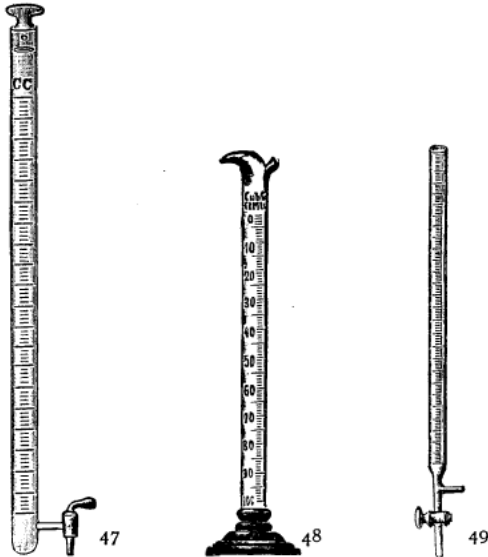


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Our stock of pure Chemicals and Acids is very considerable; hence all orders are executed with the utmost despatch. See comprehensive list at end of Catalogue.



# GRADUATED LABORATORY APPARATUS



**47.—Geissler's Burettes**, graduated in cubic centimetres with glass tap, stoppered at top and cavity at the side for volatile solutions, etc.

25 c.c. in $\frac{1}{10}$ ths .. .. .	each	6/6
50 " " $\frac{1}{10}$ ths .. .. .	"	7/6
100 " " $\frac{1}{5}$ ths .. .. .	"	8/6

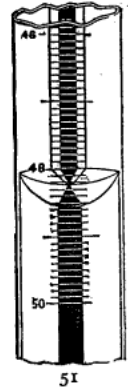
**48.—Bink's Burettes**, on polished foot.

25 c.c. in $\frac{1}{5}$ ths each	3/-	50 c.c. in $\frac{1}{5}$ ths each	5/-
25 " " $\frac{1}{10}$ ths "	4/-	50 " " $\frac{1}{10}$ ths "	6/-

**49.—Burettes**, with side tube for rubber connection each extra 6d.

**51.—Schelbach's Burettes.** We supply any burette with a white enamel back and a blue line running down the centre, for reducing to a minimum the error in reading.

For prices see Nos. 34 and 36. Other kinds same proportionate price.



**52.—Erdmann's Burette Floats.**

Each .. .. .	1/3
Dozen .. .. .	14/-



**53.—Measuring Cylinders** graduated in cubic inches. Tall form with spout.

1	2	5	10 cubic inches.
1/6	2/-	3/-	4/9 each.



**50.—Pipettes**, bulb form, with one mark on stem.

To deliver	1	2	3	5	10	15 c.c.
Each ..	4d.	4d.	5d.	6d.	7d.	8d.
Dozen ..	3/6	3/6	4/6	5/-	6/-	7/-

To deliver	20	25	50	100 c.c.
Each ..	9d.	10d.	1/2	1/6
Dozen ..	8/-	8/6	12/-	16/-

**54.—Pipettes graduated in parts.**

Capacity ..	1	1	2	5 c.c.
Divided into	$\frac{1}{10}$	$\frac{1}{100}$	$\frac{1}{50}$	$\frac{1}{10}$ c.c.
Each..	10d.	1/2	1/2	1/2
Dozen ..	9/-	12/-	12/-	10/6

Capacity ..	5	10	25 c.c.
Divided into	$\frac{1}{20}$	$\frac{1}{10}$	$\frac{1}{10}$
Each..	1/4	1/4	1/8
Dozen ..	14/-	14/-	18/-



For other Graduated Glassware please refer to Index and General Section.

Every requisite for Chemical, Physical, and Bacteriological work supplied, from a test tube to the complete furnishing of the largest laboratory.

# GRADUATED LABORATORY GLASSWARE



**55.—Pipettes with Safety Bulb**, one mark on stem, accurately graduated by the weighing method.

To deliver ..	1	2	5	10 c.c.
Each ..	rod.	rod.	1/-	1/2
Dozen..	9/6	9/6	11/6	13/6
To deliver ..	20	25	50	100 c.c.
Each ..	1/6	1/8	1/10	2/6
Dozen..	17/-	19/-	21/-	29/-

55

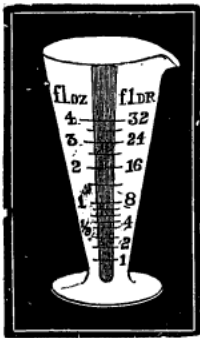
**56.—Plain Pipettes**, not graduated.

- A. With cylindrical bulb.
- B. „ spherical bulb.

Capacity ..	1	2	3	4 oz.
Each ..	6d.	8d.	8d.	10d.
Dozen ..	5/6	7/6	7/6	9/6



A 56 B



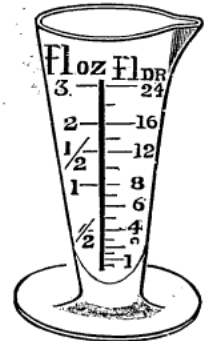
**57. — Measures, Hicks' Patent, conical**, can be read with the greatest ease in almost any light. Where accurate measurements are absolutely essential they will be found indispensable.

1 dram.,	60 minims,	5/-	each.
2 drams.,	120 minims,	5/3	„
4 drams.,	240 minims,	6/-	„
1/2	1	2	4 oz.
5/9	6/3	7/-	8/- each.
6	8	10	20 oz.
9/-	10/6	12/6	13/9 each.

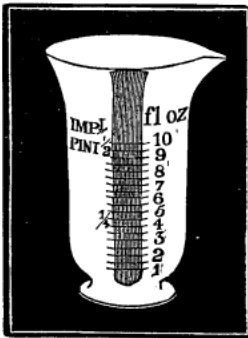
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**60. — Conical Form Measures** for Laboratory and Photographic work.

Capacity	1	2	4	8 dr.	
Each ..	10d.	11d.	1/1	1/3	
Dozen	9/-	10/-	12/-	14/-	
Capacity	1	2	4	6	8 oz.
Each	11d.	1/2	1/4	1/6	1/9
Dozen	10/-	12/6	15/-	17/-	20/-



60



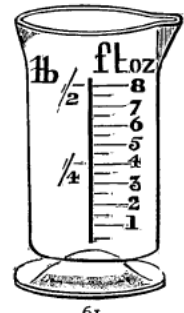
**58.—Measures, Hicks' Patent, cylindrical.**

1	2	4 oz.	
5/3	6/6	7/6 each.	
6	8	10 oz.	
8/6	9/-	11/3 each.	
12	16	20	40 oz.
12/-	12/6	13/9	23/6 each.

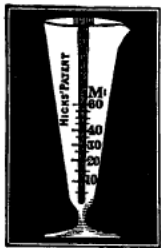
58

**61.—Cup Form Measures.**

Capacity	4	6	8	10 oz.
Each ..	1/4	1/6	1/9	1/11
Dozen..	15/-	17/-	20/-	22/-
Capacity	16	20	32	40 oz.
Each ..	2/3	2/9	3/3	3/9
Dozen..	25/-	27/-	35/-	42/-



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**59. — Measures, Hicks' Patent, conical, on wine-glass foot.**

60 minims	..	..	4/3 each.
120	„	..	5/9 „

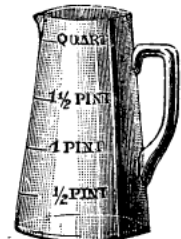
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**62.—Graduated Glass Jugs.**

- A. 1 pint .. .. each 1/6
- B. 1 quart .. .. „ 3/-

**63.—Ditto**, but graduated in metric system.

Capacity .. 1000 c.c. Each 4/-



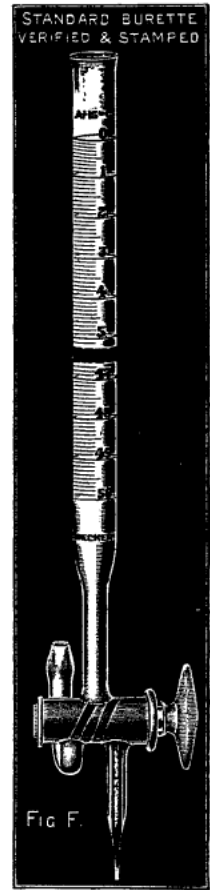
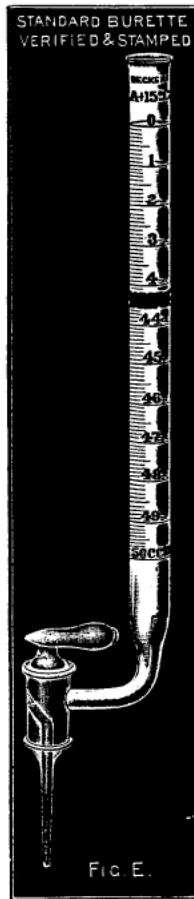
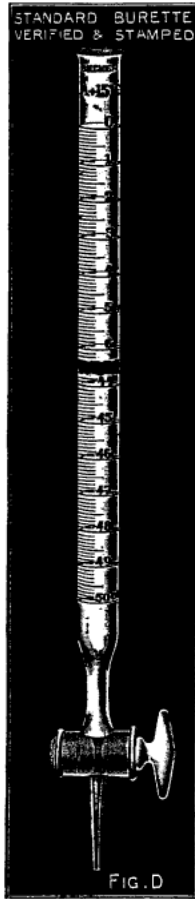
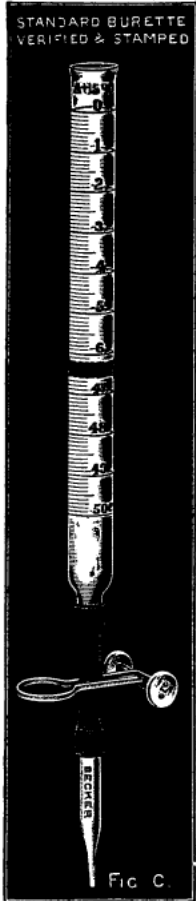
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Our Balances and Weights have achieved World-wide Reputation ; vide Opinions of the Leading Scientific Press.

# STANDARD GRADUATED INSTRUMENTS

— of the —

## Highest Possible Accuracy for Research Work.



**64.—Standard Burettes as Fig. C, with Mohr's Clip and Jet, of the Highest Possible Accuracy, Verified and Stamped at the National Physical Laboratory.** The main divisions are engraved completely round the burette.

Capacity ..	10	25	50	100 c.c.
Divided into ..	$\frac{1}{10}$	$\frac{1}{10}$	$\frac{1}{10}$	$\frac{1}{10}$ "
Price each ..	21/-	24/-	29/-	31/- net.

**65.—Standard Burettes as Fig. D, with ordinary straight Glass Stopcock of the Highest Possible Accuracy, Verified and Stamped at the National Physical Laboratory.** The main divisions are engraved completely round the burette.

Capacity ..	10	25	50	100 c.c.
Divided into ..	$\frac{1}{10}$	$\frac{1}{10}$	$\frac{1}{10}$	$\frac{1}{10}$ "
Price each ..	23/6	26/6	31/-	33/6 net.

**66.—Standard Burettes as Fig. E, with Tube Bent at right angles and Glass Stopcock as figured, of the Highest Possible Accuracy, Verified and Stamped at the National Physical Laboratory.** The main divisions are engraved completely round the burette.

Capacity ..	10	25	50	100 c.c.
Divided into ..	$\frac{1}{10}$	$\frac{1}{10}$	$\frac{1}{10}$	$\frac{1}{10}$ "
Price each ..	23/6	26/6	31/-	33/6 net.

**67.—Standard Burettes as Fig. F, with Improved Three-way Glass Stopcock, with Oblique Bore for Filling as figured, of the Highest Possible Accuracy, Verified and Stamped at the National Physical Laboratory.** The main divisions are engraved completely round the burette.

Capacity ..	..	..	..	25	50 c.c.
Divided into ..	..	..	..	$\frac{1}{10}$	$\frac{1}{10}$ "
Price each ..	..	..	..	32/-	36/- net.

Our stock of pure Chemicals and Acids is very considerable; hence all orders are executed with the utmost despatch. See comprehensive list at end of Catalogue.

68.—Standard Measuring Cylinders, as Fig. A, of the Highest Possible Accuracy, tall form with lip, Verified and Stamped at the National Physical Laboratory.

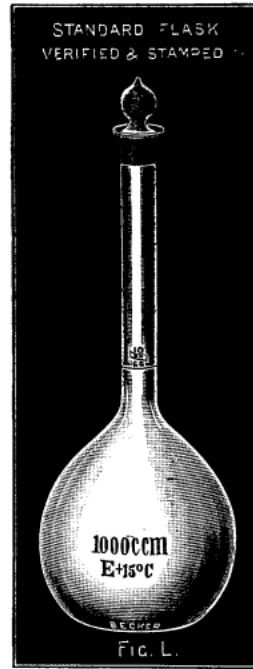
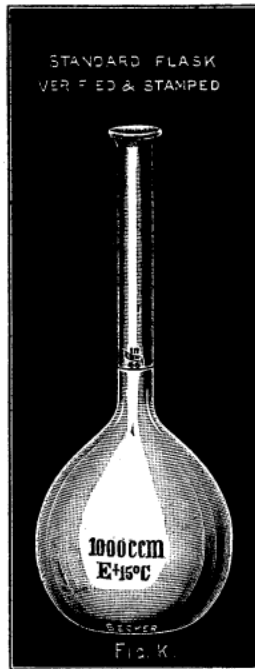
Capacity	Graduation	Each	Capacity	Graduation	Each
10 c.c.	into $\frac{1}{10}$ c.c.	12/3	250 c.c.	into $\frac{1}{2}$ c.c.	18/6
25 "	" "	12/9	500 "	" "	21/6
50 "	" "	14/3	1000 "	" "	27/-
100 "	" "	16/-			

69.—Standard Measuring Cylinders, as Fig. B, of the Highest Possible Accuracy, tall form, with well-ground-in stopper, Verified and Stamped at the National Physical Laboratory.

Capacity	Graduation	Each	Capacity	Graduation	Each
10 c.c.	into $\frac{1}{10}$ c.c.	12/6	250 c.c.	into $\frac{1}{2}$ c.c.	19/6
25 "	" "	13/6	500 "	" "	23/6
50 "	" "	15/6	1000 "	" "	30/-
100 "	" "	17/-			

72.—Standard Flasks, as Fig. K, without stopper, one mark on neck, of the Highest Possible Accuracy, Verified and Stamped at the National Physical Laboratory.

Capacity c.c.	Price each.
50	6/-
100	6/9
200	7/6
250	8/3
500	11/-
1000	12/6



73.—Standard Flasks as Fig. L, with well ground in stopper, one mark on neck, of the Highest Possible Accuracy, Verified & Stamped at the National Physical Laboratory.

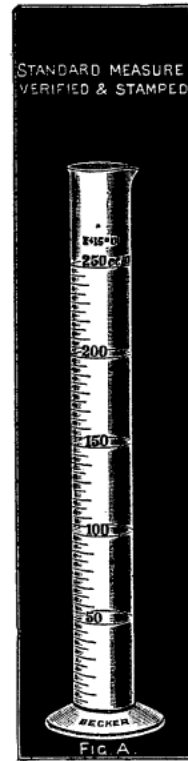
Capacity c.c.	Price each.
50	7/-
100	7/9
200	8/6
250	9/6
500	12/6
1000	14/3

70.—Standard Pipettes, as Fig. G, with one mark on stem, of the Highest Possible Accuracy, Verified and Stamped at the National Physical Laboratory.

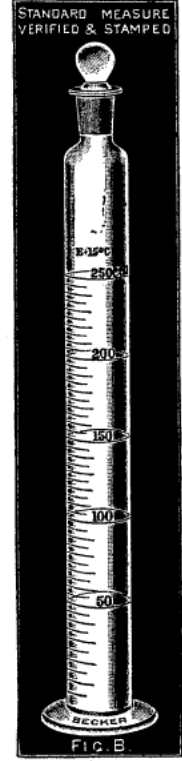
To deliver	1	2	5	10	20	25	50	100 c.c.
Price each	6/-	6/-	6/3	7/6	8/-	8/6	10/-	11/3

71.—Standard Pipettes, as Fig. H, graduated in parts, of the Highest Possible Accuracy, Verified and Stamped at the National Physical Laboratory.

Capacity	1	2	5	10	25 c.c.
Divided into	$\frac{1}{100}$	$\frac{1}{50}$	$\frac{1}{20}$	$\frac{1}{10}$	$\frac{1}{10}$
Price each	16/6	17/-	17/-	17/6	18/6



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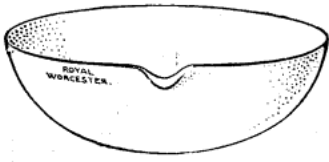
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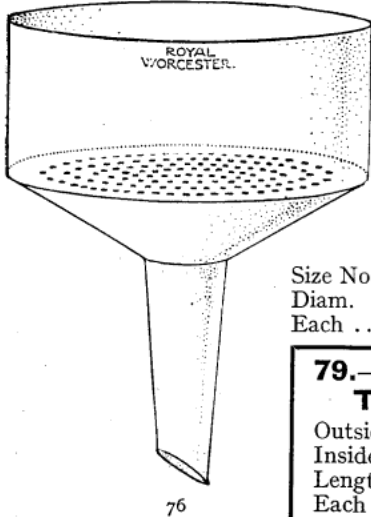
Every requisite for Chemical, Physical, and Bacteriological work supplied, from a test tube to the complete furnishing of the largest laboratory.

# ROYAL WORCESTER LABORATORY PORCELAIN



**74. Royal Worcester Porcelain Evaporating Basins.** With spout. Sizes 000 to 5 glazed inside and outside. Size 6 and upwards unglazed outside on base.

Size No.	000	00	0	I	2	3	4	5	6
Diam.	60	70	78	85	90	98	108	116	140 mm.
Cap.	35	60	80	100	140	175	210	300	385 c.c.
Per doz.	9/-	11/3	13/6	17/3	20/3	24/-	27/-	33/-	45/-
Size No.	7	8	9	10	11	12			
Diam.	185	213	258	300	360	430 mm.			
Capacity	765	1285	2220	3250	5700	10000 c.c.			
Per doz.	65/3	81/-	121/6						
Each				17/-	23/9	50/9			

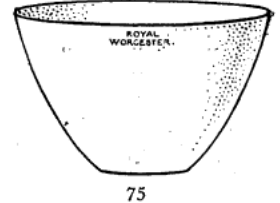


**76. Royal Worcester Porcelain Buchner Funnel,** with fixed perforated plate.

Size No.	0	I	2		
Diam.	50	66	71 mm.		
Each	3/9	4/6	6/5		
Size No.	3	4	5	6	
Diam.	84	116	174	211 mm.	
Each	7/6	8/8	14/3	20/3	

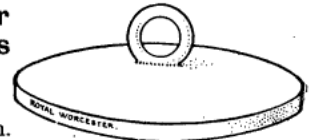
**75.—Royal Worcester Porcelain Crucibles.** Glazed inside and outside. Without covers.

Size No.	000	00	0A	0	I	
Dia.	26	31	36	41	46 mm.	
Ht.	19	25	26	25	30 mm.	
Cpcty.	5	10	15	17	30 c.c.	
Doz.	5/-	6/9	8/3	10/6	13/6	
Size No.	..	..	2	3	4	5
Diam.	..	..	57	68	80	100 mm.
Height	..	..	36	44	50	65 mm.
Capacity	..	..	50	90	145	265 c.c.
Per doz.	..	..	18/9	22/6	27/-	33/-



**77.—Royal Worcester Porcelain Covers** for Crucibles. No. 75.

Size No.	000	00	0A	0	I	
Dia.	33	35	43	46	52 mm.	
Doz.	5/-	5/-	5/-	5/-	5/9	
Size No.	..	..	2	3	4	5
Diam.	..	..	65	76	90	107 mm.
Per doz.	..	..	5/9	7/6	9/9	11/3



**78.—Royal Worcester Porcelain Gooch Crucibles,** with perforated bottom.

Size No.	I	2	3	4
Dia. at top	24	27	35	42 mm.
Height	30	32	40	45 mm.
Per doz.	15/9	20/3	27/-	29/3



**79.—Royal Worcester Porcelain Combustion Tubes.**—Glazed inside and out.

Outside diameter	25	25	25	28	28	28	35 mm.
Inside diameter	20	20	20	20	20	20	25 mm.
Length	..	510	660	810	510	660	810 660 mm.
Each	..	15/5	21/-	24/-	15/5	21/-	24/- 28/11

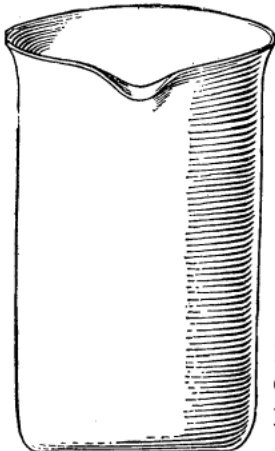
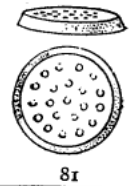


**80.—Royal Worcester Porcelain Combustion Boats.**

Length	..	60	75	115	100 mm.
Width	..	10	11	13	18 mm.
Per doz.	..	14/3	15/9	27/-	31/6

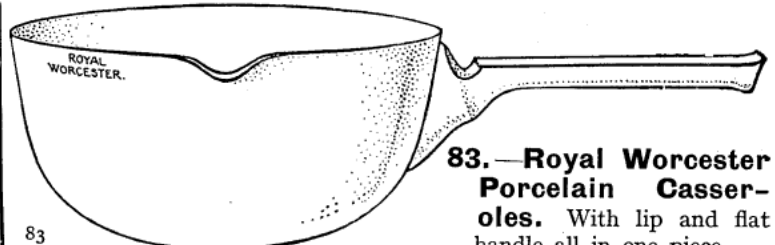
**81.—Royal Worcester Porcelain Filter Discs.**

Diam.	..	15	20 mm.
Thickness	..	1 1/2	1 mm.
Per doz.	..	9/9	9/9
Diam.	..	30	33 mm.
Thickness	..	2	2 mm.
Per doz.	..	11/3	11/3



**82. Royal Worcester Porcelain Beakers,** with lip and flange.

Ht.	66	81	90 mm.
Cap.	55	116	176 c.c.
Doz.	24/-	30/-	40/6
Ht.	100	117	136 mm.
Cap.	215	285	442 c.c.
Doz.	48/-	57/-	67/6



**83.—Royal Worcester Porcelain Casseroles.** With lip and flat handle all in one piece.

Size No.	..	I	2	3	3A	4	5	6
Diam.	..	50	70	90	95	110	135	165 mm.
Capacity	..	30	75	130	210	375	750	1300 c.c.
Dozen	..	27/-	33/9	40/6	49/6	63/-	112/6	144/-

# LABORATORY PORCELAIN NIVOC AND ROYAL BERLIN QUALITIES.

NOTE.—If one of the two makes is not in stock, the other will be supplied.



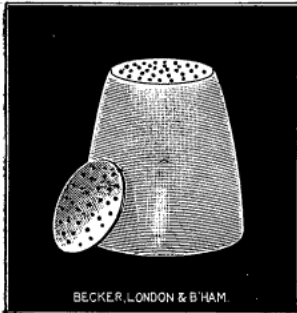
### 84.—Evaporating Basins.

Either Nivoc or Royal Berlin quality porcelain.

Size No.	000	00	0	I	2
Diam.	60	70	78	85	90 mm.
Cap...	35	60	80	100	140 c.c.
Per doz.	9/-	11/3	13/6	17/3	20/3

Size No.	3	4	5	6	7
Diam.	98	108	116	140	185 mm.
Cap.	175	210	300	385	765 c.c.
Per doz.	24/-	27/-	33/-	45/-	65/6

Size No.	..	8	9	10	11	12
Diameter	..	213	258	300	360	430 mm.
Capacity	..	1285	2220	3250	5700	10,000 c.c.
Each ..	..	6/9	10/6	18/6	25/-	52/-



### 87.—Gooch Crucibles,

with perforated bottom. Either Nivoc or Royal Berlin quality porcelain.

Size No.	..	1	2	3	4
Dia. at top	..	24	27	35	42 mm.
Height	..	30	32	40	45 mm.
Per doz.	..	15/9	20/3	27/-	29/3

#### 87A.—Perforated Loose Plates for Gooch Crucibles.

For Size No.	..	1	2	3	4
Per dozen	..	9/9	9/9	11/3	11/3



### 89.—Buchner Funnels,

with fixed perforated plate. Either Nivoc or Royal Berlin quality porcelain.

Size No.	0	1	2	3
Diam.	54	66	71	84 mm.
Each	3/9	4/6	6/5	7/6

Size No.	4	5	6
Diam.	116	180	220 mm.
Each	8/8	14/3	20/3



### 91.—Porcelain Combustion Tubes,

either Nivoc or Royal Berlin quality porcelain.

Size No.	..	1	2	3
Length	..	1000	1000	1000 mm.
Inside Diameter	..	18	20	23 mm.
Outside ..	..	25	28	30 mm.
Each ..	..	18/6	38/6	39/6

### 85.—Crucibles,

without lids. Either Nivoc or Royal Berlin quality porcelain.



Size No.	..	000	00	0a	0	I
Diameter	..	26	31	36	41	46 mm.
Per dozen	..	5/-	6/9	8/3	10/6	13/6

Size No.	..	2	3	4	5
Diameter	..	57	68	80	100 mm.
Per dozen	..	18/9	22/6	27/-	33/-

### 86.—Crucibles, with lids. Either Nivoc or Royal Berlin quality.

Size No.	..	000	00	0a	0	I
Diameter	..	26	31	36	41	46 mm.
Per doz.	..	10/-	11/9	13/3	15/6	19/3

Size No.	..	2	3	4	5
Diameter	..	57	68	80	100 mm.
Per dozen	..	24/6	30/-	36/9	44/3

### 88.—Evaporating Basins. Flat form. Either Nivoc or Royal Berlin quality porcelain.

Size No.	1	2	3	4
Diam.	7	8	9½	10½ cm.
Each	1/3	1/8	2/3	2/10
Dozen	14/-	18/-	25/-	31/6



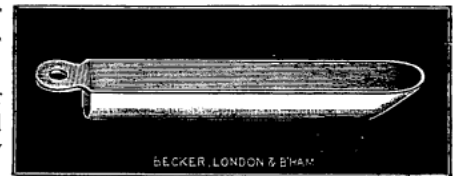
### 90.—Porcelain Beakers, either Nivoc or Royal Berlin quality porcelain.

Size No.	1	2	3	4	5	6
Cap.	165	340	420	580	970	1500 c.c.
Each	2/3	3/-	3/3	3/9	5/-	6/-
Dozen	26/-	34/-	37/6	43/-	58/-	70/-



### 92.—Porcelain Combustion Boats, either Nivoc or Royal Berlin quality porcelain.

Size No.	..	1	2	3
Length	..	65	85	115 mm.
Width..	..	12	11	12 mm.
Dozen	..	13/-	15/-	20/-

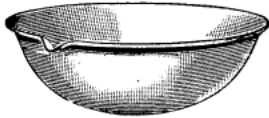


For cheaper quality Laboratory Porcelain see next page.

Our stock of pure Chemicals and Acids is very considerable ; hence all orders are executed with the utmost despatch. See comprehensive list at end of Catalogue.

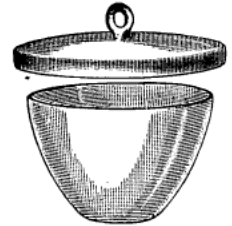
# LABORATORY PORCELAIN

SCHOOL QUALITY.



**93.—Porcelain Evaporating Basins.**  
With spout, glazed inside and partially outside.

Size No. ..	000	00	0	I	2	3	4
Diam. ..	6	7	8	8½	9	10	11 cm.
Capacity ..	35	60	80	100	140	175	225 c.c.
Each ..	7d.	7d.	9d.	10d.	1/-	1/2	1/7
Per doz. ..	6/7	6/7	7/6	8/9	11/3	13/4	17/3
Size No. ..	5	6	7	8	9		
Diam. ..	12	14½	18½	21½	25½		
Capacity ..	240	350	650	1000	1500		
Each ..	1/10	3/-	3/8	5/3	7/8		
Per doz. ..	21/7	34/5	42/10	60/-	85/8		

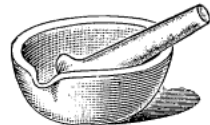


**97.—Porcelain Crucibles.** With covers. Glazed inside and outside.

Size No. 000	00	0	I	2	3	4	5
Diam.	26	30	41	46	56	67	81 87 mm.
Height	19	25	25	29	36	44	52 72 mm.
Capacity	5	10	17	30	50	90	145 280 c.c.
Each	7d.	7d.	7d.	10d.	10d.	1/-	1/2 1/7
Per doz.	6/7	6/7	6/7	8/9	8/9	11/3	13/2 17/2

**98.—Porcelain Crucibles only.** Without covers.

Size No. 000	00	0	I	2	3	4	5
Each ..	5d.	5d.	5d.	7d.	7d.	9d.	10d. 1/1
Per doz.	4/5	4/5	4/5	5/10	5/10	7/6	8/9 11/6



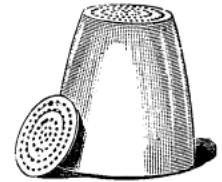
**94. — Porcelain Mortars and Pestles.** Glazed outside, biscuit inside.

Size No. 00	0	I	2
Out. dia.	6½	8	9 11 cm.
Capacity	25	40	75 150 c.c.
Each	10d.	1/2	1/7 2/1
Per doz.	8/9	13/2	17/3 23/5

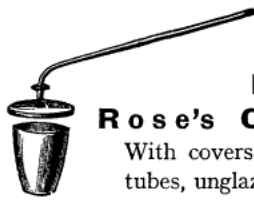
For Wedgwood and Glass Mortars and Pestles see Index.

Size No. 3	4	5	6
Out. dia.	13	15	17½ 20 cm.
Capacity	225	400	650 1000 c.c.
Each ..	2/8	3/10	5/- 5/11
Per doz.	30/-	45/-	57/10 68/5

**99. — Porcelain Gooch's Crucibles.** Glazed, with perforated bottom, loose perforated disc and cover.



Size No. ..	I	2	3	4	5
Height ..	33	38	38	38	40 mm.
Top diam. ..	26	32	38	38	38 mm.
Bottom diam. ..	18	23	30	35	25 mm.
Each ..	2/1	2/1	2/1	2/1	2/1
Per doz.	23/5	23/5	23/5	23/5	23/5



**95. Porcelain Rose's Crucibles.** With covers and leading tubes, unglazed.

Size No.	I	2	3	4
Dimensions in mm.	37 x 31	41 x 36	45 x 41	60 x 50
Crucibles, ea.	7d.	1/-	1/7	1/10
Lids, each	5d.	10d.	10d.	10d.
Tubes, ea.	1/10	1/10	1/10	1/10

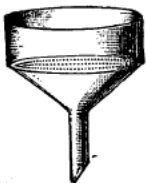


**100. — Porcelain Combustion Boats.**

Length	70	60	75	115	75	100 mm.
Width	6	10	11	13	15	18 mm.
Each	1/-	1/-	1/-	1/-	1/-	1/-
Per doz.	8/9	8/9	8/9	8/9	8/9	8/9

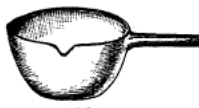
**101. — Porcelain Beakers.** Without spout, glazed inside and outside.

Height	10½	12	13½	15½	cm.
Capacity	200	325	500	700	c.c.
Ea.	1/9	2/3	3/-	3/8	
Per doz.	19/5	25/8	34/5	42/10	
Height	17	20	23	25½	cm.
Capacity	1000	1500	2000	3000	c.c.
Each ..	5/7	7/5	9/2	12/11	
Per doz.	64/8	86/3	106/11	150/-	



**96.—Porcelain Buchner's Funnels.** With vertical sides and perforated plate.

Outside diam.	5	6½	8	10	12½	15	20 cm.
Each	3/3	4/-	4/6	5/6	7/6	9/6	16/-
Per doz.	33/9	45/-	53/-	64/-	87/-	110/-	188/-



**102. — Porcelain Evaporating Basins or Casseroles.** With spout and handle.

Size No.	00	0	I	2	3	4
Diam.	8½	9½	10½	11½	13½	16 c.m.
Capacity	125	200	275	400	700	1200 c.c.
Each	2/2	2/9	3/5	3/10	5/3	6/6
Per doz.	24/5	31/11	39/5	45/-	60/-	75/-

**103. — Porcelain Perforated Filter Discs.** Glazed one side, for quick filtering.

Diam.	14	20	25	30	mm.
Each ..	7d.	7d.	10d.	10d.	
Per doz.	6/7	6/7	8/9	8/9	
Diam.	40	45	50	60	mm.
Each ..	1/-	1/2	1/2	1/7	
Per doz.	11/3	13/2	13/2	17/2	

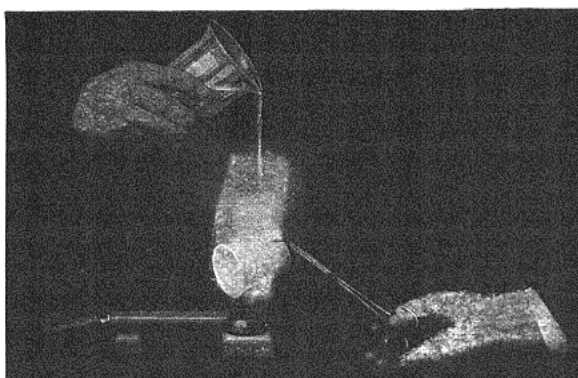
Every requisite for Chemical, Physical, and Bacteriological work supplied, from a test tube to the complete furnishing of the largest laboratory.



# OPAQUE SILICA APPARATUS

(For Transparent see pages 26 to 31).

**ACID-PROOF. "VITREOSIL" HEAT-PROOF.**



Vitreosil Vessel being tested under very severe conditions

AN ASTONISHING PROOF:—Cold water poured on red hot Vitreosil Vessel does not crack it.  
Vitreosil resists the hottest gas flame.

HIGHLY REFRACTORY.  
RESISTANT TO SUDDEN AND  
EXTREME TEMPERATURE  
CHANGES.  
CONSTANT IN WEIGHT.



UNAFFECTED BY ACIDS,  
EXCEPTING HYDROFLUORIC  
and (at high temperatures only)  
PHOSPHORIC.  
EXTREMELY DURABLE.

VITREOSIL, the material of which the various articles enumerated in the following pages are manufactured, consists of pure silica, fused by the original and patented electric process into a thoroughly pure, homogeneous and uniform product, containing about 99.8 per cent.  $\text{SiO}_2$ , and possessing remarkable properties of great value for scientific and technical purposes, and in fact, it is no exaggeration to say that in many laboratory operations, especially those where heat or acids, etc., are involved, **Vitreosil has almost entirely replaced, not only platinum and other costly materials, but also porcelain.**

From the production of comparatively small pieces of laboratory ware, the process has been developed and extended until large chemical and other similar plants have become regular items of manufacture, the demand for which, both in this country and abroad, has steadily increased.

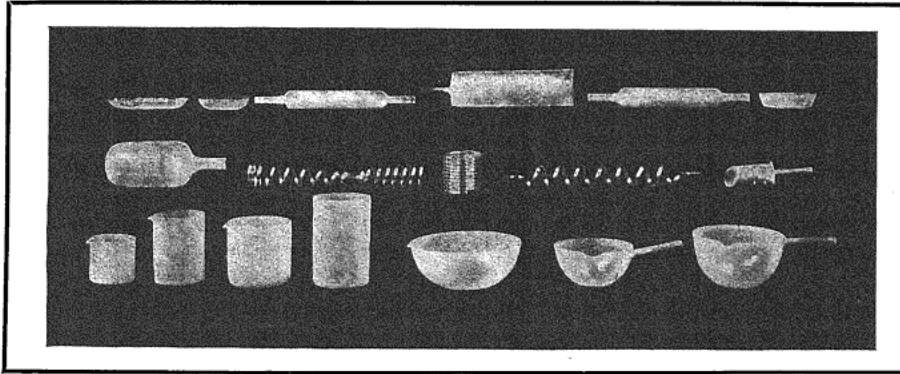
Apart from and in addition to this class of manufacture, enterprising attention has been directed to the production of the requirements of the electrical and gas industries, and the medical profession, whilst the application of Vitreosil for mosaic and many other useful and ornamental purposes present great possibilities, its remarkable rippled-silver like appearance enhancing its artistic effect.

These various productions are dealt with or referred to under their respective headings, and are all sold under the registered trade-mark of "Vitreosil," the process of manufacture being fully protected by patents, the validity of which has been established both in this country and abroad.

**The particulars on the next page regarding the valuable properties of "Vitreosil" are exceedingly interesting, and will, we feel sure, be found useful.**

**Our Balances and Weights have achieved World-wide Reputation: *vide* Opinions of the Leading Scientific Press:**

## PROPERTIES OF VITREOSIL



The principal properties of VITREOSIL which render it of such value to the chemical and allied industries, as well as for laboratory uses, are its **great resistance to heat and acids.**

### RESISTANCE TO HEAT.

It is amongst the most refractory of materials, melting at about the same temperature as platinum (between  $1,700^{\circ}\text{C}$ . and  $1,800^{\circ}\text{C}$ .). The melting point is, however, not well defined as an appreciable softening of the material takes place at about  $1,500^{\circ}\text{C}$ .

### CO-EFFICIENT OF EXPANSION.

The co-efficient of expansion of VITREOSIL is extremely small, the exact figure being  $0.0000059$ , which is about  $1/17$ th of that of glass. In consequence of its small co-efficient, it is possible to subject VITREOSIL to rapid and extreme changes of temperature without any danger of breakage. This property, unique amongst ceramic materials, is illustrated by the fact that **small articles can be made red hot and plunged into cold water without cracking.**

### DEVITRIFICATION.

Although VITREOSIL is extremely refractory, it has a tendency when subjected for long periods to a very high temperature to become brittle, and to change its physical characteristics. This, of course, is due to a reversion of the VITREOSIL from the vitreous to the crystalline state. The National Physical Laboratory has investigated this change of state, or devitrification, and obtained results which are of considerable importance to users of the materials for high temperature work.

### DEVITRIFICATION TEMPERATURE.

The results of the National Physical Laboratory's investigations are summarized as follows:—

"In general, the loss of strength hardly commenced at  $1,120^{\circ}\text{C}$ .; at  $1,188^{\circ}\text{C}$ . it existed, but was not very serious, even after eight hours' heating; but four hours' heating at  $1,350^{\circ}\text{C}$ . produced a reduction of 40% to 50% in the strength, showing that the rate of loss of strength increases very rapidly as the temperature rises."

It will, therefore, be seen that although VITREOSIL cannot be exposed continuously to temperatures over  $1,200^{\circ}\text{C}$ ., still, if the heating is not continued for long periods the material may be used successfully for much higher temperatures, For example, in pyrometric measurements VITREOSIL tubes are largely used for rapid readings at very high temperatures,

### RESISTANCE TO ACIDS.

VITREOSIL is unaffected by mineral or organic acids, with the exception of hydrofluoric, and at high temperatures phosphoric. It is, therefore, possible to successfully concentrate phosphoric acid in VITREOSIL basins, and for all ordinary purposes they can be used with this acid.

**Sulphuric, Nitric, and Hydrochloric acids, or a mixture of acids, such as Aqua-regia, have absolutely no action on the material.**

### SPECIFIC GRAVITY.

The specific gravity is about 2.07.

### NON-POROSITY.

VITREOSIL is not porous to gases, with the exception of hydrogen, and that only at high temperatures.

Professor Dixon, lecturing to the Society of British Gas Industries, March 19, 1914, stated that "The silica coil supplied by the Thermal Syndicate Limited has stood the test of alternate heating and cooling from  $0^{\circ}$  to  $1,000^{\circ}\text{C}$ ., and has remained gas-tight during the year." The coil referred to was of VITREOSIL, 50 ft. long, 1 in. bore.

As VITREOSIL can be suddenly heated and cooled without fear of fracture, work can be done with greater rapidity, and any anxiety regarding the possible breakage of a crucible or basin containing the result of two or three days' work is removed.

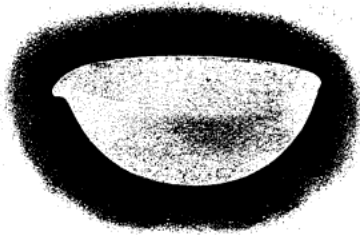
### GLAZED WARE.

All small basins, capsules and crucibles have a highly glazed surface produced by a special process. This glazed surface is of exactly the same nature as the article itself—viz., VITREOSIL, and is not an easily fusible enamel or flashed glaze.

# VITREOSIL LABORATORY APPARATUS

(OPAQUE SILICA).

For Transparent, see pages 26 to 31.



104

**104.—Vitreosil Basins.** Glazed. Ordinary form with spout.

INSIDE MEASUREMENTS.

Size No.	Diameter. inches.	Depth. inches.	Diameter. mm.	Depth. mm.	Capacity.	Price. each.
B 1	2	$\frac{13}{16}$	51	21	20 c.c.	<b>2/8</b>
B 3	$2\frac{3}{4}$	1	70	25	45 c.c.	<b>3/-</b>
B 5	$3\frac{1}{2}$	$1\frac{3}{16}$	83	30	70 c.c.	<b>3/4</b>
B 6	$3\frac{1}{2}$	$1\frac{5}{16}$	89	33	85 c.c.	<b>4/-</b>
B 7	$3\frac{1}{2}$	$\frac{7}{8}$	89	22	60 c.c.	<b>3/8</b>
B 9	$3\frac{7}{8}$	$1\frac{3}{16}$	98	30	100 c.c.	<b>4/4</b>
B 10	$4\frac{1}{4}$	$1\frac{3}{4}$	108	45	200 c.c.	<b>5/-</b>



105

**105.—Vitreosil Basins.** Deep form with spout. Smooth inside only.

INSIDE MEASUREMENTS.

Size No.	Diameter. inches.	Depth. inches.	Diameter. mm.	Depth. mm.	Capacity.	Price. each.
B 11	$5\frac{3}{8}$	$2\frac{1}{4}$	137	57	400 c.c.	<b>7/8</b>
B 12	$5\frac{1}{2}$	$2\frac{1}{2}$	130	64	500 c.c.	<b>8/-</b>
B 13	6	$2\frac{1}{2}$	152	64	600 c.c.	<b>8/4</b>
B 15	6	3	152	76	700 c.c.	<b>9/4</b>
B 17	7	$2\frac{3}{4}$	178	70	800 c.c.	<b>10/-</b>
B 19	7	$3\frac{3}{4}$	178	95	1,200 c.c.	<b>10/4</b>
B 21	8	$3\frac{1}{4}$	203	83	1,400 c.c.	<b>11/8</b>
B 23	8	$4\frac{1}{4}$	203	108	1,800 c.c.	<b>13/4</b>
B 25	9	$3\frac{1}{2}$	229	89	1,800 c.c.	<b>15/-</b>
B 27	9	$4\frac{3}{4}$	229	121	2,500 c.c.	<b>16/8</b>
B 29	$12\frac{1}{4}$	$5\frac{1}{4}$	311	133	4,500 c.c.	<b>25/-</b>
B 31	$15\frac{1}{2}$	4	394	102	3,000 c.c.	<b>30/-</b>
B 33	18	7	457	178	15,000 c.c.	<b>35/4</b>
B 35	18	$8\frac{1}{2}$	457	216	20,000 c.c.	<b>38/-</b>

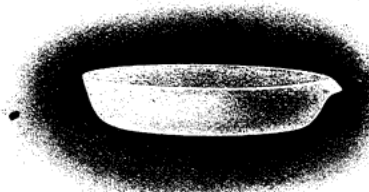


106

**106.—Vitreosil Crucibles.** Glazed. Squat shape.

OUTSIDE MEASUREMENTS.

Size No.	Height. inches.	Diameter at top. inches.	Height. mm.	Diameter at top. mm.	Capacity.	Price. each.	Extra for Covers each.
C 00	$\frac{3}{4}$	$1\frac{5}{8}$	20	40	10 c.c.	<b>1/8</b>	<b>1/2</b>
C 0	1	$1\frac{5}{8}$	25	41	15 c.c.	<b>1/8</b>	<b>1/2</b>
C 1	$1\frac{1}{8}$	$1\frac{7}{8}$	28	47	25 c.c.	<b>2/-</b>	<b>1/4</b>
C 2	$1\frac{7}{16}$	$2\frac{1}{4}$	37	57	40 c.c.	<b>2/4</b>	<b>1/8</b>
C 3	$1\frac{3}{4}$	$2\frac{5}{8}$	45	67	75 c.c.	<b>3/4</b>	<b>2/-</b>
C 7	2	$3\frac{1}{8}$	50	79	100 c.c.	<b>4/-</b>	<b>2/4</b>



107

**107.—Vitreosil Basins.** Flat form. Glazed.

INSIDE MEASUREMENTS.

Size No.	Diameter. inches.	Depth. inches.	Diameter. mm.	Depth. mm.	Capacity.	Price. each.
F 1	$2\frac{1}{2}$	$\frac{1}{2}$	63	13	20 c.c.	<b>3/-</b>
F 2	$2\frac{7}{8}$	$\frac{1}{2}$	73	13	25 c.c.	<b>3/4</b>
F 3	$3\frac{3}{4}$	$\frac{11}{16}$	95	18	75 c.c.	<b>3/8</b>
F 4	$4\frac{7}{8}$	$\frac{13}{16}$	127	21	125 c.c.	<b>5/-</b>

Every requisite for Chemical, Physical, and Bacteriological work supplied, from a test tube to the complete furnishing of the largest laboratory. B

# VITREOSIL LABORATORY APPARATUS

(OPAQUE SILICA).

For Transparent, see pages 26 to 31.

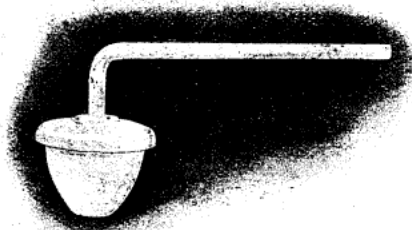
These Crucibles have finely glazed exterior and interior surfaces, and for many purposes successfully replace platinum, as they possess the advantage of resisting a Bunsen reducing flame, and they may be used constantly with boiling aqua regia without loss of weight. As compared with the best British or Continental porcelain, VITREOSIL glazed Crucibles are superior, being constant in weight and uniform in chemical and physical characteristics.



108

**108.—Vitreosil Crucibles.** Glazed. Platinum shape.

Size No.	Cap. c.c.	OUTSIDE MEASUREMENTS.				Price. each.	Extra price for Lids. each.
		Height. at Top. ins.	Diameter at Top. ins.	Height. at Top. mm.	Diameter at Top. mm.		
C 4	50	2	2	50	50	3/4	1/4
C 5	20	1 3/8	1 3/8	35	35	2/8	1/2
C 6	30	1 1/2	1 11/16	38	43	2/8	1/2
C 8	100	3 3/16	2 7/8	80	73	5/4	2/4



109

**109.—Vitreosil Rose Crucibles,** with perforated cover and leading off tube. Squat form.

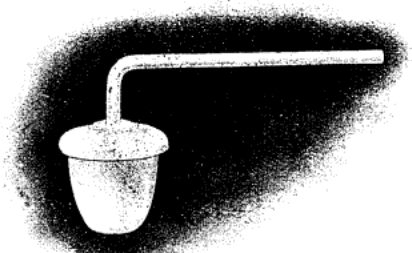
Size No.	Capacity. c.c.	Price Crucible only.	Price of Cover.	Price of Tube.	Price Complete.
C 1	25	2/-	1/8	4/8	8/4
C 2	35	2/4	1/8	4/8	8/8
C 3	75	3/4	2/-	4/8	10/-
C 7	100	4/-	2/-	4/8	10/8



110

**110.—Vitreosil Gooch Crucibles, Glazed.** With Fixed Perforated Bottom.

Size No.	Capacity. c.c.	Diameter			Height. mm.	Price. each.	Extra for Covers. each.
		at Top. mm.	at Bottom. mm.	Diameter mm.			
G 1	10	30	22	30	4/8	1/2	
G 2	15	34	23	34	5/4	1/2	
G 3	20	38	24	38	5/4	1/2	
G 4	25	40	25	40	5/4	1/2	
G 5	30	42	26	42	6/-	1/2	
G 6	35	45	27	45	6/-	1/2	



111

**111.—Vitreosil Rose Crucibles,** with perforated cover and leading off tubes. Platinum shape.

Size No.	Capacity. c.c.	Crucible only.	Cover.	Tube.	Complete.
C 6	30	2/8	1/2	4/8	8/6
C 4	50	3/4	1/4	4/8	9/4

**Vitreosil Crucibles for Bomb Calorimeters.**

Height.	Diameter at Top (external).	Price.
1 1/4 in.	1 1/8 in.	2/8 each

Our Balances and Weights have achieved World-wide Reputation: *vide* Opinions of the Leading Scientific Press.

# VITREOSIL LABORATORY APPARATUS

(OPAQUE SILICA).

For Transparent, see pages 26 to 31.



112

### 112.—Vitreosil Crucible Furnace, for use with Bunsen Burner.

These Furnaces afford a convenient and efficient support for small Crucibles, and being, in common with other VITREOSIL productions, heat and acid proof, are practically indestructible, conserve the heat, and direct it entirely on to the Crucible.

DIAMETER, OUTSIDE, 2 INCHES.  
Height .. .. 4 inches.  
A. Price (Furnace only) **3/4**  
B. Price, complete with Burner .. .. **6/6**



114

These Beakers are capable of resisting higher temperatures than glass, and possess the characteristic properties of VITREOSIL, being unaffected by extreme and sudden changes of temperature.

### 114.—Vitreosil Beakers. Ordinary tall form without spout.

	Capacity about 5 c.c.	10 c.c.	25 c.c.	50 c.c.		
Height .. ..	35	40	54	70 mm.		
Diameter, Internal ..	15	20	26	38 mm.		
Each .. ..	<b>2/6</b>	<b>3/4</b>	<b>4/2</b>	<b>4/7</b>		
	Capacity about 75 c.c.	100 c.c.	150 c.c.	250 c.c.	500 c.c.	750 c.c.
Height .. ..	75	80	89	104	130	150 mm.
Diameter, Internal ..	41	44	51	57	70	84 mm.
Each .. ..	<b>4/10</b>	<b>5/-</b>	<b>5/5</b>	<b>6/8</b>	<b>9/7</b>	<b>12/6</b>



113A



113B

### 113.—Vitreosil Combustion Boats.

Vitreosil Combustion Boats do not deteriorate in use, and are to be preferred to platinum and similar materials in operations where it is important to avoid loss of weight. Special sizes can be supplied if required at slightly increased prices.

OUTSIDE MEASUREMENTS EXCLUSIVE OF HANDLE.

Size No.	Length. mm.	Width. mm.	Depth. mm.	A		B	
				Without Handle. Price, each.	With Handle. Price, each.	Without Handle. Price, each.	With Handle. Price, each.
O 1	48	15	8	<b>1/4</b>	<b>1/7</b>		
O 2	77	16	10	<b>2/-</b>	<b>2/3</b>		
O 3	77	20	11	<b>2/4</b>	<b>2/7</b>		
O 4	102	20	11	<b>3/-</b>	<b>3/3</b>		



115

### 115.—Vitreosil Beakers. Wide form with spout.

	Capacity about 5 c.c.	10 c.c.	25 c.c.	50 c.c.		
Height .. ..	33	37	44	51 mm.		
Diameter, Internal ..	16	21	30	40 mm.		
Each .. ..	<b>3/2</b>	<b>4/-</b>	<b>4/10</b>	<b>5/3</b>		
	Capacity about 75 c.c.	100 c.c.	150 c.c.	250 c.c.	500 c.c.	750 c.c.
Height .. ..	58	66	80	86	106	121 mm.
Diam. Internal ..	44	48	54	65	80	92 mm.
Each .. ..	<b>5/8</b>	<b>5/10</b>	<b>6/8</b>	<b>7/11</b>	<b>11/3</b>	<b>14/5</b>

Our stock of pure Chemicals and Acids is very considerable ; hence all orders are executed with the utmost despatch. See comprehensive list at end of Catalogue.

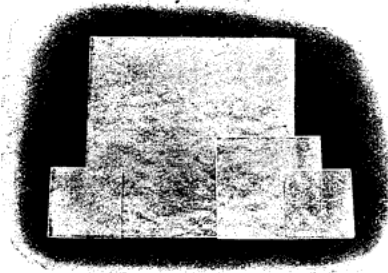
# VITREOSIL LABORATORY APPARATUS

(OPAQUE SILICA).

For Transparent, see pages 26 to 31.

**116.—Vitresil Heating Plates.** Supplied either glazed or unglazed. Please state which when ordering.

Heating plates of VITREOSIL possess properties entirely wanting in plates of other materials, as they do not crack on heating, and do not corrode. They are, in consequence, eminently suitable for air baths, sand baths, etc.



116

**UNGLAZED.**

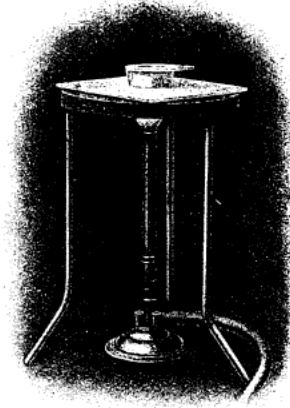
Thickness.	Thickness.	Price per sq. inch.
$\frac{1}{16}$ – $\frac{1}{8}$ in.	2.5–3 mm.	1½d.
$\frac{3}{16}$ "	4–5 "	2d.
$\frac{1}{4}$ "	6–7 "	3d.

Other Sizes and Prices on application.

**GLAZED.**

Thickness.	Thickness.	Price per square inch.	Maximum size supplied.
Up to $\frac{1}{8}$ in.	3 mm.	4d.	6 × 6 in.
$\frac{1}{8}$ – $\frac{3}{16}$ "	5 "	5½d.	3 × 3 "

NOTE.—The price of circular plates is equivalent to the price of square plates of same size as the square of the diameter—e.g., a plate 3 in. diameter would be the same price as a plate 3 × 3 in.

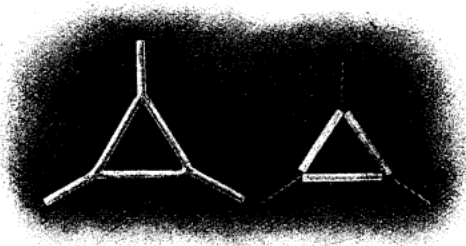


117

**117.—Vitresil Plate Supports,** for Crucibles with circular hole in centre.

These supports are greatly superior to the perforated asbestos board commonly employed for preventing the access of flame to crucibles during sulphur and similar determinations and ignitions. Can be supplied in any size desired, the following being generally in demand.

Size	3" × 3" × 1/8"	4" × 4" × 1/8"	Hole any size up to
Price	4/6	6/-	1¼" (32 mm.).



118 D

118 A B C

**118.—Vitresil Triangles.**

Length of Side, mm. . .	38	45	50	57	63	70	76	82	88	95	102
A Price on Iron Wire . .	6d.	6d.	6d.	8d.	8d.	10d.	10d.	1/-	1/-	1/4	1/4
B " on Nickel Wire . .	8d.	8d.	8d.	10d.	1/-	1/2	1/2	1/4	1/4	1/6	1/6
C " on Chrome Nickel Wire . .	9d.	9d.	9d.	11d.	1/1	1/3½	1/3½	1/5½	1/5½	1/8	1/8
D " All Silica . .	3/-	3/-	3/-	3/6	3/6	4/-	4/-	4/-	4/6	4/6	5/-

Every requisite for Chemical, Physical, and Bacteriological work supplied, from a test tube to the complete furnishing of the largest laboratory.

# VITREOSIL LABORATORY APPARATUS

(OPAQUE SILICA).

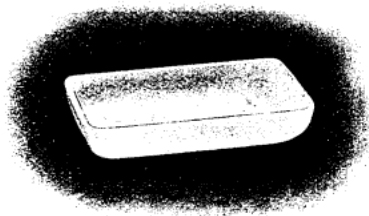
For Transparent, see pages 26 to 31.



119

## 119.—Vitreosil Circular Capsules. Glazed. Shallow Form.

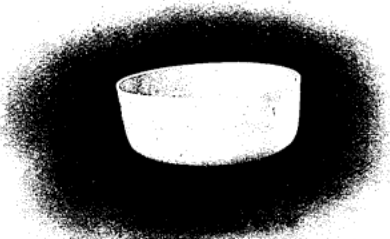
Size No.	Capacity. c.c.	INSIDE MEASUREMENTS.		Price. each.
		Diameter. mm.	Depth in Centre. mm.	
A 5	10	35	13	1/8
A 1	20	45	13	1/8
A 2	25	51	13	2/4
A 6	30	57	13	2/4
A 3	35	60	13	2/8
A 4	55	70	16	3/4



120

## 120.—Vitreosil Rectangular Capsules. Glazed.

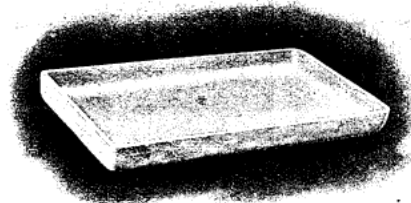
Size No.	Length. ins.	Width. ins.	Depth. ins.	INSIDE MEASUREMENTS.			Price. each.
				Length. mm.	Width. mm.	Depth. mm.	
R 1	2 3/16	1 5/8	3/8	56	24	10	2/8
R 2	1 7/8	1 1/2	5/8	48	38	15	2/8
R 3	2 1/2	1 3/8	3/8	63	35	10	3/4



121

## 121.—Vitreosil Circular Capsules. Glazed. Deep Form.

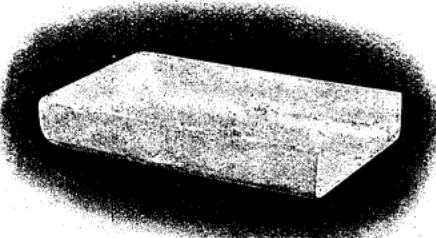
Size No.	Capacity. c.c.	Depth in		Depth in		Price. each.
		Diameter. ins.	Centre. ins.	Diameter. mm.	Centre. mm.	
AA 1	45	2	1	51	25	3/4
AA 9	50	2 3/16	1	55	25	3/4
AA 10	80	2 3/4	1	70	25	4/-



122

## 122.—Vitreosil Trays. Four sided.

Size No.	Length. mm.	Width. mm.	Depth. mm.	Price. each.
T 3	235	66	25	6/-
T 5	355	117	25	9/4
T 7	324	152	35	9/4
T 9	397	240	38	11/4
T 11	425	286	38	15/6
T 13	425	340	44	18/8
T 15	254	178	22	8/8
T 17	156	95	24	5/4



123

## 123.—Vitreosil Trays. Three sided.

Size No.	Length. ins.	Width. ins.	Depth. ins.	OUTSIDE MEASUREMENTS.			Price. each.
				Length. mm.	Width. mm.	Depth. mm.	
T 2	4 1/2	2 5/8	1	114	66	25	2/8
T 4	6 7/8	4 5/8	1	175	117	25	4/4
T 6	9 3/4	6	1 3/8	248	152	35	6/4
T 8	15 1/4	9 1/2	1 1/2	384	240	38	9/4
T 10	15 1/4	11 1/4	1 1/2	387	286	38	13/4
T 12	15 3/4	13 3/4	1 3/4	391	340	44	16/8

These Trays may be introduced cold into a Vitreosil muffle heated to operating temperature, without risk of injury to either tray or muffle.

Our Balances and Weights have achieved World-wide Reputation; *vide* Opinions of the Leading Scientific Press.



# VITREOSIL TUBING

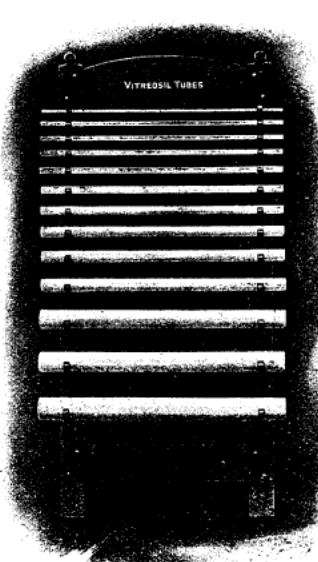
## (OPAQUE SILICA)

For Transparent, see page 30.

VITREOSIL Tubing, being **Heat and Acid Resistant**, has now almost entirely, and with great advantage, replaced those of hard glass, porcelain, and other refractory materials for most purposes where high temperatures and highly oxydizing gases, etc., are to be encountered.

NOTE.—These Tubes are supplied in **SATIN SURFACE** up to  $\frac{3}{8}$ " bore. The **GLAZED SURFACE** Tubes of  $\frac{1}{2}$ " and  $\frac{9}{16}$ " bore can be supplied up to 16" lengths only;  $\frac{3}{8}$ " to  $1\frac{1}{2}$ " bore in lengths not exceeding 5' 6". All these Tubes are supplied with the following tolerance limits—viz., up to  $\frac{3}{8}$ " bore 10%; beyond  $\frac{3}{8}$ " bore 5%. *Closer limits may entail an increase of price.*

### PRICE LIST.

Bore. inches.	Bore. mm.	Normal Wall Thickness. mm.	Price per Foot.	HEAVY WALLS.				Extra Price per Tube for Closed End.	Extra Price per Foot "Specially Glazed."
				Thickness. mm.	Price per Foot.	Thickness mm.	Price per Foot.		
$\frac{1}{32}$ — $\frac{1}{16}$	1—2	.5—1	8d.	from 1—2	11d.	(from 2—3	1/2	—	—
$\frac{1}{8}$	3	.75—1	1/1	" 1—2	1/7	" 2—3	1/11	4d.	—
$\frac{3}{16}$	4—5	1—1.5	1/10	" 1.5—2.5	2/4	" 2.5—3	2/11	6d.	—
$\frac{1}{4}$	6—7	1—1.5/2	2/6	" 2—2.5	2/11	" 2.5—3	3/4	6d.	—
$\frac{5}{16}$	8	1—2	2/11	" 2—2.5	3/10	" 2.5—3	4/8	6d.	—
$\frac{3}{8}$	9—10	1—2	3/4	" 2—2.5	4/8	" 2.5—3	6/-	8d.	—
$\frac{7}{16}$	11	1—2	3/8	—	—	—	—	8d.	—
$\frac{1}{2}$	12—13	1—2	4/-	—	—	—	—	8d.	8d.
$\frac{9}{16}$	14	1—2.5	4/1					11d.	1/4
$\frac{5}{8}$	15—16	1—2.5	4/6					11d.	1/4
$\frac{11}{16}$	17—18	1—2.5	5/-					1/4	1/4
$\frac{3}{4}$	19	1—3	5/7					1/4	1/4
$\frac{7}{8}$	22	1—3	6/2					1/8	1/4
1	25	1—3	6/8					2/-	2/-
$1\frac{1}{8}$	28—29	2—4	7/2					2/-	2/-
$1\frac{1}{4}$	31—32	2—4	7/6					2/-	2/-
$1\frac{3}{8}$	35	2—5	8/-					2/4	2/8
$1\frac{1}{2}$	38	2—5	8/6					2/4	2/8
$1\frac{5}{8}$	41	2—5	9/-					2/4	3/-
$1\frac{3}{4}$	44	2—5	9/4					2/8	3/4
2	50	2—5	10/3					2/8	3/8
$2\frac{1}{8}$	54	3—6	11/4					2/8	4/-
$2\frac{3}{8}$	60	3—6	13/-					3/4	4/8
$2\frac{5}{8}$	66	3—6	14/8					3/4	5/4
$2\frac{7}{8}$	73	3—6	17/4					4/-	6/8

Lengths of less than 1 foot (30 cm.) 10 per cent. extra. Prices for other sizes and large quantities on application.  
*Unless otherwise ordered normal wall thicknesses will be sent.*

Our stock of pure Chemicals and Acids is very considerable; hence all orders are executed with the utmost despatch. See comprehensive list at end of Catalogue.

# VITREOSIL COMBUSTION TUBES

(OPAQUE SILICA).

For Transparent, see pages 26 to 31.

For combustion work, VITREOSIL tubes are most efficient, both on account of the rapidity with which they can be heated, and the fact that they do not sag or alter their shape with any temperature that is attainable in gas-fired furnaces. If the combustion is carried out with copper oxide, it is necessary to prevent contact between the tube and the oxide by means of a layer of asbestos paper.

These tubes can now be supplied with the ends fused smooth and quite circular, so as to enable a gastight closure to be made by insertion of a rubber stopper. The possible condensation of moisture during a combustion operation would have no detrimental effect upon the tube.

COMBUSTION TUBES. (SPECIALLY GLAZED.)					
Bore. inch.	Bore. mm.	Length. Inches.	Length. mm.	Price. each.	
$\frac{3}{4}$	19	24	610	<b>13/10</b>	
$\frac{3}{4}$	19	26	661	<b>14/11</b>	
$\frac{7}{8}$	22	24	610	<b>14/11</b>	
$\frac{7}{8}$	22	26	661	<b>16/-</b>	
$\frac{7}{8}$	22	30	763	<b>18/8</b>	
I	25	24	610	<b>17/4</b>	
I	25	26	661	<b>18/9</b>	
I	25	30	763	<b>21/8</b>	



126

**126.—Vitreosil Combustion Tube with Transparent Section or Window,** permitting observation of the experiment whilst in progress.

NOTE.—The window can be located in the centre or any part of the tube, as desired, but this should be specified when ordering.

Size No.	Length.	Bore.	Length of Window.	Price
1	2 ft. 6 in.	$\frac{3}{4}$ in.	4 in.	<b>37/4</b> each.
2	3 ft. 0 in.	$\frac{7}{8}$ in.	4 in.	<b>30/8</b> „
3	3 ft. 3 in.	$\frac{7}{8}$ in.	4 in.	<b>40/-</b> „

Other sizes can be supplied, but the above are those in general demand.



128

**128.—Vitreosil Tips.** For use with adjustable tripod stands, etc., to support small Crucibles.  
 Per set of Three .. **2/3**

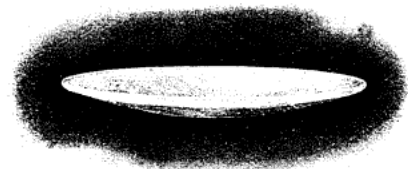


127

**127.—Vitreosil Reduction Tubes.**

Size No.	Overall Length.	Length of Reduced Ends.	Bore of Bulb.	Bore of Reduced Ends.	Price each.
1	9 in.	$2\frac{1}{2}$ in.	$\frac{5}{8}$ in.	$\frac{5}{16}$ in.	<b>10/-</b>
2	$10\frac{1}{2}$ in.	4 in.	$\frac{3}{4}$ in.	$\frac{1}{8}$ in.	<b>8/-</b>
3	$8\frac{1}{2}$ in.	$1\frac{1}{2}$ in.	$\frac{3}{4}$ in.	$\frac{1}{4}$ in.	<b>10/8</b>

Other Sizes and Prices on application.



129

**129.—Vitreosil Watch Glasses.**

Translucent. These Watch Glasses can be heated in the drying oven without fear of cracking.

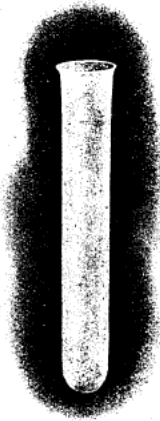
Diameter	$2\frac{1}{2}$	3	$3\frac{1}{2}$	4	$4\frac{1}{2}$	$5\frac{5}{16}$ ins.
Each ..	<b>2/9</b>	<b>3/3</b>	<b>4/-</b>	<b>6/3</b>	<b>7/-</b>	<b>8/-</b>

Every requisite for Chemical, Physical, and Bacteriological work supplied, from a test tube to the complete furnishing of the largest laboratory.

# VITREOSIL LABORATORY APPARATUS

(OPAQUE SILICA).

For Transparent, see pages 26 to 31.



130

**130.—Vitreosil Test Tubes.** Translucent. Specially glazed.

Length. mm.	Bore. mm.	Price. each.
A 102	12-13	2/-
B 152	12-13	3/2
C 102	19	2/4
D 152	19	3/4
E 102	25	3/2
F 152	25	4/6

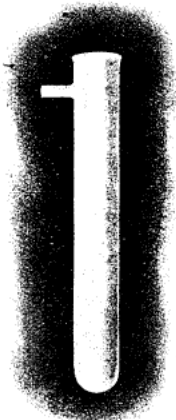


133

**133.—Vitreosil Cylindrical Bulb Tube.**

Size No.	Overall Length.	Length of Reduced End.	Bore of Wide End.	Bore of Reduced End.	Price. each.
I	16 in.	6 in.	1 3/8 in.	1/2 in.	26/8

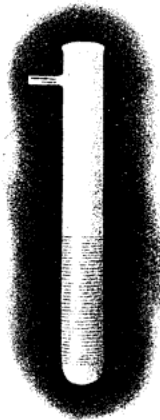
Other sizes on application.



131

**131.—Vitreosil Combustion Tube** with side tube.

Length of main tube	10 ins.
Bore	1 1/2 ins.
Each	20/-



132

**132.—Vitreosil Combustion Tube,**

grooved, with side tube similar to No. 131, but grooved for wiring and having the mouth of main tube smooth so as to ensure a gas-tight fit when rubber stopper is inserted.

Length of main tube	18 ins.
Bore	1 1/4 ins.
Each	24/8

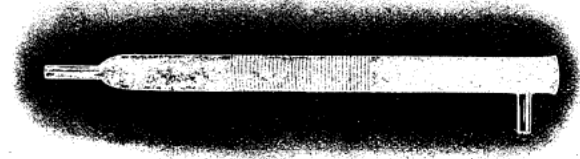
## VITREOSIL ROD.

IN. LENGTHS UP TO 8 FEET = 244 CM.

NOTE.—VITREOSIL Rod can be advantageously employed in the construction of apparatus for delicate physical experiments where material of extremely small co-efficient of expansion is necessary, and for other laboratory purposes.

**134.**

Diameter ..	3	4-5	6-7	8	9-10 mm.
Price per foot ..	1/4	2/-	2/8	3/2	3/7



135

**135.—Vitreosil Tube,** with side tube and reduced end. Extensively used in connection with the analysis of steel, etc., in conjunction with electric vitreosil furnace tubes.

Standard size.

Length of main tube	..	..	..	10 ins.
Bore	..	..	..	3/4 in
Each	..	..	..	12/8

Our Balances and Weights have achieved World-wide Reputation: *vide* Opinions of the Leading Scientific Press.

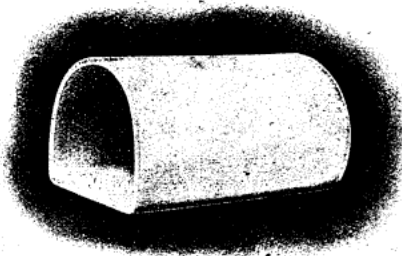
# VITREOSIL MUFFLES

(OPAQUE SILICA.)

VITREOSIL Muffles are highly refractory, will not crack with sudden and extreme changes of temperature, and effect great economy in time and fuel, owing to the rapidity with which they may be heated. They also have the further advantage of being absolutely gas tight, so that contamination of the contents of the muffle by fuel gases is impossible.

For use in high temperatures, gas, oil, or electric furnaces VITREOSIL Muffles are eminently suitable, and may be directly wound with resistance wire for electric heating, whilst for enamelling small work, hardening and annealing small metal parts, and for general testing and experimental purposes they are also specially valuable.

Being non-porous, they do not absorb moisture and disintegrate in use.



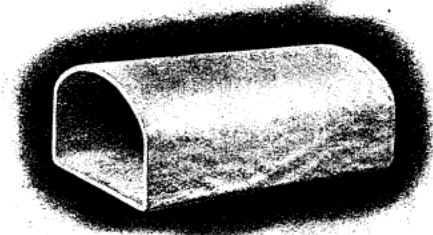
136

## 136.—Vitreosil Muffles. Ordinary shape.

OUTSIDE MEASUREMENTS.

Size No.	Length. in.	Width. in.	Height. in.	Length. mm.	Width. mm.	Height. mm.	Price. each.
* 2	4½	2½	2¾	114	67	60	6/3
4	6½	4¾	3½	165	111	89	8/4
* 6	9½	5¾	5	241	149	127	13/9
63	7½	4¾	2¾	180	120	70	8/4
64	9½	6¾	4½	241	156	114	12/6
66	18¼	6¾	5	464	168	127	20/10
67	7¾	5¾	3¼	198	144	82	11/8
68	6½	3¾	2¾	165	92	67	7/6
71	7¾	4¾	3¾	180	120	80	10/-
72	8¼	4¾	3¾	208	109	84	10/-
73	8	5	3¾	203	127	86	10/-
75	11¼	6¾	4¾	300	160	110	16/8
78	21	5	4	533	127	102	20/10
*80	6¼	4¾	3¾	173	117	90	8/4
81	14	7¼	5	356	198	127	20/-
*85	8¾	6	4¾	222	152	120	12/6
*86	11¼	7¾	6¾	298	200	171	18/4
88	7	4¾	3	178	121	76	8/4
89	19¼	7¾	4¾	500	180	120	22/11
90	7¾	4	3½	200	102	89	8/4
93	10¼	6¼	4¾	255	175	115	14/7
94	18¾	11	7¼	479	279	184	38/9
96	7¾	6¾	3¾	200	160	90	8/4
98	8¼	4½	3¾	210	115	90	10/-
99	28	12½	6	710	310	155	50/-
107	10	6¾	4¾	255	155	110	14/2

\* Suitable for Fletcher Russell's Muffle Furnaces, Nos. 261, 661, 461, 761.

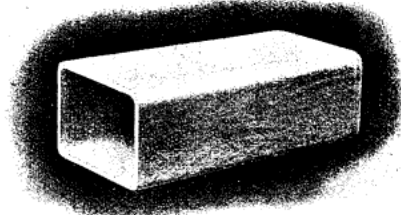


137

## 137.—Vitreosil Muffles. Dome shape.

EXTERNAL DIMENSIONS.

Size No.	Length. in.	Width. in.	Height. in.	Length. mm.	Width. mm.	Height. mm.	Price. each.
8	15	9¾	6¾	380	240	160	22/11
10	15	11	7	380	280	180	31/3
12	15¼	13¼	7	385	335	185	38/9
95	19¾	14¼	10	505	360	265	53/4
100	4¾	2¾	2¾	105	60	60	6/8
101	7¼	4¾	3¾	185	120	90	11/8
102	10¾	6¾	5¾	265	171	135	20/-
103	14½	9¾	6¾	370	230	160	23/4
109	15	13¾	6¾	380	350	175	37/6
112	19¾	15¾	7¾	505	400	195	50/-
114	21¼	16¼	7¼	540	410	185	50/-



138

## 138.—Vitreosil Muffles. Rectangular shape.

EXTERNAL DIMENSIONS.

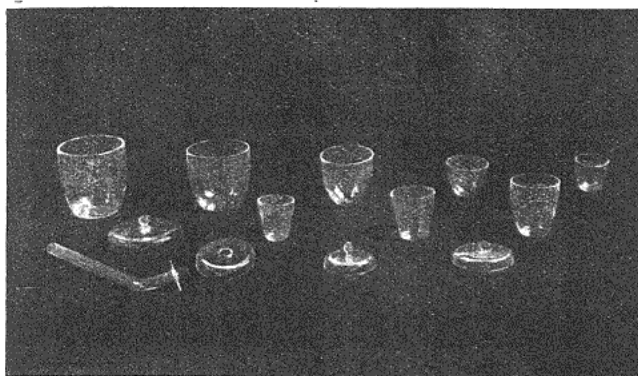
Size No.	Length. in.	Width. in.	Height. in.	Length. mm.	Width. mm.	Height. mm.	Price. each.
65	9¼	6¾	4¾	235	170	105	13/9
69	7	3½	3	180	90	75	8/4
74	10	4½	3	255	115	75	12/6
76	12	5¾	4¾	305	145	105	16/8
77	14	7¾	5½	355	200	140	20/-
105	22	8¼	6	560	210	150	33/4
106	4¾	3¾	2¾	120	85	55	7/6
108	15	9¾	4¾	380	245	110	20/10
110	10	8¾	5	255	220	125	14/7
115	21	4¼	3	535	105	80	20/10

Our stock of pure Chemicals and Acids is very considerable ; hence all orders are executed with the utmost despatch. See comprehensive list at end of Catalogue.



# TRANSPARENT FUSED QUARTZ APPARATUS

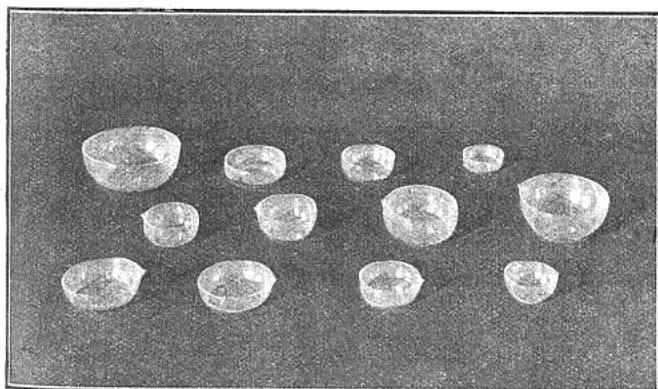
The following illustrations are from photographs of actual apparatus of fused quartz, although the transparency in some cases is not made obvious by photography.



139/140/141

## 142.—Transparent Silica Gooch Crucibles. With fixed perforated bottom.

Size No.	Approx. Capacity. c.c.	OUTSIDE MEASUREMENTS.		Price. each.
		Top Diameter. ins.	Height. ins.	
1	10	$1\frac{1}{4}$	$1\frac{1}{4}$	9/-
2	15	$1\frac{5}{16}$	$1\frac{3}{8}$	12/-
3	20	$1\frac{1}{2}$	$1\frac{3}{8}$	13/6
4	30	$1\frac{3}{8}$	$1\frac{3}{4}$	15/-



143/144

## 144.—Transparent Silica Evaporating Basins, with spout. Flat form.

Size No.	Approx. Capacity. c.c.	INSIDE MEASUREMENTS.		Price. each.
		Diameter. ins.	Depth. ins.	
F 1	20	$2\frac{1}{2}$	$\frac{1}{2}$	9/5
F 2	30	$2\frac{7}{8}$	$\frac{1}{2}$	12/6
F 3	75	$3\frac{3}{4}$	$\frac{11}{16}$	18/9
F 4	125	$4\frac{7}{8}$	$\frac{13}{16}$	25/-

## 139.—Transparent Silica Crucibles. Squat porcelain shape.

Size No.	Approx. Capacity. c.c.	OUTSIDE MEASUREMENTS.		Price. each.	Lids. each.
		Top Diameter. ins.	Height. ins.		
C 000	4	$1\frac{1}{16}$	$\frac{3}{4}$	2/6	2/6
C 00	10	$1\frac{1}{8}$	$\frac{3}{4}$	3/9	3/9
C 0	15	$1\frac{1}{8}$	1	5/-	4/-
C 1	25	$1\frac{7}{8}$	$1\frac{1}{8}$	6/3	5/-
C 2	40	$2\frac{1}{4}$	$1\frac{7}{16}$	9/5	7/6
C 3	75	$2\frac{3}{8}$	$1\frac{3}{4}$	12/6	9/5
C 7	100	$3\frac{3}{16}$	2	16/3	12/6

## 140.—Transparent Silica Crucibles. Platinum shape.

Size No.	Approx. Capacity. c.c.	OUTSIDE MEASUREMENTS.		Price. each.	Lids. each.
		Top Diameter. in.	Height. in.		
—	10	$1\frac{1}{16}$	$1\frac{1}{4}$	3/9	3/2
—	15	$1\frac{1}{4}$	$1\frac{5}{16}$	5/-	3/9
C 5	20	$1\frac{3}{8}$	$1\frac{3}{8}$	5/8	4/1
C 6	30	$1\frac{11}{16}$	$1\frac{1}{2}$	6/3	4/9
C 4	50	2	2	11/11	6/3

## 141.—Transparent Silica Rose Crucible Cover, with leading off tube.

Prices as above plus extra for tube.

## 143.—Transparent Silica Evaporating Basins, with spout. Ordinary form.

Size No.	Approx. Capacity. c.c.	INSIDE MEASUREMENTS.		Price. each.
		Diameter. ins.	Depth. ins.	
B 1	20	2	$\frac{13}{16}$	5/8
B 3	45	$2\frac{3}{4}$	1	9/6
B 5	70	$3\frac{1}{4}$	$1\frac{3}{16}$	13/9
B 6	85	$3\frac{1}{2}$	$1\frac{5}{16}$	15/-
B 7	60	$3\frac{1}{2}$	$\frac{7}{8}$	13/2
B 9	100	$3\frac{7}{8}$	$1\frac{3}{8}$	15/8
B 10	200	$4\frac{1}{4}$	$1\frac{3}{4}$	22/-

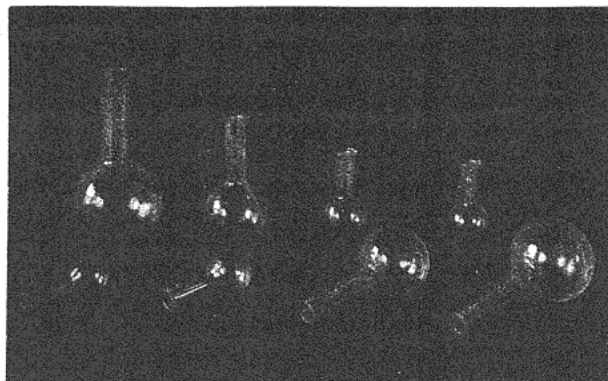
## 145.—Transparent Silica Evaporating Basins, with handle in one piece. Casseroles.

Size No.	Approx. Capacity. c.c.	INSIDE MEASUREMENTS.		Price. each.
		Diameter. ins.	Depth. ins.	
H 1	30	2	1	7/6
H 2	75	$2\frac{3}{4}$	$1\frac{3}{8}$	15/-
H 3	150	$3\frac{1}{4}$	$1\frac{3}{4}$	21/11
H 4	200	$3\frac{3}{4}$	2	25/-
H 5	350	$4\frac{1}{4}$	$2\frac{1}{2}$	37/6

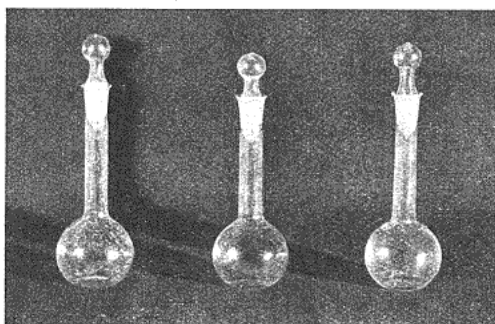
Our Balances and Weights have achieved World-wide Reputation ; *vide* Opinions of the Leading Scientific Press.



# TRANSPARENT FUSED QUARTZ APPARATUS



146



**146.—Transparent Silica Flasks.** Flat bottom, Round bottom, Distilling with side tube, Erlenmeyer, Kjeldahl, or Claissen. (When ordering please clearly state the kind and capacity required.)

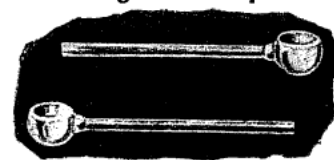
Approx. Capacity. c.c.	A.—Plain Round or Flat Bottom. each.	B.—Distilling Flask, with Side Tube. each.
25	8/6	13/6
50	11/6	16/6
100	15/-	20/-
150	17/6	22/6
200	20/-	25/-
250	22/6	27/6
300	25/-	30/-
400	30/-	35/-
500	35/-	40/-
1000	60/-	70/-

These Flasks can be fitted with Stoppers at an extra charge of 15/- each for sizes up to and including 250 c.c. ; above which size the extra charge is 25/- each.

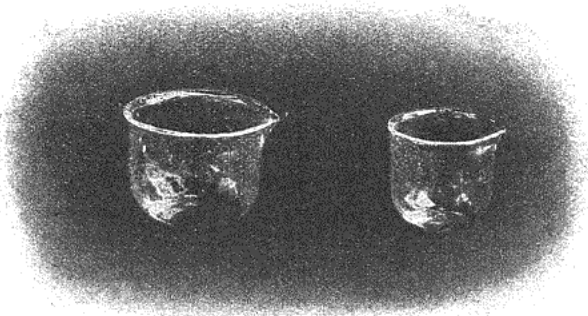
Approx. Capacity. c.c.	C.—Erlenmeyer Flask. each.	D.—Kjeldahl Flask. each.	E.—Claissen Flask. each.
25	10/7	10/7	19/6
50	14/4	14/4	22/6
100	21/-	21/-	30/-
150	24/6	24/6	32/6
200	28/-	28/-	35/-
250	31/6	31/6	37/6
300	35/-	35/-	40/-
400	42/-	42/-	45/-
500	49/-	49/-	50/-
1000	84/-	84/-	85/-

## 149.—Transparent Silica Ignition Spoons.

Fused Quartz Ignition Spoons were originally designed for simple qualitative and quantitative ignitions, but other uses will readily suggest themselves. Length 75 mm.



Price, each .. 2/8



## 147.—Transparent Silica Beakers. Wide form with spout.

	Approximate Capacity, c.c.								
	50	100	150	200	250	300	400	500	
Price, each	19/6	31/6	36/-	40/6	45/-	52/6	60/-	75/-	

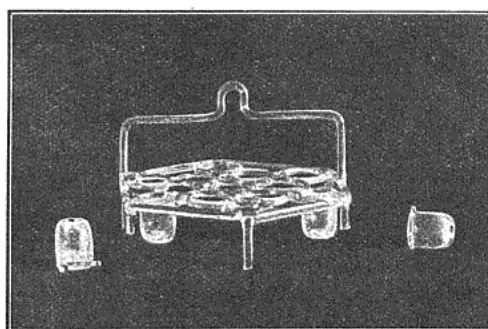
## 148.—Transparent Silica Beakers. Ordinary tall form. Without spout.

	Approximate Capacity, c.c.								
	50	100	150	200	250	300	400	500	
Price, each	19/6	31/6	36/-	40/6	45/-	52/6	60/-	75/-	

## 150.—Transparent Silica Assay Trays and Cups.

Arranged to accommodate 6, 9, 13, or 16 Cups. Complete with .. 6 9 13 16 cups. Price, complete .. 36/- 54/- 79/6 96/-

Trays to hold any number of Cups are charged at the rate of 6/- per Cup (including Cup).



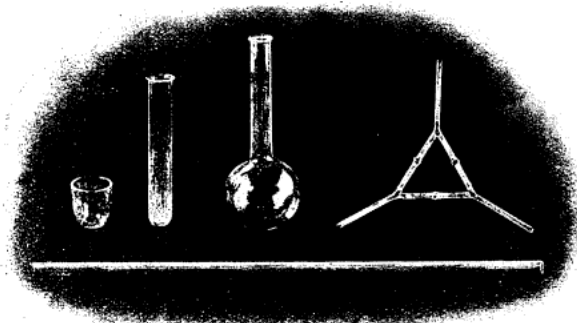
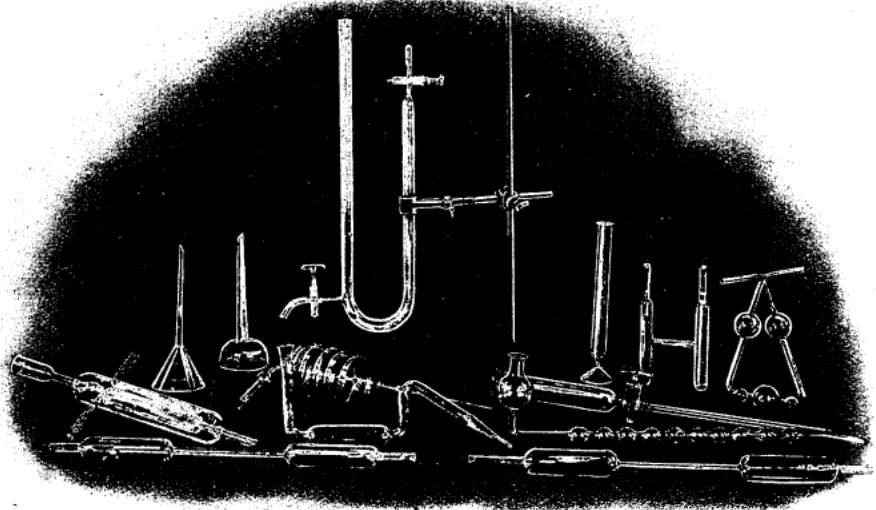
Our stock of pure Chemicals and Acids is very considerable ; hence all orders are executed with the utmost despatch. See comprehensive list at end of Catalogue.



# TRANSPARENT FUSED QUARTZ APPARATUS

In addition to the ordinary forms, almost any piece of Laboratory Apparatus can be made of Transparent Silica.

PRICES ON APPLICATION.



**155.—Transparent Silica Retorts.** With or without stopper. Prices on application.

**156.—Transparent Silica Test Tubes.**

A. Usual Wall Thickness.			B. With Heavy Wall Lipped.			
Bore, in.	Length, ins.	Price, each.	INSIDE DIMENSIONS.	Bore, in.	Length, in.	Price, each.
	4	2/6		4	6/-	
	5	3/6		5	7/2	
	5	5/-		5	9/6	
	6	6/6		6	11/-	
	6	9/-		6	12/9	
	7	11/-		7	14/7	

**151.—Transparent Silica Combustion Boats.** With handle unless otherwise ordered.

Size No.	OUTSIDE MEASUREMENTS (Exclusive of Handle).			Price, each.
	Length, ins.	Width, in.	Depth, in.	
O 1	1 7/8	9/16	1 1/8	3/9
O 2	3	5/8	3/8	6/11
O 3	3	3/4	7/16	7/6
O 4	4	3/4	7/16	9/6

**152.—Transparent Silica Watch Glasses.**

Diameter, mm. . .	40	60	80	100
Price, each . . .	12/6	15/8	22/-	31/3

**153.—Transparent Silica Arsenic Tubes.**

Price 2/- each.

Other Patterns and Particulars on Application.

**154.—Vitresil Tubes (Empty).** For Palladium Asbestos, Orsat-Lunge Gas Analysis Apparatus.

"U" Form.	Triangular Form.
10/- each.	10/- each.

**157.—Transparent Silica Reduction Tubes.**

Cylindrical Bulb, Reduced Ends.

Length of Bulb . . . . .	100	200 mm.
Price, each . . . . .	11/3	17/8

Other Sizes and Particulars on Application.

**158.—Transparent Silica Tubes for Dr. Lessing's Coking Test of Coal.**

Complete Set of Four Pieces.

- (A) Plain Tube, 10/- each.
- (B) Tube with Sidearm near Middle, 12/6.
- (B<sub>1</sub>) Tube with Sidearm near End, 12/6.
- (E) Weight, 9/6.

**159.—Transparent Silica Plates.**

Thickness, in.	Thickness, mm.	Maximum Size.	Price per sq. inch.
1/16	1.5	5" x 5"	1/3
3/16	3	5" x 5"	2/-
3/8	4.5	3" x 3"	2/6

Every requisite for Chemical, Physical, and Bacteriological work supplied, from a test tube to the complete furnishing of the largest laboratory.

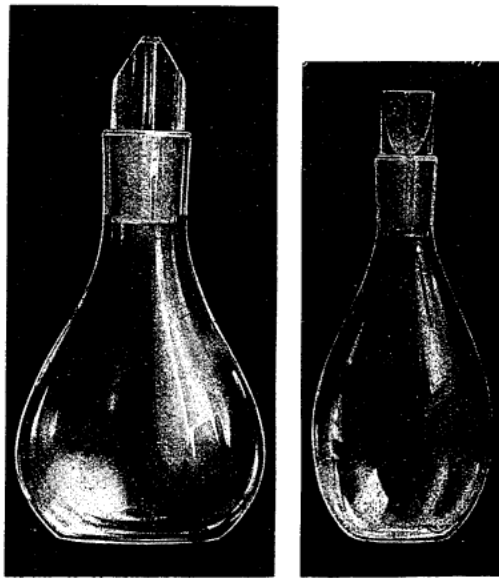
# TRANSPARENT FUSED QUARTZ APPARATUS

**160.—Weight Thermometers**, made of transparent fused silica, for finding the coefficient of dilation of a liquid relative to glass .. .. . each, **3/-**

*Extract from "School World," October, 1908.*—"The use of fused silica for making weight-thermometers offers many advantages. The co-efficient of expansion of this material is so low that the correction for it becomes of very slight importance. Also the fact that it is unaffected by even the most sudden changes of temperature makes it possible to fill the thermometer with any liquid in a small fraction of the time required to fill a glass thermometer. I had some made about a year ago, and although they have been several times in use there has been no case of breakage. It is necessary, of course, to use the *transparent* variety of the material."

Brighton College.

W. BENNETT.



**161.—Transparent Silica Specific Gravity Bottles.**

Capacity .. ..	5	10	25	50 c.c.
Each .. ..	10/6	14/6	30/-	42/-

**164.—Large Transparent Silica Tubing.**

Bore. ins.	Bore. mm.	Stand. Wall Thickness. mm.	Max. Length (in one piece). ins.	Price per inch.
1 3/8	35	Maximum 3.5 mm. Extra price 50%.	18	3/4
1 1/2	38		18	3/9
1 5/8	41		14	4/2
1 7/8	44		12	4/9
1 9/8	48		12	5/3
2	51		9	8/4
2 1/4	57		9	
2 1/2	63		9	
2 3/4	70		9	
3	76		8	
3 1/4	82	Standard and Maximum.	8	
3 1/2	89		8	
3 3/4	95		8	
4	102		8	
4 1/2	114		8	
5	127	6		

PRICES FOR THESE SIZES ON APPLICATION.

**162.—Transparent Silica Tubes.** The maximum wall thickness for tubes from 3 to 20 mm. bore is 2 mm. and over 20 mm. bore 1.5 mm.

Prices of heavier walled tubing on application.

Bore. in.	Bore. mm.	Max. Stand. Wall Thickness, mm.	Max. Stand. Length ins.	Price per foot.
3/2 - 1/16	1-1 1/2	1-2	60	2/-
1/16	1-2	1-2	60	2/6
1/8	3	2	60	3/9
3/16	4	2	60	4/3
1/4	5	2	60	4/9
1/2	6	2	60	5/9
3/4	7	2	60	6/3
1 1/8	8	2	60	6/9
1 1/4	9	2	60	7/3
1 1/2	10	2	60	8/-
1 3/4	11	2	42	10/-
2	12	2	42	12/-
2 1/4	13	2	42	14/-
2 1/2	14	2	42	16/-
2 3/4	15	2	42	18/-
3	16	2	42	19/-
3 1/4	17	2	42	20/-
3 1/2	18	2	42	21/-
3 3/4	19	2	42	22/-
4	20	2	42	24/-
4 1/4	22	1 1/2	24	26/-
4 1/2	25	1 1/2	24	28/-
4 3/4	30	1 1/2	18	34/-

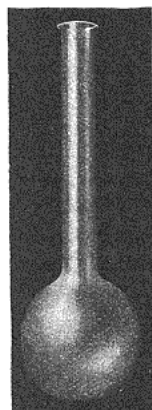
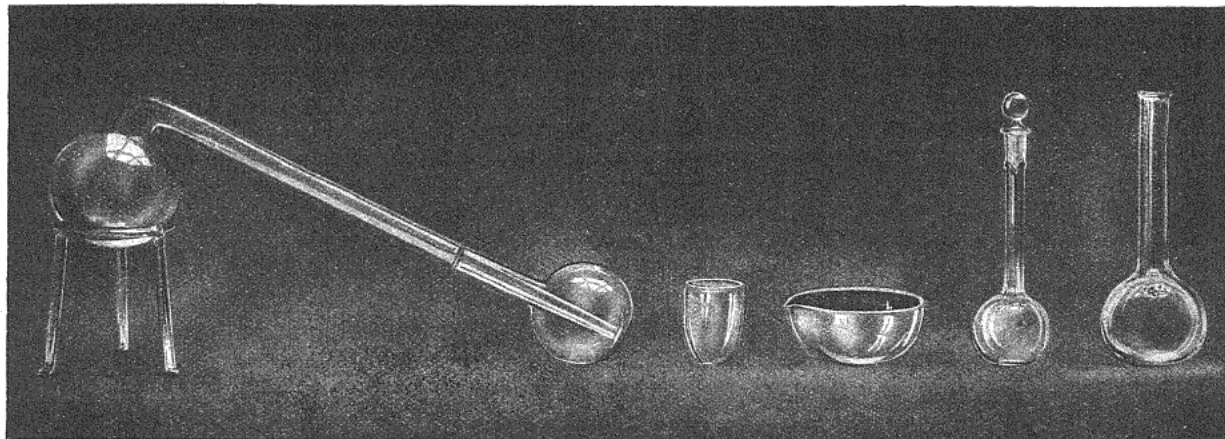
(Special wall thicknesses and lengths can be supplied to order.)

**163.—Transparent Silica Rod.**

(Standard Lengths up to 24".)		Price per foot.
Diameter. in.	Diameter. mm.	
1/2	1	1/-
1/16	2	1/6
1/8	3	2/6
3/16	4	3/6
1/4	5	4/6
5/16	6	5/6
3/8	7	7/6
1/2	9	12/3
5/8	11	18/6

Our Balances and Weights have achieved World-wide Reputation : vide Opinions of the Leading Scientific Press.

# TRANSPARENT FUSED QUARTZ APPARATUS



165



166

**I**N ADDITION to the ordinary forms, **TRANSPARENT SILICA LABORATORY APPARATUS CAN BE MADE TO ALMOST ANY DESIGN**, and we shall be pleased to quote on receipt of sketches or description of the Apparatus required.

## STRIKING PROPERTIES OF FUSED SILICA

It does not crack or fly even when cold water is poured into a red hot basin.

It is acid proof and absolutely insoluble in water. It is 99.8 SiO<sub>2</sub>.

It is constant in weight.

It may generally be used as a substitute for Platinum.

It will stand permanently 1200° C., and for short periods much higher temperatures.

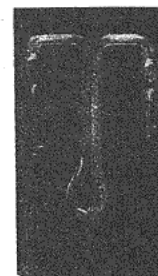
It is one of the best insulators of electricity, and at high temperatures is unequalled.

It is made by British workmen in Britain by a British process.

Enquiries for special apparatus invited.



167



168



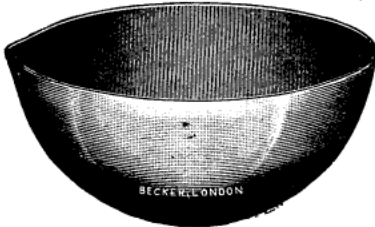
169

Our stock of pure Chemicals and Acids is very considerable; hence all orders are executed with the utmost despatch. See comprehensive list at end of Catalogue.

# NICKEL LABORATORY APPARATUS

BEST QUALITY FOR CHEMICAL WORK.

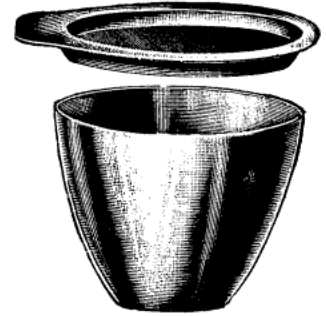
For the new MONEL METAL Crucibles and Basins, see page 294.



170

Diameter	4	5	6	7	8 cm.
Each	2/5	2/9	3/6	4/2	5/6
Per doz.	25/6	30/-	37/6	45/-	60/-

Diam.	10	12	14½	18½	20 cm.
Each	7/2	10/4	17/11	24/9	28/11
Per doz.	78/-	112/6	195/-	270/-	315/-



171. — Nickel Crucibles.  
With covers.

Diam.	2½	3	3½	4	5	6	8	10 cm.
Each	2/9	3/5	3/8	4/5	5/6	7/3	11/9	16/6
Per doz.	30/-	36/9	39/9	48/-	60/-	78/9	127/6	180/-

172. — Nickel Crucibles only. Without covers.

Diam.	2½	3	3½	4	5	6	8	10 cm.
Each	1/10	2/3	2/5	2/11	3/9	5/2	8/8	12/5
Per doz.	19/6	24/-	26/3	31/6	40/6	56/3	94/6	135/-



173

173. — Nickel Spatulas.  
With spoon end.

Length	12	15	18	21 cm.
Each	2/-	2/9	3/2	4/2
Per doz.	21/-	30/-	34/6	45/-



174

174. — Nickel Spatulas.  
With flat ends.

Length	12	15	18 cm.
Each	2/1	2/5	2/7
Per doz.	22/6	25/6	27/9



175

175. — Nickel Spatulas. Flat shape.

Length	7½	9	12	15 cm.
Each	1/1	1/5	2/-	2/3
Per doz.	11/3	15/-	21/-	24/-

176. — Nickel Evaporating Basins. With spouts and wooden handles.

Diam.	7	10	11.5	14	17 cm.
Each	8/9	11/11	15/2	24/9	31/8
Doz.	95/-	130/-	165/-	270/-	345/-

177. — Nickel Basins. Flat, with cover.

Diam.	5.5	6	9	9 cm.
Depth	1.0	1.6	1	1.6 cm.
Each	5/6	6/4	7/4	7/7
Per doz.	60/-	69/-	79/6	82/6

178. — Nickel Triangles. For crucibles.

Size	3	4	5	6	7	8 cm.
Each	1/8	1/10	2/-	2/1	2/4	2/9
Per doz.	18/-	20/-	21/-	22/6	25/-	30/-

181. — Nickel Scoops.

Size	10½ cm.
Each	4/7
Per doz.	50/-

182. — Nickel Gauze.

11/3 per sq. ft.

183. — Nickel Sheet.

No. 20 S.W.G.	
Per oz.	7d.
Per lb.	6/9

184. — Nickel Wire.

Per oz.	9d.
Per lb.	8/8

Please state gauge when ordering.

Every requisite for Chemical, Physical, and Bacteriological work supplied, from a test tube to the complete furnishing of the largest laboratory.

# FILTER PAPERS

To determine quickly which size filter paper is of the most suitable diameter for any particular funnel, the following table will be found useful:—

Diameter of funnel	2½	4	5	6½	7½	9	10	12½	15 cms.
Diameter of filter paper required	5½	7	9½	11½	12½	14	19	25	28 cms.

For **Allnutt's Filter Papers**, see pages 34 and 35, and lower half of page 33.

For **Green's Filter Papers**, see pages 36 to 39, and bottom of page 46.

For **Whatman Filter Papers**, see pages 40 to 45.

For **Muncktell's Filter Papers**, see page 46.



**185.—Original English Filter Papers.** An excellent paper for school Laboratory work. Cut circles in packets of 100. White.

Diameter in cms.	..	..	..	7	9	11	12.5	15	18.5	24	27	32	38.5	50
Diameter in inches	..	..	..	2¾	3½	4¾	5	5¾	7¼	9¼	10¾	12½	15¼	19¾
Price per 100	..	..	..	3d.	4d.	6d.	7d.	10d.	1/5	1/11	2/5	3/3	5/6	6/11
Price per 1,000	..	..	..	2/-	3/-	4/6	5/6	7/6	12/6	17/6	22/6	30/-	50/-	63/-

**186.—Original English Filter Papers**, as above, but in **Sheets**. Size of Sheet, 24 inches by 24 inches. Price per quire, 3/6. Price per ream, Weight .27 lb., £2 4 0.

## ALLNUTT'S DOUBLE WASHED "ASHLESS" FILTER PAPERS.

Allnutt Brand No.	SPECIFICATION.
589(1) ..	Extremely fast, very low ashed, for retaining coarse or gelatinous precipitates. Ashless variety of 604.
589(2)/308 ..	A low ashed paper for the average quantitative work, reliable, efficient and medium speed.
589(3)/308A	A thicker variety of 589(2), a little slower low ash, but retaining the finest precipitates.
590 ..	The double washed variety of 602, slow, very strong, but extremely accurate, very efficient, low ash.

### PRICES (per 1,000).

Diameter in cms.	..	4.5	5.5	7	9	11	12.5	15	18.5	24	
Diameter in inches	..	1¾	2¼	2¾	3½	4¾	4¾	5¾	7¼	9½	
Allnutt Brand No. { 589(1) 589(2)/308 }		5/-	7/-	12/-	17/-	25/-	30/-	35/-	55/-	75/-	Other sizes to order.
Allnutt Brand No. { 589(3)/308A 590 }		6/6	9/6	16/-	22/6	33/6	40/-	46/-	73/-	100/-	" " "

### ACID WASHED CUTTINGS

Allnutt's. Per lb. box .. 5/-

### ADAMS MILK ANALYSIS STRIPS.

Allnutt No. 571. Medium thickness. Remaining fats stamped on back.  
2/6 per 25; 8/6 per 100.

Our Balances and Weights have achieved World-wide Reputation: *vide* Opinions of the Leading Scientific Press.

c

The ash of these papers is stamped on the back of each packet in the case of the Acid Washed papers, and approximate ash on the backs of the Untreated laboratory papers.

Each batch is tested individually, and as each batch varies the recorded ash on the back will also vary.



**MACHINE MADE.**

A great many users seem to want a soft Filter paper; a soft Filter generally means a weak one which is very liable to burst at the point, also a loose texture which generally implies inefficiency. However, softness in handle has absolutely no bearing on filtering qualities.

The variation from sheet to sheet both in thickness and texture, is reduced to a very low minimum in machine-made papers.

**Filter Papers, White.** Allnutt No. 311/595. Weight of Ash stamped on each packet.  
A suitable filter paper for school laboratory work.

Diameter in cms. .. ..	5.5	7	9	11	12.5	15	18.5	24		Per 500 SHEETS 20 x 20 cms. or 18 x 23 cms. Price 31/6
Diameter in inches .. ..	2 $\frac{1}{8}$	2 $\frac{3}{4}$	3 $\frac{1}{2}$	4 $\frac{3}{8}$	4 $\frac{7}{8}$	5 $\frac{7}{8}$	7 $\frac{1}{4}$	9 $\frac{1}{2}$		
Weight of ash in grammes ..	.00052	.00086	.0013	.0021	.0027	.0039	.0059	.0099		
Price per 1,000 .. ..	2/3	3/-	4/3	5/6	6/6	8/6	14/6	21/-		

**Filter Papers.** White. Allnutt No. 311 $\frac{1}{2}$ /597. Weight of ash stamped on each packet.  
A thicker and stronger paper.

Diameter in cms. .. ..	5.5	7	9	11	12.5	15	18.5	24	27	32	38.5	Per 500 SHEETS 20 x 20 cms. or 18 x 23 cms. Price 37/6
Diameter in inches .. ..	2 $\frac{1}{8}$	2 $\frac{3}{4}$	3 $\frac{1}{2}$	4 $\frac{3}{8}$	4 $\frac{7}{8}$	5 $\frac{7}{8}$	7 $\frac{1}{4}$	9 $\frac{1}{2}$	10 $\frac{5}{8}$	12 $\frac{5}{8}$	15 $\frac{7}{8}$	
Weight of ash in grammes ..	.00074	.00128	.00195	.0030	.0040	.0058	.0087	.0144	—	—	—	
Price per 1,000 .. ..	2/9	3/3	4/6	5/9	7/6	9/6	14/9	23/-	25/-	33/6	45/-	

**Filter Papers.** White. Allnutt No. 602. A thin slow strong very reliable paper.  
Retains finest precipitates. Useful with pump.

Diameter in cms. .. ..	5.5	7	9	11	12.5	15	18.5	24	27	32	Per 500 SHEETS 20 x 20 cms. or 18 x 23 cms. Price 30/-
Diameter in inches .. ..	2 $\frac{1}{8}$	2 $\frac{3}{4}$	3 $\frac{1}{2}$	4 $\frac{3}{8}$	4 $\frac{7}{8}$	5 $\frac{7}{8}$	7 $\frac{1}{4}$	9 $\frac{1}{2}$	10 $\frac{5}{8}$	12 $\frac{5}{8}$	
Weight of ash in grammes ..	.00043	.00073	.0012	.0017	.0023	.0032	.0049	.0084	—	—	
Price per 1,000 .. ..	2/3	3/-	4/3	5/6	6/6	8/6	14/6	21/-	22/6	25/6	

**Filter Papers.** White. Allnutt No. 604. Very fast for metallurgical and coarse precipitates.

Diameter in cms. .. ..	5.5	7	9	11	12.5	15	18.5	24	27	32	Per 500 SHEETS 20 x 20 cms. or 18 x 23 cms. Price 40/-
Diameter in inches .. ..	2 $\frac{1}{8}$	2 $\frac{3}{4}$	3 $\frac{1}{2}$	4 $\frac{3}{8}$	4 $\frac{7}{8}$	5 $\frac{7}{8}$	7 $\frac{1}{4}$	9 $\frac{1}{2}$	10 $\frac{5}{8}$	12 $\frac{5}{8}$	
Weight of ash in grammes ..	.00031	.00053	.00082	.0012	.0016	.0023	.0035	.0064	—	—	
Price per 1,000 .. ..	3/6	5/3	6/6	7/9	10/-	12/6	20/-	30/6	32/-	35/9	

**Filter Papers.** White. Allnutt No. 575/309. Nitric acid toughened for use with filter pump.  
If carefully handled can be cleaned and used repeatedly.

Diameter in cms. .. ..	4.5	5.5	7	9	11	12.5	15	18.5	24	
Diameter in inches .. ..	1 $\frac{3}{4}$	2	2 $\frac{3}{4}$	3 $\frac{1}{2}$	4	4 $\frac{7}{8}$	5 $\frac{7}{8}$	7 $\frac{1}{4}$	9 $\frac{1}{2}$	
Price per 1,000 .. ..	2/6	4/-	6/6	9/6	13/6	16/-	18/-	28/-	45/-	

**Drop Reaction Paper.** Allnutt No. 601. A thick very absorbent paper for drop reactions.  
Size of Paper, 7 cms. wide, 23 cms. long. Per packet of 100 .. .. . 2/6

Our stock of pure Chemicals and Acids is very considerable; hence all orders are executed with the utmost despatch. See comprehensive list at end of Catalogue.

## FILTER PAPERS PACKED IN TINS

As so many filters are wasted owing to dirt and wet benches, the Allnutt varieties, described on pages 34 and 35, are now packed in round tins of 100 in all sizes up to 15 cms. at an extra cost as follows:—

Tins to take filters	4.5 cms. diam.	..	Id. per tin.	10d. per 10 tins.
"	5.5	"	.. Id.	1/-
"	7	"	.. 1½d.	1/3
"	9	"	.. 2d.	1/5
"	11	"	.. 2½d.	1/7
"	12.5	"	.. 3d.	1/9
"	15	"	.. 3½d.	2/-

Ashless and single washed, packed in tins free.



MACHINE MADE.

## ALLNUTT'S ROUGH CREPED SURFACE FILTER PAPERS

A new departure in laboratory papers, they have rough creped surface, are very fast, and the thicker varieties are very efficient. Suitable for general laboratory work. Approximate ash given. The Crepe Surface not only increases the speed, but retains the precipitates on the sides as well as at the point, thereby reducing clogging.

Diameter in cms. .. .. .	5.5	7	9	11	12.5	15	18.5	24	27	32	Per 500 SHEETS 20 x 20 cms. or 18 x 23 cms.
Diameter in inches .. .. .	2 1/8	2 3/4	3 1/2	4 3/8	4 7/8	5 7/8	7 1/4	9 1/2	10 5/8	12 5/8	
Thin .. Allnutt No. 3I4 1/2 C	2/-	2/6	3/6	4/6	5/6	7/-	12/6	17/6	18/6	22/6	27/-
Normal .. Allnutt No. 3I4 C	2/9	3/3	4/9	6/6	7/6	9/9	16/-	24/6	25/6	33/6	37/6
Thick .. Allnutt No. 3I4 D	—	7/-	9/-	10/9	12/9	14/9	28/-	43/-	44/-	51/-	60/-
Very thick. Allnutt No. 3I4 E	—	—	12/-	15/-	17/9	22/-	40/9	61/6	63/-	72/-	82/6

**Cream Crepe Filter Papers.** Allnutt No. 3I4 (C2). A very good quality commercial filter paper with a rough crepe surface, for commercial laboratory work, alcohols and foodstuffs. Very largely used for fats and oils.

Diameter in cms. .. .. .	9	11	12.5	15	18.5	24	27	32	38.5	Per 500 SHEETS 20 x 20 cms. or 18 x 23 cms. Price 34/6
Diameter in inches .. .. .	3 1/2	4 3/8	4 7/8	5 7/8	7 1/4	9 1/2	10 5/8	12 5/8	15 1/8	
Price per 1,000 .. .. .	4/3	5/2	6/6	8/4	12/9	19/9	23/-	30/3	40/6	

**Grey Crepe Filter Papers.** Allnutt No. D2/3I5C. Very fast filtering and does not clog so easily as the smooth grey variety. Largely used for commercial laboratory work and for mining purposes. Not recommended for food stuffs or fine chemicals.

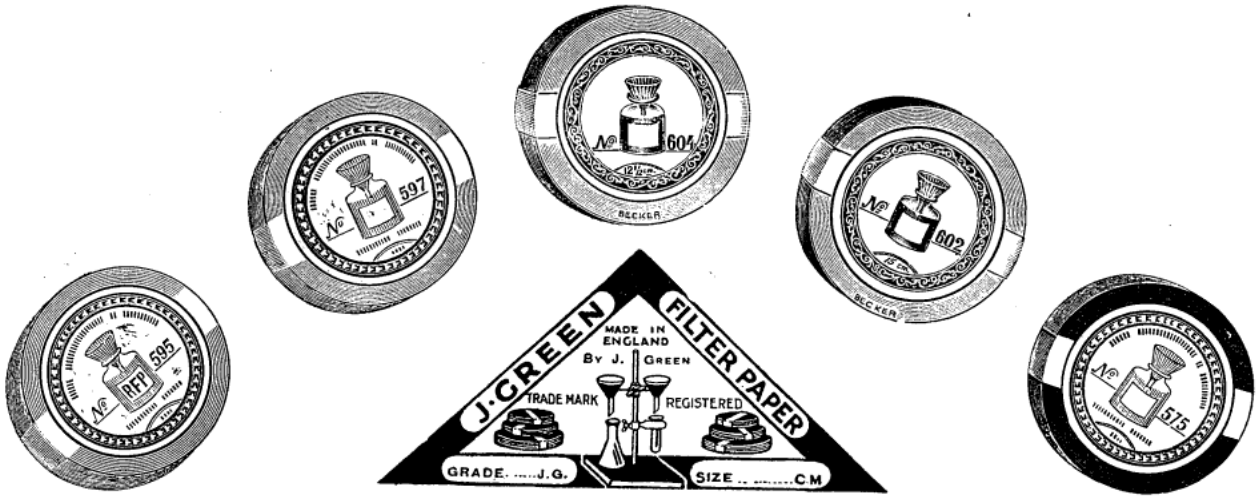
Diam. in cms. .. .. .	7	9	11	12.5	15	18.5	24	27	32	38.5	Per 500 SHEETS 20 x 20 cms. or 18 x 23 cms. Price 37/6
Diam. in inches .. .. .	2 3/4	3 1/2	4 3/8	4 7/8	5 7/8	7 1/4	9 1/2	10 5/8	12 5/8	15 1/8	
Price per 1,000 .. .. .	3/-	3/6	4/-	5/-	7/9	12/-	19/-	22/-	28/9	37/6	

**SINGLE WASHED "ASHLESS" FILTER PAPERS.** Packed in tins. No charge for tins. Except that these papers are single washed the specifications are same as double washed. (See page 33.)

Allnutt Brand No.	Diam. in cms. Diam. in inches	4.5 1 3/4	5.5 2	7.0 2 3/4	9 3 1/2	11 4 3/8	12.5 4 7/8	15 5 7/8	18.5 7 1/4	24 9 1/2	For Double Washed, see page 33.
1F/308 1/2	Price per 1,000	2/6	4/-	6/6	9/6	13/6	16/-	18/-	28/-	45/-	Other sizes to order " " "
2/308 1/2 A	" " "	3/6	5/6	8/6	12/6	17/6	20/-	24/6	36/6	57/6	
No. 3, Price as No. 1F. No. 0, Price as No. 2.											

All the above "ASHLESS" papers have the ash STAMPED, not printed, on the back, each batch being separately tested. In the fat extracted papers, the remaining fats that can be extracted in a Soxhlet for 3 hours are also shown.





FOR PRICES OF BRITISH FILTER PAPERS  
**J.G. Nos. 595, 597, 604, 598, 602, 575, 574, and 572, etc.,**  
 See pages 38 and 39.



**ACID WASHED**  
**BRITISH**  
**FILTER PAPERS**  
 "ASHLESS"  
 "J.G." Brand.



<b>ASHLESS FILTER PAPERS, J.G. 589/2 (White Band), Acid Washed.</b>						
Diameter, cms. . . . .	5.5	7	9	11	12.5	15
Diameter, inches. . . . .	2 $\frac{1}{4}$	2 $\frac{3}{4}$	3 $\frac{1}{2}$	4 $\frac{3}{4}$	5	5 $\frac{7}{8}$
Weight of ash in grammes . . . . .	.00005	.00008	.00014	.00020	0.00026	.00037
Price per 100 . . . . .	1/9	2/-	3/-	3/6	4/6	6/-
Price per 1000 . . . . .	14/-	15/-	24/-	28/-	36/-	48/-
<b>ASHLESS FILTER PAPERS, J.G. 589/1 (Black Band) and 589/3 (Blue Band).                      SAME PRICES AS J.G. 589/2.</b>						

For <b>ALLNUTT'S FILTER PAPERS</b> , see pages 34 and 35, and lower half of page 33. For <b>GREEN'S FILTER PAPERS</b> , see pages 36 to 39, and bottom of page 46.	For <b>WHATMAN FILTER PAPERS</b> , see pages 40 to 45. For <b>MUNCKTELL'S FILTER PAPERS</b> , see page 46.
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Our Balances and Weights have achieved World-wide Reputation : *vide* Opinions of the Leading Scientific Press.

HAND MADE



HAND MADE

DETAILS OF "J.G." BRAND

# BRITISH FILTER PAPERS

LISTED ON PAGES 38 AND 39 INCLUSIVE.

WEIGHT OF ASH IN GRAMMES OF HAND MADE FILTER CIRCLES.										
	5.5 cm.	7 cm.	8 cm.	9 cm.	11 cm.	12.5 cm.	15 cm.	18.5 cm.	24 cm.	27 cm.
<b>J.G. 575</b>	·00035	·00057	·00074	·00094	·0014	·0018	·0026	·0040	·0067	·0084
<b>J.G. 595</b>	·00045	·00073	·00095	·0012	·0018	·0023	·0034	·0051	·0086	·0108
<b>J.G. 597</b>	·000825	·0013	·00175	·0022	·0033	·00426	·0061	·0093	·0157	·0199
<b>J.G. 598</b>	·00127	·0020	·0027	·0034	·0051	·0066	·0095	·0144	·0243	·0307
<b>J.G. 602</b>	·000875	·0014	·00185	·0023	·0035	·00452	·0065	·0099	·0166	·0211
<b>J.G. 604</b>	·00050	·00081	·00106	·0013	·0020	·0026	·0037	·0056	·0095	·0120

The above records of Ash are worked from the results of Analyses made by some well-known County Analysts.

## RESULTS OF ANALYSES Of "J.G." Brand Hand Made British Filter Papers.

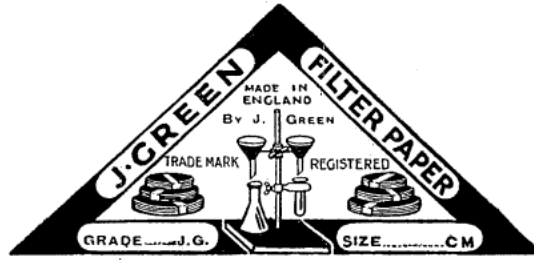
Size of each circle = 11 cm.

Description of paper analysed.	No. 595. Sept. make.	No. 575. Sept. make.	No. 597. Sept. make.	No. 598. July make.	No. 602. July make.	No. 604. Sept. make.
	Good light paper with plain surface. Medium standard quality.	Hardened paper suitable for pump and for fine precipitates.	A stouter paper, filters rapidly, standard quality for analysis.	A soft and extra thick paper suitable for fine precipitates.	A dense and hard paper for fine precipitates.	Soft and similar to 597, adapted for rapid filtration.
Average Weight of each Circle in grams. Number of Filters used.	·5958 (25 taken).	·8007 (25 taken).	·7616 (15 taken).	1·5161 (15 taken).	·7896 (15 taken).	·8465 (15 taken).
Per cent. of Moisture in the Filter Paper.	7·21%	8·26%	7·37%	8·36%	7·54%	8·13%
Ash per cent. on the Filter Paper. Do. on Dry Substance.	·303% ·326%	·177% ·193%	·431% ·465%	·337% ·368%	·448% ·485%	·234% ·255%
ASH FOR EACH CIRCLE. Mean Results in grams =	·001804 ·0018	·00142 ·0014	·00328 ·0033	·00511 ·0051	·00354 ·0035	·00198 ·0020
Packed with :—	Slate-coloured Band.	Red band.	Lavender-coloured Band.	Yellow Band.	Buff-coloured Band.	Salmon-coloured Band.

For Prices see pages 38 and 39.

Our stock of pure Chemicals and Acids is very considerable ; hence all orders are executed with the utmost despatch. See comprehensive list at end of Catalogue.

**BRITISH  
 FILTER  
 PAPERS  
 (HAND MADE).**



**BRITISH  
 FILTER  
 PAPERS  
 (HAND MADE)**

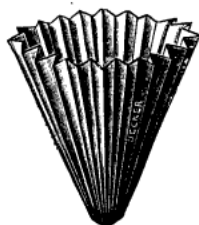
**PRICES.**

*Quantities of less than 1,000 charged for at the rate per 100.*

SIZE		J.G. 595		J.G. 597 and 604		J.G. 598 and 591		J.G. 575		J.G. 574 FILTER CONES		J.G. 602		J.G. 207 "WASHED" Replacing Max Dreverhoff Paper	
Cms.	Inches	per 100	per 1000	per 100	per 1000	per 100	per 1000	per 100	per 1000	per 100	per 1000	per 100	per 1000	per 100	per 1000
5.5	2 1/4	5d.	4/-	7d.	5/-	5d.	4/-	7d.	5/-	2/10	25/10	8d.	6/-	1/-	8/-
7	2 3/4	5d.	4/-	7d.	5/-	5d.	4/-	7d.	5/-	3/1	27/10	8d.	6/-	1/2	10/-
9	3 1/2	9d.	7/-	11d.	8/-	10d.	7/6	1/-	9/-	4/3	38/7	1/-	9/-	1/6	13/-
11	4 3/8	11d.	8/6	1/1	9/6	1/4	12/-	1/5	13/-	5/3	47/2	1/3	11/-	2/-	18/-
12.5	5	1/4	12/-	1/4	12/3	1/7	14/6	1/10	17/-	5/8	51/7	1/5	13/-	2/4	21/-
15	5 7/8	1/9	16/-	1/9	16/-	2/2	20/-	2/9	25/-	6/10	62/1	2/-	18/-	3/1	28/-
18.5	7 1/4	2/5	22/-	2/11	27/-	4/2	38/-	3/11	36/-	8/8	79/4	3/4	30/-		
24	9 1/2	3/9	34/6	4/8	42/-	5/4	48/-	6/-	54/-	13/6	122/2	5/1	46/-		
27	10 3/8	5/2	47/-	6/2	56/-	6/7	60/-	8/10	80/-			6/10	62/-		
32	12 1/2	7/-	64/-	8/5	75/-	10/7	96/-	12/1	110/-			9/3	84/-		
38.5	15 1/4	10/1	91/-	10/6	95/-	15/2	138/-	14/3	130/-			11/7	105/-		
50	19 3/4	15/2	138/-	15/2	138/-	17/7	160/-	19/10	180/-			16/6	150/-		
<b>IN SHEETS</b>		per 1000		per 1000		per 1000		per 1000				per 1000			
45 x 50 cms. } 18 x 23 ins. }		138/-		138/-		160/-		180/-				150/-			
*51 x 51 cms. } 20 x 20 ins. }		138/-		138/-		160/-		180/-		*Can be made to order.		150/-			
*43 x 43 cms. } 17 x 17 ins. }		—		—		—		—				—			
*38 x 38 cms. } 15 x 15 ins. }		—		—		—		—		150 lbs. of a sort minimum		—			

**For full details of "J.G." Brand British Filter Papers, Weight of Ash, Results of Analyses, etc., see page 37.**

**Every requisite for Chemical, Physical, and Bacteriological work supplied, from a test tube to the complete furnishing of the largest laboratory.**



PRICES OF  
**BRITISH FOLDED FILTER PAPERS,  
SOXHLET THIMBLES, ETC.**  
"J.G." BRAND.



For full details of "J.G." Brand British Filter Papers, Weight of Ash, Results of Analyses, etc., see p. 37.

Folded Circles								
<i>All these Filters are folded by hand, thus ensuring that each Filter is properly examined before packing. No folding machine is used.</i>								
SIZE OF CUT CIRCLES	J.G. 588		J.G. 598 $\frac{1}{2}$		J.G. 605		J.G. 575 $\frac{1}{2}$	
	PRICE		PRICE		PRICE		PRICE	
	per 100	per 1000	per 100	per 1000	per 100	per 1000	per 100	per 1000
Cms. 12.5	2/9	25/-	3/3	30/-	3/3	30/-	3/2	29/-
" 15	3/2	29/2	3/10	35/-	3/10	35/-	4/2	38/6
" 18.5	4/7	41/3	5/6	50/-	5/6	50/-	5/9	52/-
" 24	6/5	57/9	7/8	70/-	7/8	70/-	8/-	73/-
" 27	8/3	74/10	9/9	88/-	9/9	88/-	11/8	106/-
" 32	10/7	95/9	12/8	115/-	12/8	115/-	15/8	142/-
" 38.5	13/3	121/-	16/-	145/-	16/-	145/-	18/6	168/-
" 40	13/11	126/6	16/9	152/-	16/9	152/-	19/10	180/-
" 50	18/6	168/4	22/3	202/-	22/3	202/-	25/1	228/-

The above FOLDED FILTERS are supplied in boxes, each box containing 100 Filters, packed 5 Filters per packet.

Soxhlet Thimbles				
J.G. 603		BOXED In 25's		DOUBLE THICKNESS
SIZE		PRICE		
Diam. mm.	Height mm.	per 25	per 250	Any of these can be made double thickness at double prices.
10	50	8/-	—	
16	100	8/-	—	
19	90	8/-	—	
22	80	8/-	—	
26	60	8/-	—	
25	80	8/-	—	
25	90	10/-	—	
25	100	11/-	—	
28	80	8/-	—	
28	118	12/-	—	
29	50	8/-	—	
30	80	8/-	—	
30	100	11/-	—	
33	80	8/-	—	
33	94	11/-	—	
33	118	14/-	—	
35	150	16/-	—	
40	85	14/-	—	
43	123	16/-	—	
45	50	8/-	—	
53	145	26/-	—	
60	180	28/-	—	

**J.G. 500 $\frac{1}{2}$ . FOLDED PAPERS,** similar to CHARDIN'S "AGAR-AGAR" PAPER.  
Per box of 25, size 50 cms. .. .. . 5/6  
Per box of 30, size 34 cms. .. .. . 5/6

**J.G. 500.** Same as above, but in the flat.  
50 cms. circles .. .. . 292/6 per 1000  
50 cms. squares .. .. . 299/- per 1000  
36 cms. squares .. .. . 195/- per 1000

**J.G. 296. MICRO BLOOD PAPER,** in boxes of 500 pieces.  
Starch free. 1 inch  $\times$   $\frac{5}{8}$  inch (25  $\times$  15 mms.), per box 10/11

**J.G. 571. STRIPS FOR MILK ANALYSIS.**  
22 inches  $\times$  2 $\frac{1}{2}$  inches (560  $\times$  65 mms.) .. per 100 strips 15/7

**J.G. 601. DROP REACTION PAPER.**  
14  $\times$  22 cms. Boxed in 100's .. per 100 sheets 12/11  
per 1000 sheets 117/-

**J.G. 280. LABORATORY MATS,** for crystal drying, etc.  
11 cms. diameter, in packets of 100. 11/8 per 100. 87/9 per 1000.

**J.G. 255. SOFT DRYING PAPER.**—To replace the foreign make for drying and pressing plants, etc. Similar to DUMAS papers.  
Sheets 45  $\times$  59 cms. .. .. . per ream 51/3

**J.G. 576.—Crystal Drying Trays.** 3 mms.  $\times$  110 mms.  
per box of 25 trays 14/8

**J.G. 255.—Soft Drying Paper.**  
Very absorbent, for drying and pressing plants. In sheets 45  $\times$  59 cms.  
per ream 51/3

Our Balances and Weights have achieved World-wide Reputation ; vide Opinions of the Leading Scientific Press.

# WHATMAN

## High Grade FILTER PAPERS

### FILTRATION TESTS UPON VARIOUS GRADES OF WHATMAN FILTER PAPERS

#### Conditions of Tests :

Size of circle=15 cm. C.c. of water=100. Temperature of water=68° F. (20° C.).

Whatman Paper No. ..	1	2	3	4	5	30	31	40	41
Filtration time in seconds	50-80	60-90	80-120	20-35	110-140	70-100	20-40	40-60	20-35

*Each of the above tests was carried out on a simple folded Filter, keeping a constant head of water.*



**Whatman No. 1 Filter Paper.**—A high-grade Filter Paper for general qualitative work, and for filtering ordinary precipitates when the ash weight of the paper is of no consequence. A 15 cm. filter requires 50-80 seconds to filter 100 ccs. of water. Widely used in Sugar Laboratories and for the filtration of yellow Ammonium Phospho-Molybdate after digestion, in determining phosphorus in fertilizers.

**Whatman No. 1.**  
 In sheets 18½ in. × 22½ in. Price 50/- per ream.  
 11/- per 100 sheets.

Diam. in cm. ..	4.25	5.5	7	9	11	12.5	15	18.5	24	27	32	38.5	40	50
Diam. in inches ..	1⅞	2¼	2¾	3½	4⅜	5	5⅞	7¼	9½	10⅞	12½	15¼	15¾	19⅞
Ash per circle in grammes ..	.00026	.00043	.00073	.0012	.00175	.0023	.00326	.00496	.00835	.0106	.0148	.0215	.0233	.0364
Price per box (100 circles) ..	4d.	5d.	6d.	7d.	9d.	1/-	1/3	1/9	3/-	3/8	5/8	6/10	7/9	10/10

**Whatman No. 2 Filter Paper.** A qualitative paper similar to No. 1, but stouter, retaining fine precipitates. This is THE STANDARD GRADE FOR ANALYTICAL PURPOSES. Widely used in the qualitative analysis of the alkaline earths, and in general, where fine precipitates of crystalline nature are to be filtered. Especially applicable to Fertilizer, Cement, Steel, and Ore Analysis.

*For gelatinous and large-particle precipitates, see Grade No. 4—page 41.*

**Whatman No. 2.**  
 In sheets, 8½ in. × 22½ in. Price 76/9 per ream.  
 17/- per 100 sheets.



Diam. in cm. ..	4.25	5.5	7	9	11	12.5	15	18.5	24	27	32	38.5	40	50
Diam. in inches ..	1⅞	2¼	2¾	3½	4⅜	5	5⅞	7¼	9½	10⅞	12½	15¼	15¾	19⅞
Ash per circle in grammes ..	.00031	.00051	.00086	.0073	.002	.0027	.0038	.0058	.0098	.0125	.0175	.025	.0275	.045
Price per box (100 circles) ..	5d.	6d.	8d.	10d.	1/-	1/4	1/10	2/7	4/4	5/4	8/2	9/10	11/3	14/10

Our stock of pure Chemicals and Acids is very considerable ; hence all orders are executed with the utmost despatch. See comprehensive list at end of Catalogue.

# BRITISH FILTER PAPERS

## WHATMAN BRAND



**Whatman No. 3 Filter Paper.**—A very stout filter paper for general qualitative work. Slightly slower than No. 2, but very retentive. Will withstand considerable washing. Especially suited for fine precipitates, such as Metastannic Acid, Calcium Oxalate and Ammonium Phospho-Molybdate. Very satisfactory for filtering the solution of a fusion made with Eschka's mixture in determining Sulphur in coal and coke; can also be used in recovering small quantities of Silver in the form of Chloride.

### Whatman No. 3.

In sheets, 18½ in. × 22½ in. Price 114/6 per ream.  
 25/3 per 100 sheets.

Diam. in cms. ..	4.25	5.5	7	9	11	12.5	15	18.5	24	27	32	38.5	40	50
Diam. in inches ..	1⅝	2¼	2¾	3½	4⅝	5	5⅝	7¼	9½	10⅝	12½	15¼	15¾	19⅝
Ash per circle in grammes ..	.00057	.00094	.0016	.0025	.0038	.0050	.0071	.011	.018	.0231	.0323	.047	.051	.0794
Price per box (100 circles) ..	8d.	10d.	1/-	1/3	1/6	1/10	2/7	3/8	6/3	7/8	11/8	14/-	16/-	21/3

**Whatman No. 4 Filter Paper.**—A soft paper of more open texture than the preceding grades. Extremely rapid, but not recommended for use with the finest precipitates for which purpose No. 2 or 3 should be employed. Especially adapted for the rapid filtration of gelatinous and large-particle precipitates such as Ferric Hydroxide and Aluminium Hydroxide; also useful for Pharmaceutical purposes, such as the filtration of fruit juices, syrups, oils, etc. Widely used in Copper and other Ore Mining, Sugar and Cement Laboratories.

### Whatman No. 4.

In sheets, 18½ × 22½ in. Price 98/6 per ream.  
 21/9 per 100 sheets.



Diam. in cms. ..	4.25	5.5	7	9	11	12.5	15	18.5	24	27	32	38.5	40	50
Diam. in inches ..	1⅝	2¼	2¾	3½	4⅝	5	5⅝	7¼	9½	10⅝	12½	15¼	15¾	19⅝
Ash per circle in grammes ..	.00023	.00038	.00061	.0010	.0015	.0019	.0028	.0043	.0072	.0091	.013	.0186	.02	.0314
Price per box (100 circles) ..	7d.	8d.	9d.	1/-	1/3	1/7	2/3	3/3	5/6	6/8	10/2	12/3	14/-	18/6



**Whatman No. 5 Filter Paper.**—A very tough hard paper of close texture that will retain the finest precipitates, such as Barium and Lead Sulphates even when freshly precipitated. Especially suited for use with solutions which are filtered with difficulty and for vacuum filtration with the Buchner funnel, etc.

### Whatman No. 5.

In sheets, 18½ in. × 22½ in. Price 78/- per ream.  
 17/3 per 100 sheets.

Diam. in cms. ..	4.25	5.5	7	9	11	12.5	15	18.5	24	27	32	38.5	40	50
Diam. in inches ..	1⅝	2¼	2¾	3½	4⅝	5	5⅝	7¼	9½	10⅝	12½	15¼	15¾	19⅝
Ash per circle in grammes ..	.00031	.00051	.00086	.0013	.002	.0027	.0038	.0058	.0098	.0125	.0175	.025	.0275	.045
Price per box (100 circles) ..	5d.	6d.	8d.	10d.	1/-	1/4	1/10	2/9	4/5	5/4	8/3	10/-	11/4	15/-

Every requisite for Chemical, Physical, and Bacteriological work supplied, from a test tube to the complete furnishing of the largest laboratory.

# BRITISH FILTER PAPERS

## WHATMAN BRAND.



**Whatman No. 30 Filter Paper.**—A single acid-washed paper of low ash content, which is retentive. Very satisfactory for the filtration of Ammonium Phospho-Molybdate, Barium Sulphate when properly precipitated, for volumetric Lime determinations and for general quantitative work when the lowest ash is not important. Extensively used in Cement and Metallurgical Laboratories. For greater filtering speed, but not for use with fine precipitates, see Grade No. 31.

**ACID WASHED.**

Diam. in cms. . . . .	4.25	5.5	7	9	11	12.5	15	18.5	24	Larger sizes to special order only.
Diam. in inches . . . . .	1 $\frac{5}{8}$	2 $\frac{1}{4}$	2 $\frac{3}{4}$	3 $\frac{1}{2}$	4 $\frac{3}{8}$	5	5 $\frac{7}{8}$	7 $\frac{1}{4}$	9 $\frac{1}{2}$	
Ash per circle in grammes . . . . .	.000041	.000076	.00012	.0002	.0003	.00039	.00056	.00086	.00144	
Price per box (100 circles)	1/-	1/4	1/8	2/3	3/-	3/8	4/8	6/8	11/9	

**Whatman No. 31 Filter Paper.** A single acid-washed paper, similar to No. 30, but more open in texture, making it more rapid. On account of its extreme rapidity it is not recommended for the finest precipitates. Suitable for the very rapid filtration of gelatinous and large-particle precipitates, for volumetric determinations of Phosphates, for Silicon in Iron analysis, and general rapid quantitative separations where the lowest ash is not essential. Extensively used in Metallurgical Laboratories.



**ACID WASHED.**

Diam. in cms. . . . .	4.25	5.5	7	9	11	12.5	15	18.5	24	Larger sizes to special order only.
Diam. in inches . . . . .	1 $\frac{5}{8}$	2 $\frac{1}{4}$	2 $\frac{3}{4}$	3 $\frac{1}{2}$	4 $\frac{3}{8}$	5	5 $\frac{7}{8}$	7 $\frac{1}{4}$	9 $\frac{1}{2}$	
Ash per circle in grammes . . . . .	.000041	.000076	.00012	.0002	.0003	.00039	.00056	.00086	.00144	
Price per box (100 circles) . . . . .	1/-	1/4	1/8	2/3	3/-	3/8	4/8	6/8	11/9	



**Whatman No. 40 Filter Paper ("Ashless").**—A double acid-washed paper of very low ash, all mineral matter possible having been removed by treatment with hydrochloric and hydrofluoric acids. This is the STANDARD DOUBLE-WASHED GRADE FOR ANALYTICAL PURPOSES. Excellently suited for Barium Sulphate when properly precipitated and filtered hot, also for Lead Sulphate, and for crystalline precipitates, such as Magnesium-Ammonium Sulphate, etc. For precipitates that ordinarily are difficult to filter, see Grade No. 42, page 43.

**ACID WASHED.**

Diam. in cms. . . . .	4.25	5.5	7	9	11	12.5	15	18.5	24
Diam. in inches . . . . .	1 $\frac{5}{8}$	2 $\frac{1}{4}$	2 $\frac{3}{4}$	3 $\frac{1}{2}$	4 $\frac{3}{8}$	5	5 $\frac{7}{8}$	7 $\frac{1}{4}$	9 $\frac{1}{2}$
Ash per circle in grammes . . . . .	.000017	.000028	.000046	.000076	.00011	.00015	.00021	.00035	.00054
Price per box (100 circles) . . . . .	1/8	2/3	2/11	4/3	5/-	5/8	6/8	8/10	15/-

Our Balances and Weights have achieved World-wide Reputation ; *vide* Opinions of the Leading Scientific Press.



# BRITISH FILTER PAPERS

## WHATMAN BRAND.



**Whatman No. 41 Filter Paper ("Ashless").**—A double acid-washed paper, similar to No. 40, but more open in texture and therefore filters more rapidly. Suitable for Iron, Alumina and other gelatinous precipitates which can be filtered quickly and washed rapidly and easily. Widely used in determining Silicon in Iron and Steel analysis. Not recommended where retention of fine precipitates is required (or desired).

For fine precipitates use either No. 40 or No. 42.

**ACID WASHED.**

Diam. in cms. .. .. .	4.25	5.5	7	9	11	12.5	15	18.5	24
Diam. in inches .. .. .	1 $\frac{5}{8}$	2 $\frac{1}{4}$	2 $\frac{3}{4}$	3 $\frac{1}{2}$	4 $\frac{3}{8}$	5	5 $\frac{7}{8}$	7 $\frac{1}{4}$	9 $\frac{1}{2}$
Ash per circle in grammes .. .. .	.000017	.000028	.000046	.000076	.00011	.00015	.00021	.00035	.00054
Price per box (100 circles) .. .. .	1/8	2/3	2/11	4/3	5/-	5/8	6/8	8/10	15/-

**Whatman No. 42 Filter Paper ("Ashless").**—A double acid-washed paper, similar to No. 40, but much harder and extremely close in texture. On account of its close texture it is recommended for use with the filter pump and as folded filters where possible. Especially adapted for the finest precipitates which tend to pass through the filter paper, such as Barium Sulphate when precipitated in cold solution, and in general for precise analytical work where speed is not important. Entirely free from Starch, and is **neutral** in Reaction.



**ACID WASHED.**

Diam. in cms. .. .. .	4.25	5.5	7	9	11	12.5	15	18.5	24
Diam. in inches .. .. .	1 $\frac{5}{8}$	2 $\frac{1}{4}$	2 $\frac{3}{4}$	3 $\frac{1}{2}$	4 $\frac{3}{8}$	5	5 $\frac{7}{8}$	7 $\frac{1}{4}$	9 $\frac{1}{2}$
Ash per circle in grammes .. .. .	.000011	.000017	.000027	.000046	.000068	.000089	.00013	.0002	.00033
Price per box (100 circles) .. .. .	1/8	2/3	2/11	4/3	5/-	5/8	6/8	8/10	15/-



**Whatman No. 43 Filter Paper ("Ashless").**—A double acid-washed paper, of the same stock as No. 40, but having been subjected to an additional chemical process which renders it **FAT-FREE**. Especially suitable for the recovery of the ether extract in the Roese-Gottlich Fat Test, and in general for any purposes requiring a fat-free paper.

**ACID WASHED.**

Diam. in cms. .. .. .	4.25	5.5	7	9	11	12.5	15	18.5	24
Diam. in inches .. .. .	1 $\frac{5}{8}$	2 $\frac{1}{4}$	2 $\frac{3}{4}$	3 $\frac{1}{2}$	4 $\frac{3}{8}$	5	5 $\frac{7}{8}$	7 $\frac{1}{4}$	9 $\frac{1}{2}$
Ash per circle in grammes .. .. .	.000017	.000028	.000046	.000076	.00011	.00015	.00021	.00035	.00054
Price per box (100 circles) .. .. .	2/6	3/4	3/8	5/4	6/4	7/-	8/10	12/6	21/6

Our stock of pure Chemicals and Acids is very considerable ; hence all orders are executed with the utmost despatch. See comprehensive list at end of Catalogue.

# BRITISH FILTER PAPERS

## WHATMAN BRAND



**Whatman No. 44 Filter Paper ("Ashless").**—A double acid-washed paper of thinner substance and lower ash content than the preceding numbers. It will retain the finest precipitates, but is slower in filtration than No. 40. No. 44 is recommended for use when the GREATEST POSSIBLE DEGREE OF ACCURACY in quantitative work is required. Entirely free from Starch and is **neutral** in Reaction.

**ACID WASHED.**

Diam. in cms. .. .. .	4.25	5.5	7	9	11	12.5	15	18.5	24
Diam. in inches .. .. .	1 $\frac{5}{8}$	2 $\frac{1}{4}$	2 $\frac{3}{4}$	3 $\frac{1}{2}$	4 $\frac{3}{8}$	5	5 $\frac{7}{8}$	7 $\frac{1}{4}$	9 $\frac{1}{2}$
Ash per circle in grammes .. .. .	.000009	.000016	.000025	.000042	.000062	.00008	.00012	.00018	.0003
Price per box (100 circles) .. .. .	2/6	3/4	3/8	5/4	6/4	7/-	8/10	12/6	21/6

**Whatman No. 50 Filter Paper.**—A paper specially hardened by treatment with Nitric Acid. Very tough, will resist great pressure, and retain the very finest precipitates. Can be used repeatedly, the hard smooth surface permitting precipitates to be scraped or washed off without injury to the paper.

Especially recommended for use with vacuum. Suitable for very fine precipitates and for filtering corrosive liquids such as Acids and strong Alkalies. Should be used when it is desired to transfer a precipitate without ignition.

Widely used for filtering Biological products, as the hardened surface prevents contamination of the filtered product by particles of paper when scraped off. Can be used as a substitute for Platinum cones, and as supports for large folded filters to prevent them bursting at the points. This paper resists a pressure of 2 to 3 atmospheres when moist.



**ACID WASHED.**

Diam. in cms. ..	4.25	5.5	7	9	11	12.5	15	18.5	24	27	32	38.5	40	50
Diam. in inches ..	1 $\frac{5}{8}$	2 $\frac{1}{4}$	2 $\frac{3}{4}$	3 $\frac{1}{2}$	4 $\frac{3}{8}$	5	5 $\frac{7}{8}$	7 $\frac{1}{4}$	9 $\frac{1}{2}$	10 $\frac{5}{8}$	12 $\frac{1}{2}$	15 $\frac{1}{4}$	15 $\frac{3}{4}$	19 $\frac{5}{8}$
Ash per circle in grammes ..	.00023	.00038	.00061	.001	.0015	.0019	.0028	.0043	.0072	.0091	.013	.0186	.02	.0314
Price per box (100 circles) .. .. .	1/8	2/3	2/11	4/3	5/-	5/8	6/8	8/10	15/-	18/-	28/-	34/-	39/-	51/6



**Whatman Extraction Thimbles (Seamless).**—Made from the same material as WHATMAN Filter Papers and rendered fat-free by special chemical process. Can be used repeatedly. For the extraction of soaps, fats, food, rubber, etc.

These Thimbles can also be supplied in Double Thickness, which will not permit the finest substances to pass through.



Inside diam. in mm.	10	19	22	26	25	30	30	33	25	25	30	33	33	43
Height in mm. ..	50	90	80	60	80	77	80	80	90	100	100	94	118	123
Price per box of 25 SINGLE THICKNESS .. .. .	7/9	7/9	7/9	7/9	8/9	8/9	8/9	8/9	10/-	10/9	10/9	10/9	15/-	17/6
Price per box of 25 DOUBLE THICKNESS .. .. .	13/-	13/-	13/-	13/-	14/6	14/6	14/6	14/6	17/-	18/3	18/3	18/3	25/-	29/3

# BRITISH FILTER PAPERS

## WHATMAN BRAND.



### Whatman No. 29 Black Filter Papers.

Used for filtering light coloured sediments. The most minute trace of light coloured sediment is easily perceptible.

Diam. in cms. .. ..	5.5	7	9	11	12.5	15.0	18.5
Diam. in inches .. ..	2 $\frac{1}{4}$	2 $\frac{3}{4}$	3 $\frac{1}{2}$	4 $\frac{3}{8}$	5	5 $\frac{7}{8}$	7 $\frac{1}{4}$
Price per box of 100 circles	10d.	1/-	1/3	1/6	1/10	2/7	3/8



### Whatman No. 12 Folded Filters.

For those who prefer this style of Filter. Largely used in Pharmaceutical work for filtering fluid extracts and tinctures. They are made from the best materials and are free from acid.

Diam. in cms. .. ..	12.5	15	18.5	24	32	38.5	50
Diam. in inches .. ..	5	5 $\frac{7}{8}$	7 $\frac{1}{4}$	9 $\frac{1}{2}$	12 $\frac{1}{2}$	15 $\frac{1}{4}$	19 $\frac{3}{8}$
Price per 100 circles ..	2/-	2/6	3/-	4/6	7/-	8/9	13/9



### Whatman Diffusion Shells.

These shells are far superior to parchment paper, for with the smallest volume of fluid they offer the largest possible dialysing surface, enabling work to be carried on with the smallest size outer vessel and combining the greatest cleanliness with absolute reliability.  
 16 mms. x 100 mms. 15/- per 25  
 35 mms. x 100 mms. 35/- per 25

### Whatman Absorption Blocks.

Made from purified paper, purified with acids and are used to absorb difficult combustible liquids.  
 Per box of 50 blocks, 14 mms. x 16 mms. .. .. 4/-



### Whatman No. 120 Drop Reaction Paper.

In sheets 14 cms. x 22 cms.  
 This paper has been found most suitable for drop reactions, absorbing rapidly without allowing the drop to spread too much. Is a single-washed paper. The paper is free from Iron and Copper in a condition where it would give a coloration with Sulphocyanide or Ferrocyanide of Potassium.  
 Price per packet of 100 sheets .. .. 10/6  
 Price per packet of 25 sheets .. .. 3/3



### Whatman No. 100 Fat-Free Strips.

Size 22 in. x 2 $\frac{1}{2}$  in. (56 x 6.5 cms.).  
 For determination of fat in milk by the Adam's coil method. One strip absorbs 10 c.c. of milk.  
 Per packet of 100 strips .. .. 12/9  
 Per packet of 50 strips .. .. 7/-  
 Per packet of 25 strips .. .. 3/9

### Whatman No. 130 Arsenic Test Strips.

These strips approximately 2 $\frac{1}{2}$  x 120 mm. are of unsensitized paper and suitable for making arsenic determinations.  
 Price per box of 1,000 strips approximately 140 mms. x 2 $\frac{1}{2}$  mms. .. .. 3/-

### Whatman No. 14 Folded Filter Paper.

With HARDENED TIPS.  
 Diam. in cms. .. .. 32 38.5 50  
 Price per 100 circles .. 8/- 10/- 16/-



### Whatman Filter Cones.

Are made from the same paper as WHATMAN No. 50, made in the form of semicircular discs of special shape and are suitable for use with filter pump as a substitute for Platinum cones, enabling a good fit to be obtained in the funnel.  
 Diam. in cms.—  
 5.5 7 9 11 12.5 15 18.5 24  
 Price per 100—  
 1/9 2/3 3/6 4/- 4/6 5/3 7/- 12/-

### Whatman Ashless Filter Paper Clippings.

Per lb. box .. .. 6/-

Our Balances and Weights have achieved World-wide Reputation ; vide Opinions of the Leading Scientific Press.



# MUNCKTELL'S SWEDISH FILTER PAPERS



No.	5.5 cms.	7 cms.	9 cms.	11 cms.	12.5 cms.	15 cms.	18.5 cms.
<b>1F</b>	·00014	·00023	·00038	·00056	·00073	·00105	·00161
<b>2</b>	·00018	·00030	·00051	·00074	·00095	·00138	·00209
<b>0</b>	·000060	·00010	·00017	·00025	·00033	·00046	·00070
<b>00</b>	·000011	·000018	·000030	·000045	·000058	·000083	·000126

Specification of No **1F** .. .. Thin unwashed  
 " " " **2** .. .. Ordinary thickness  
 " " " **0** .. .. Washed with Hydrochloric Acid  
 " " " **00** .. .. Washed with Hydrochloric and Hydrofluoric Acids.

SIZE. in Cut Circles		Muncktell's No. <b>1F</b>		Muncktell's No. <b>2</b>		Muncktell's No. <b>3</b>		Muncktell's No. <b>0</b>		Muncktell's No. <b>00</b>	
		Price		Price		Price		Price		Price	
Diameter in cms.	Diameter in inches.	per 100	per 1000	per 100	per 1000	per 100	per 1000	per 100	per 1000	per 100	per 1000
5.5	2 $\frac{1}{4}$	10d.	7/6	11d.	7/9	10d.	7/3	1/7	14/-	3/2	29/6
7	2 $\frac{3}{4}$	1/2	10/10	1/1	9/9	11d.	8/3	2/2	19/3	3/8	34/9
9	3 $\frac{1}{2}$	1/11	17/6	1/8	14/10	1/5	12/8	2/11	27/-	5/6	51/-
11	4 $\frac{3}{8}$	2/3	21/-	2/1	19/-	1/8	14/10	3/8	34/-	6/9	61/-
12.5	5	3/1	28/-	2/8	24/-	1/10	19/6	4/6	40/10	7/6	67/-
15	5 $\frac{7}{8}$	3/6	34/-	3/5	30/-	2/3	24/9	5/9	52/-	8/9	79/-
18.5	7 $\frac{1}{4}$	5/3	49/-	4/4	40/-	3/-	32/9	8/9	80/-	13/3	122/6
In SHEETS.		per ream	per quire	per ream	per quire	per ream	per quire	per ream	per quire	per ream	per quire
48 × 48 cms. 24 sheets to 1 quire 480 sheets to 1 ream.		£6 15 0	7/6	£5 12 6	6/6	£4 15 0	5/3	£11 10 0	12/6	£18 10 0	20/-

## "J.G." BRAND. BRITISH FILTER PAPERS EQUAL TO AND REPLACING SWEDISH.

	Diameter in cms.	5.5	7	9	11	12.5	15	18.5
<b>J.G. 1F</b> ..	per 100	1/-	1/2	1/6	2/-	2/4	3/1	4/3
	per 1000	8/-	10/-	13/-	18/-	21/-	28/-	38/10
<b>J.G. 0</b> ..	per 100	1/9	2/-	3/-	3/6	4/6	6/-	
	per 1000	14/-	15/-	24/-	28/-	36/-	48/-	
<b>J.G. 2</b> ..	per 100	1/-	1/2	1/6	2/-	2/4	3/1	4/3
	per 1000	8/-	10/-	13/-	18/-	21/-	28/-	38/10

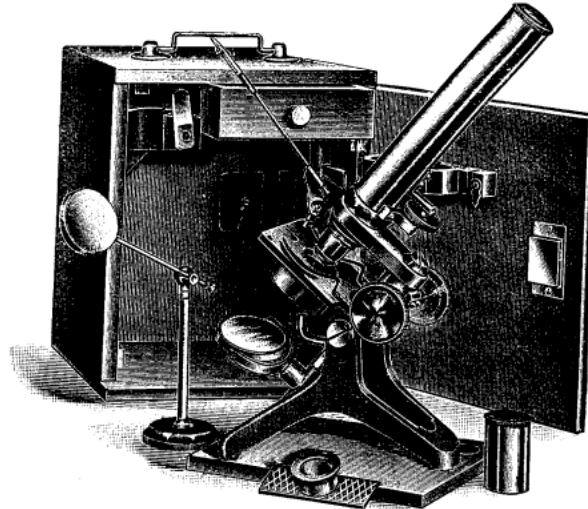
Our stock of pure Chemicals and Acids is very considerable ; hence all orders are executed with the utmost despatch. See comprehensive list at end of Catalogue.

# MICROSCOPES

**187—Society of Arts Microscope**, with removable body tube. All brass model with rack and pinion, coarse adjustment and lever fine adjustment.

A—Complete with  $\frac{1}{4}$  in. achromatic objective dividing to  $\frac{1}{2}$  in. and 1 in., 1 eye-piece, bulls eye condenser, live box and hand forceps, complete in polished mahogany cabinet.

Price .. .. £6 10 0



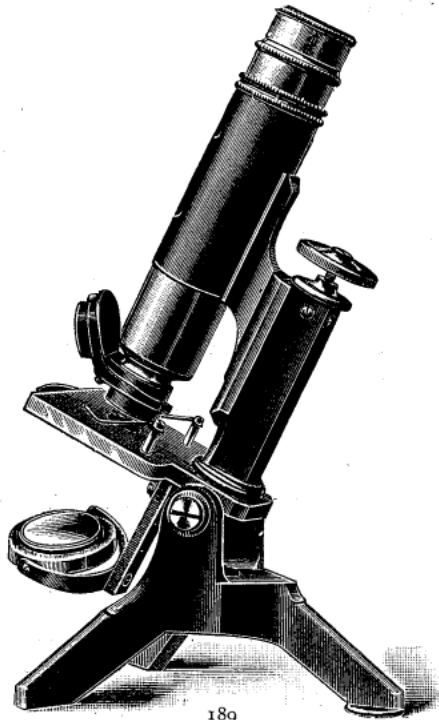
187/188

SOCIETY OF ARTS MICROSCOPE.

**188.—Society of Arts Microscope**, as per specification opposite, but with 1 in. and  $\frac{3}{8}$  in. objectives in place of the dividing objective.

Price .. .. £8 5 0

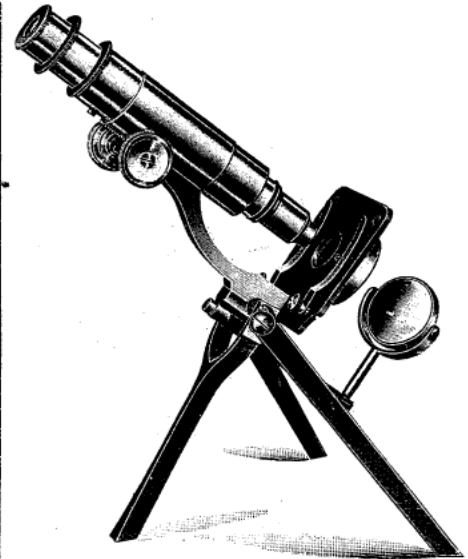
The body tube screws into the stand and is removable in an instant, enabling the whole instrument to be packed in the small compact cabinet provided.



189

**189.—The "Student's" Microscope**, for first grade and elementary laboratory work, having steady and durable fine adjustment and cloth-lined collar to tube, elongating draw-tube, revolving diaphragm, plane and concave mirrors on swinging arm; complete, in mahogany lock case, with one eye-piece (No II) and the following objectives—

A. 1 in. and $\frac{1}{4}$ in. of 0.54 N.A. .. .. .	£7 12 6
B. 1 in. and $\frac{1}{8}$ in. of 0.61 N.A. .. .. .	8 2 6
C. Double nose-piece with above .. .. . extra	1 1 0



190

**190.—"Student's" Portable Microscope.**

A.—All brass model, fitted with coarse adjustment to focus 4 in. objective. Nickel body and draw-tube, plane and concave mirrors, on nickel stem, brass stage and revolving diaphragm. 1 eye-piece and 2 in. objective, complete in case.

Price .. .. £7 5 0.

B.—As above, but with 2 in. and  $\frac{1}{2}$  in. objectives, Nos. 2 and 4 eyepieces, complete in case.

Price .. .. £8 17 6

Every requisite for Chemical, Physical, and Bacteriological work supplied, from a test tube to the complete furnishing of the largest laboratory.



# THE "NIVOC" MICROSCOPE

BRITISH MANUFACTURE THROUGHOUT.

Built to the specification of the British Science Guild this Instrument will be found excellent for every form of Laboratory work.

Of first quality throughout, the stand is of BRASS with diagonal rack, coarse adjustment and horizontal lever fine adjustment, one complete rotation of which moves the body 0.125 mm.

The stage, measuring  $3\frac{1}{2} \times 3\frac{1}{4}$  inches, is covered completely with ebonite and will carry a 6 inch Petri dish. The limb can be inclined to the horizontal. Plane and concave mirrors of plain understage fitting are included.

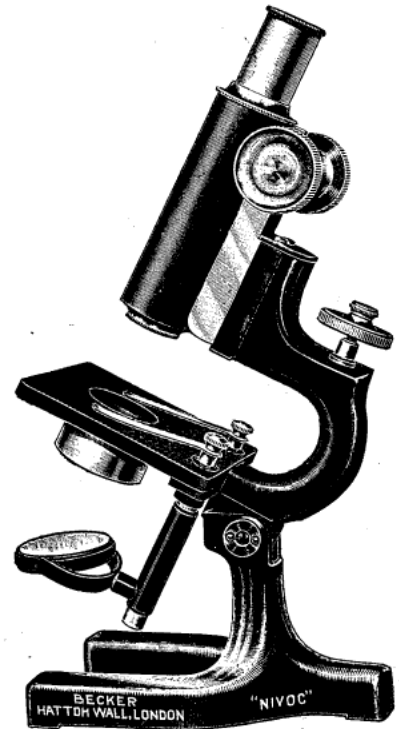
### PRICES.

194 A "Nivoc" Microscope.	Stand only .. .. .	£6 10 0
B " " "	Fitted oak carrying case ..	1 2 6

### COMPLETE OUTFITS.

C "Nivoc" Microscope with objectives 3 and 6, 1 eyepiece,		
either $\times 6$ , $\times 8$ , $\times 10$ .	Case .. .. .	£11 10 0

D "Nivoc" Microscope, with spiral focussing screw and oak case, dustproof double nosepiece,		
1 eyepiece, either $\times 6$ , $\times 8$ , $\times 10$ , objectives 3 and 6, simplified Abbé condenser .. .. .		£14 12 6



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### ACCESSORIES FOR THE "NIVOC" MICROSCOPE.

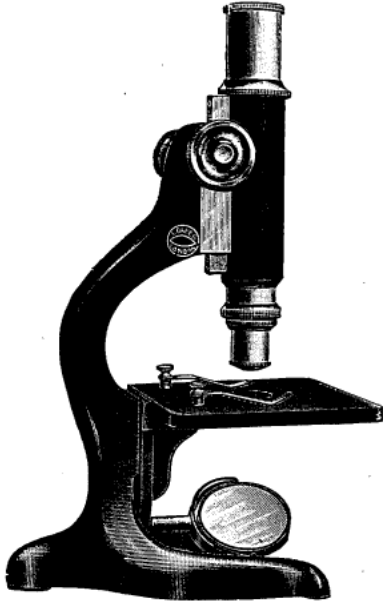
E Nosepiece dustproof pattern, double .. .. .	£1 2 6
F " " " triple .. .. .	1 5 0
G Simplified Abbé condenser .. .. .	1 10 0
H Sleeve pattern iris diaphragm .. .. .	0 15 0
J $\frac{1}{2}$ in. oil immersion objective, N.A. 1.28 .. .. .	7 10 0
K Attachable mechanical stage .. .. .	7 0 0
L Spiral focussing screw .. .. .	1 2 6

**NOTE.**—If a case is not required deduct from the above prices of sets .. £1 2 6

Our stock of pure Chemicals and Acids is very considerable ; hence all orders are executed with the utmost despatch. See comprehensive list at end of Catalogue. D



# BAKER'S MICROSCOPES



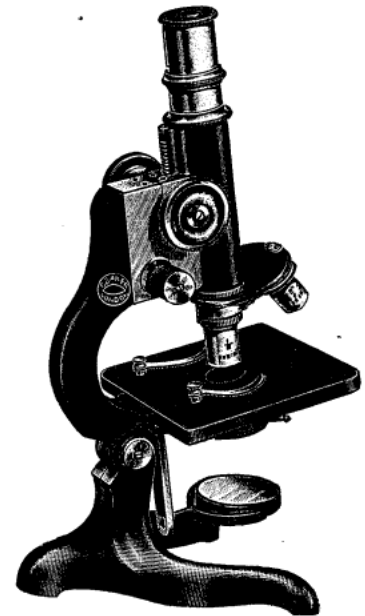
195

## 195.—SCIENCE MICROSCOPE.

- A. **Stand**, as figured, fitted with diagonal rack and pinion coarse adjustment. Large square stage 4'2 × 4'2 in., plain and concave mirrors, in case. This instrument has been designed to meet all the requirements in science schools, and the focusing adjustment is constructed to enable the user to focus a power as high as a  $\frac{1}{8}$  in. objective with comfort.. . . . . **£4 10 0**
- B. **Stand**, fitted with 1 eyepiece No. 3, 1 combination objective 2 in., 1 in. and  $\frac{1}{2}$  in., or 1 in.,  $\frac{1}{2}$  in., and  $\frac{1}{4}$  in. . . . . **£6 14 6**
- C. **Stand**, fitted with 1 eyepiece No. 3, 1 objective  $\frac{3}{4}$  in., 1 objective  $\frac{1}{8}$  in. **£9 14 6**
- D. **Stand**, fitted with 2 eyepieces, 2 and 4, 1 objective  $\frac{3}{4}$  in., 1 objective  $\frac{1}{8}$  in., 1 double nosepiece . . . . . **£11 7 0**

## 196.—STUDENT'S MICROSCOPE.

- A. **Stand**, built to withstand the hard wear and tear to which this class of stand is subject. The usual diagonal rack and pinion is provided and the fine adjustment is fool-proof, there being nothing to go wrong, and is actuated by a milled head placed at the side of the limb which pushes a steel ball up an inclined plane resulting in a smooth and deliberate movement capable of focussing the highest power objectives. With this form it is almost impossible to break a cover glass or damage the front lens of the objective, when brought in contact. The stage is very rigid and measures 4'2 in. × 4'2 in., under which is mounted a tube to carry an iris diaphragm or condenser. In case . . . . . **£7 15 0**
- B. **Stand**, with Abbé condenser and iris diaphragm, triple nosepiece, eyepieces 2 and 4, objectives  $\frac{3}{4}$  in.,  $\frac{1}{6}$  in.,  $\frac{1}{12}$  in. oil immersion, magnifications from 53 to 900 . . . . . **£25 2 6**
- C. **Stand**, with Abbé condenser and iris diaphragm, double nosepiece, eyepieces 2 and 4, objectives  $\frac{3}{4}$  in. (or  $\frac{2}{3}$  in.),  $\frac{1}{8}$  in., magnification from 53 to 406 **£16 17 6**
- D. **Stand** with iris diaphragm, double nosepiece, eyepiece 3, objectives  $\frac{3}{4}$  in. (or  $\frac{2}{3}$  in.),  $\frac{1}{8}$  in., magnification from 76 to 320 . . . . . **£14 11 6**



196

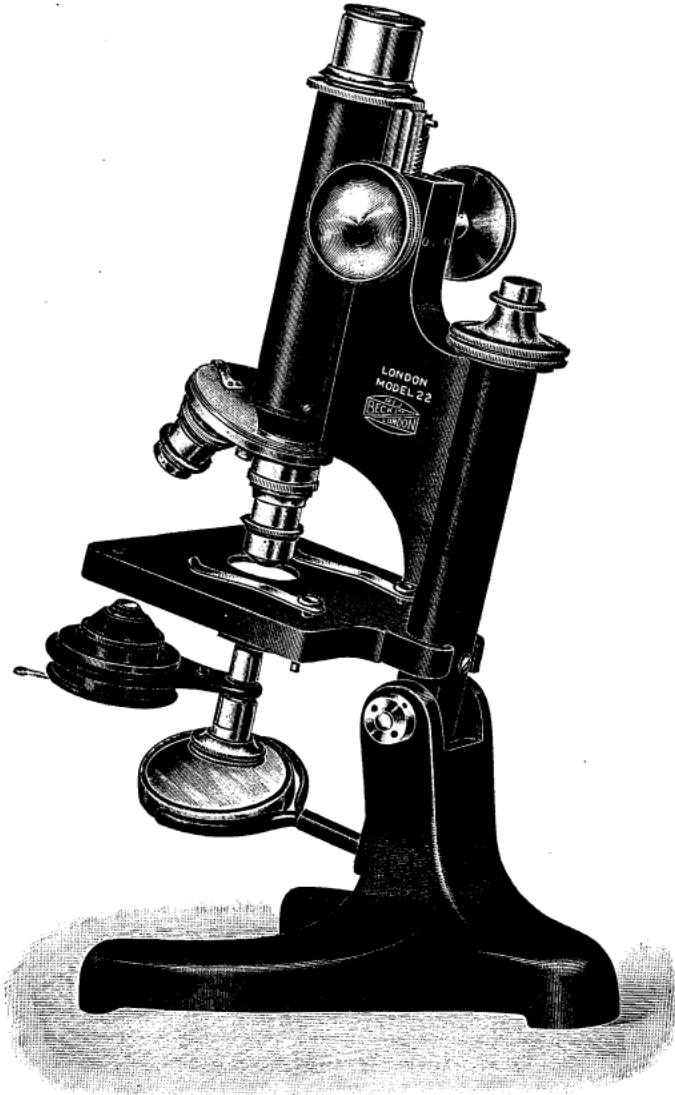
### Extras.

- E. Spiral screw focussing substage . . . . . **£1 10 0**
- F. Mechanical stage . . . . . **6 10 0**

Every requisite for Chemical, Physical, and Bacteriological work supplied, from a test tube to the complete furnishing of the largest laboratory.

# BECK'S MICROSCOPES

For General Specifications see pages 52 and 53.



197

## 197.—LONDON MICROSCOPE MODEL 22.

<b>Model A/1.</b> Stand, without substage, in canvas covered case .. .. .	£4 3 0	
Eyepiece, 42 mm. .. .. .	0 12 0	
$\frac{3}{8}$ in. object glass, 16 mm., without box .. .. .	0 12 0	
$\frac{1}{4}$ in. object glass, 4 mm., without box .. .. .	3 10 6	£8 17 6
<b>Model A/2.</b> Model A/1, as above .. .. .	£8 17 6	
Double nosepiece .. .. .	1 1 0	£9 18 6
<b>Model B/1.</b> Stand, with swing out focussing substage, in canvas covered case .. .. .	£5 1 0	
Eyepiece, 42 mm. .. .. .	0 12 0	
$\frac{3}{8}$ in. object glass, 16 mm., without box .. .. .	0 12 0	
$\frac{1}{4}$ in. object glass, 4 mm., without box .. .. .	3 10 6	
Abbé condenser and iris diaphragm .. .. .	1 9 6	£11 5 0

This instrument, Model 22, is first rate in quality but simple in design. The costly side fine adjustment is replaced by a very excellent though less expensive type. The size of the instrument is the same as our Standard pattern. The stage is 4 in.  $\times$  3 $\frac{1}{2}$  in., but is not covered with vulcanite; the base is a strong casting enamelled with an acid resisting surface. The spiral rack and pinion coarse adjustment is equal to that of our more expensive instruments.

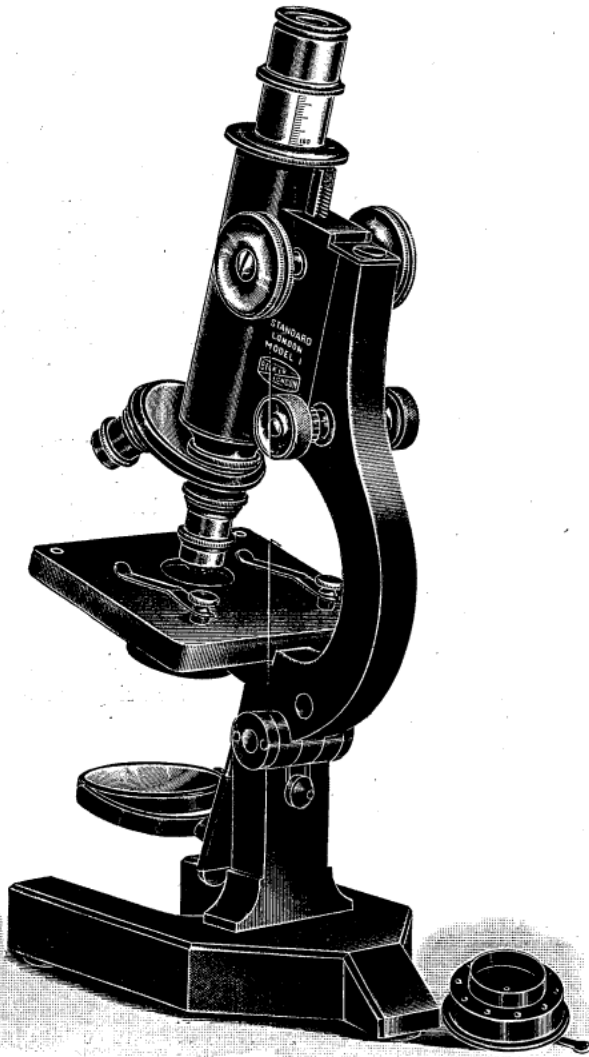
The object glasses and eyepieces are our Standard Series throughout, with the exception of a lower angled  $\frac{3}{8}$  in. (16 mm.), which we include with the cheaper sets. This is a thoroughly good lens, but has not a sufficiently large aperture for use with exceptionally high eyepieces.

The microscope is supplied either plain without a substage, with a spiral screw focussing swing-out substage, or with complete rack and pinion focussing swing-out substage with centring adjustments. It can be fitted with a detachable mechanical stage and works well with the highest power object glasses.

<b>Model B/2.</b> Stand, with swing out focussing substage in wooden cabinet .. .. .	£5 16 0	
2 eyepieces, 42 mm. and 25 mm. .. .. .	1 4 0	
$\frac{3}{8}$ in. object glass, 16 mm. .. .. .	1 10 0	
$\frac{1}{4}$ in. object glass, 4 mm. .. .. .	3 15 0	
$\frac{1}{2}$ in. oil immersion object glass .. .. .		
2 mm. .. .. .	8 10 0	
Abbé condenser and iris diaphragm .. .. .	1 9 6	
Triple nosepiece .. .. .	1 10 0	£23 14 6
<b>Model B/3.</b> Outfit as Model B/2 .. .. .	23 14 6	
Sloan objective changer, with 3 fittings, and case in place of triple nosepiece .. .. .	0 14 0	£24 8 6
<b>Model C/1.</b> Stand with rack and pinion focussing and swing out substage, in wooden cabinet .. .. .	£8 8 0	
2 eyepieces, 42 mm. and 25 mm. .. .. .	1 4 0	
$\frac{3}{8}$ in. object glass, 16 mm. .. .. .	1 10 0	
$\frac{1}{4}$ in. object glass, 4 mm. .. .. .	3 15 0	
$\frac{1}{2}$ in. object glass, 2 mm. oil immersion .. .. .		
Large Abbé condenser and iris diaphragm .. .. .	8 10 0	
Triple nosepiece .. .. .	2 10 0	£27 7 0
Detachable mechanical stage fitted to any of the above .. .. .	£6 0 0	
Wooden cabinet in place of canvas case .. .. .	0 15 0	

Our Balances and Weights have achieved World-wide Reputation; *vide* Opinions of the Leading Scientific Press.

# BECK'S MICROSCOPES



198

## 198.—STANDARD LONDON MICROSCOPE (MODEL 3210).

This model has a joint for inclination, rack and pinion coarse adjustment, double speed fine adjustment, engraved draw-tube, iris diaphragm, double mirror and large vulcanite covered stage.

<b>A. Stand only</b> in case, with iris diaphragm, without object glasses or eyepieces .. ..	£10 10 0
<b>B. Stand</b> , in case .. ..	£10 10 0
1 eyepiece, 42 mm. .. ..	0 12 0
$\frac{2}{3}$ in. object glass, 16 mm. .. ..	1 10 0
$\frac{1}{6}$ in. object glass, 4 mm. .. ..	3 15 0
	<hr/>
	£16 7 0
<b>C. Outfit B</b> , as above .. ..	£16 7 0
Sloan objective changer and two fittings .. ..	1 7 6
	<hr/>
	£17 14 6
<b>D. Outfit B</b> , as above .. ..	£16 7 0
Double nosepiece .. ..	1 1 0
	<hr/>
	£17 8 0
<b>E. Stand</b> , in case .. ..	£10 10 0
2 eyepieces, 42 mm. and 25 mm. .. ..	1 4 0
$\frac{2}{3}$ in. object glass, 16 mm. .. ..	1 10 0
$\frac{1}{6}$ in. object glass, 4 mm. .. ..	3 15 0
$\frac{1}{2}$ in. immersion object glass, 2 mm. .. ..	8 10 0
Abbé condenser .. ..	1 5 0
Sloan objective changer and 3 fittings .. ..	1 12 6
	<hr/>
	£28 6 6
<b>F. Outfit E</b> , as above .. ..	£28 6 6
Mechanical stage .. ..	6 0 0
	<hr/>
	£34 6 6
<b>G. Outfit E</b> , as above—	
Triple nosepiece in place of Sloan objective changer .. ..	£28 4 0

### General Specification of Beck's Microscopes, shown on pages 51 to 57.

**The Base** is on the so-called horse-shoe pattern, standing on three feet. It measures  $6\frac{1}{2} \times 4 \times 1$  inches. **The Pillar** has a joint for inclination, with stops which limit the position of the body when it is in either the vertical or horizontal position. It has ample room for complete substage apparatus. The upper surface of the stage is  $4\frac{3}{4}$  inches from the table. The total height of the instrument when in a vertical position is  $12\frac{1}{2}$  ins.

**The Stage** is covered with ebonite, and is 4 inches wide. The free distance from the optical centre to the limb is 3 inches. Four holes are provided for stage clips.

**The Mechanical Stage** is easily detachable and is made to standard dimensions. It is attached to the Microscope by a bolt which passes through a hole provided for the purpose in the limb of the instrument and held firmly in position by a clamping milled head. In order to attach it, the milled head having been removed from the mechanical stage bolt, the bolt is passed through the hole in the limb and the milled head clamped up while the mechanical stage is held down flat upon the plain stage. When a microscope is supplied with a mechanical stage at the time of purchase, a steady pin is provided to ensure that the mechanical stage is always attached in exactly the same position. The Mechanical Stage has slightly over one inch vertical and two inches horizontal motions. It is actuated by two milled heads which move the slide by rack and pinion, the milled head of the horizontal motion is considerably longer than that of the vertical, so that the two can be readily recognised by the feel. Each slide is provided with vernier scales, reading to  $\frac{1}{10}$ th of a millimetre.

A special concentric rotating Mechanical Stage is made for the models with circular stages.

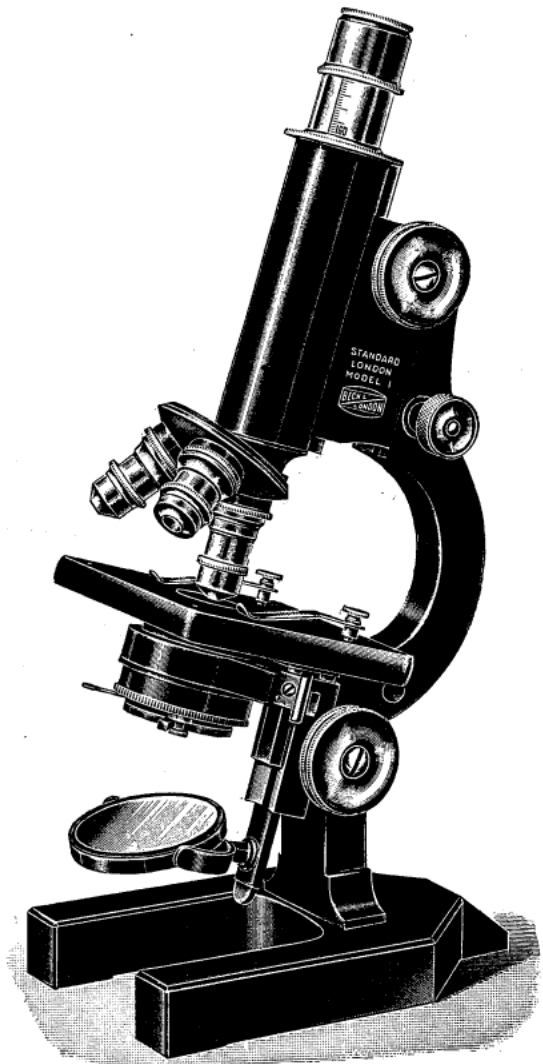
(Continued on next page.)

# BECK'S MICROSCOPES

## 199.—STANDARD LONDON MICROSCOPE (MODEL 3212).

This model has a swing-out rack and pinion focussing substage.

<b>A. Stand only</b> , in case, without object glasses or eyepieces .. .. .	£13 10 0
<b>B. Stand</b> , in case, with following outfit..	£13 10 0
2 eyepieces, 42 mm. and 25 mm. ..	1 4 0
$\frac{3}{8}$ in. object glass, 16 mm. ..	1 10 0
$\frac{1}{8}$ in. object glass, 4 mm. ..	3 15 0
Large size Abbé condenser .. ..	2 10 0
	£22 9 0
<b>C. Outfit B</b> , as above .. .. .	£22 9 0
Sloan objective changer and 2 fittings	1 7 6
	£23 16 6
<b>D. Outfit B</b> , as above .. .. .	£22 9 0
Double nosepiece .. .. .	1 1 0
	£23 10 0
<b>E. Stand</b> , in case, with following outfit	£13 10 0
3 eyepieces, 42 mm., 25 mm., 17 mm.	1 16 0
$\frac{3}{8}$ in. object glass, 16 mm. ..	1 10 0
$\frac{1}{8}$ in. object glass, 4 mm. ..	3 15 0
$\frac{1}{2}$ in. immersion object glass, 2 mm.	8 10 0
Large size Abbé condenser .. ..	2 10 0
High power dark ground illuminator in centring fitting .. .. .	3 5 0
Stop for $\frac{1}{2}$ th object glass .. ..	0 2 6
Sloan objective changer and 3 fittings, in case .. .. .	2 4 0
	£37 2 6
<b>F. Outfit E</b> , as above .. .. .	£37 2 6
Mechanical stage .. .. .	6 0 0
Micrometer eyepiece .. .. .	2 2 0
	£45 4 6
<b>G. Outfit E</b> , as above, with 3 apochromatic object glasses, in place of achromatic object glasses, and 3 compensating eyepieces in place of Huyghenian	£73 10 6



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**General Specification of Beck's Microscopes, shown on pages 51 to 57. (Continued from previous page.)**

**The Limb** is of a solid curved pattern shaped for grasping with the hand in order to lift the instrument. **The Body** carries the draw-tube in a sleeve, lined with a strong fabric which ensures a smooth and easy-fitting even if the draw-tube becomes tarnished or dirty.

**The Draw-tube** is nickel-plated and is divided in millimetres, enabling any tube length between 140 and 200 mm. to be used. At the lower end it carries a screwed fitting to take a low power object glass or erecting lens.

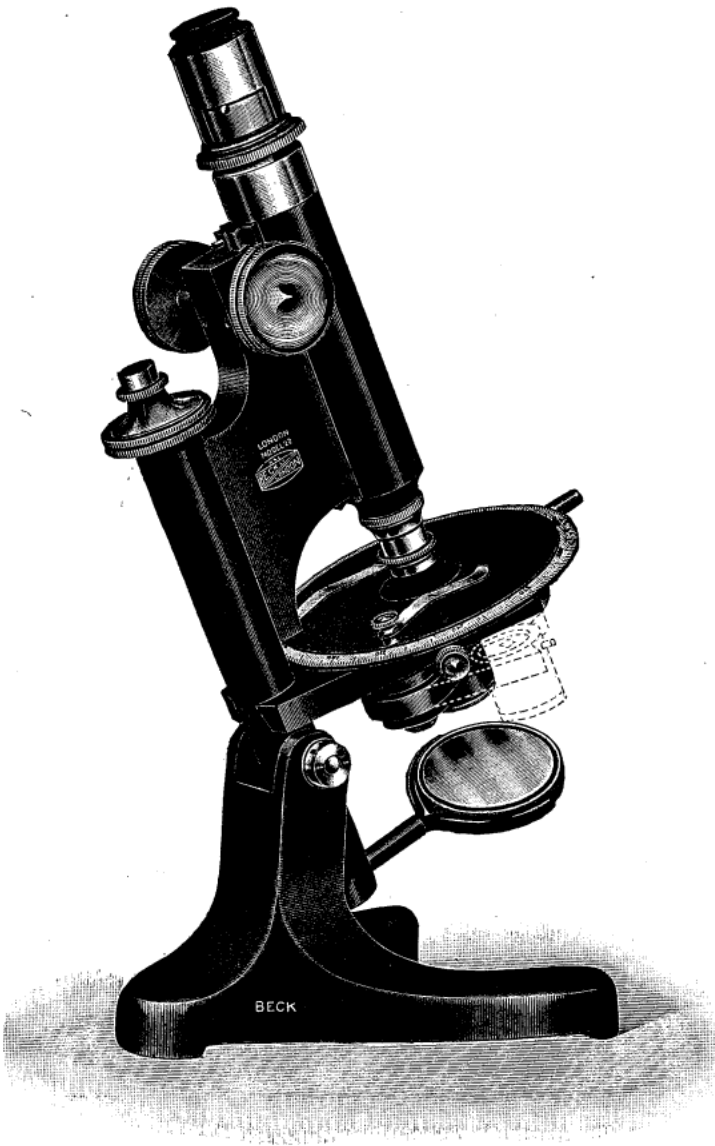
**The Coarse Adjustment** is by means of spiral rack and pinion cut on specially made machines to ensure accurate and smooth-running teeth.

**The Fine Adjustment** is on a new patented design. Both milled heads are upon the same axis. The milled head on one side moves the body at twice the speed of that on the other, so that either a moderately fine or a superlatively fine adjustment can be used, and the friction is so slight that the delicacy, obtained only by a lever and point contact motion, is secured, avoiding all drag or heavy movement. One of the milled heads is divided in hundredths of a millimetre for measuring thickness.

**The Mirror** is two inches in diameter, and is plane on one side and concave on the other, mounted on a swinging bar on which it slides up and down for focussing. A movement is provided to enable it to be swung out of position when changing substage apparatus. The mirror itself can be withdrawn from its fitting when it is desired to use direct light.

The milled heads are of large diameter, the pinions are fitted with cone fittings in an eccentric sleeve which is adjusted till the teeth are in perfect gear without backlash.

# BECK'S MICROSCOPES



200

## 200.—PETROLOGICAL MICROSCOPE.

The need for a Petrological microscope at a low price has induced us to produce an instrument which is somewhat simpler than the usual types, but has all the requirements for the majority of the work which is done with this class of instrument.

This microscope has excellent coarse and fine focussing adjustments and a very firm base.

The stage has concentric rotation divided to degrees and centring adjustments. The polarizing prism rotates for 90° being stopped at each end of its travel, and it swings in and out of the optic axis. The analyser fits over the eyepiece and also rotates for 90°. If the analyser and polariser are both turned as far as they will go in the same direction, the prisms are parallel. If they are turned in opposite directions as far as they will go they are crossed.

The eyepiece has a slot for the insertion of a quartz wedge, mica waveplate or micrometer.

A system of converging lenses fits the central aperture of the stage and for the examination of rings and brushes the eyepiece can be removed and the analyser replaced on the tube of the microscope.

If it is desired a Beck lens can be supplied to fit over the top of the analyser in which case the eyepiece is not removed. The eyepiece is provided with crosswires.

The instrument is packed in a wooden cabinet.

### MODEL 22 P.A.

<b>A.</b> Stand, with 1 eyepiece with crosswires, swing-out polariser, analyser over eyepiece, in cabinet .. .. .	£14 8 6
<b>B.</b> 1½ in. (32 mm.) achromatic object glass .. .. .	1 7 6
<b>C.</b> ¾ in. (16 mm.) achromatic object glass .. .. .	0 16 6
	£16 12 6

### MODEL 22 P.B.

<b>A.</b> Stand, with 1 eyepiece with crosswires, swing-out polariser, analyser over eyepiece, in cabinet .. .. .	£14 8 6
<b>B.</b> ¾ in. achromatic object glass	0 16 6
<b>C.</b> ½ in. achromatic object glass	3 15 0
<b>D.</b> Converging system of lenses..	1 0 0
	£20 0 0

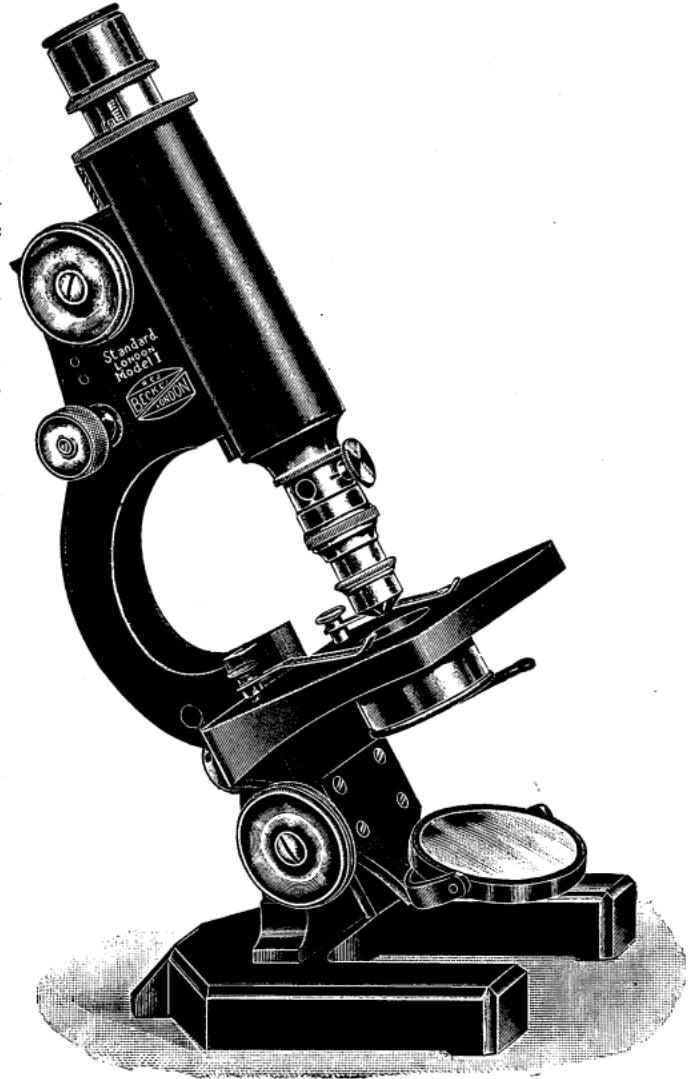
Our Balances and Weights have achieved World-wide Reputation; *vide* Opinions of the Leading Scientific Press.

# BECK'S MICROSCOPES

## 201.—STANDARD LONDON MICROSCOPE.

(Metallurgical Model No. 3227).

This instrument is similar in construction to the No. 3210 Standard London model, except that it is provided with a focussing stage by means of rack and pinion. The stage itself consists of a solid brass casting, 4 in. × 4 in. square. The rack is a prolongation of the limb which renders the instrument rigid, especially for photography. The travel of the rack is 3 ins., which allows the use of a wide range of object glasses. Either the prism or thin glass form of vertical illuminator can be supplied.



201

<b>A.</b> Metallurgical stand, in case .. ..	£15 10 0
2 eyepieces, 42 mm. and 25 mm. .. ..	1 4 0
Thin glass vertical illuminator .. ..	1 7 6
$\frac{2}{3}$ in. (16 mm.) achromatic object glass ..	1 10 0
$\frac{1}{8}$ in. (3 mm.) oil immersion object glass ..	6 17 6
Sloan objective changer and 2 fittings ..	1 7 6
Total	£27 16 6

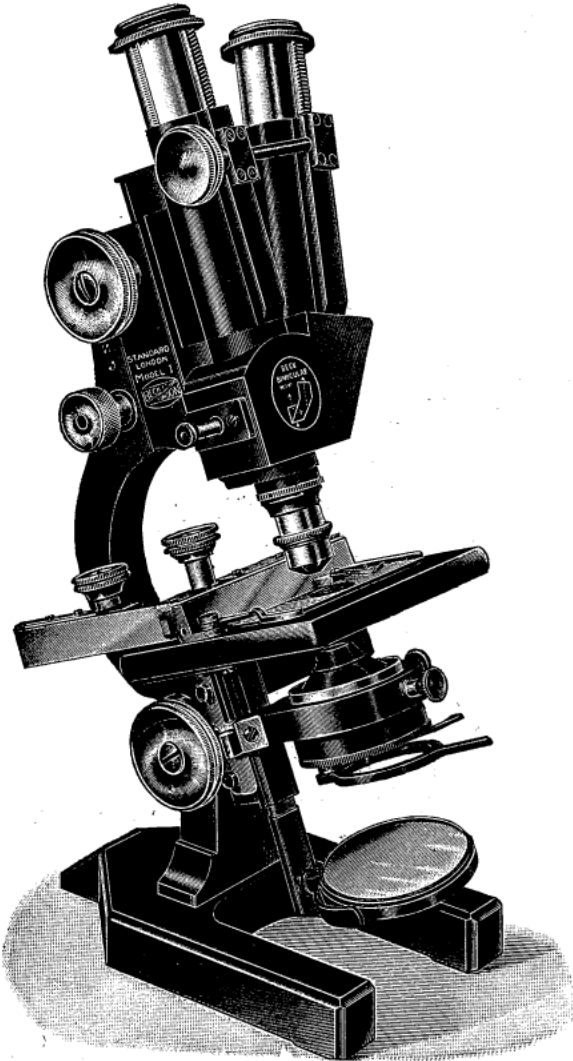
<b>C.</b> Metallurgical stand, in case .. ..	£15 10 0
3 compensating eyepieces, 45, 22, 10 mm. ..	7 2 0
Thin glass vertical illuminator .. ..	1 7 6
1½ in. (40 mm.) apochromatic object glass ..	4 10 0
$\frac{2}{3}$ in. (16 mm.) apochromatic object glass ..	7 15 0
$\frac{1}{8}$ in. (8 mm.) apochromatic object glass ..	9 10 0
$\frac{1}{8}$ in. (4 mm.) apochromatic object glass ..	12 0 0
1½ in. (2 mm.) apochromatic object glass ..	18 0 0
Beck aplanatic ring reflector fitted to 16 mm. and 8 mm. object glasses .. ..	2 10 0
Sloan objective changer and 6 fittings in 2 cases .. .. ..	3 10 6
Detachable mechanical stage .. ..	7 0 0
Micrometer eyepiece .. ..	2 2 0
Beck electric lamp with "Pointolite" bulb and resistance .. .. ..	14 15 0
Set of Wratten & Wainwright colour filters ..	2 15 0
Photo-micrographic camera and 1 dark slide .. .. ..	6 6 0
Total	£114 13 0

<b>B.</b> Metallurgical stand, in case .. ..	£15 10 0
2 eyepieces, 42 mm. and 25 mm. .. ..	1 4 0
Thin glass vertical illuminator .. ..	1 7 6
1½ in. (32 mm.) achromatic object glass ..	2 5 0
$\frac{2}{3}$ in. (16 mm.) achromatic object glass ..	1 10 0
$\frac{1}{8}$ in. (8 mm.) achromatic object glass ..	4 5 0
$\frac{1}{8}$ in. (4 mm.) achromatic object glass ..	3 15 0
1½ in. (2 mm.) achromatic object glass ..	8 10 0
Beck aplanatic ring reflector fitted to 16 mm. and 8 mm. object glasses .. ..	2 10 0
Sloan objective changer and 6 fittings in 2 cases .. .. ..	3 10 6
Detachable mechanical stage .. ..	7 0 0
Total	£51 7 0

Our stock of pure Chemicals and Acids is very considerable ; hence all orders are executed with the utmost despatch. See comprehensive list at end of Catalogue.

## BECK'S MICROSCOPES

### 202.—BECK BINOCULAR MICROSCOPE (Patent).



202

1. Resolution equal to that of Monocular.
2. Binocular Vision at normal convergence of the eyes, avoiding eyestrain.
3. Converted into a Monocular by a touch.
4. Equal illumination, both eyes.
5. Equal optical path and magnification, both eyes.
6. No special object glass or oculars, no special requirements.

**Equal Illumination.** As the transparency and reflecting power of the surface can be regulated according to the amount of silver that is deposited, the relative intensity of each image can be made identical, and the right and left-hand images are equal in brilliancy. It is no disadvantage if a slightly stronger light is required with a binocular than a monocular microscope. The monocular observer, in order to more readily concentrate his attention on the employed eye, is apt to use an illumination that is far too brilliant, to the detriment of his eyesight. In the use of the Binocular both eyes are equally stimulated, and there is no temptation to use excessive illumination.

**Monocular.** The prism is carried in a sliding box in the body of the microscope. By sliding it out of the optic axis the microscope is converted into a monocular so that the instrument becomes absolutely the same as a monocular microscope, rendering it equally useful for photography, drawing, micrometry, or other purposes, or by unscrewing the knob the prism can be slid completely out of the microscope for cleaning or dusting.

**Short Tube Length.** The construction of this binocular renders it possible to retain the short tube of the compact monocular microscope. When the draw tubes are extended to the average interocular distance tube is of the standard 160 mm. length. The tubes converge at an angle of about 14 degrees. This will be found in practice to give absolute comfort for either long or short periods of working. The eyes are in exactly the condition required for reading a book. For those whose eyes are specially far apart, or near together, the microscope can be made with tubes at a special angle. We can supply an adapter which screws between the object glass and the body which carries a slide containing a series of low power lenses which alter the optical length of tube so that lenses corrected for longer tubes can be used to their best advantage on this instrument.

Binocular telescopes which are used with the eyes looking horizontally at distant objects have their two tubes parallel, but this is unsuitable for a microscope. The microscopist who uses his instrument alternately with examining objects on the table on which it stands would find it difficult and tiring to constantly change the direction of his convergence, such is the force of habit that the mere action of bending the head downwards induces the convergence of the eyes necessary for examining near objects.

**Binocular Vision.** The advantages of binocular vision are not only that a stereoscopic relief can be obtained; the rest to the eyes prevents fatigue and improves the quality of the vision; not only is more seen, but the perceptive faculties are much more constant and observation of obscure detail is more rapid. It is frequently found that after a quarter of an hour's examination with a monocular microscope, the perception of fine detail goes, and does not return till after a pause. This does not seem to occur with binocular vision, or at least to only a slight degree. A further consequence of monocular vision is that the employed eye generally loses its visual intensity of light. In order to concentrate the attention upon the employed eye a stronger light than is wise is often used, and by degrees an illumination that appears white to the unemployed eye is only grey to the other.

**The Interocular Distance** is varied with a double rack and pinion on the tubes of the microscope, altering the distance between the oculars from 2 inches to 2½ inches, which represent interocular distances of about 2¼ inches to 2¾ inches.

*See next page for prices of complete sets.*

**Every requisite for Chemical, Physical, and Bacteriological work supplied, from a test tube to the complete furnishing of the largest laboratory.**



# BECK'S MICROSCOPES

## BINOCULAR MODEL. No. 202.

(See previous page.)

<b>A.</b> —Binocular stand with square stage and rack and pinion focussing and centring substage .. .. .	£32 10 0
2 pairs of eyepieces .. .. .	2 8 0
$\frac{3}{8}$ in. (16 mm.) achromatic object glass .. .. .	1 10 0
$\frac{1}{8}$ in. (4 mm.) achromatic object glass .. .. .	3 15 0
Abbé condenser .. .. .	2 10 0
Sloan objective changer or double nosepiece .. .. .	1 7 6
	<hr/>
	£44 0 6
<b>B.</b> —Standard apparatus as above, with addition of mechanical stage .. .. .	6 0 0
	<hr/>
	£50 0 6
<b>C.</b> —Binocular stand but with plain circular rotating stage and centring adjustments .. .. .	£35 0 0
<b>D.</b> —Stand as above with the addition of circular rotating mechanical stage .. .. .	£47 0 0
<b>E.</b> —Binocular stand with square stage and rack and pinion focussing substage .. .. .	£32 10 0
3 pairs of eyepieces .. .. .	3 12 0
$1\frac{1}{2}$ in. (32 mm.) achromatic object glass .. .. .	2 5 0
$\frac{3}{8}$ in. (16 mm.) achromatic object glass .. .. .	1 10 0
$\frac{1}{8}$ in. (8 mm.) achromatic object glass .. .. .	4 5 0
$\frac{1}{8}$ in. (4 mm.) achromatic object glass .. .. .	3 15 0
$\frac{1}{8}$ in. (3 mm.) achromatic object glass .. .. .	7 10 0
High power dry and immersion achromatic condenser ..	9 15 0
Set of patch stops for condenser .. .. .	0 7 6
Sloan objective changer and 6 fittings in 2 cases ..	3 10 6
Beck patent focussing dark ground immersion illuminator in plain fitting .. .. .	5 7 6
Metal plate to carry extra thin slips (.02 in.) .. ..	0 3 6
12 thin slips .02 in. thick .. .. .	0 5 0
Mechanical stage .. .. .	6 0 0
Micrometer eyepiece .. .. .	2 2 0
Case for apparatus .. .. .	2 0 0
	<hr/>
	£84 18 0
<b>F.</b> —Above stand and apparatus, with complete rotating centring stage and mechanical stage .. .. .	£8 10 0
	<hr/>
	£93 8 0
<b>G.</b> —Above stand and apparatus, "F," with apochromatic object glasses and compensating eyepieces in place of achromatic object glasses and ordinary eyepieces, extra .. .. .	40 2 0
<b>H.</b> —Interchangeable extra monocular large body (2 in.) with rack and pinion draw-tubes extending to 260 mm. .. .. .	8 0 0
	<hr/>
	£141 10 0

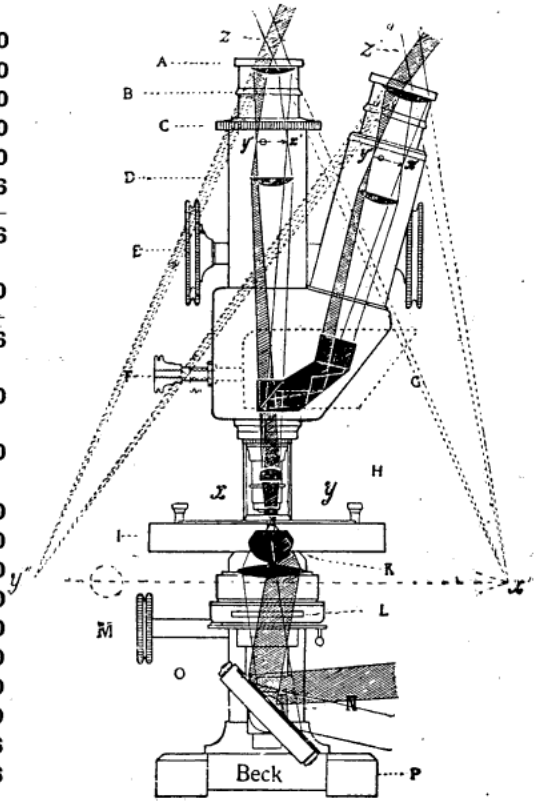


Diagram showing path of light through the Beck Binocular Microscope. No. 202.

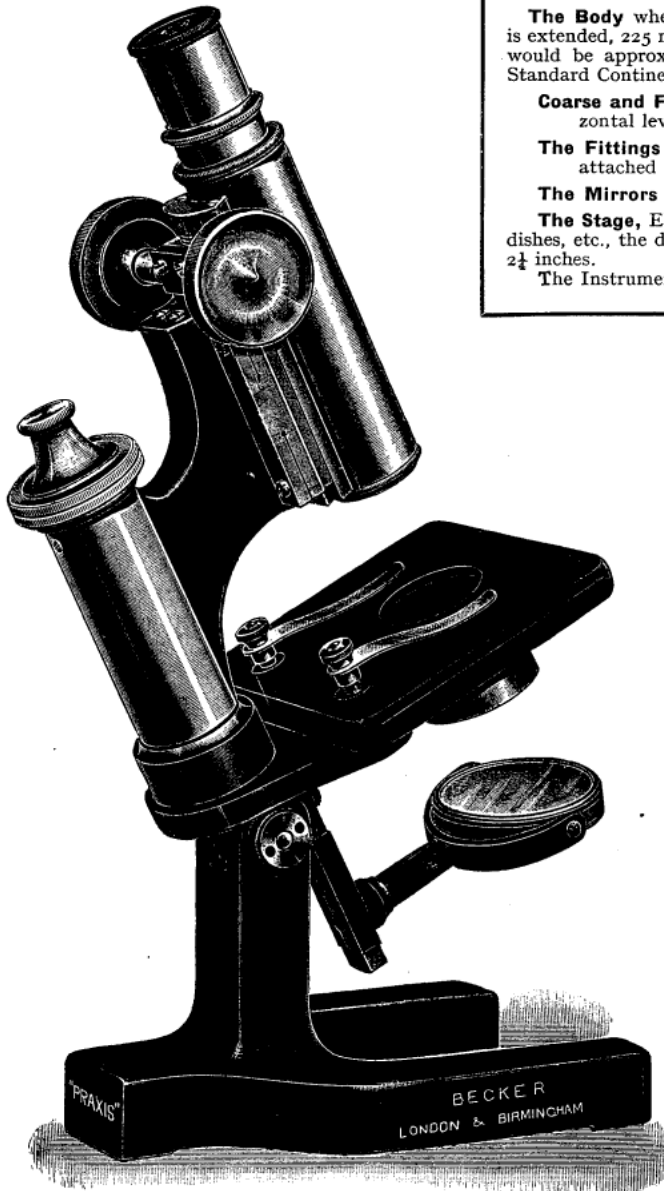
- (A) Eyepiece
- (B) Draw-tube
- (C) Adjustment for extending draw-tubes
- (D) Body
- (E) Course focussing adjustment
- (F) Prism box knob
- (G) Sliding Prism box
- (H) Object Glass
- (I) Stage
- (K) Substage Condenser
- (L) Iris Diaphragm
- (M) Substage Focussing Adjustment
- (N) Mirror
- (O) Pillar
- (P) Base
- (x y) Object
- (x' y') Image formed by Object Glass
- (x'' y'') Virtual image formed by eyepiece
- (zz') Ramsden discs—conjugate images of back equivalent plane of Object Glass

Our Balances and Weights have achieved World-wide Reputation; vide Opinions of the Leading Scientific Press.

# WATSON'S MICROSCOPES

## THE "PRAXIS" MICROSCOPE. No. 203.

The "Praxis" is eminently suited for those Students who, for everyday work, need a simple stand without costly mechanical refinements.



203

### SPECIFICATION.

**The Body** when closed is 145 mm. ( $5\frac{1}{2}$  inch) long; and when the draw-tube is extended, 225 mm. long. With a revolving nosepiece in position, the total length would be approximately the full English length. It carries Eyepieces of the Standard Continental, or Students' size.

**Coarse and Fine Adjustments** of our Standard patterns, the latter with horizontal lever.

**The Fittings for Condenser, etc.**, turn aside from the optical axis, and are attached to the under side of the stage.

**The Mirrors** are plane and concave.

**The Stage**, Ebonite covered, is  $3\frac{1}{2}$  in. square, and gives ample room for Petri's dishes, etc., the distance from the front of the limb to the centre of the stage being  $2\frac{1}{4}$  inches.

The Instrument is inclinable to the horizontal.

### COMPLETE SETS. No. 203.

Prices.

- A.**—"Praxis" stand and mahogany case, 2 objectives,  $\frac{2}{3}$  in. and  $\frac{1}{6}$  in., parachromatic series, 1 eyepiece (Nos. 1, 2, 3 or 4) .. .. . £14 14 0
- B.**—"Praxis" stand and case, spiral focussing screw underfitting, Abbé model illuminator with iris diaphragm, 2 parachromatic objectives,  $\frac{2}{3}$  in. and  $\frac{1}{6}$  in. .74 N.A., 2 eyepieces (Nos. 1, 2, 3 or 4), double nosepiece .. .. . £19 17 0
- C.**—"Praxis" stand and case, spiral focussing screw underfitting, Abbé model illuminator, with iris diaphragm, 3 objectives, parachromatic series,  $\frac{2}{3}$  in.,  $\frac{1}{6}$  in. .74 N.A.,  $\frac{1}{2}$  in. "Versalic" oil immersion, 2 eyepieces (Nos. 1, 2, 3 or 4), triple nosepiece dust-proof pattern .. .. . £27 9 6

### EXTRAS.

- D.**—Attachable mechanical stage .. .. . £7 0 0
- E.**—Iris diaphragm to fit in understage carrier .. .. . £0 15 0
- F.**—Simplified Abbé condenser with iris diaphragm, so arranged that condenser can be removed and iris diaphragm used independently .. .. . £1 10 0

**OBJECTIVES** Nos. 3 and 6, as supplied to the "Nivoc" Microscope, page 49, can be substituted for the parachromatic objectives at a reduction of .. .. . £1 5 0

Our stock of pure Chemicals and Acids is very considerable; hence all orders are executed with the utmost despatch. See comprehensive list at end of Catalogue.

# WATSON'S MICROSCOPES

## THE "SERVICE" MICROSCOPE. No. 204.

This Instrument has been produced as the result of conclusions arrived at by a Committee composed of representative men of science under the auspices of the British Science Guild. A specification was prepared for the best microscope for students' use and **this instrument is made to that specification.**

The **Stand**, as will be seen, is of the modified Continental type, but made in such proportions as to be steady at whatever angle of inclination the body may be placed.

The **Limb** is so shaped as to form a convenient grip for lifting the whole instrument. At its lower part it is continued to form a very firm support to the stage, and then downwards so as to receive on its face the carrier for Abbé or other condenser, and understage apparatus.

An important feature is associated with this construction of limb. The hitherto prevailing method of suspending the condenser carrier from the underside of the stage, is abolished, and in this instrument such carriers are fixed to the extension of the limb.

The **Coarse Adjustment** is by spiral rack and pinion.

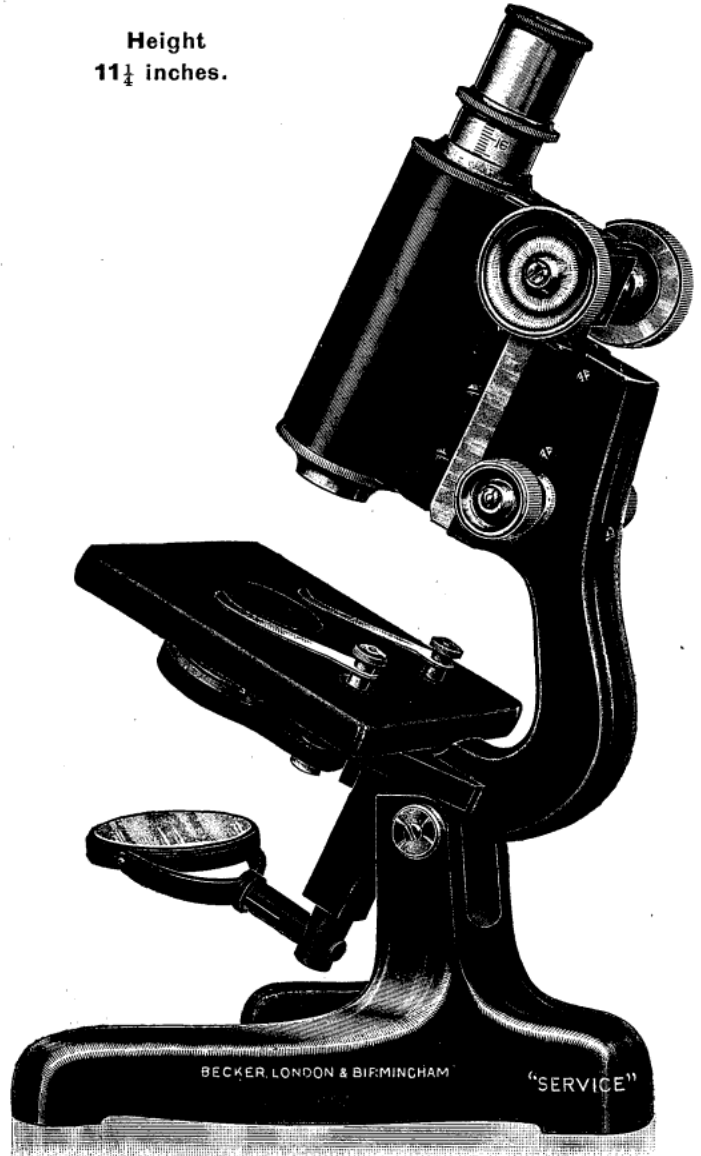
The **Fine Adjustment** is of the vertical lever type with lateral milled heads.

The **Body** is fitted with a draw-tube to receive eyepieces of the Standard Students' diameter, and the total length of the body when the draw-tube is closed is such that with a revolving nose-piece in position, an Objective corrected for 160 mm. (about 6 in.) will work satisfactorily.

The **Stage** is  $4\frac{1}{2}$  in. square, having ebonite moulded upon its surface to render it permanent and perfectly plane. It is provided with plain spring clips for holding the object. The distance between the centre of the stage and the portion of the limb that is on a level with it is more than 3 in., so allowing ample room for the use of a 6-in. Petri Dish.

The fittings throughout are of the Standard R.M.S. gauge.

Height  
 11 $\frac{1}{4}$  inches.



204

### COMPLETE SETS. No. 204.

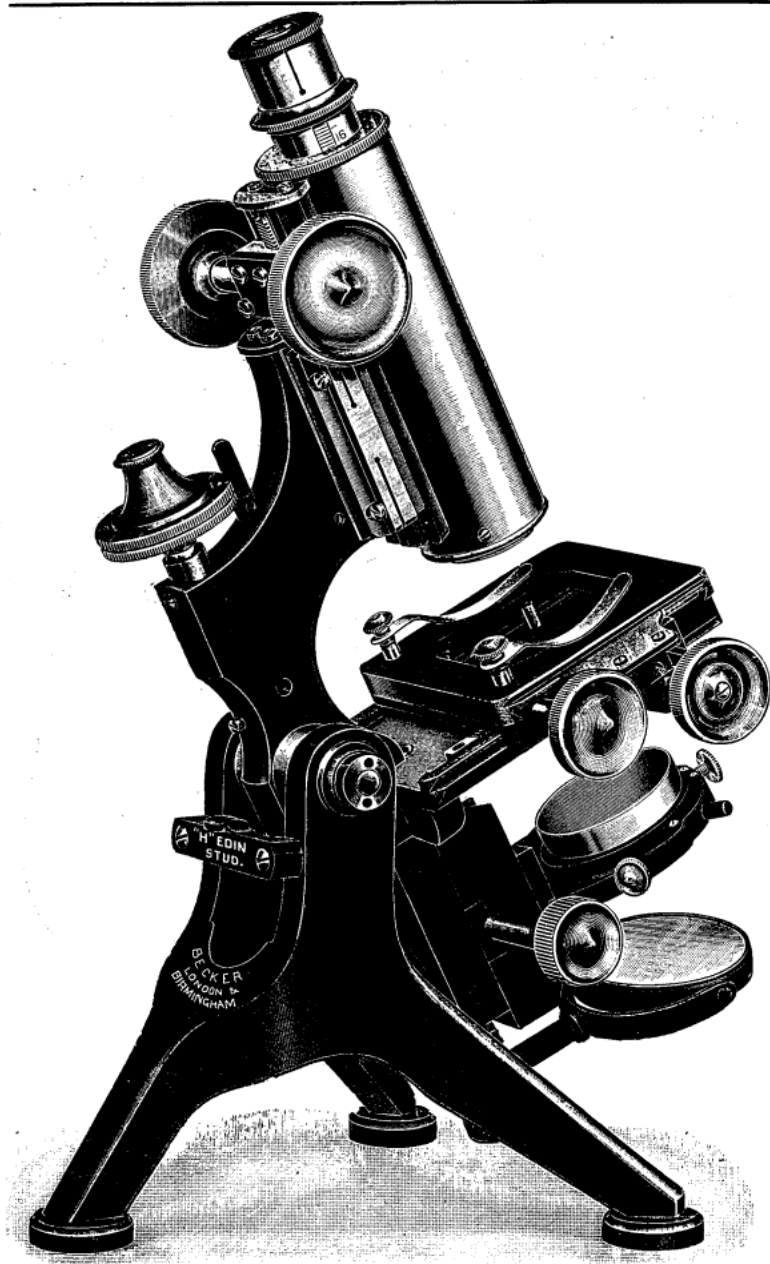
- A.—"Service" Microscope Stand with plain understage carrier,  $\frac{3}{8}$  in. and  $\frac{1}{8}$  in. parachromatic objectives, 1 eyepiece (No. 1, 2, 3 or 4) .. .. £15 10 0
- B.—Ditto, but with the addition of an iris diaphragm to fit the understage carrier .. .. £16 5 0
- C.—As "A" but with the addition of a special simplified condenser to work in conjunction with the iris diaphragm in B. The condenser optical part is removable, so that the iris diaphragm can be used independently if desired .. .. £17 0 0  
 Nosepieces for either of the above sets :  
     Double .. .. .. .. 1 2 6  
     Triple .. .. .. .. 1 5 0
- D.—"Service" Stand with plain understage carrier, Abbé model illuminator with iris diaphragm,  $\frac{3}{8}$  in. and  $\frac{1}{8}$  in. parachromatic objectives, 2 eyepieces (Nos. 1, 2, 3 or 4), double nosepiece .. .. £18 12 6
- E.—"Service" Stand with spiral screw underfitting,  $\frac{3}{8}$  in. and  $\frac{1}{8}$  in. parachromatic objectives, 2 eyepieces (Nos. 1, 2, 3 or 4), Abbé illuminator with iris diaphragm, triple nosepiece .. .. £20 0 0
- F.—"Service" Stand with spiral focussing screw underfitting with objectives, etc., as in Set E, with the addition of  $\frac{1}{8}$  in. "Versalic" oil immersion objective .. .. £27 10 0

- G.—"Service" Stand with compound sub-stage, having rack work to focus and screws to centre, and complete accessories as in Set F .. .. £29 15 0
- Objectives Nos. 3 and 6, as supplied to the "Nivoc" Microscope, page 49, can be supplied in place of parachromatic objectives at a reduction of .. £1 5 0

NOTE.—A fitted mahogany or walnut cabinet is included with the sets specified above, but if it is not required a deduction of £1 4s. 9d. may be made from the price of the set.

Special Mahogany or Teak Cabinets with Screwed Joints and Fittings, suitable for Foreign, Colonial and Tropical Use are supplied at a cost of £1 beyond the prices shown above.

Every requisite for Chemical, Physical, and Bacteriological work supplied, from a test tube to the complete furnishing of the largest laboratory.



205

In its general design, this microscope leaves nothing to be desired. It is massive without being cumbersome, and the arrangements and proportions of its various parts will be found in practice exceedingly convenient. Constructed, as it is, with a perfect-working mechanical stage and sub-stage, and furnished with a graduated draw-tube, and the most sensitive of fine and coarse adjustments, this microscope is capable of any class of work. Thus, with one-twelfth inch oil immersion objective and other apparatus, as detailed in Set C, it is extensively used in bacteriological work and is unsurpassed for the purpose. Arranged with a projection eyepiece and objectives of high aperture, **it will stand the severest test of high-power photo-micrographic work.** The range of rackwork to the Coarse Adjustment is sufficient for the use of very low power Objectives, giving a distance between the Stage surface and nosepiece end of body of  $3\frac{1}{2}$  inches. It is thus a Microscope that meets the demands of the worker, no matter what they may be, in the most satisfactory manner, and while its many conveniences make it always advantageous and appreciated in the Laboratory, it is no less a favourite with the amateur worker, who will always find it unequalled for ease and satisfaction in working. Further, it offers for its price fuller combined advantages in completeness of design and perfection of workmanship, than any other Microscope.

*For prices of complete Sets see next page.*

## WATSON'S MICROSCOPES

THE  
EDINBURGH  
STUDENT'S MICROSCOPE  
STAND "H."  
No. 205.

REMODELLED WITH MANY  
IMPROVEMENTS

The most popular model, and as such merits  
a few words of special description  
and commendation.

Our Balances and Weights have achieved World-wide Reputation; *vide* Opinions of the  
Leading Scientific Press.

# WATSON'S MICROSCOPES

## PRICES OF THE EDINBURGH STUDENT'S MICROSCOPE. STAND "H." No. 205.

*Illustration on previous page.*

### SPECIFICATION.

The **height** when placed vertically and racked down is 11½ inches.  
 The **tripod** spreads 7 inches and is quite firm in any position.  
 The **body** is 1½ in. diameter, and can be supplied with a draw-tube to take either student's or large capped eyepieces at the same cost.

The **mechanical stage** is our Standard pattern with compensating screws. The range of horizontal movement has been increased to 1½ in. The milled head controlling the horizontal motion is stationary, and the plates so arranged that the condenser is not fouled at any point of the travel. The surface of the stage has a thin covering of ebonite attached by vulcanizing.

The **sub-stage** has rackwork focussing and centring screws.

The  **fittings** throughout are of R.M.S. standard gauge. We can unhesitatingly recommend this microscope as the ideal for all classes of general microscopical work.

	Price.
"H" Microscope, Stand only, as figured on previous page .. .. .	£25 0 0
Mahogany Case .. .. .	2 10 0

### COMPLETE SETS. No. 205.

<b>Set A.</b> —"H" Microscope Stand and Mahogany Case. 2 Objectives, Parachromatic Series: $\frac{3}{8}$ in. and $\frac{1}{8}$ in. 74 N.A. 1 Eyepiece, No. 1, 2, 3 or 4 .. .. .	£32 17 6
<b>Set B.</b> —"H" Microscope Stand and Mahogany Case. 2 Objectives, Parachromatic Series: $\frac{3}{8}$ in. and $\frac{1}{8}$ in. 74 N.A. 2 Eyepieces Nos. 1, 2, 3 or 4. Abbé Model Illuminator with Iris Diaphragm. Double Nosepiece .. .. .	£37 10 0
<b>Set C.</b> —"H" Microscope Stand and Mahogany Case. 3 Objectives, Parachromatic Series: $\frac{3}{8}$ in., $\frac{1}{8}$ in., 74 N.A., $\frac{1}{2}$ in. "Versalic" Oil Immersion. 2 Eyepieces, Nos. 1, 2, 3 or 4. Abbé Model Illuminator with Iris Diaphragm. Triple Nosepiece, dust-proof pattern .. .. .	£45 2 6

### EXTRAS FOR No. 205.

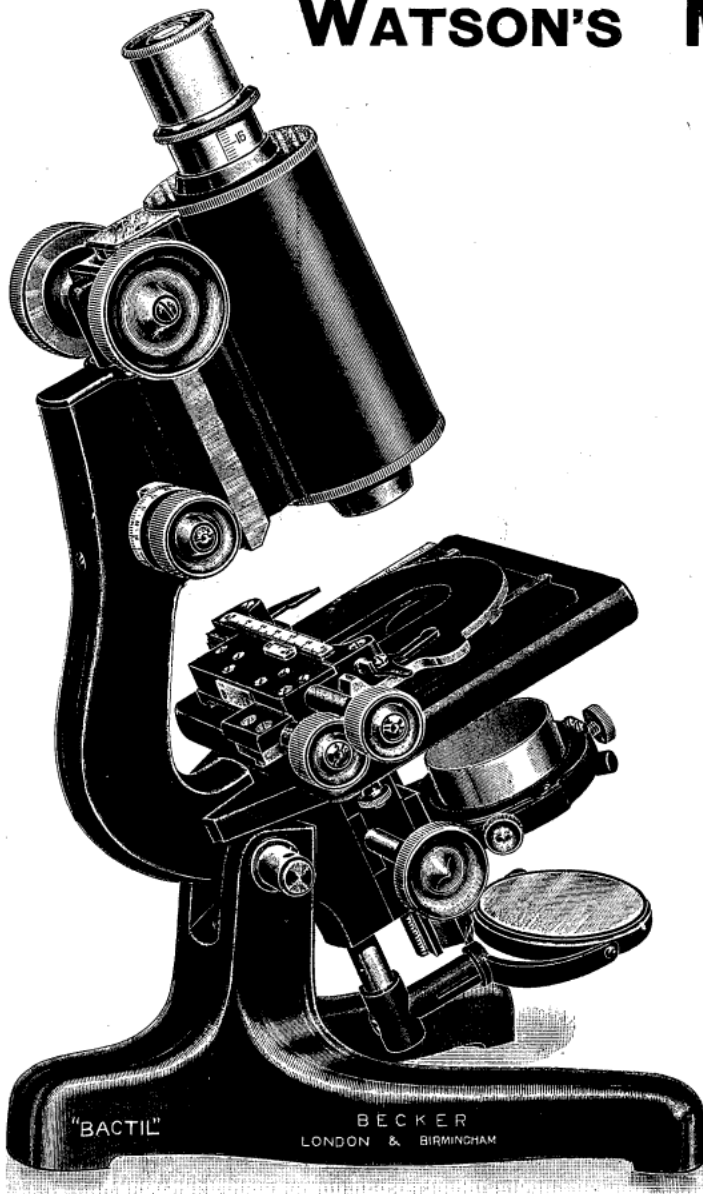
<b>D.</b> —Sliding Bar to Mechanical Stage .. .. .	£1 10 0
<b>E.</b> —Division to Stage Movements, reading by verniers to $\frac{1}{10}$ mm. .. .. .	£1 10 0
<b>F.</b> —Holoscopic Universal Condenser in Substage Iris Mount in place of Abbé Illuminator .. .. .	£4 0 0

The late Rev. W. H. Dallinger, LL.D., F.R.S., etc., in his edition of Carpenter's "The Microscope and its Revelations" (Eighth Edition, page 218), says: "One of the finest examples of this class of microscopes at present brought within reach of the average student's means, is that known as the Edinburgh Student's Microscope 'H.' . . . It will be seen that it has the prime requisite, a rigid foundation combined with lightness, and it is also possessed of a well-constructed mechanical stage which is built with the instrument, an advantage over the best 'attachable' stage.

"It is essentially a Student's microscope, and although of so low a price, is not only a specimen of the best workmanship, but is also extremely complete, and represents an advanced type of construction, capable of doing all ordinary and much experimental work."

Our stock of pure Chemicals and Acids is very considerable; hence all orders are executed with the utmost despatch. See comprehensive list at end of Catalogue.

# WATSON'S MICROSCOPES



206

## THE "BACTIL" MICROSCOPE.

Re-constructed Model, 1921, to the specification of the British Science Guild, for a High Power Research Microscope.)  
**For Research, the Laboratory and General High-Power Work.**

The "Bactil" Microscope follows the general lines of the "Service" Microscope, but it is built up as a complete instrument, and every part is co-ordinated, and adjusted by the most highly skilled mechanics.

The working fittings are throughout provided with adjustments by means of special screws, and it satisfies in every way the demands of the Research worker for whom it is especially intended.

Its principal features are as follows:—

**The Body** is of 2 in. diameter, and carries a Draw-tube, with fitting for standard Students' Eyepieces. Any larger size of Draw-tube can be provided, if desired, without extra charge. The Fine Adjustment is of our standard vertical lever type; the stage is the highly appreciated "Service" Mechanical Stage, either made as a permanent fitting or to remove when desired.

Alternatively, Dr. Murray's Long Range Stage may be supplied in place of the "Service" Mechanical Stage at the same price.

**The Condenser Carrier** has the Compound Substage with Centring Screws arranged to be turned aside from the optical axis when desired.

**The whole instrument is of superior finish.**

- C.—"Bactil" Microscope in mahogany case, three objectives  $\frac{3}{8}$  in.,  $\frac{1}{2}$  in. .74 parachromatic series,  $\frac{1}{2}$  in. "Versalic" oil immersion, two eyepieces Nos. 1, 2, 3 or 4, Abbé model illuminator with iris diaphragm, triple nosepiece, dust-proof pattern.. .. £44 7 6
- D.—"Bactil" Microscope stand in mahogany case, three objectives holoscopic series, 16 mm., 4 mm., 2 mm. oil immersion, two holoscopic eyepieces magnifying 7, 10 or 14, Universal condenser in understage iris mount, triple nosepiece, dust-proof pattern.. .. £64 12 6

- Price.  
 A.—"Bactil" Microscope Stand only with Mahogany Case .. .. . £27 10 0

### COMPLETE SETS. No. 206.

- B.—"Bactil" Microscope and mahogany case, two objectives parachromatic series,  $\frac{3}{8}$  in. and  $\frac{1}{2}$  in., two eyepieces, Nos. 1, 2, 3 or 4, Abbé model illuminator with iris diaphragm, double nosepiece .. .. . £36 15 0
- E.—"Bactil" Microscope stand and mahogany case, three apochromatic objectives, 16 mm., 4 mm., 2 mm. oil immersion, three compensating eyepieces, magnifying 7, 10 or 14, parachromatic condenser, completely mounted, triple nosepiece, dust-proof pattern .. .. . £74 0 0
- F.—The Universal condenser can be supplied in place of the Abbé illuminator in sets A and B at an extra charge of .. .. . £4 0 0

Every requisite for Chemical, Physical, and Bacteriological work supplied, from a test tube to the complete furnishing of the largest laboratory.

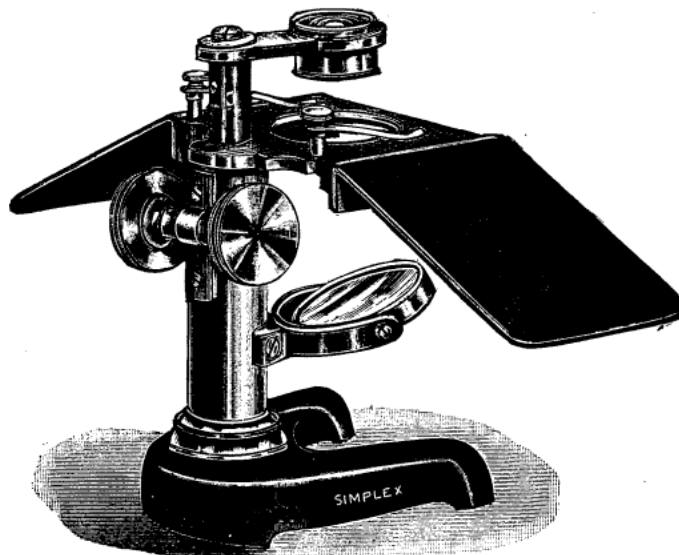
# WATSON'S DISSECTING MICROSCOPES



207

**207.—Dissecting Microscope**  
 with a simple metal base,  $4 \times 3\frac{1}{8}$  in., on which fits in grooves a piece of matt opal glass,  $2\frac{7}{8} \times 2\frac{3}{4}$  in. Rising from the base is a cylindrical rod on which slides an arm to carry an Aplanatic Magnifier. This forms a very useful Dissecting Microscope .. £0 10 6

**207A.—Single Lens Magnifier** for ditto, magnification about 9 diameters £0 7 6

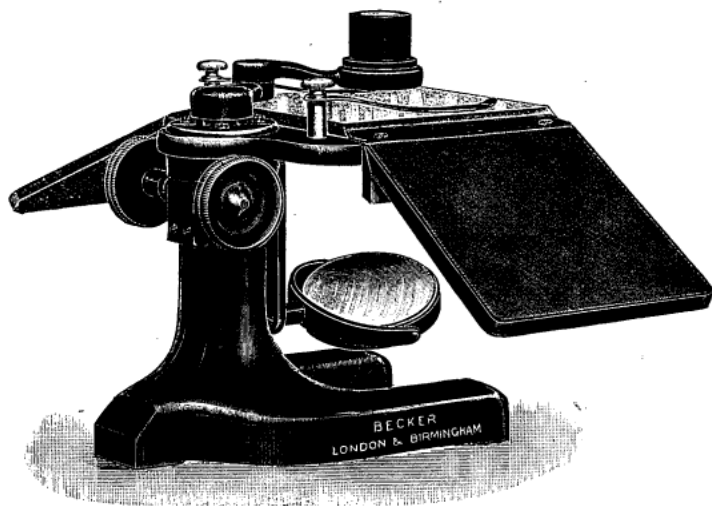


208

**208.—Dissecting Microscope.**

This Stand receives all Aplanatic Magnifiers mounted for Dissecting. For focussing, it is fitted with a rackwork and pinion adjustment. Also fitted with glass disc for Stage, plane mirror, and matt opal reflector, complete with hand rests .. £2 15 0

**209.—The above Stand, fitted with simple lens magnifying 9 diameters. Excellent for botanical work .. .. . £3 2 6**



210

**210.—Dissecting Microscope.**

This instrument is made with jointed arm, to receive the aplanatic Magnifiers mounted for dissection, listed below. Mounted on a heavy horseshoe foot, the upright carries a large stage, provided with a bevelled glass plate, below which is mounted the Diaphragm.

A plane mirror and opal glass disc are provided to the mirror box, which is mounted independently of the pillar.

Focussing is by means of a rack and pinion adjustment to the Lens carrier.

Strong metal hand rests, removable at will are provided.

It will be noticed that the arm carrying the Dissecting lens is jointed, so as to allow the comfortable examination of an object covering the whole area of the stage.

Prices.

<b>210.—Universal Dissecting Microscope, without lenses</b> .. .. .	£6 0 0
<b>211.—Aplanatic Magnifiers</b> $\times 6, \times 10, \times 15$ or $\times 20$ .. .. . each	0 17 6

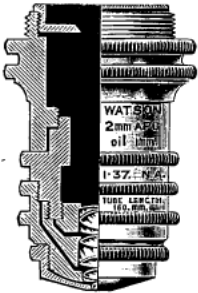
Our Balances and Weights have achieved World-wide Reputation: *vide* Opinions of the Leading Scientific Press.



# MICROSCOPE ACCESSORIES OBJECTIVES (APOCHROMATIC).

Nos. 212/215.

The Apochromatic Objectives are intended for those who require not only the maximum resolving power, but with it the highest perfection of correction of spherical and chromatic aberration that is obtainable. The worker who has once used Apochromatic Objectives, is not easily satisfied with anything less perfect.



The Apochromatic Objectives we make are equal to the best that have been produced, and in some respects, superior. They all possess in an exceptional degree the high qualities that are associated with this type of objective.

Cat. No.	Equivalent Focal Length.		Initial Power. Image Distance 10 inches.	Numerical Aperture.	Price. £ s. d.
	Inches.	Mm.			
212	$\frac{2}{3}$	16	15 in.	0.30	6 0 0
213	$\frac{1}{3}$	8	30 "	0.65	8 0 0
214	$\frac{1}{6}$	4	60 "	0.85	10 0 0
215	$\frac{1}{2}$	2	120 "	1.37 Oil Immersion	17 10 0

The above may be supplied corrected for any tube length to order.

# OBJECTIVES (HOLOSCOPIC).

Holoscopic Objectives, Nos. 216/224, have the same resolving power as the Apochromatics and are equal in all respects in their corrections, excepting that of colour, but the small residuum is not found to militate against effective working, and in fact is unobservable when coloured objects are under examination.

The modern colour filter practically abolishes residual colour aberrations, and renders objectives of this series equal to the far more expensive Apochromatics.

These Objectives have been highly praised by expert workers who have purchased them for their excellent working with deep-power Eyepieces, large solid illuminating Cones, annular and dark-field illumination, and the yielding of exquisite photographic effects.

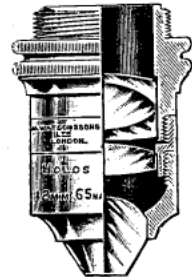
They meet the needs of the original investigator, and all who would possess the best optical means, in the fullest possible manner.

The numerical aperture stated is the guaranteed minimum for each Objective. The Lenses may be trusted to have the magnifying power (within a small percentage) corresponding to the equivalent focus given in the list.

All Lenses in this series with the exception of the low-power lenses, as noted below, are under-corrected for chromatic differences of magnification; they should therefore be used in conjunction with our Holoscopic Eyepiece.

The 2 mm., which has a guaranteed minimum aperture of 1.37 N.A., is a superb lens and has no equal at anything like the same price. Microscopists requiring the maximum resolving power will find their wishes satisfied with this lens.

**Special Note re Low Powers.** The three Objectives of lower power than 24 mm., are not under-corrected in the manner that the other Holoscopic Objectives are. They should, therefore, be used either with Huyghenian Eyepieces or Holoscopic Eyepieces with the adjusting tube pushed home.



**Low Powers.** These Objectives are new to the Holo series. Their construction is such that they should be used with either Huyghenian Eyepieces or Holoscopic Eyepieces with the adjusting tube pushed home.

Cat. No.	Equivalent Focal Length.		Initial power Diameters calculated for an image distance of 10 inches.	Numerical Aperture.	Tube Length.	Prices. £ s. d.
	Mm.	Inches.				
216	75	3	4	0.11	For any tube length	3 0 0
217	50	2	5	0.17	Do.	3 0 0
218	35	$1\frac{1}{2}$	8	0.19	Do.	3 0 0

**Medium and High Powers.** From stock for 8 inch (200 mm.) tube length only.

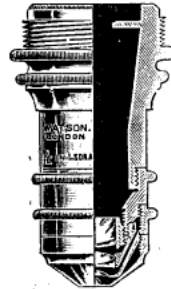
219	25	1	10	0.30	8" to 10"	Dry 5 5 0
220	16	$\frac{2}{3}$	15	0.40	6" to 10"	" 5 5 0
221	12	$\frac{1}{2}$	20	0.65	6" to 10"	" 6 15 0
222	8	$\frac{1}{3}$	30	0.65	8" to 10"	" 6 10 0
223	4	$\frac{1}{6}$	60	0.85	6" to 10"	" 7 10 0
224	2	$\frac{1}{2}$	120	1.37	6" to 10"	12 0 0 Oil Immersion

The above 4 mm. Objective can be mounted to give a numerical aperture of .95 N.A. as heretofore, but the marginal corrections are then incapable of complete correction. The N.A. .85 will bear a full cone of illumination and is totally effective.

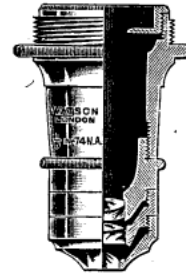
# MICROSCOPE ACCESSORIES

## OBJECTIVES (PARACHROMATIC).

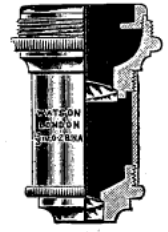
The Parachromatic Series, Nos. 225/234, plays a part in microscopical work that is distinct; the resolving power is well proportioned to the magnifying power, so as to place in the hands of the general worker, lenses that will be effective, easily used and give undeniably fine definition. The corrections generally are no less good than those of the Holoscopic and Apochromatic, but inasmuch as the greater ease in working is chiefly due to the smaller aperture given to the objectives of this series, they have less resolving power in comparison to their focal length than the Holoscopic and Apochromatic lenses.



Oil Immersion Objective.  $\frac{1}{2}$  in.



High-power Objective.  $\frac{1}{8}$  in. to  $\frac{1}{2}$  in.



Low-power Objective. 2 in. to  $\frac{1}{2}$  in.

### PARACHROMATIC OBJECTIVES. Nos. 225/234.

Cat. No.	Approximate Focal Length.		Initial Power calculated for an image distance of 10 inches (about 250 mm.).	Numerical Aperture.	Price.
	Inches.	Mm.			
225 .. ..	4	100	3	0.08	£ 2 5 0
226 .. ..	3	75	4	0.09	£ 2 5 0
227 .. ..	2	50	6	0.15	£ 2 5 0
228 .. ..	$1\frac{1}{2}$	35	8	0.17	£ 2 5 0
229 .. ..	1	25	12	0.21	£ 1 12 6
230 .. ..	$\frac{3}{4}$	16	15	0.28	£ 1 12 6
231 .. ..	$\frac{1}{2}$	12	20	0.34	£ 2 0 0
232 .. ..	$\frac{1}{4}$	6	42	0.68	£ 3 5 0
233 .. ..	$\frac{1}{8}$	4	Semi-Apochromatic 65	0.74	£ 3 15 0
234 .. ..	$\frac{1}{8}$	3	83	0.88	£ 3 15 0

**Oil-Immersion.** The New "Versalic"  $\frac{1}{2}$  inch, No. 236, has a flatter field than any other first-class Oil Immersion Objective. It has the long working distance from the front lens to the object of 43 mm. This is appreciably greater than that of other Oil Immersion Lenses, but it is well within the limits for maintaining oil contact. The formula is different from ordinary Oil Immersion Objectives, and enables the front lens to be fixed in a manner which renders it practically immovable. For systematic search work, blood examination and counting, this Objective has no equal. It is computed specially for work on stained subjects. All Laboratory workers should use Watson's "Versalic"  $\frac{1}{2}$  inch Oil Immersion Objective. The "Versalic" Objective, though denominated a  $\frac{1}{2}$  inch, has been made with the magnifying power of  $\frac{1}{4}$  inch, in accordance with the universal custom that prevails with lenses for bacteriological work.

Cat. No.	Approximate Focus.		Initial Power calculated for an image distance of 10 inches (about 250 mm.).	Numerical Aperture.	Price.
	Inch.	Mm.			
235 .. ..	$\frac{1}{4}$	3.40	74	0.90	£ 5 15 0
236 .. ..	Versalic $\frac{1}{2}$	1.8	125	1.28	£ 7 10 0

The price includes an oil bottle and supply of oil.

### THE "STUDENT'S" SERIES ACHROMATIC OBJECTIVES. Cat. Nos. 237/242

**Student's Objectives, Dry Series,** for first grade and elementary laboratory work; all made with the Standard "Society Screw," and fitted in brass boxes. These objectives consist of a single combination of lenses only, and although not equal in performance to the beautiful double combination lenses of the same powers of the "Parachromatic" series, they give crisp and brilliant definition and are thoroughly serviceable.

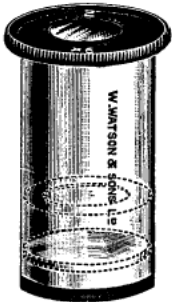
Cat. No.	Designation of Objective.	Numerical Aperture.	Magnification with any length of $6\frac{1}{2}$ in. (170 mm.) image distance of 10 in. (250 mm.) and Huyghenian Eyepiece.			Price.
			I.	II.	III.	
237 .. ..	1 inch .. 24 mm.	0.13	50	60	80	£ 1 4 0
238 .. ..	$\frac{2}{3}$ " .. 16 "	0.16	70	85	110	£ 1 4 0
239 .. ..	$\frac{1}{2}$ " .. 5.8 "	0.54	200	240	320	£ 2 0 0
240 .. ..	$\frac{1}{3}$ " .. 4.4 "	0.61	275	330	440	£ 2 7 0
241 .. ..	$\frac{1}{4}$ " .. 3.2 "	0.79	375	450	600	£ 3 0 0
242 .. ..	$\frac{1}{10}$ " .. 2.5 "	0.87	450	540	720	£ 3 0 0

E

# MICROSCOPE ACCESSORIES

## EYEPIECES, Etc.

**The Huyghenian or ordinary type of Eyepiece.**  
—These Eyepieces work approximately in the same focal plane, so that on interchanging Eyepieces of different powers, the object remains practically in focus and the working distance of an Objective is not shortened when a high-power Eyepiece is used with it, as is usually the case. Also, there is no disturbance to the corrections of the Objective on interchanging Eyepieces.

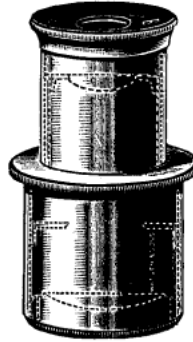


243  
Student's Eyepiece.

These Eyepieces are made in two patterns: (1) the capped form, 1.27 in. (32.258 mm.) diameter, and (2) the Student's pattern .9173 in. (23.30 mm.) diameter. The latter are the regular Eyepieces supplied with the great majority of our Instruments and those of other makers, all of which are interchangeable. These are the standard sizes of the Royal Microscopical Society.

EACH IS ENGRAVED WITH ITS INITIAL MAGNIFYING POWER.

The Eyepieces are numbered 1 to 5, No. 1 being the weakest. They were formerly described as A, B, C, D, etc., but this lettering is no longer used.



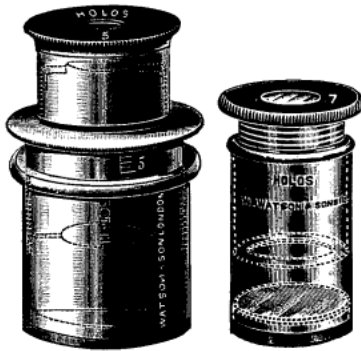
244.  
Best Capped Eyepiece

### Student's Type. Cat. No. 243.

Eyepiece No.	Initial Magnifying Power.	Price.		
		£	s.	d.
1	5 diams.	0	10	0
2	6 "	0	10	0
3	8 "	0	10	0
4	10 "	0	10	0
5	12 "	1	0	0
6	15 "	1	0	0

### 244.—Capped Type.

No.	Initial Magnifying Power.	Price.		
		£	s.	d.
1	5 diams.	1	5	0
2	6 "	1	5	0
3	8 "	1	5	0
4	10 "	1	15	0
5	12 "	1	15	0
6	15 "	1	15	0



246  
245  
**NEW FORMULA.**

Not a compromise, but the best possible Eyepiece for either Ordinary, Holoscopic or Apochromatic Objectives.

These Eyepieces, already widely known to, and greatly appreciated by, microscopists, have recently been greatly improved by the use of compound lenses of an unusual type, with a view to securing three additional advantages.

### "HOLOSCOPIC" EYEPIECES.

**ADVANTAGES.**—1. The Eyepoint has been made longer than formerly, so that even the deepest of the new Eyepieces can be used in perfect comfort.

2. With any given objective the new Eyepieces will give a flatter and more uniformly defined field than ordinary Eyepieces of either the Huyghenian or the Compensating type.

3. The range of adjustment by the small draw-tube has been limited, so that it is impossible to exceed the really useful limits.

**HOW TO USE THEM.**—In nearly every case it will be sufficient to use the Eyepiece (1) with the draw-tube pushed in as far as it will go with ordinary low-power objectives up to and including the  $\frac{1}{2}$  inch.

(2) With the draw-tube pulled out as far as it will go with all Holoscopic and Apochromatic objectives, and with most ordinary  $\frac{1}{2}$  inch Oil Immersions.

(3) With the draw-tube at a half-way setting with ordinary  $\frac{1}{2}$  in.,  $\frac{1}{8}$  in. and  $\frac{1}{4}$  in. objectives, and some  $\frac{1}{2}$  in. Oil Immersions.

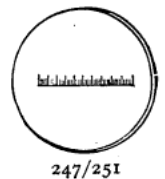
Very painstaking observers will find the absolutely best positions of the Eyepiece, draw-tube close to those just indicated in those rare cases, where an unusually sensitive object still shows traces of coloured margins (orange and blue) in the outer part of the field of the Eyepiece.

**MAGNIFYING POWERS.**—The Holoscopic Eyepieces are made in two patterns: (1) the ordinary Student's pattern and (2) the best capped form. Either kind can be used with any tube length.

The magnifying powers are calculated for the 10-in. tube length, and are as follows:—

245.—Student's patterns, 7, 10, 14 and 20 diameters .. .. .	£2 6 6
246.—Best capped pattern only, 1.27 in. diameter, 5, 7, 10, 14 and 20 diameters .. .. .	3 0 0

- 247.—Eyepiece Micrometers, ruled with scale, as figured .. .. . 10/-
- 248.—Ditto, ditto, in squares .. .. . 10/-
- 249.—Ditto, ditto, the same as Nos. 247 or 248, but mounted to fit large-sized capped eyepiece 15/-
- 250.—Stage Micrometers, on 3 x 1 slips, ruled to  $\frac{1}{100}$  and  $\frac{1}{1000}$  in. .. .. . 10/-
- 251.—Ditto, ditto,  $\frac{1}{10}$  and  $\frac{1}{100}$  mm. .. .. . 10/-



Our Balances and Weights have achieved World-wide Reputation: *vide* Opinions of the Leading Scientific Press.

## MICROSCOPE ACCESSORIES CONDENSERS (SUBSTAGE)

### The Universal Condenser. Holoscopic System. Nos. 252/256.

For rapid work, a condenser having large lenses is an immense advantage, and in the Universal Condenser a diameter of back lens is given, which in practice affords all the convenience of the larger sizes. With it work can be done as rapidly, and more accurately, than with any other Condenser, while the beautiful aplanatic corrections render it the finest all-round Condenser procurable.

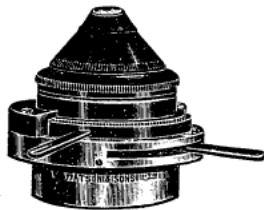
The Mounting is the same as used for the Abbé Illuminator, with which the Holoscopic Condenser will interchange. It has iris diaphragm and rotating cell for stops, etc.



Power.		Total Aperture.	Aplanatic Aperture.		Diam. of Back Lens.
Complete.	Front Lens removed.		Complete.	Front Lens removed.	
.4 in.	1.0 in.	1.0	.95	.40	.77

- 252.—Optical part only .. .. . £5 10 0
- 253.—Completely-mounted with iris diaphragm. For Understage .. .. . 6 10 0
- 254.—Ditto, ditto, ditto. For Substage .. .. . 7 0 0
- 255.—Set of stops for dark-ground illumination, etc. .. .. . 0 10 0
- 256.—Coloured glasses—blue, yellow, signal green, ground, etc., Dr. Spitta's "pot green" .. .. . 0 1 6

## ABBÉ ILLUMINATORS



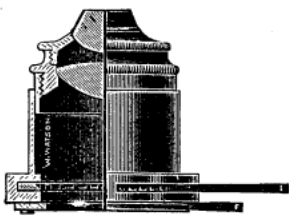
258  
 Mounted for Substage.

The continued popularity of this Condenser is due to the ease and rapidity with which it can be employed and for its brilliancy of image.

Although its numerical aperture is great, being 1.20, its Aplanatic Cone is comparatively small, but the ease with which it can be worked has caused it to be universally used for both high and low-power work; for the latter purpose the top lens is removed. A beautiful dark-ground effect may be obtained with it.

A very perfect Iris Diaphragm has been designed for the fittings of these Condensers, which permits the most precise gradation of illumination being immediately obtained.

- 257.—Optical part only, N.A. 1.20 .. .. . £1 5 0
- 258.—Completely mounted for **substage**, with iris diaphragm and carrier for stops, N.A. 1.20.. .. . 3 0 0
- 259.—Completely mounted for **understage** with iris diaphragm and carrier for stops, N.A. 1.20.. .. . 2 5 0
- 260.—Set of stops for dark-ground, etc., illumination in brass box .. .. . 0 10 0
- 261.—Discs of glass, tinted, blue, signal green, yellow, ground glass, Dr. Spitta's "Pot Green" (2 thicknesses), etc. .. .. . each 0 1 6



262  
 Simplified Abbé Condenser.

- 262.—Simplified Abbé Condenser with Iris Diaphragm.  
 The iris diaphragm can be used independently if the condenser is removed £1 10 0

**MICROSCOPES, OBJECTIVES, EYEPIECES AND  
 CONDENSERS OF ALL MAKES CAN BE SUPPLIED  
 AT CURRENT LIST PRICES.**

Our stock of pure Chemicals and Acids is very considerable; hence all orders are executed with the utmost despatch. See comprehensive list at end of Catalogue.

E\*

# MICROSCOPE ACCESSORIES

## 263. — The Nivoc Patent Microscope Lamp (electric).

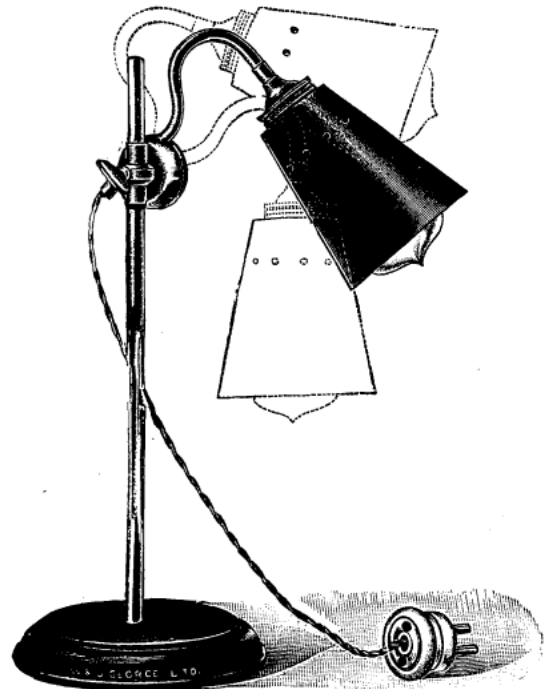
The favourite lamp for the laboratory.

This lamp is furnished with our patent universal joint, securing a free movement in every direction. This is of extreme value to the scientist. It can, moreover, be turned with one hand, leaving the operator free to continue his work. It has a heavy base, and the stand is rigid under all circumstances. The shade is a large one to avoid heating, enamelled green without, white within. It will take the ordinary Edison lamps.

One hundred of these lamps have been supplied to the Birmingham University, and one hundred to the Sheffield University; also a large number of institutions are using the lamps in smaller quantities. It has been highly recommended by several professors. There is a simple adjustment by means of which wear can be taken up. The clamp is arranged to lock, so there is never any possibility of slipping.

The easy movements of the patent Nivoc joint allows the operator to throw a clearly defined circle of light in any direction on the work he is doing.

The price of the lamp complete is 35/-, including lamp, plug and connections. We shall be glad to quote special prices for quantities.



263

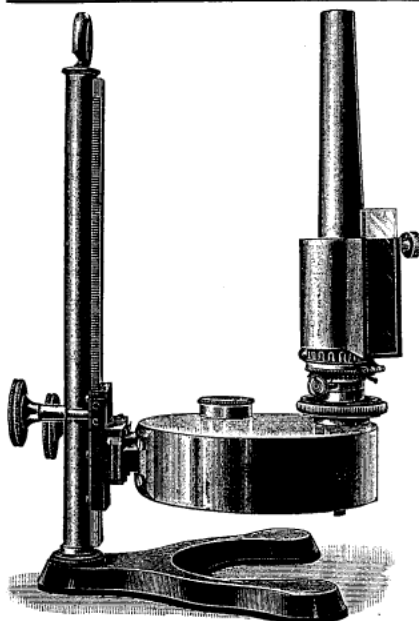
## 264.—“ Standard ” Microscope Lamp.

Burns paraffin. The type most frequently used by workers. It has a flat glass reservoir, which allows of the light being brought close to the table. The lamp itself may be securely fixed at any height on the upright bar, which latter being square, prevents it from swinging round. A metal chimney, taking 3 × 1½ slips, is provided. This lamp will burn for 10 hours, and is especially suitable for photo-micrography. With supply of blue and white slips .. .. £1 10 0

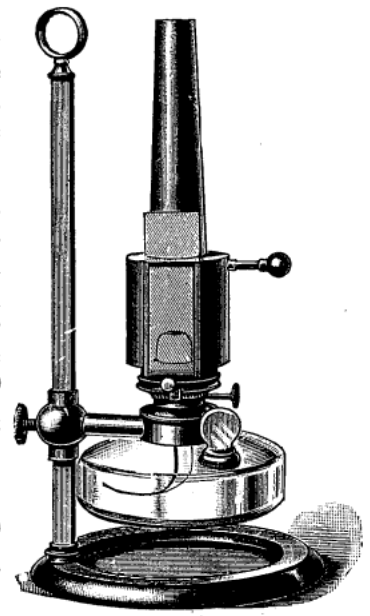
This lamp will be found a most perfect illuminant for photo-micrography.

265.—Mahogany case for above—  
 extra £1 0 0

NOTE.—After use remove the metal chimney, or it may smell when re-lighted.



266

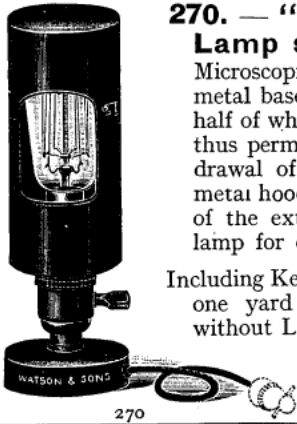


264

- 266.—“ Premier ” Microscope Lamp. Burns paraffin. This is a highest-class microscope lamp, with rack work and screw movements, fitted to the upright bar in vertical and horizontal directions, by means of which the light can be exactly set in any desired position. It has very solid brass foot and brass oil container; the burner can be rotated so that either the flat or edge of wick may be used. With metal chimney for 3 in. by 1½ in. slips. Price.. .. £10 10 0
- 267.—Ditto, ditto, without mechanical adjustments .. .. 6 15 0
- 268.—Mahogany Case for lamps Nos. 266 and 267 .. .. extra 1 10 0
- 269.—Nelson’s Aplanatic Bull’s-Eye, mounted on arm attached to oil container, for use on lamp No. 264, and with sliding adjustment for focussing, etc. .. .. extra 2 10 0

Every requisite for Chemical, Physical, and Bacteriological work supplied, from a test tube to the complete furnishing of the largest laboratory.

# MICROSCOPE ACCESSORIES



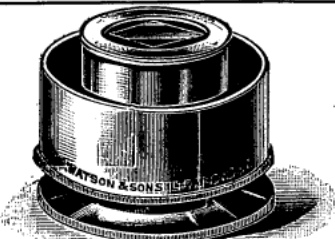
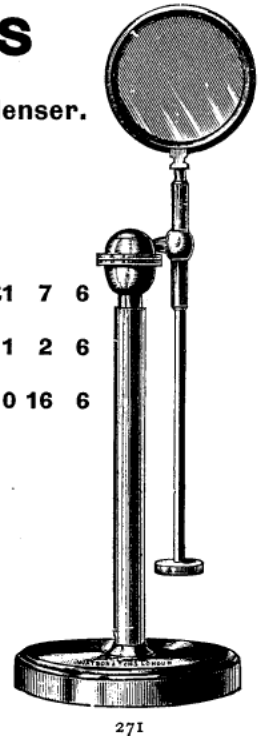
**270. — "Laboratory" Electric Lamp stand**, specially designed for Microscopic work. It consists of a heavy metal base carrying a metal hood, the upper half of which is removable by bayonet catch, thus permitting the ready insertion or withdrawal of lamp bulb. The interior of the metal hood is enamelled white and the whole of the exterior is in dark bronze, an ideal lamp for constant or occasional work.

Including Key-switch, Lamp Holder, one yard of flexible cord, but without Lamp Bulb or Wall Plug **£2 5 0**

**271. — Stand Condenser.**

Standard Pattern.

- A. With upright lengthening bar, and ball and socket motions, large size, as figured .. .. **£1 7 6**
- B. Ditto, medium size .. **1 2 6**
- C. Ditto, small size .. **0 16 6**



**POLARISING APPARATUS**



Polariser.

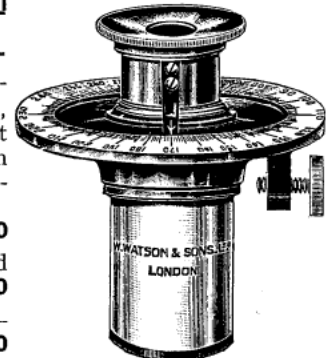
Analyser.

**272. — Polariser and Analyser, with selenite, complete—**

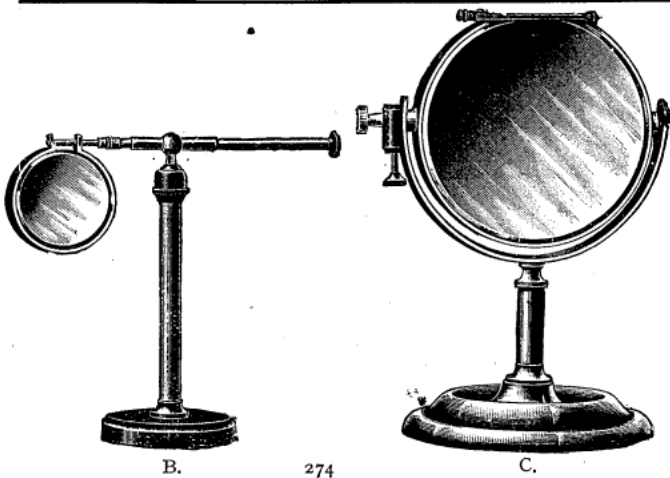
- |  | Price.                          |
|--|---------------------------------|
| A. Small size .. .. .  | <b>£1 10 0</b>                  |
| B. Medium size .. .. .   | <b>2 5 0</b>                    |
| C. Large size .. .. .  | <b>3 2 6</b>                    |
| D. Rotating analyser instead of fixed form, extra  | <b>0 7 6</b>                    |
| E. Analyser to fit over Capped Eyepiece  | <b>£1 10 0</b> and <b>2 0 0</b> |
| F. Ditto, fitted to Body of Microscope when new  | <b>3 10 0</b>                   |
| G. Adapting Polariser to work in conjunction with Abbé Illuminator or other condenser for Substage .. .. . | <b>0 7 6</b>                    |
- Consisting of Polariser and Analyser. A disc of selenite is supplied with Sets A, B and C.

**273. — Eyepiece Analyser**

- to fit over Eyepiece, with large field prism, rotating with reader against divided circle, complete with Student's Huyghenian Eyepiece, having cross-webs—  
**£4 5 0**
- Ditto, with best large sized Capped Eyepiece **£4 15 0**
- Extra for Calc-spar to above—  
**£1 1 0**



273



B. 274

C.

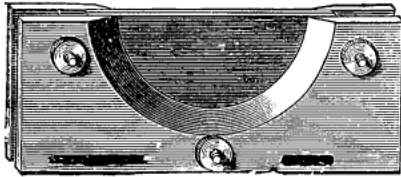
**274. — Kingsford's Trough.** These troughs are designed especially for watching the development of "Pond Life," and for the purposes of small Aquaria. In addition, they form exceptionally advantageous light filters, the smaller size especially. They are absolutely water-tight.

- A. As figured on B, 2 $\frac{3}{8}$  in., internal diameter. Trough *only*, to interchange with Bull's Eye Lens of Stand Condenser .. .. **£0 17 6**
- B. Trough, complete with Stand, as figured **1 12 6**
- C. Large Table Trough, as figured, with 6 in. solid metal base. Internal diameter of Trough, 7 $\frac{3}{8}$  in., mounted in gymbals, with clamp to fix at any desired angle. Complete .. .. . **3 3 0**

Our Balances and Weights have achieved World-wide Reputation : *vide* Opinions of the Leading Scientific Press.

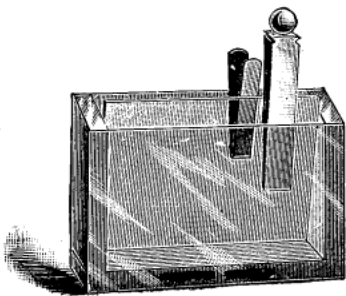
# MICROSCOPE ACCESSORIES

## LIFE SLIDES AND TROUGHS.



275

**275.—Botterill's Trough.** This has two plates of vulcanite, held together by three screws, between which are placed two slips of glass separated by an ordinary india-rubber ring. The glasses can be readily taken apart and cleaned, and in the event of being broken can at once be replaced. Price .. each 5/-

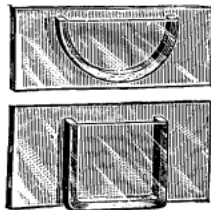


276

**276.—Zoophyte Trough,** with plate, wedge and spring .. .. . each 6/6

**277.—Animalculæ Troughs—**

- A. 3 × 1 in. .. each 1/-
- B. 3 × 1½ in. .. „ 2/6



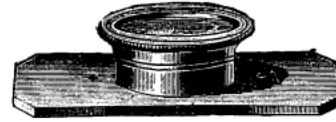
277



278

**278.—Petri's Culture Dishes,** best quality white glass. Depth 1.5 cm.—

Diameter of lower dish	} 6 8 9 10 11 12 15 18 20 cms.
Per pair ..	
	1/7 2/- 2/3 2/6 2/9 3/- 4/2 5/9 7/4



279

- 279.—Live Box,** large size, best quality £1 0 0
- 280.—Ditto,** medium size .. .. . 0 13 6
- 281.—Ditto,** small size .. .. . 0 6 6

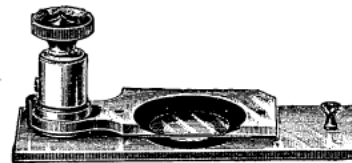


282

**282.—Rousselet's Live Box** for use with Condenser, Paraboloid, etc. .. .. . 17/6

The advantages of this are:—It can be used with the substage condenser, spot lens, etc., and there is sufficient margin between the edge of the glass base disc—on which the object is compressed—and the edge of the cell carrying the cover glass, for the objective to work at any point where compression can take place.

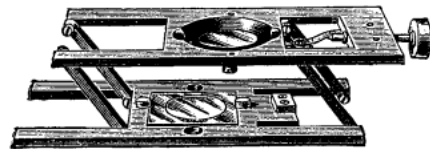
\*\* Extra covers for live boxes, 2/6 per doz.



283

**283.—Rousselet's Compressor.** The compression is by means of a screw in the drum, and the cover glass having a square top, media may be introduced during examination of specimens. The objective may be worked at any point where compression takes place. The arm carrying the cover glass may be turned completely aside for cleaning or replacing covers, and is held centrally by a spring catch. We have introduced a special improvement with two screws, instead of cement, to hold the cover glass.

Price, with covers .. .. . 17/6



284

**284.—Reversible Life Cell.** With this form the specimen may be examined from either side. Made of aluminium throughout. Price, with covers—

£2 2 0

Our stock of pure Chemicals and Acids is very considerable ; hence all orders are executed with the utmost despatch. See comprehensive list at end of Catalogue.



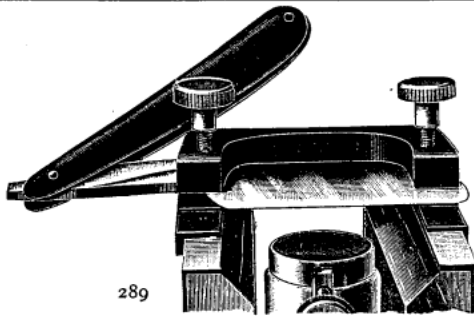
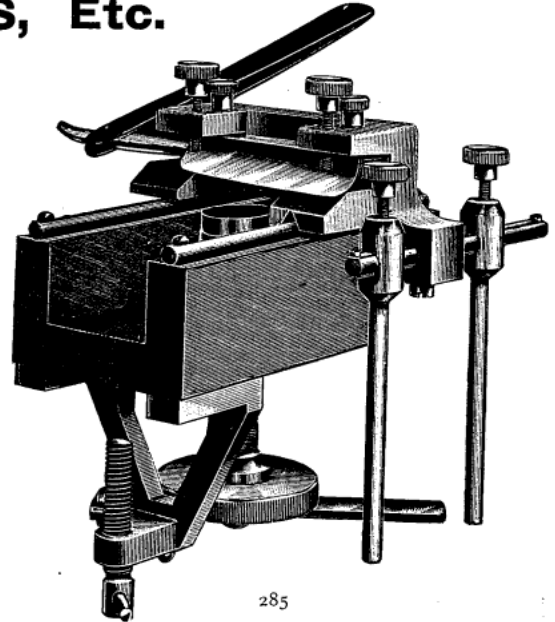
# MICROSCOPE ACCESSORIES

## MICROTOMES, Etc.

### 285.—The Cathcart-Darlaston Microtome (Registered).

A low-priced microtome, which, while preserving the simplicity and excellence of the Cathcart pattern, enables the worker to cut sections of a definite thickness. The illustration shows the general principle, which is briefly as follows:—The forks are attached to the knife carriage, and, in drawing the latter back, one of the forks engages with a lever attached to the milled head, and thus raises the material a distance of from  $\frac{1}{250}$  to  $\frac{1}{5000}$  of an inch, according to the position in which the forks are placed, thumbscrews permitting of the distance between the two being varied at will. The forward traverse of the carriage causes the second fork to engage, which replaces the lever in its original position ready for the return thrust. It will thus be seen that the entire system is automatic, and work as accurate as that produced by a complicated and expensive instrument is possible. The automatic motion may be dispensed with at pleasure, and the milled head rotated by the hand as usual.

- |   |        |
|---|--------|
| A. Price, complete, for Freezing and Embedding .. | £4 7 6 |
| B. For Freezing only .. .. .                      | 4 2 6  |
| C. For Embedding only .. .. .                     | 3 17 6 |
| D. Razor for above .. .. .                        | 0 3 6  |



**286.—The Cathcart Microtome.** Knife Carriage Pattern. In this instrument the razor carrier runs on brass guides. This latter has an adjustment allowing the razor edge angle to be adapted to the work in hand. The milled head for raising the material is also furnished with an indicator by which the thickness of section can be accurately gauged—

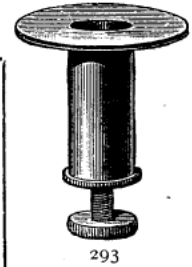
- |   |        |
|---|--------|
| A. For freezing and embedding, with one razor | £3 5 0 |
| B. For embedding only .. .. .                 | 2 17 6 |
| C. For freezing only .. .. .                  | 2 15 0 |

NOTE.—The plane-iron-section knife cannot be used upon the brass guides.

**287.—The Cathcart Microtome.** Simple form. This popular form of Microtome is fitted for Ether Freezing or Embedding. For freezing tissues it is arranged as shown above; to embed tissues the tubes, bottle and the freezing tube are drawn out; the latter being replaced by another tube, with clamp. The substance to be cut (embedded in paraffin or other medium) is then inserted, and the clamp screwed up. This instrument is thoroughly well-finished, and the adjusting screw milled head is made specially large to permit a fine movement.

**287.—Microtome as above, with double clamp to fasten it to table, spray bellows and freezing apparatus, tubes for making paraffin blocks, etc., complete** £2 0 0

### 293.—Hand Section Cutter for Botanical work .. each 9/6

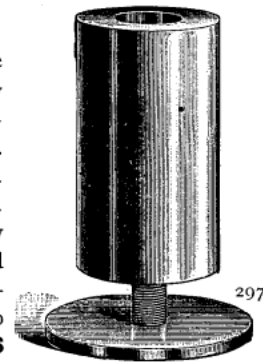


**294.—Mr. Cole's Pattern Section-Cutter.** This is a most useful and efficient Section-Cutter, being very solid and rigid in use. The screw for raising the sections is very fine, and the milled head extra large, enabling very thin sections to be cut .. £2 12 6

**295.—Set of Punches, complete in case, for cutting out embedding substances** extra £0 10 0

**296.—Mr. Cole's Pattern Section-Knife, in case .. .. .** £0 8 6

### 297.—Darlaston's Hand Section Cutter, of simple construction, but of especially solid make, enabling considerable accuracy to be attained. It is of solid brass, $1\frac{1}{2}$ in. diameter, and has a well $\frac{1}{8}$ in. diameter. The raising screw—which is purposely fitted loosely to facilitate exact adjustment—has 35 threads to the inch .. .. each 14/6



**288.—The above Instrument, arranged for Ether Freezing only .. .. .** 1 11 6

**289.—Ditto, ditto, for Embedding only .. .. .** 1 10 0

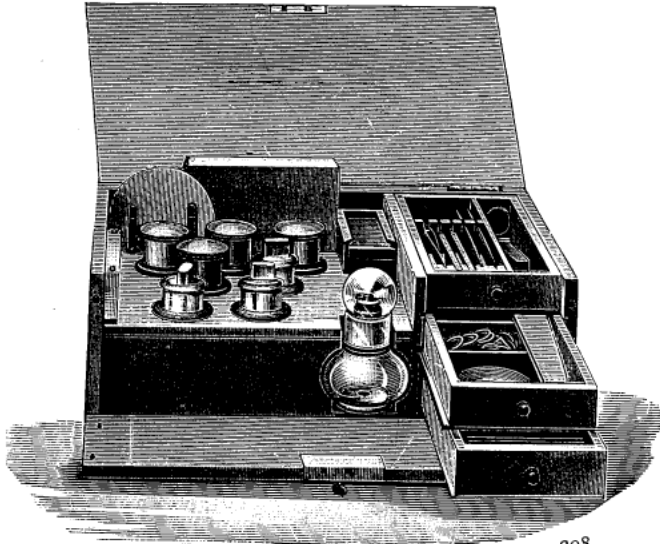
**290.—Plane Iron Section Knife, in handle .. .. .** 0 8 6

**291.—Ether Points, extra sets .. .. .** 0 4 6

**292.—Rubber Spray Bellows .. .. .** 0 5 0

# MICROSCOPE ACCESSORIES

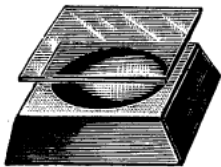
MOUNTING CABINETS, SCISSORS, SCALPELS, Etc.



298

**298.—Complete Cabinets for Mounting,** containing asphalt, 3 bottles for solutions, brass table, Canada balsam, cells, cover glasses, 2 dissecting knives, dissecting needles, forceps and scissors, glass slips, gold size, labels, marine glue, spirit lamp, spring clips, turntable, etc.

- A. In mahogany case .. .. . £6 10 0  
 B. In polished pine case .. .. . 5 15 0

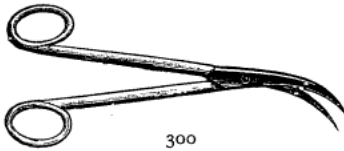


299

**299.—Square Glass Pots with Circular Excavations,** polished. Complete, with covers—

- A.  $1\frac{1}{2}$  in.  $\times$   $1\frac{1}{2}$  in., diameter of excavation,  $1\frac{1}{4}$  in.; white glass, 9/-; black glass, 14/- per dozen.  
 B.  $2\frac{3}{8}$  in.  $\times$   $2\frac{3}{8}$  in., diameter of excavation,  $1\frac{7}{8}$  in.; white glass, 14/-; black glass, 17/- per dozen.

**300.—Dissecting Scissors,** best quality steel,



300

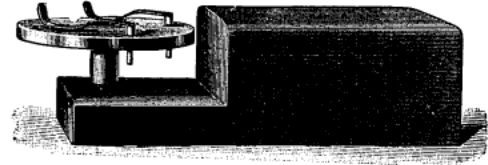
nickel plated, with curved fine points—  
 each, 2/6  
 per doz. 27/6

**301.—Razors for Cutting Sections,** flat one side .. .. . each 3/6

**302.—Needles or Seekers,** mounted in neat hardwood handles, straight .. each 3d.; per doz. 2/-

**303.—Ditto,** ebonite handles .. .. per doz. 4/9

**304.—Ditto,** as 302 but curved.. .. , 4/-

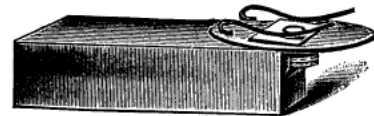


305

**305.—Improved Ball-bearing Turntable.**

This Turntable is an improvement on all existing patterns. The table is balanced in the ordinary way on a hardened steel pin and rotates on a dead hard steel ball, thus reducing friction to a minimum and ensuring a smooth and steady revolution. The hand support is placed high, enabling a careful application of the brush. The brass table is engraved with a circle which exactly encloses a  $3 \times 1$  slip, thus giving instant centering—

each £1 2 6

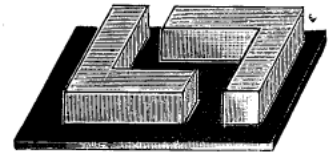


306

**306.—Turntable,** ordinary pattern, mahogany block and revolving brass disc, fitted with two spring clips .. .. . each 10/6

**307.—Ditto,** improved self-centering pattern with concentric revolving adjustment .. each £1 2 6

**308.—Schulze's L Moulds for Embedding,** consisting of two ground-glass angles and zinc-base .. per set 7/6



308

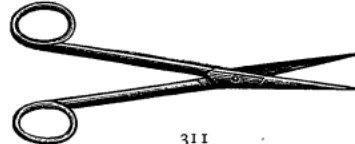
**309.—Ditto,** made of brass .. .. per pair 5/-



310

**310.—Scalpels,** ebony handle each 1/4; per doz. 14/6

**311.—Dissecting Scissors,** best quality steel, nickel plated, straight, fine points—



311

each 2/-  
 per doz. 22/6

**312.—Pipettes,** plain .. each 2d.



312

**313.—Ditto,** with rubber teat .. .. , 4d.

Our Balances and Weights have achieved World-wide Reputation; *vide* Opinions of the Leading Scientific Press.

## MICROSCOPE ACCESSORIES

### FORCEPS, SECTION LIFTERS, Etc.



**314.—Forceps**, brass, nickel plated .. each 7d. ; per doz. 6/-



**315.—Forceps**, brass, nickel plated, straight— each 7d. ; per doz. 6/-



**316.—Forceps**, brass, with curved ivory points .. each 2/6



**317.—Forceps**, best quality, steel, nickel-plated, fine points .. .. . each 1/3 ; per doz. 14/-

**318.—Ditto**, with platinum points—  
Price variable, each 12/6

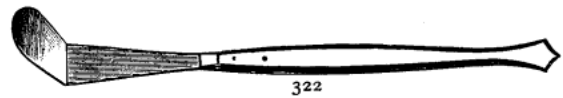
**319.—Forceps**. Best quality steel, nickel plated, broad points each 1/3 ; per doz. 14/-



**320.—Forceps**, best quality steel, nickel-plated, with curved pointed ends—  
each 2/3 ; per doz. 26/-



**321.—Forceps**, with spring bow and glass arms .. each 3/-  
per doz. 35/-



**322.—Section Lifter**, nickel-plated ebonite handle. each 1/6 ; per doz. 17/-

**323.—Ditto**, German Silver .. 1/9 ; .. 20/-

**324.—Ditto**, Aluminium .. 1/9 ; .. 20/-



**325.—Flat Bottomed Watch Glasses**, finest quality, ground edge.  
Diameter .. 2 2½ in.  
Per dozen .. 2/3 2/8



**326.—Specimen Tubes**, flat bottomed, with corks.

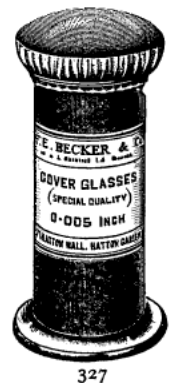
Height ..	1½	2	3	3	3	3 in.
Diameter ..	⅜	½	½	⅝	¾	1 in.
Per gross with corks ..	6/-	6/9	8/-	10/-	14/6	22/-

Height ..	4	4	4	5	5	6	6	6
Diameter	½	⅝	¾	⅝	¾	⅝	¾	1
Per gross with corks	8/6	11/6	16/6	13/6	18/6	15/-	21/6	32/-

**327.—Cover Glasses**, very special quality, in circles ⅜ in. diam. These are excessively thin—0.005 in.—for high-power work, and are supplied in Clove Oil in hermetically sealed bottles.

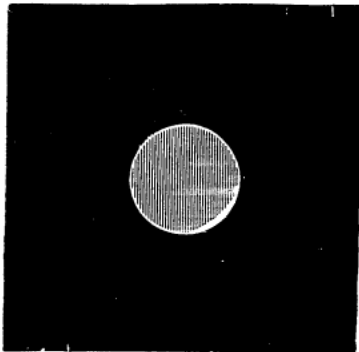
Price, complete, as figured, per oz. 15/-

N.B.—We do not supply a smaller quantity than ½ oz. in this special quality.

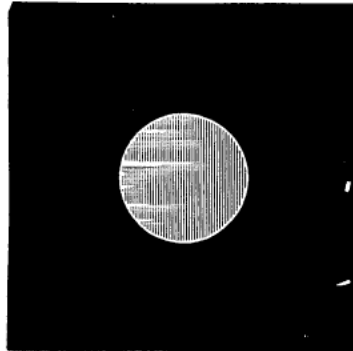


Our stock of pure Chemicals and Acids is very considerable ; hence all orders are executed with the utmost despatch. See comprehensive list at end of Catalogue.

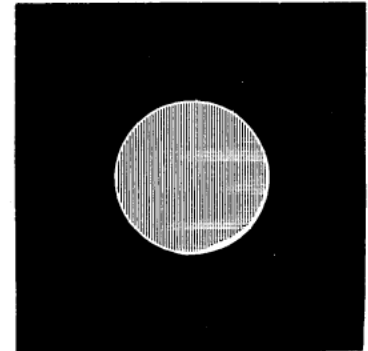
## MICROSCOPE COVER GLASSES



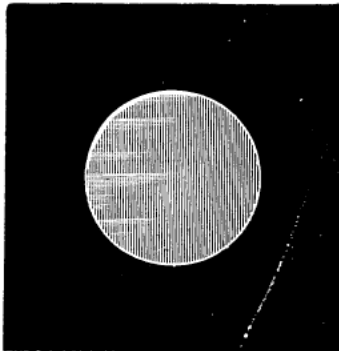
$\frac{5}{8}$  in.



$\frac{3}{4}$  in.



$\frac{7}{8}$  in.



1 in.

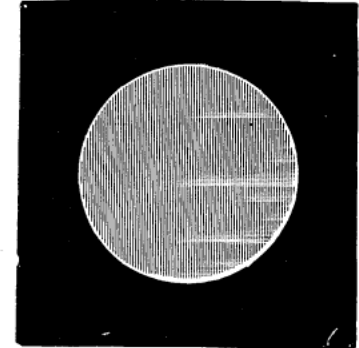
### 328. — Microscope Cover Glasses, finest English glass. CIRCLES.

Thickness Ref. No...	1	2	3	
Approx. thickness ..	$\frac{1}{200}$	$1\frac{1}{30}$	$\frac{1}{70}$	part of an inch.
Per $\frac{1}{2}$ oz. ..	4/-	3/-	2/3	
Per oz. ..	7/6	5/6	4/3	

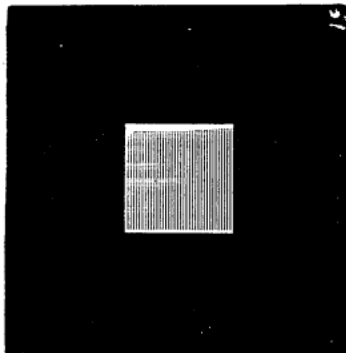
Per oz. in quantities of not less than 6 oz. 7/- 5/- 4/-

*Please state diameter when ordering.*

*Smaller sizes than  $\frac{5}{8}$  in. cut to order at 2/- per oz. extra on above prices.*



$1\frac{1}{4}$  in.



$\frac{5}{8}$  in.

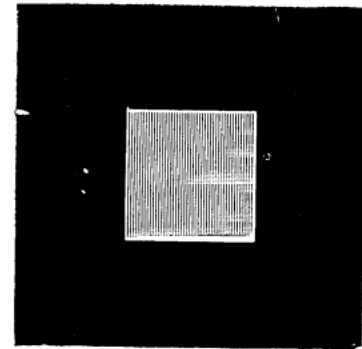
### 329. — Microscope Cover Glasses, finest English glass. SQUARES.

Thickness Ref. No...	1	2	3	
Approx. thickness ..	$\frac{1}{200}$	$1\frac{1}{30}$	$\frac{1}{70}$	part of an inch.
Per $\frac{1}{2}$ oz. ..	4/-	3/-	2/3	
Per oz. ..	7/6	5/6	4/3	

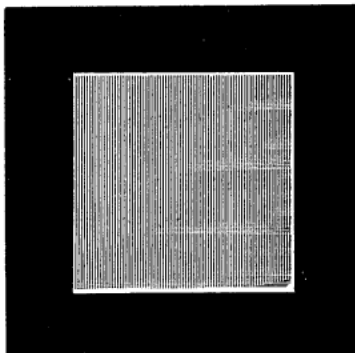
Per oz. in quantities of not less than 6 oz. 7/- 5/- 4/-

*Please state size when ordering.*

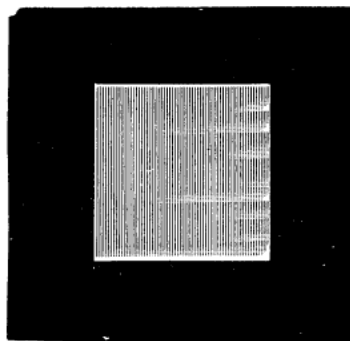
*Smaller sizes than  $\frac{5}{8}$  in. cut to order at 2/- per oz. extra on above prices.*



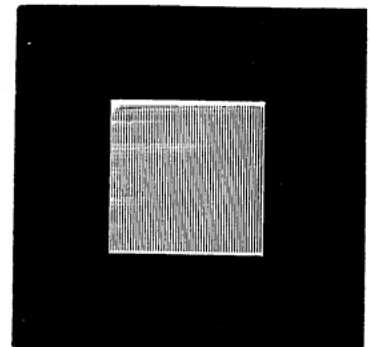
$\frac{3}{4}$  in.



$1\frac{1}{4}$  in.

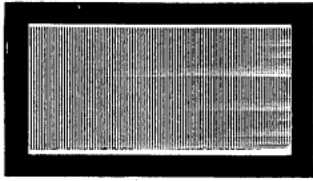


1 in.



$\frac{7}{8}$  in.

**MICROSCOPE COVER GLASSES, SLIDES, Etc.**

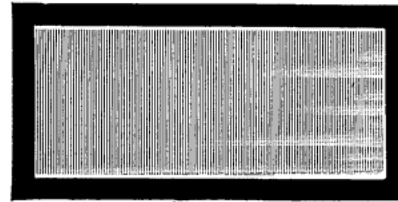


1½ in. × ¾ in.

**330.—Microscope Cover Glasses,** finest English glass. Rectangular.

Size 1½ in. × ¾ in.

Thickness	Ref. No. } 1 2 3		
Approx. thickness	⅜ 00	1 ⅜ 00	7 00 part of an inch.
Per ½ oz. . .	3/6	2/11	2/1
Per oz. . .	6/8	5/6	3/9
Per oz. in quantities of not less than 6 oz.	6/4	4/11	3/6

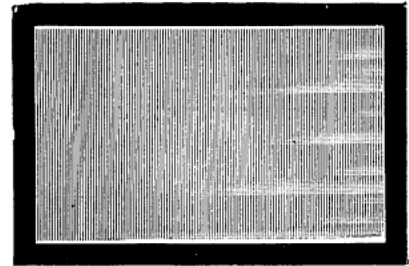


2 in. × ⅞ in.

**331.—Microscope Cover Glasses,** finest English glass. Rectangular.

Size 2 in. × ⅞ in.

Thickness	Ref. No. } 1 2 3		
Approx. thickness	⅜ 00	1 ⅜ 00	7 00 part of an inch.
Per ½ oz. . .	3/6	2/11	2/1
Per oz. . .	6/8	5/6	3/9
Per oz. in quantities of not less than 6 oz.	6/4	4/11	3/6



2 in. × 1¼ in.

**332.—Microscope Cover Glasses,** finest English glass. Rectangular. Size 2 in. × 1¼ in.

Thickness	Ref. No. } 1 2 3		
Approx. thickness	⅜ 00	1 ⅜ 00	7 00 part of an inch.
Per ½ oz. . .	3/6	2/11	2/1
Per oz. . .	6/8	5/6	3/9
Per oz. in quantities of not less than 6 oz.	6/4	4/11	3/6



333/337

<b>333.—Microscope Slides.</b> Ground edges, ordinary thickness. Thin <i>half white</i> glass, 3 in. × 1 in. . .	Per gross. 5/6	Per gross in quantities of not less than 10 gross. 5/3
<b>334.—Microscope Slides.</b> Best selected thin sheet <i>white</i> glass. Ground edges, 3 in. × 1 in. . .	6/6	6/-
<b>335.—Ditto,</b> 3 in. × 1½ in. . .	11/6	11/-
<b>336.—Ditto,</b> 3 in. × 2 in. . .	13/10	13/3
<b>337.—Microscope Slides,</b> ground edges, special quality, for use in India and tropical countries . .	7/-	6/6

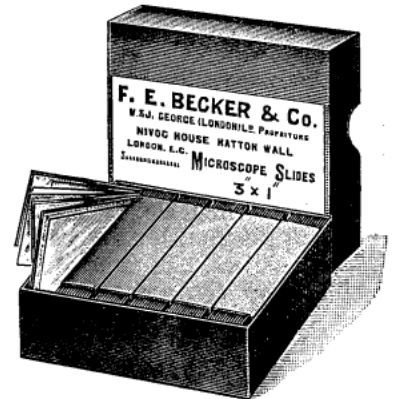
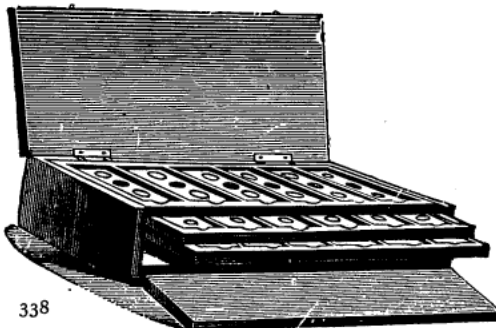


Illustration of ½ gross box of Microscope Slides, 3 in. × 1 in. (See Nos. 333 to 337.)

**MICROSCOPE SLIDE BOXES.**



338

**338.—Cloth-covered Cardboard Boxes,** with drop fronts, white cardboard trays with linen-jointed flaps.

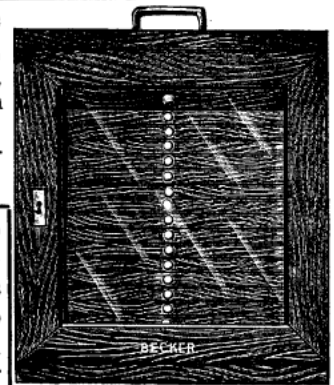
A. With 6 trays to hold 54 slides flat . . . . .	3/9
B. " 12 " " " 108 " " " " . . . . .	6/-
C. " 16 " " " 144 " " " " . . . . .	7/6

**340.—Microscopic Specimen Cabinets,**

polished pine, with glass door, lock and key, and flush handle—  
 To hold 200 500 1,000 glass slips.  
 Each 50/- 90/- 155/-

**341.—Mahogany Cabinet of superior workmanship**

with mouldings top and bottom, to hold 280 objects, each drawer numbered with an extra deep drawer for materials, etc. . . £8 15 0



340

**339.—Polished Pine Object Boxes,** with partitioned trays.

A. To hold 6 dozen in 12 trays . . . . .	10/6
B. " 12 dozen in 12 double trays . . . . .	15/-

For Mounting Media,  
 Varnishes, Stains, etc.,  
 see Chemicals List at  
 end of Catalogue.



# MICROSCOPIC OBJECTS

**BOTANY.**  
**ELEMENTARY TISSUES.**  
**COMPARATIVE ANATOMY.**  
**MILK AND DAIRY WORK.**  
**ENTOMOLOGY.**  
**GEOLOGY.**  
**PHYSIOLOGY.**  
**"AIDS TO SANITARY SCIENCE."**  
**SILK MANUFACTURE.**  
**BUTTERFLIES, INSECTS AND MOTHS.**  
**POLARISCOPE., ETC., ETC.**

A Comprehensive list of Microscopic Objects covering the above subjects will be found on pages 353 to 365 of the 1913 edition of our Chemical Apparatus Catalogue.

## CABINETS OF MICROSCOPIC OBJECTS.

Complete for Presentation, Etc.

	Price.
	£ s. d.
<b>344.—Handsome Mahogany Cabinet</b> of finest workmanship and finish, containing 1,000 objects of varied interest. Each specimen is a carefully selected example of the subject it typifies. Many novel and interesting preparations are included, Anatomical, Entomological, Zoological, etc., also many rare Diatomaceæ, Foraminifera and Radiolaria, forming a collection of the highest order, eminently suited for presentation. Each drawer has a tablet of its contents .. .. .	100 0 0
<b>345.—Handsome Mahogany Cabinet</b> , equal to the above in every respect, but containing 500 objects .. .. .	52 10 0
<b>346.—Mahogany Cabinet</b> , as above, containing 280 objects, all carefully selected, including many novel and attractive slides for exhibition purposes, as well as a large number of rare specimens of Zoological interest, etc. .. .. .	30 0 0
<b>347.—The Student's Cabinet</b> , of polished pine with glass door, lock and key, containing 200 preparations, illustrating Anatomy, Bacteriology, Pathology, Physiology, Urinary Deposits, etc. ..	22 10 0
<b>348.—The Amateur's Cabinet</b> , containing 200 specimens of general interest—Botanical Sections, Crystals for polariscope, Diatomaceæ, Entomological Objects, Foraminifera, Hydrozoa for Dark Ground Illumination, Soundings, all of the highest quality .. .. .	18 10 0
<b>349.—Pine Case</b> , containing 72 objects of General Interest, all carefully prepared and selected ..	6 5 0

Other Microscopic Object Cabinets made to any size or pattern, and furnished with slides typical of any required subject.

## EDUCATIONAL SERIES FOR STUDENTS.

<b>350.—Botany.</b>	
A. Two sets of Typical Structures, the first (Series 14) being 24 Elementary Tissues, and the second (Series 15) illustrating the Comparative Anatomy of Plants. These have been adopted by the London County Council for use in their Technical Classes, Series 33, in case .. .. .	1 16 0
B. Ditto, ditto, ditto, Series 35, in case .. .. .	2 5 0
<b>351.—Embryology.</b> Seven slides, illustrating the development of a Chick, mounted in Canada Balsam, showing with great distinctness the nervous and circulatory system, etc., in case .. .. .	1 15 0
<b>352.—Exhibition Slides.</b>	
A. An attractive selection of 36 interesting objects, many of which are quite novel in character, including slides for Polariscope and Dark Ground Illumination .. .. .	3 10 0
B. <b>Forensic Medicine.</b> —Set of twenty-four slides of pairs, blood corpuscles, starches, etc., as suggested by R. Henslowe Wellington, Esq., M.R.C.S., L.R.C.P., Barrister-at-Law, etc. .. .. .	1 15 0
<b>353.—Geology.</b> Twenty-four Typical Rock Sections, sedimentary, metamorphic and igneous. Several peculiar specimens are included showing features which have never before been demonstrated in a Microscopic section. The series will be found very useful for Petrological candidates for the B.Sc. degree .. .. .	2 7 6
<b>354.—Physiology.</b> Four complete series (Nos. 67-73) of 24 Typical Tissues, each a selected example of its kind. The complete series illustrates the Standard Text-books of Histology. Per set of 24, in case .. .. .	1 16 0
<b>355.—Public Health.</b> Seventy-two specimens, suitable for candidates for the Diploma, as approved by Dr. F. J. Allan and mentioned in his "Aids to Sanitary Science" .. .. .	6 15 0
<b>356.—Zoology.</b> Twenty-four selected specimens, Coelenterata, Infusoria, Polyzoa, Protozoa, Vermes, etc. Many of these, apart from their Biological interest, will be found of great interest as exhibition objects. In case .. .. .	3 0 0



OPEN HERE





CERTIFICATE  
— OF —  
EXAMINATION  
OF

A CHEMICAL BALANCE.  
-----

Marked:- 5. № 47616.

By:- Messrs. F.E. Becker & Company.

-----

The component parts of this balance have been examined and assembled at the National Physical Laboratory, Teddington, Middlesex, and found to be in good condition and working order. The agate knife edges and planes are satisfactory.

Variation in Sensitiveness and Period of Swing obtained by altering the Position of the Sensitivity Nut on the Beam.

The range allowed for the adjustment of the sensitivity nut gives ample variation of sensitiveness to the balance.

Observations have been made with the sensitivity nut in three different positions, the approximate results being set out in the following table. The sensitivity should be re-determined when the balance is finally set up.

Date: 8th August, 1919.

Reference: M.W. 69.96.

JAG



Table/

J. E. Petavel.

Director.

*We received an order from the Chemical Laboratories of the Royal Arsenal, Woolwich, with the request that the Balances be certified by the NATIONAL PHYSICAL LABORATORY. The Balances were taken at random from our stock and sent to Teddington. A copy of the certificate is shewn on other side.  
Also see copy of unsolicited testimonial on next folder.*

**OPEN HERE**



CONTINUATION. OF CERTIFICATE OF EXAMINATION OF A CHEMICAL BALANCE.

(No 47616)

Position of Sensitivity Nut.	Height of nut above lower end of pointer *	Load	Criterion of Sensitiveness of Balance (value of 1 division of white scale)	Period of complete (to and fro) Swing of Balance.
Low	6.1 inches	0 grammes	0.003 gramme	8 seconds
Low	" "	100 "	0.003 "	12 "
Low	" "	200 "	0.003 "	16 "
Mean	7.3 "	0 grammes	0.0010 gramme	14 seconds
Mean	" "	100 "	0.0010 "	22 "
Mean	" "	200 "	0.0010 "	28 "
High	7.7 "	0 grammes	0.0002 gramme	30 seconds
High	" "	100 "	0.0002 "	45 "
High	" "	200 "	0.0002 "	56 "

\* The position of the nut is defined by the distance between the middle groove of the nut and the lower end of the pointer.

NOTE :-

The value given in the fourth column of the above table is the mass required to be added to one pan of the balance in order to change the rest point by one division of the white scale. The smaller the value given, the more sensitive is the balance.

Reference - M.W.69.96.

Date:- 8th August, 1919.

*JAG*



Range/

CONTINUATION. OF CERTIFICATE OF EXAMINATION OF A CHEMICAL BALANCE.

(N<sup>o</sup> 47616)

Range of Load.

The balance was found to take loads up to 200 grammes satisfactorily.

There was a slight creep in the rest point of the order of 0.8 division of the white scale during observations made with loads ranging from 0 grammes to 200 grammes. This, however, only occurred in the condition of maximum sensitivity. Continued application of a 200 gramme load caused a further creep of the rest point and it is therefore inadvisable to maintain such a load for any considerable length of time.

Graduation of the Rider Bar.

The graduations on the rider bar are satisfactory, the zero and the "10" lines being found, with sufficient accuracy, vertically over the fulcrum and terminal knife edges respectively.

*J. E. Petavel.*

Director.

Reference: M.W. 69.96.

Date: 8th August, 1919.

*JAG.*





COPY OF UNSOLICITED TESTIMONIAL

Taunton's School, SOUTHAMPTON.

March 13th, 1922.

TO:- F. E. BECKER & CO.,

Dear Sirs,

The apparatus and chemicals have all arrived in very good condition, and give every satisfaction.

I am sending you on separate sheet a short account of a test I have made with the balance, which you are at liberty to use. The zero point is constant to one-tenth of a division. The sensibility with a load of 10 gm. on each pan is about 4.1 scale divisions. With a load of 10 gm. in each pan, the balance gives results which only differ by a unit or two in the fifth decimal place, i.e., by one or two-hundredths of a milligramme.--Yours faithfully

(Signed) Arthur W. Warrington.

March 13th, 1922.

I have examined the Balance you have sent to the Taunton's School.

(a) The zero point was constant. I made the following six determinations with different loads. The centre of the scale was taken as 10.

(1) 9.7, 9.8, 9.8 9.9.	(4) 9.3. 9.4, 9.6
(2) 13.6, 13.6, 13.6.	(5) 5.0. 5.0, 5.1.
(3) 5.3, 5.4, 5.6.	(6) 13.3, 13.2, 13.3.

From these figures it will be seen that the zero point is constant to one-tenth of a scale division.

(b) The deflection for one milligramme extra load was very constant. The following six determinations in scale divisions give the effect of an extra load of one milligramme:-  
4.14, 4.16, 4.07, 4.12, 4.03, 4.08.

(c) I compared the values of the two ten-gramme weights in one of your boxes, with the following results:-

(1) 10-gm. = 10-gm. + 0.000055 mg.
(2) 10-gm. = 10-gm. + 0.000049 mg.
(3) 10-gm. = 10-gm. + 0.000030 mg.

It is clear that with a load of ten grammes and weighing by vibrations and using Gauss' method the balance gives results accurate to the hundredth of a milligramme.--Yours faithfully,

(Signed) Arthur W. Warrington.

Formerly assistant lecturer and demonstrator in Chemistry at the University College of Wales, Aberystwyth, and sometime Professor of Natural Philosophy at the Imperial University, T'ai Yuan Fu, China, and now Chemistry Teacher at the Taunton's School, Southampton.

The writer of the testimonial and report on our Analytical Balance in a further letter dated March 28th, 1922. says "I could not refrain from giving your work a spontaneous approval. I am returning the copy of the National Physical Laboratory Certificate which at least shows that the sensibility of your balance does not vary with the weight. All that Chemists require in ordinary Research Work is a balance with a constant zero point, which is sufficiently sensitive to give without too long a period of vibration, results reliable to 0.0001 gramme. These requirements your balance perfectly fulfils."

 OPEN HERE



# CERTIFICATE — OF — EXAMINATION

OF

A SET OF WEIGHTS.

Sent by :- Messrs. F. E. Becker & Company.

Material:- 50 grammes to 1 gramme.....Brass.  
 500 milligrammes to 50 milligrammes....Gold.  
 20 milligrammes to 1 milligramme.....Aluminium.  
 Two Riders.....Aluminium.

Box marked:- № 50339.

<u>Distinguishing mark or form of weight.</u>	<u>Density.</u>	<u>Mass (to Class B accuracy).</u>
№ 50 G	8.29 (determined)	50.000 grammes
20	8.29 (assumed)	20.000 "
10	" "	10.000 "
10̇	" "	10.000 "
5	" "	5.000 "
2	" "	2.000 "
2̇	" "	2.000 "
1	" "	1.000 "
500 M G	19.3 (assumed)	0.5000 gramme

Date : May 17, 1921.

Reference : M.W. 98. 102.

*JAC*



*J. Pearson*  
Director.



CONTINUATION. of Certificate of Examination of a Set of Weights.

Box marked:- № 50339.

<u>Distinguishing mark or form of weight.</u>	<u>Density.</u>	<u>Mass (to "Class B" accuracy).</u>
200	19.3 (assumed)	0.2000 gramme
100	" "	0.1000 "
100	" "	0.1000 "
50	" "	0.0500 "
20	2.7 (assumed)	0.0200 "
10	" "	0.0100 "
10	" "	0.0100 "
5	" "	0.0050 "
2	" "	0.0020 "
2	" "	0.0020 "
1	" "	0.0010 "
i	" "	0.0010 "
∩	2.7 (assumed)	0.0100 "
∩	" "	0.0100 "

The above values may be taken as accurate to

Within  $\begin{cases} \pm 0.001 \text{ gramme in the case of weights of 1 gramme and upwards.} \\ \pm 0.0001 \text{ gramme in the case of fractional weights.} \end{cases}$

Date:- May 17, 1921.

Reference:- M.W. 98. 102.

*Jac*



*H. Sears*

*H. Sears* Director.

We received an order from the Chemical Laboratories of the Royal Arsenal, Woolwich, with the request that the Balances be certified at the NATIONAL PHYSICAL LABORATORY. *The Balances were taken at random from our stock and sent to Teddington.* A copy of the N.P.L. certificate is shown on accompanying folder. Also see copy of unsolicited testimonial on other side of this folder.

# BALANCES & WEIGHTS

*We still hold the unique position of being the Leading House in the Trade for Balances and Weights*

## F. E. BECKER & Co.'s ANALYTICAL BALANCE



357

357.—F. E. BECKER & Co.'s ANALYTICAL BALANCE. Designed particularly to meet the demand for a high quality reliable Analytical Balance at a moderate price. The Beam, which is free from all complicated adjustments, is graduated along its entire length and being black with white graduations is easily read. The rider apparatus is of new design specially constructed for rapid manipulation traversing whole length of beam. The knife-edges and planes are of the best quality agate throughout. The case is of superior polished mahogany with glass top, two side glass doors and sliding counterpoised front window, the whole being mounted on a heavy thick black glass base with massive brass levelling screws and spirit level.

See copy of National Physical Laboratory Certificate  
on flyleaf herein. Also copy of unsolicited testimonial.

Capacity : 200 grammes in each pan.

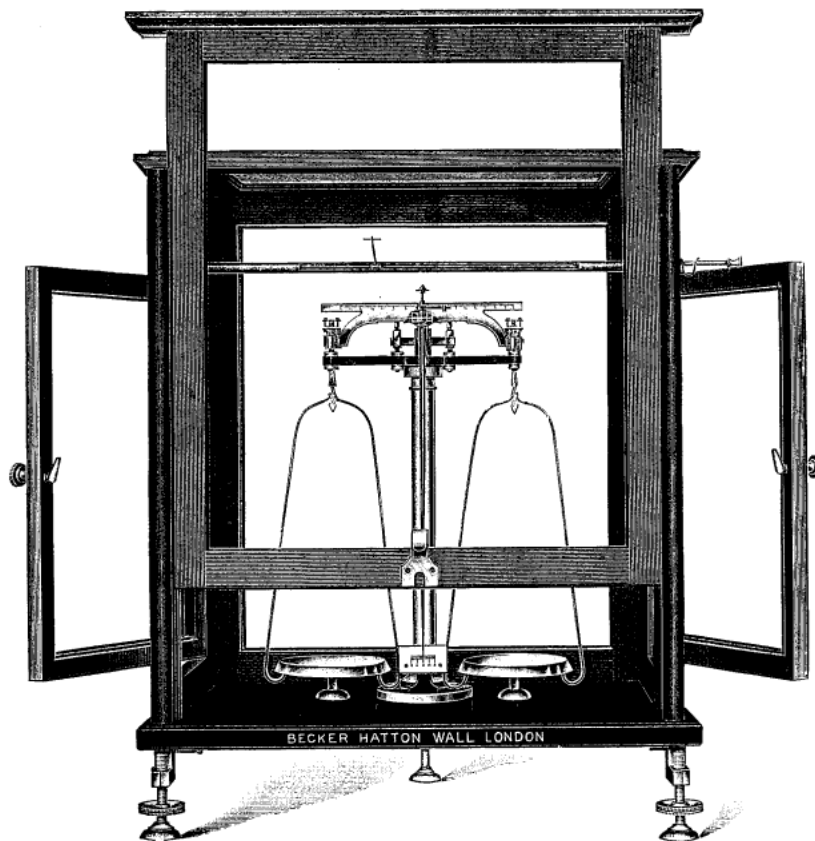
Sensitivity :  $\frac{1}{10}$  milligramme when carrying full load.

Price - £16 : 0 : 0

Our Balances and Weights have achieved World-wide Reputation : *vide* Opinions of the Leading Scientific Press

F. E. BECKER & CO., NIVOC HOUSE, HATTON WALL, LONDON, E.C. 1  
W. & J. GEORGE (LONDON), LTD., PROPRIETORS

## F. E. BECKER & Co.'s SHORT BEAM BALANCE (BUNGE'S SYSTEM)



358

358.—F. E. BECKER & Co.'s **SHORT BEAM BALANCE**, to carry 250 grammes in each pan ; sensitive to the tenth part of a milligramme when loaded with its maximum charge. Beam and pillar richly gilt. Platinised pans. Beam is notched, each notch being equal to one-tenth of a milligramme and 100 notches to a centigramme. Arrestments for beam, stirrups, and pans. Rider apparatus.

In polished mahogany case (mounted on black plate glass base) with counterpoised sliding front and glass doors at sides. Spirit level and levelling screws.

Capacity : 250 grammes.

Sensitivity :  $\frac{1}{10}$  milligramme.

**Price - £15 : 0 : 0**

359.—Ditto, as above but in polished hardwood case.

Capacity : 250 grammes.

Sensitivity :  $\frac{1}{10}$  milligramme.

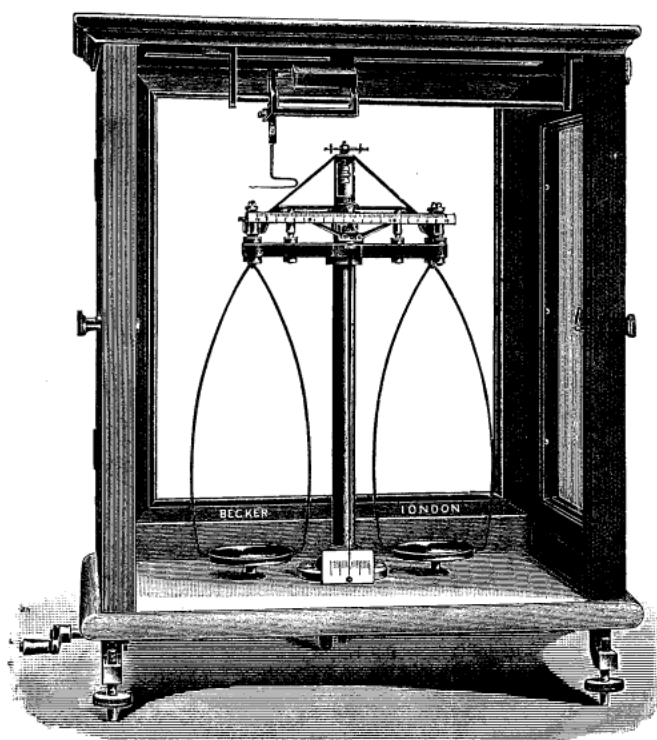
**Price - £13 : 10 : 0**

Every requisite for Chemical, Physical and Bacteriological work supplied, from a test tube to the complete furnishing of the largest laboratory

F. E. BECKER & CO., NIVOC HOUSE, HATTON WALL, LONDON, E.C. 1  
W. & J. GEORGE (LONDON), LTD. PROPRIETORS

## F. E. BECKER & Co.'s ANALYTICAL BALANCE

"Triangular Beam" Pattern



360

360.—F. E. BECKER & Co.'s SHORT BEAM BALANCE (Bunge's system), in elegant mahogany case with front and back sliding doors and two side doors. Bottom of case made of black plate glass. Agate knife-edges and planes. The beam, which is in one piece and richly gilt, is divided into 100 parts. The pans are platinised, and provided with compensation hangers. Rider apparatus is of the latest design. Arrestments for beam, pan supports, and pans.

Capacity : 250 grammes.

Sensitivity :  $\frac{1}{10}$  milligramme.

Price - £18 : 0 : 0

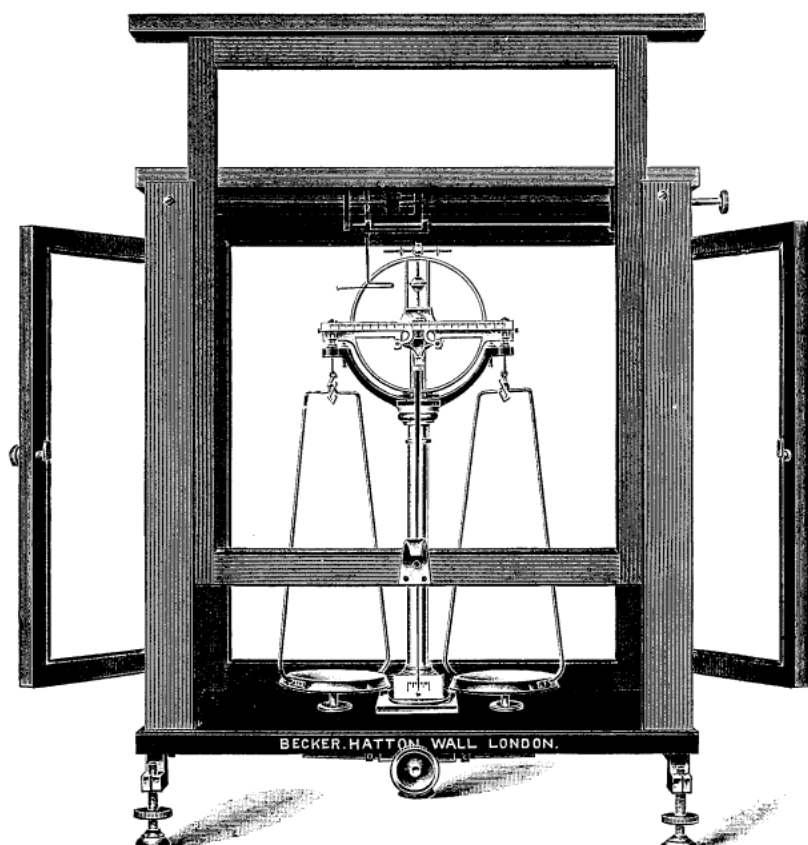
Our stock of pure Chemicals and Acids is very considerable ; hence all orders are executed with the utmost despatch. See comprehensive list at end of Catalogue

Droits réservés au Cnam et à ses partenaires

F. E. BECKER & CO., NIVOC HOUSE, HATTON WALL, LONDON, E.C. 1  
W. & J. GEORGE (LONDON), LTD., PROPRIETORS

## F. E. BECKER & Co.'s ANALYTICAL BALANCE

### "Circular Beam" Pattern



361

361.—F. E. BECKER & Co.'s "CIRCULAR BEAM" BALANCE.—Extremely sensitive; latest construction, with agate knife-edges working on agate planes. Beam is fitted with a long and quick-working pointer. Beam and pan supports richly gilt, platinised pans, arrestments for beam, stirrups and pans; plumb bob, rider apparatus, and scale. Fitted in elegant mahogany case with counterpoised sliding door, mounted on black plate glass base with screws for levelling.

*Capacity* : 250 grammes.

*Sensitivity* :  $\frac{1}{10}$  milligramme.

**Price - £19 : 0 : 0**

Every requisite for Chemical, Physical, and Bacteriological work supplied, from a test tube to the complete furnishing of the largest laboratory

Droits réservés au Cnam et à ses partenaires



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W. & J. GEORGE (LONDON), LTD., PROPRIETORS

## F. E. BECKER & Co.'s ANALYTICAL BALANCE

New Design for Advanced Work



362

362.—F. E. BECKER & Co.'s ANALYTICAL BALANCE. New design for advanced work.

The beam is manufactured by a special process, making same immune from any variations of temperature, and is graduated along its entire length engraved in white on a black background, making same easily readable. The rider apparatus is of simple design, and the knife-edges and planes are of best quality agate throughout. The case is of superior polished mahogany with glass sliding front and hinged side doors mounted on heavy black glass base with massive brass levelling screws and spirit level.

Capacity : 200 grammes in each pan.

Sensitivity :  $\frac{1}{10}$  milligramme when carrying full load.

Price - £12 : 15 : 0

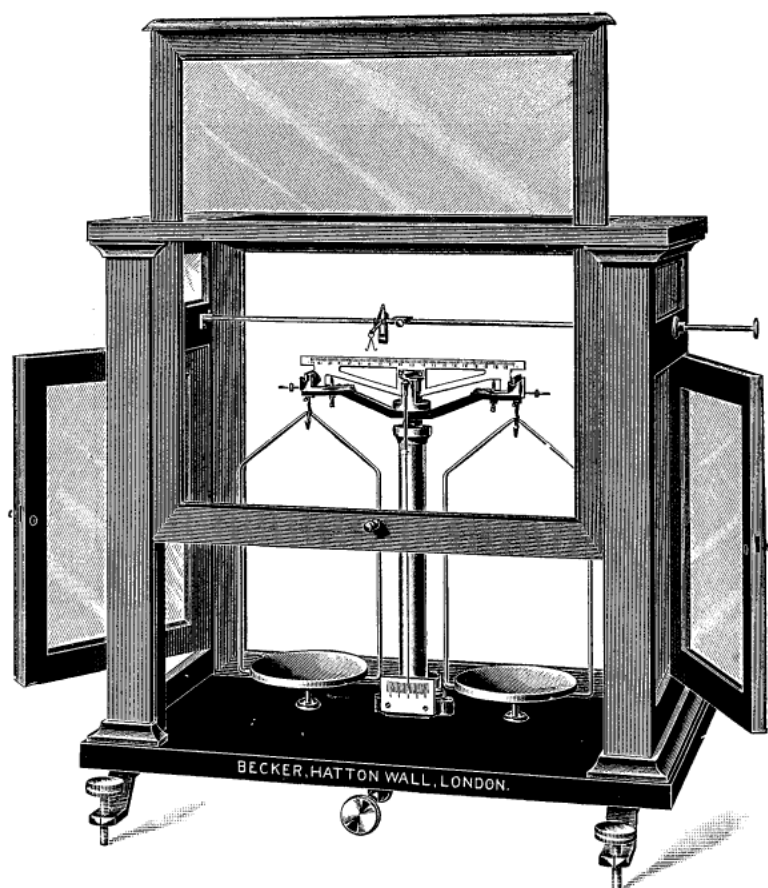
Our Balances and Weights have achieved World-wide Reputation : *vide* Opinions of the Leading Scientific Press



F. E. BECKER & CO., NIVOC HOUSE, HATTON WALL, LONDON, E.C.1  
 W. & J. GEORGE (LONDON), LTD., PROPRIETORS

## F. E. BECKER & Co.'s ANALYTICAL BALANCE

Several of these Balances are in use in Woolwich Arsenal, the Government Laboratories, National Physical Laboratory, etc.



363

363.—F. E. BECKER & Co.'s ANALYTICAL BALANCE, agate knife-edges and planes throughout; richly gilt beam graduated along its entire length and rider apparatus of new construction; extra wide pans; double hooks and wooden bridge for specific gravity work. Highest quality workmanship and finish, in elegant polished case, with front counterpoised sliding window and side doors; all mounted on heavy, thick, black plate glass base provided with levelling screws and spirit level.

Capacity : 200 grammes.

Sensitivity :  $\frac{1}{10}$  milligramme.

Price - £21 : 0 : 0

Every requisite for Chemical, Physical, and Bacteriological work supplied, from a test tube to the complete furnishing of the largest laboratory

F. E. BECKER & CO., NIVOC HOUSE, HATTON WALL, LONDON, E.C.1  
W. & J. GEORGE (LONDON), LTD., PROPRIETORS

## F. E. BECKER & Co.'s NEW SHORT BEAM ANALYTICAL BALANCE



364

364.—F. E. BECKER & Co.'s NEW SHORT BEAM ANALYTICAL BALANCE, for quick and accurate weighing. The Beam is of new design, with white graduations along its entire length and manufactured by a special process from a metal which is not influenced in any way by temperature variations and is also particularly designed to prevent stresses, etc. The rider apparatus traversing the whole length of the beam is of an improved, simple but efficient type, special attention having been given towards minimising the risk of riders falling during operations. The knife-edges and planes are of best quality agate throughout, the knife-edges being fitted with our patent mountings thus ensuring easy replacement should occasion arise. **The case is extra large and roomy** of superior polished mahogany with glass top, two side glass doors and sliding counterpoised front window, the whole being mounted on a heavy thick black glass base with massive brass levelling screws and spirit level.

*Capacity : 200 grammes in each pan.*

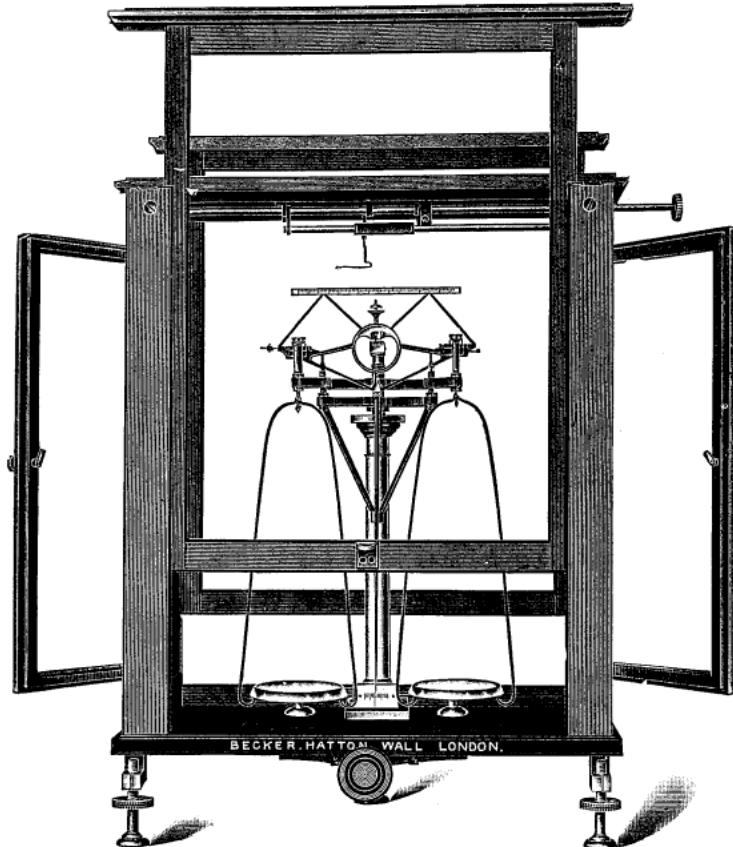
*Sensitivity :  $\frac{1}{10}$  milligramme when carrying full load.*

**Price - £14 : 10 : 0**

Our Balances and Weights have achieved World-wide Reputation : *vide* Opinions of the Leading Scientific Press

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 W. & J. GEORGE (LONDON), LTD., PROPRIETORS

F. E. BECKER & Co.'s  
**PATENT "RESEARCH" BALANCE**  
 SENSITIVE TO THE TWENTIETH PART OF A MILLIGRAMME



365

365.—F. E. BECKER & Co.'s PATENT "RESEARCH" BALANCE, for work requiring the utmost possible accuracy. The beam of this Balance is made of magnalium, its special feature being *great lightness combined with absolute stability*. The end supports are *outside* the end knife-edges, thus giving *absolute rigidity* to the beam. The rider scale is graduated from left to right, beginning at zero, thus avoiding all errors in + or - calculations. On placing a 5-milligramme rider on the zero point of rider scale, the pointer will set at zero.

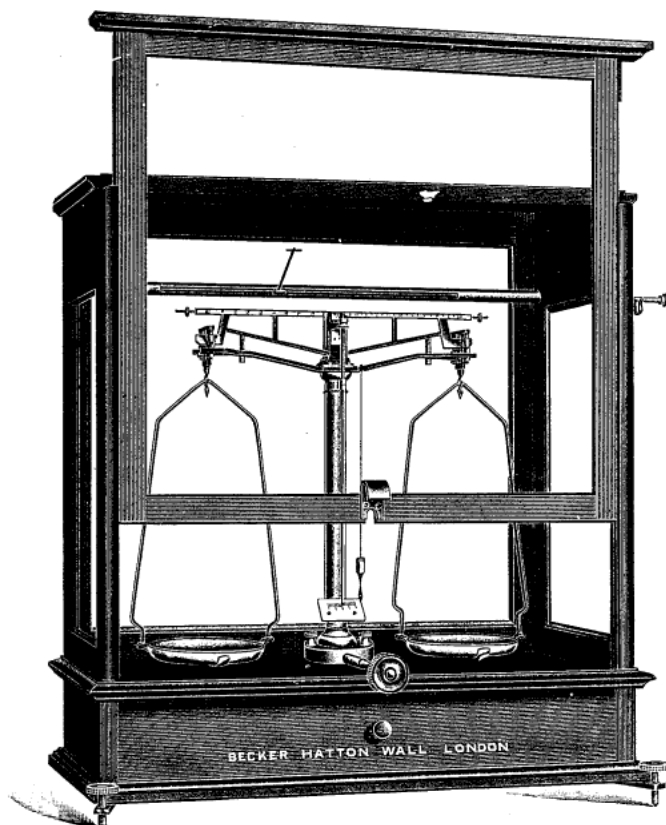
This Balance is eminently adapted for use in research laboratories, and we can recommend it with every confidence. It is of handsome appearance, and provided with agate knife-edges and planes; compensating suspenders which transfer the load to the centre of the knife-edges, platinised pans, rider apparatus of latest construction which lifts rider vertically, arrestments for beam, pan supports, and pans; in nicely finished mahogany case opening at front, back, and both sides, and mounted on black plate glass base, provided with levelling screws and plumb bob.

To carry	...	...	...	120	250 grammes.
Sensitive to	...	...	...	$\frac{1}{20}$	$\frac{1}{20}$ milligramme.
Price	-	-	-	£19 : 15 : 0	£22 : 10 : 0

Our stock of pure Chemicals and Acids is very considerable; hence all orders are executed with the utmost despatch. See comprehensive list at end of Catalogue.

F. E. BECKER & CO., NIVOC HOUSE, HATTON WALL, LONDON, E.C. 1  
W. & J. GEORGE (LONDON), LTD., PROPRIETORS

## F. E. BECKER & Co.'s ANALYTICAL BALANCE "South Kensington" Pattern



366

366.—F. E. BECKER & Co.'s "OPEN BEAM" ANALYTICAL BALANCE, "South Kensington" pattern with beam graduated along its entire length. **Agate knife-edges and planes.** No steel used in its construction. Arrestments for beam and suspenders. Rider apparatus works on both sides of the beam. Plumb bob, levelling screws, double hooks for specific gravity experiments. In highly finished polished case with drawer, glass sides and sliding door, as illustrated. Guaranteed highest-quality workmanship and finish throughout.

Several of these Balances are in use in the Imperial College of Science and Technology, South Kensington; Government College, Lahore; Central College, Bangalore, etc.

*Capacity 250 grammes, and sensitive to  $\frac{1}{5}$  milligramme.*

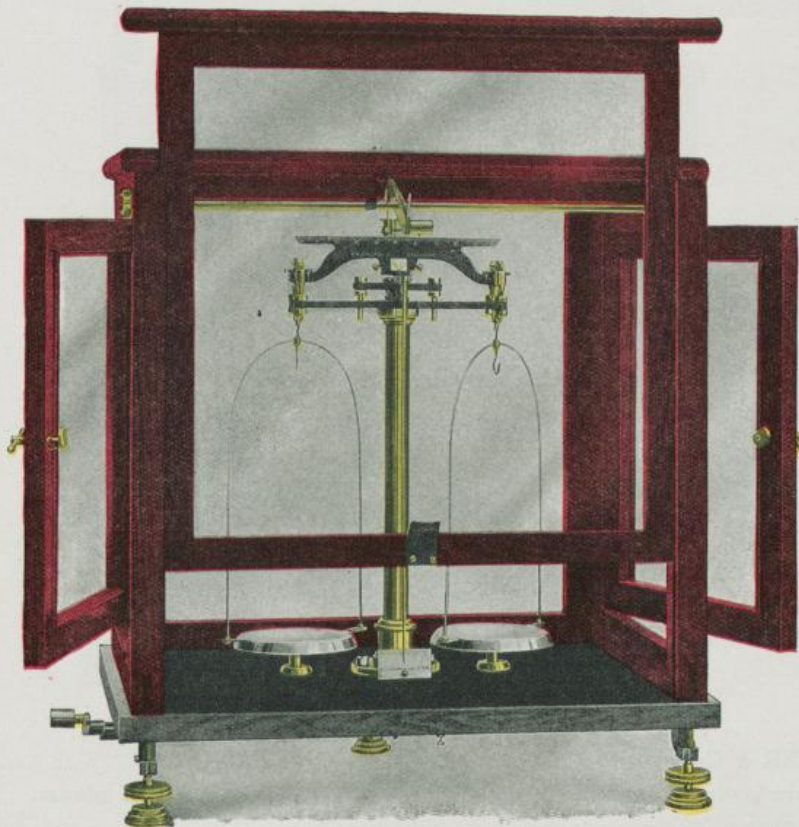
**Price - £10 : 10 : 0**

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F. E. BECKER & CO., NIVOC HOUSE, HATTON WALL, LONDON, E.C.1  
 W. & J. GEORGE (LONDON), LTD., PROPRIETORS

F. E. BECKER & Co.'s SHORT BEAM BALANCE  
 "Nivoc" Pattern  
 (BUNGE SYSTEM)



367

367.—F. E. BECKER & Co.'s SHORT BEAM BALANCE. "Nivoc" Pattern. Capacity, 100 grammes, and sensitive to  $\frac{1}{10}$ th milligramme. Agate knife-edges and planes. Divided beam and special rider apparatus. Six agate centres, resting in six agate cups, form the beam and stirrup arrestment. A great feature is the method of lowering the arrestment from the Beam to put the Balance in action. In superior polished mahogany case, with black plate glass base, sliding front and glass doors at sides.

Price - £16 : 16 : 0

Every requisite for Chemical, Physical, and Bacteriological work supplied, from a test tube to the complete furnishing of the largest laboratory

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W. & J GEORGE (LONDON), LTD., PROPRIETORS

## F. E. BECKER & Co.'s CHEMICAL BALANCE "George Green" Pattern

*Copy of unsolicited Testimonial received from the Senior Science Master of the George Green School, East India Dock Road, Poplar, E.*

TO MESSRS. F. E. BECKER & CO.

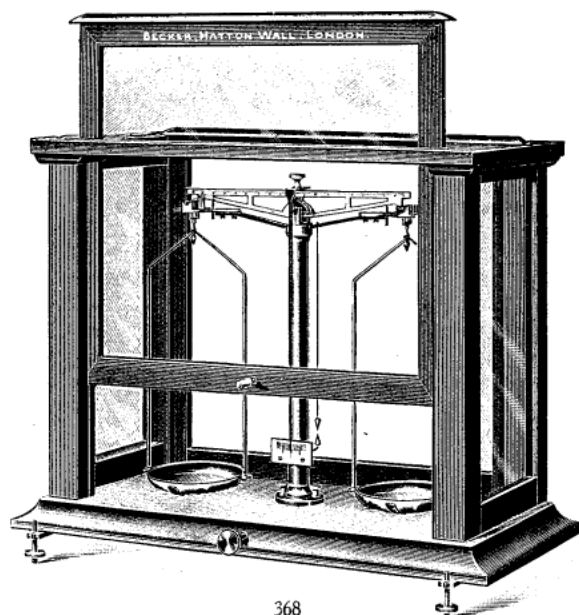
GENTLEMEN,—On the occasion of the completion of our equipment order, I beg to cordially thank you and your staff for the courtesy, care, and despatch which have been uniformly observed throughout its execution.

*The quality of the goods supplied is of a high order, and especially is this so in regard to the Chemical Balances.*

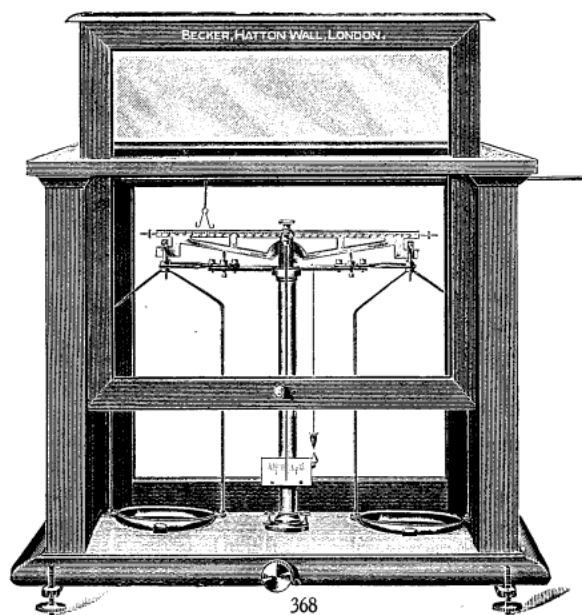
They are handsome in appearance, simple in construction, and that they are eminently adapted to students' use is abundantly shown by the daily results obtained by our students.

*They are simple enough for beginners, and they are sensitive and accurate enough for Honours Students.*

I shall always feel it is simply your due that anyone you may wish to send should be allowed to inspect your work here.



368  
Without Rider Apparatus



368  
With Rider Apparatus

368.—F. E. BECKER & Co.'s CHEMICAL BALANCE ("George Green" pattern). Extra strongly made for students' use; cannot possibly get out of order; cannot be knocked over; absolutely dust-proof; beam cannot be knocked off its support. No steel used in its construction.

This balance was especially made by us (in quickest time on record) for the George Green School, Poplar, and was made exactly to their specification.

It is extra strongly made, and will therefore stand any quantity of rough handling without getting out of order.

The beam is of the "open" pattern, and is graduated to show the principle of the Rider Apparatus. It rests on a special support and cannot be shaken from its place. When beam is at rest its links and middle knife-edge are out of action. The original pattern was made by us to specification **without** rider apparatus, but if rider apparatus is required it can be supplied at small extra cost—see note below.

When loaded with 100 grammes in each pan, the balance is sensitive to half a milligramme.

The Balance is provided with **agate knife-edges and bearings**, special beam support, double hook for specific gravity experiments, and plumb bob. It is mounted in a highly finished polished mahogany case, provided with counterpoised sliding door in front, sliding door at back, and three strong levelling screws on heavy base.

A.—100 gramme size, sensitivity, $\frac{1}{2}$ milligramme	...	...	...	...	...	...	...	...	£6 : 10 : 0
B.—250 " " " " " " " " " "	...	...	...	...	...	...	...	...	7 : 10 : 0

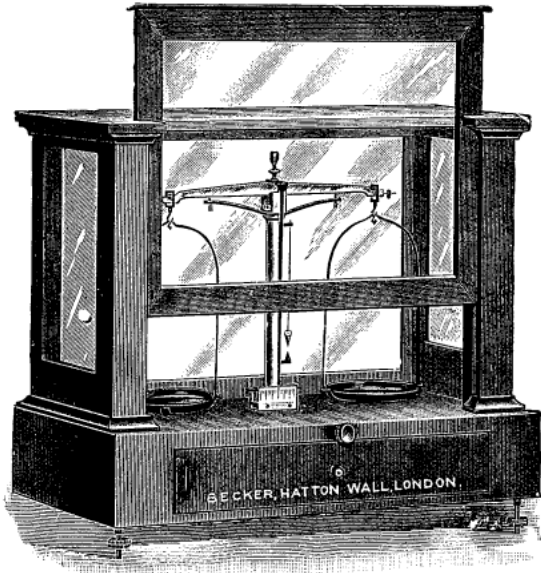
The above prices are for Balances **without** Rider Apparatus. If required **with** Rider Apparatus the extra cost per Balance is 19/6. When ordering please state clearly whether 100 gramme or 250 gramme size is required, and if with or without Rider Apparatus.

**Our Balances and Weights have achieved World-wide Reputation: vide Opinions of the Leading Scientific Press**

Droits réservés au Cnam et à ses partenaires

F. E. BECKER & CO., NIVOC HOUSE, HATTON WALL, LONDON, E.C. 1  
W. & J. GEORGE (LONDON), LTD., PROPRIETORS

## F. E. BECKER & Co.'s "SCIENCE SCHOOL" BALANCE



369/370

369.—F. E. BECKER & Co.'s "SCIENCE SCHOOL" BALANCE. Best quality workmanship and finish; movable pans, **agate knife-edges and layers**, beam support, plumb bob, levelling screws, double hooks for specific gravity work; in nicely finished polished mahogany case, with drawer and counterpoised sliding door. Guaranteed highest quality and finish. No steel used in its construction.

Capacity 100 grammes, and sensitive to  $\frac{1}{2}$  milligramme.

Price £7 : 12 : 6

370.—F. E. BECKER & Co.'s "SCIENCE SCHOOL" BALANCE. Specification as above, but to carry **250 grammes** in each pan, and sensitive to 1-2 milligrammes. Diameter of pans, 10 cms.

Price £8 : 17 : 6

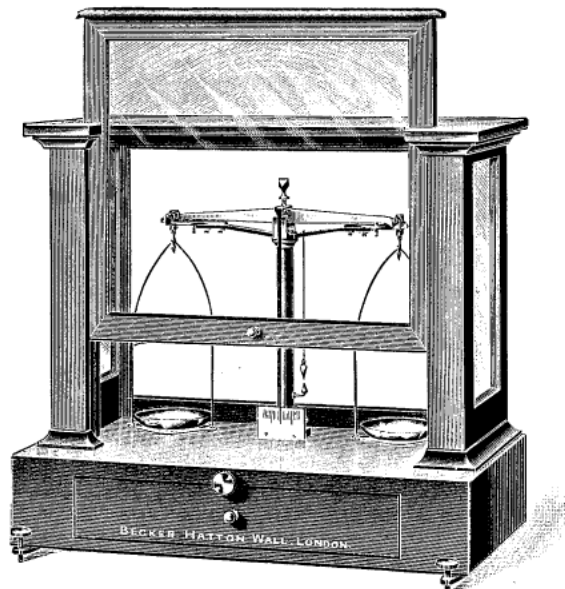
## F. E. BECKER & Co.'s "Munitions Pattern" BALANCE

371.—F. E. BECKER & Co.'s PRECISION BALANCE.

Specially made by us for **Cartridge Filling and Munitions Factories**. Elegant, well-finished polished case, with drawer and counterpoised sliding front, to carry **50 grammes** in each pan, and sensitive to  $\frac{1}{2}$  milligramme. Loose brass pans, each with handle for quickly emptying weighed material; levelling screws and pendulum; **agate knife-edges and bearings**, with improved stops to take weight off knife-edges when not in use.

For Sets of Grain Weights suitable  
for this Balance, see page 100

Price - £5 : 17 : 6



371

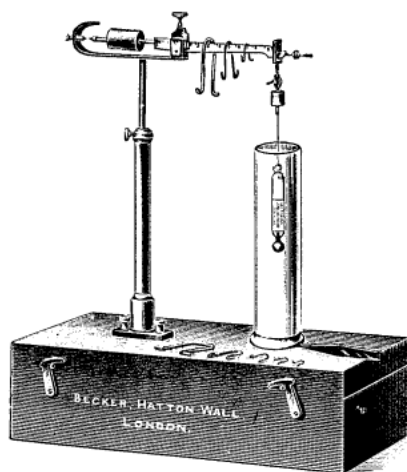
Every requisite for Chemical, Physical and Bacteriological work supplied, from a test tube to the complete furnishing of the largest laboratory

F. E. BECKER & CO., NIVOC HOUSE, HATTON WALL, LONDON, E.C. 1  
W. & J. GEORGE (LONDON), LTD., PROPRIETORS

## F. E. BECKER & Co.'s WESTPHAL SPECIFIC GRAVITY BALANCE

372.—F. E. BECKER & Co.'s WESTPHAL SPECIFIC GRAVITY BALANCE. For the rapid and accurate determination of the specific gravity of liquids.

With this balance the specific gravity of liquids *heavier* or *lighter* than water can be rapidly and accurately determined, only a small quantity of the liquid being required. The right arm of the beam is divided into 10 equal parts, grooved to carry the riders, and adjustable to any convenient height. The support for the beam is easily fixed to the top of the box by means of two milled screws. The polished box is partitioned to take the various parts of the balance, thus making it portable.



372

Price  
Complete

£2 : 15 : 0

372A

Extra Plummets  
with  
Platinum Wire  
each 15s.

372

The balance consists of:—

A thermometer plummet, suspended by means of a platinum wire, and having a displacement of 5 grammes of distilled water at 15° C.

A trial jar with a capacity of about 60 ccs.

A double set of rider weights, which may be called D, E, F and G.

A conveniently partitioned highly-finished polished box.

The largest rider D is equal to the weight of the quantity of distilled water (5 grammes weighed at a temperature of 15° C.) displaced by the plummet. Rider E is equal to  $\frac{1}{10}$  of D, rider F is equal to  $\frac{1}{10}$  of E and  $\frac{1}{100}$  of D, rider G is equal to  $\frac{1}{10}$  of F and  $\frac{1}{1000}$  of E or  $\frac{1}{10000}$  of D. When the balance is set up and plummet immersed in distilled water at 15° C. the equilibrium is immediately upset, but is restored by placing rider D on the hook of the stirrup from which the plummet hangs.

### To determine the specific gravity of a liquid LIGHTER than water.

The liquid of which the specific gravity is to be determined must be poured into the trial glass and the plunger entirely immersed in it, after which rider D is placed in one of the grooves of the right arm, which exactly readjusts the equilibrium, but when this occurs at some point between two grooves on the beam, say between 8 and 9, the rider D is placed on the lower number (8) and rider E is used for the second decimal place. For example, if rider E readjusts the equilibrium at 5, the specific gravity would be 0.85. If rider E falls also between 5 and 6, the rider F (and if necessary rider G) is used in the same way to get the third and fourth decimal places, so that if rider F must be placed between 5 and 4, and rider G between 4 and 3, the specific gravity would be 0.8543. If it happens that two riders must be placed in the same groove, the smaller of the two is hooked into the larger, and so we get two same decimal-ciphers. For further example, if rider F must be placed at 4, and rider G in the same groove, the specific gravity would be 0.8544.

### To determine the specific gravity of a liquid HEAVIER than water.

In this case one of the large riders D is placed on the hook of the stirrup of the right arm above the plunger, and the decimals are found in the same manner as above.

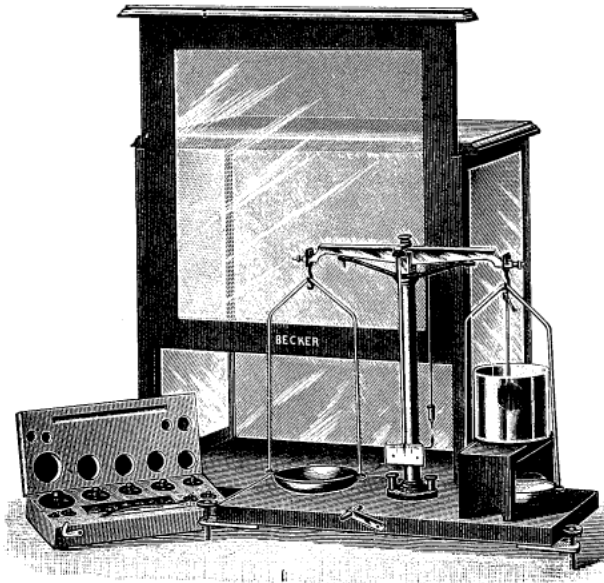
Our stock of pure Chemicals and Acids is very considerable; hence all orders are executed with the utmost despatch. See comprehensive list at end of Catalogue



F. E. BECKER & CO., NIVOC HOUSE, HATTON WALL, LONDON, E.C. 1  
 W. & J. GEORGE (LONDON), LTD., PROPRIETORS

### F. E. BECKER & Co.'s BALANCE SETS FOR STUDENTS

Either with "Solid" graduated beam or "Open" graduated beam, agate knife-edges and planes.



373/376

NOTE:—The Balance supplied with these Sets has a graduated beam of latest design No. 330, and the Case has a glass top giving maximum light on Balance during weighing operations.

373.—F. E. BECKER & Co.'s "BALANCE SET" FOR STUDENTS, consisting of Balance 100 grammes with graduated beam, **agate knife-edges and planes** as No. 380. Case with sliding front and glass top, mahogany stool, and glass vessel for specific gravity work and set of weights 100 grammes to 1 milligramme in polished box with lid as No. 391.

Price for the complete set .. £3 : 19 : 6

374.—Ditto, exactly as Specification No. 373, but Balance with "OPEN" BEAM, agate knife-edges and planes, 100 gramme size as No. 384.

Price for the complete set .. £3 : 19 : 6

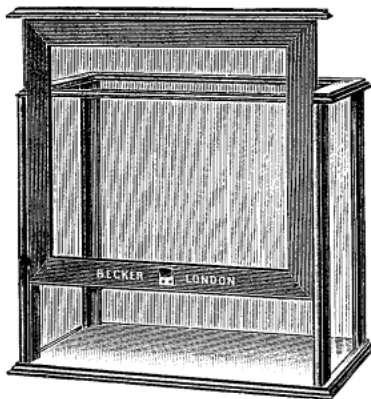
375.—F. E. BECKER & Co.'s "BALANCE SET" FOR STUDENTS, as No. 373, but larger size. Balance will carry 250 grammes in each pan as No. 381, and weights go from 1 milligramme to 200 grammes.

Price for the complete set .. £4 : 8 : 6

376.—Ditto, exactly as Specification No. 374, but Balance with "OPEN" BEAM, agate knife-edges and planes, 250 gramme size, as No. 385.

Price for the complete set .. £4 : 8 : 6

### Balance Cases

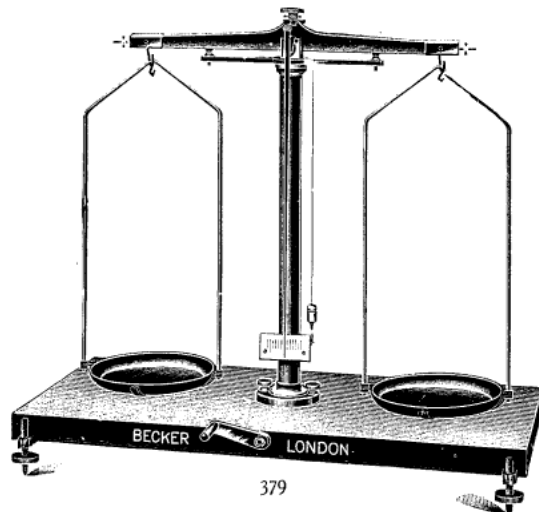


377

377.—Balance Cases to take Students' Balances. White wood stained to resemble mahogany. Glass all sides and glass top. The front glass sliding door is provided with stops to keep it at required height for weighing.

To take Balances	100	250	500 grammes.
Each .. ..	23/-	24/6	35/-
378.—Ditto, best quality, polished mahogany.			
To take Balances	100	250	500 grammes.
Each .. ..	30/-	33/6	40/-

### Cheap Balance for Elementary Work



379

379.—F. E. BECKER & Co.'s CHEAP BALANCE for elementary work

SPECIFICATION.—Balance, cheap pattern, brass beam having knife-edge in middle and hook suspender at each end, beam support, movable brass pans, plumb bob, levelling screws, mounted on polished base. Capacity 250 grammes, and sensitive to 5 to 8 milligrammes.

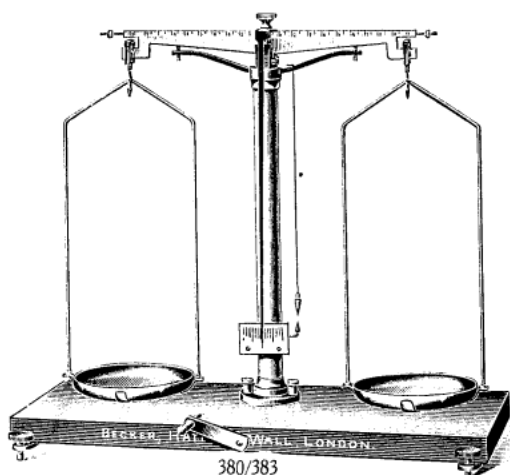
Price .. .. . £1 : 9 : 6

Every requisite for Chemical, Physical, and Bacteriological work supplied, from a test tube to the complete furnishing of the largest laboratory

F. E. BECKER & CO., NIVOC HOUSE, HATTON WALL, LONDON, E.C. 1  
W. & J. GEORGE (LONDON), LTD., PROPRIETORS

## F. E. BECKER & Co.'s STUDENTS' BALANCES

"Solid Beam" Pattern, Agate Knife-edges and Planes



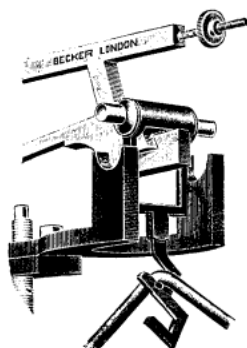
- 380.—F. E. BECKER & Co.'s STUDENTS' BALANCE. "Solid Beam" pattern, **agate knife-edges and planes**. Knives are mounted in hard brass (as in the finer-made analytical balances) to avoid chipping. Graduated beam for showing principle of the rider apparatus, beam support, plumb bob, levelling screws, stirrup-shaped suspenders, double hooks for specific gravity experiments. Mounted on handsomely finished base. Capacity **100 grammes**, and sensitive to **1 milligramme** . . . . . Price .. **£2 : 7 : 6**
- 381.—F. E. BECKER & Co.'s STUDENTS' BALANCE. "Solid Beam" pattern, as above, but capacity **250 grammes**, and sensitive to **2 milligrammes**. Price .. **£2 : 12 : 6**
- 382.—F. E. BECKER & Co.'s STUDENTS' BALANCE. "Solid Beam" pattern, as above, but capacity **500 grammes**, and sensitive to **8 milligrammes**. Price .. **£3 : 15 : 0**
- 383.—F. E. BECKER & Co.'s STUDENTS' BALANCE. "Solid Beam" pattern, as above, but capacity **1,000 grammes**, and sensitive to **15 milligrammes**. Price .. **£4 : 7 : 6**

## F. E. BECKER & Co.'s STUDENTS' BALANCES

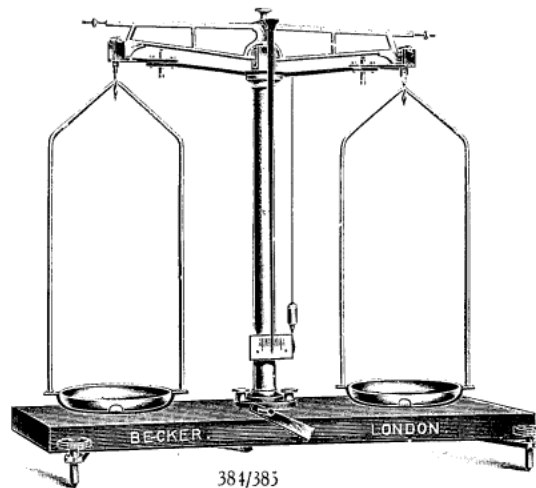
"Open Beam" Pattern, Agate Knife-edges and Planes

384.—F. E. BECKER & Co.'s STUDENTS' BALANCE. "Open Beam" pattern, of improved construction, **agate knife-edges and planes**, arrestments for stirrup suspenders, beam support, plumb bob, and levelling screws. The stirrup-shaped suspenders are fitted with double hooks for specific gravity experiments. Beam is graduated for showing principle of the rider apparatus, and when at rest on its support its links and middle knife-edge are out of action. Mounted on handsomely finished base.

Capacity **100 grammes**, and sensitive to **1 milligramme** . . . . . Price **£2 : 7 : 6**



*This enlarged illustration shows the action of the improved arrestments and supports for the stirrup suspenders in Balance*



- 385.—F. E. BECKER & Co.'s STUDENTS' BALANCE. "Open Beam" pattern, as above, but capacity **250 grammes**, and sensitive to **2 milligrammes**. Price .. **£2 : 12 : 6**

Balances with **Steel Knife-edges** can be supplied, if specially required, at somewhat lower prices. We do not recommend them as the method of mounting our Agates has any advantage which steel may possess without any of its disadvantages.

Our Balances and Weights have achieved World-wide Reputation: *vide* Opinions of the Leading Scientific Press

STUDENTS' BALANCES WITH GRADUATED BEAM are now in general use to enable students to become familiar with the principle of the Rider Apparatus and for that reason we have discontinued supplying the plain beam unless specially required.

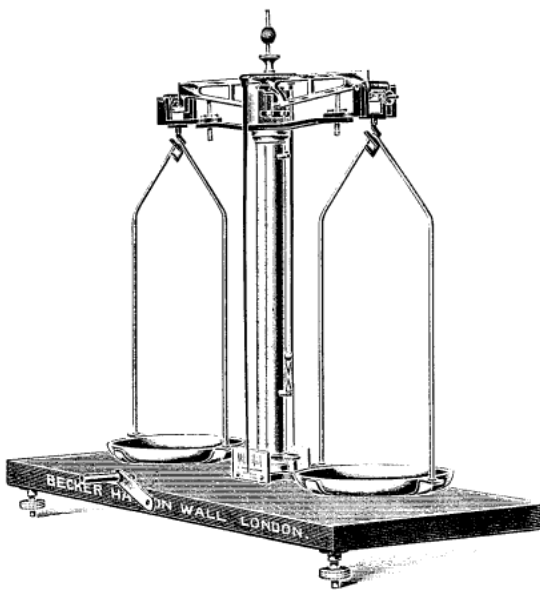
All Balances on this page can be supplied with Beams *Not Graduated* at 5/- **LESS** per balance. The same remarks apply to our special Balance Sets on page 90, *i.e.*, 5/- **LESS** per set if required *WITHOUT GRADUATED BEAM*.

38190—**STUDENTS' MAGNESIUM BALANCES**. "Solid Beam" pattern (Beam not graduated), capacity 250 grammes. Agate knife edges and planes. Each £2 2 0.

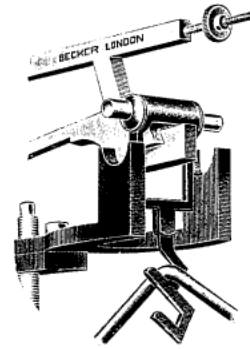
38590—**STUDENTS' MAGNESIUM BALANCES**. "Open Beam" pattern (Beam not graduated), capacity 250 grammes. Agate knife edges and planes. Each £2 10 0.

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F. E. BECKER & Co.'s  
 LECTURE DEMONSTRATION BALANCE WITH  
 DOUBLE POINTER



386



This enlarged illustration shows the action of the improved arrestments and supports for the stirrup suspenders in Balance No. 386.

386.—F. E. BECKER & Co.'s "DOUBLE POINTER" BALANCE of special design, provided with pointer and scale on both sides, thus enabling students to observe weighing operations carried out by the lecturer at the demonstration bench.

This Balance is of the "Open Beam" type, and is provided with **agate knife-edges and planes**. When beam is at rest its links and middle knife-edge are out of action.

Capacity : 300 grammes, and sensitivity 3 to 4 milligrammes

Price - - - - - £3 : 7 : 6

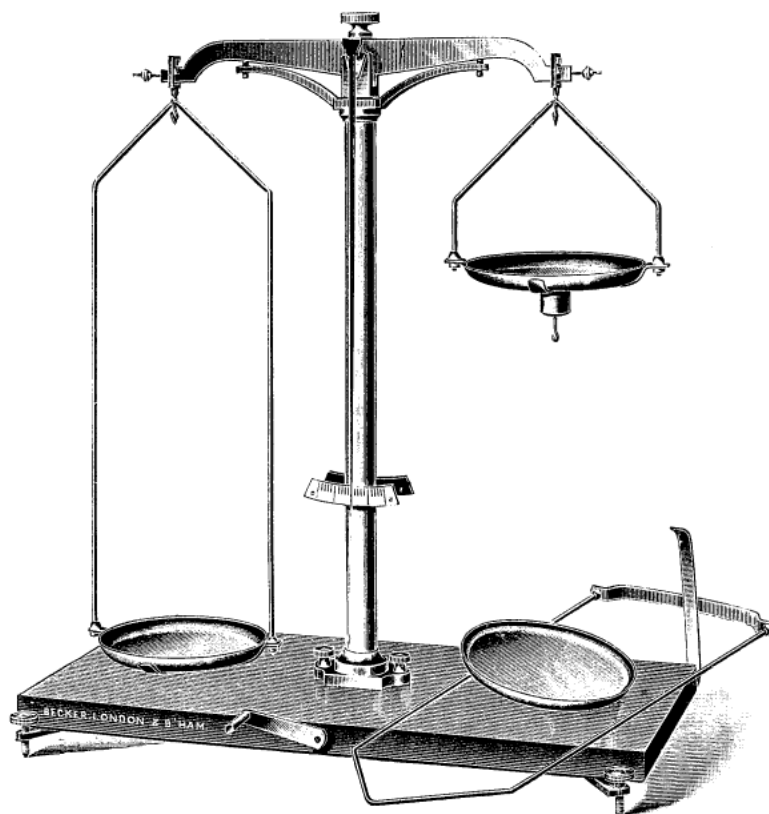
(Short Pan, if required, extra . . . . . 7s. 6d.)

Our Balances and Weights have achieved World-wide Reputation: *vide* Opinions of the Leading Scientific Press

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W. & J. GEORGE (LONDON), LTD., PROPRIETORS

## F. E. BECKER & Co.'s LECTURE DEMONSTRATION BALANCE

"Tall Form" with Pointer and Scale on Both Sides



387

387.—F. E. BECKER & Co.'s LECTURE DEMONSTRATION BALANCE WITH DOUBLE POINTER, "Tall Form." The Balance is provided with pointer and scale on both sides. The beam is made of hard brass nicely lacquered and is furnished with specially hardened steel knife-edges and bearings. The total height of the Balance is 24in. The pans, which are 5½in. in diameter, will take a boiling flask of nearly 2 litres capacity.

The distance from suspender to inside of long pan is 17½in. The distance from the hook at bottom of the short pan to the base of balance is 10½in. The base, is made of mahogany and nicely polished, measures 20in. × 11in.

The whole Balance is soundly constructed and will be found very serviceable for lectures. Its carrying capacity is **1,000 grammes** and when thus loaded is sensitive to 12 *milligrammes*.

**Price - £4 : 17 : 6**

**Complete with two long pans and one short pan as figured**

Every requisite for Chemical, Physical and Bacteriological work supplied, from a test tube to the complete furnishing of the largest laboratory

F. E. BECKER & CO., NIVOC HOUSE, HATTON WALL, LONDON, E.C.1  
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## F. E. BECKER & Co.'s STUDENTS' PHYSICAL BALANCE

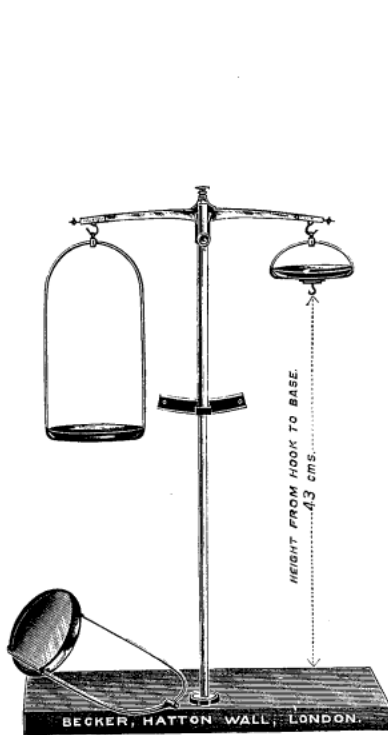


FIG. A.—Back View.  
388

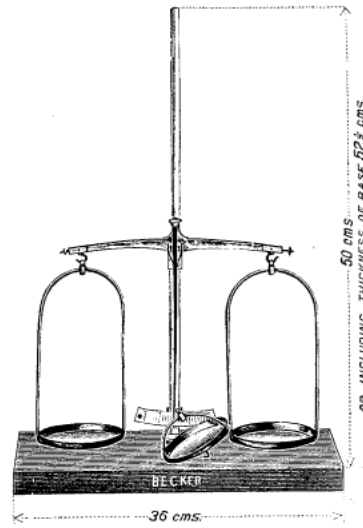


FIG. C.—Ready for Ordinary Weighings.  
388

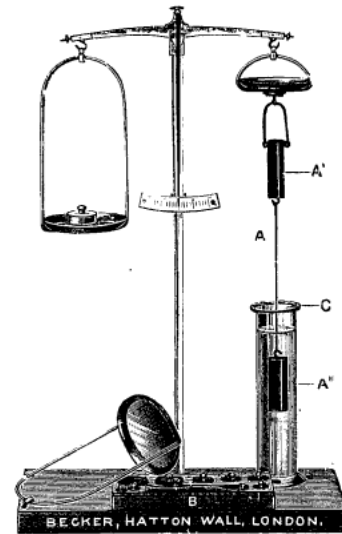


FIG. B.—Front View.  
388

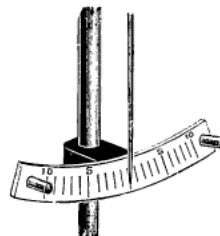


FIG. D.—Enlarged View of  
Pointer and Scale.  
388

388.—F. E. BECKER & Co.'s STUDENTS' PHYSICAL BALANCE, as Illustrated (see Figs. A, B, C, and D).

To weigh to 250 grammes in each pan, and sensitive to 2 milligrammes when loaded with its maximum charge. Beam can be raised to desired height and rigidly held there by means of a thumb-screw. Can be used for ordinary chemical laboratory weighings as well as for Physical Laboratory Experiments.

A. Price of Balance only, including short pan (as Fig. C.)

**£1 : 8 : 6**

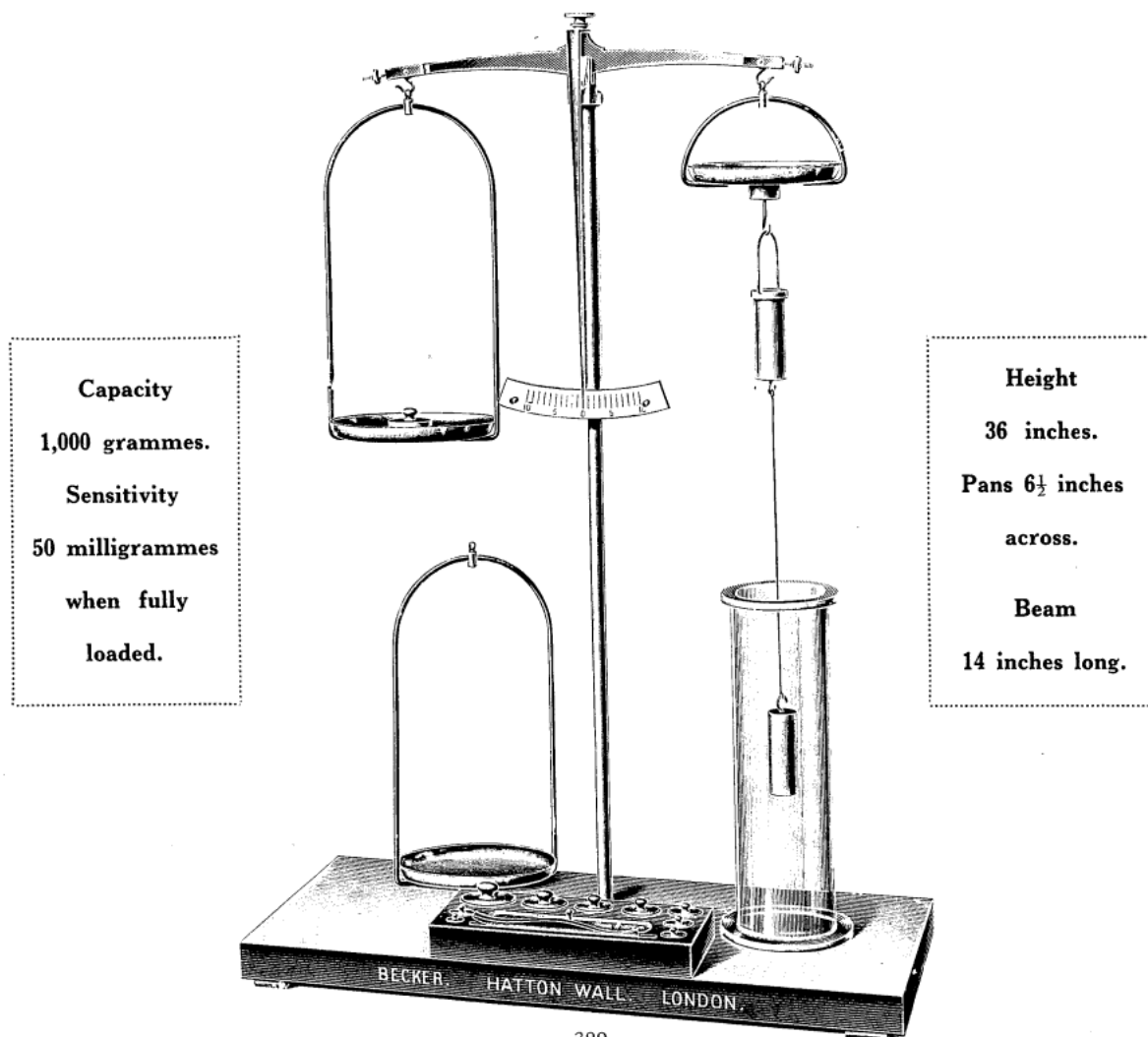
B. Price, including short pan, bucket and cylinder, A' and A'' (to prove Archimedes' Law) glass jar, C, and set of weights, B (200 grammes to 1 milligramme in box with lid and fractions under glass slab)

**£2 : 5 : 0**

Our stock of pure Chemicals and Acids is very considerable; hence all orders are executed with the utmost despatch. See comprehensive list at end of Catalogue

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## F. E. BECKER & Co.'s PHYSICAL BALANCE "Science School" Pattern



Capacity  
1,000 grammes.

Sensitivity  
50 milligrammes  
when fully  
loaded.

Height  
36 inches.

Pans  $6\frac{1}{2}$  inches  
across.

Beam  
14 inches long.

389

### 389.—F. E. BECKER & Co.'s NEW PHYSICAL BALANCE "SCIENCE SCHOOL" PATTERN.

When loaded with 1,000 grammes in each pan will turn with 50 milligrammes.

This Balance is of the same design as the Students' Physical Balance figured on page 94, and can be used for ordinary Chemical weighings as well as for Physical Laboratory experiments.

The illustration above shows balance beam raised to its maximum height, where it is kept rigidly in position by a thumb-screw fixed behind sliding rod.

- A.—Price of Balance only, including short pan . . . . . **£2 : 17 : 6**
- B. Price, including set of weights, 1,000 grammes to 1 milligramme (fractions in separate compartments under glass slab), forceps, glass vessel, bucket and cylinder for Archimedes' experiment, and short pan . . . . . **£3 : 12 : 6**

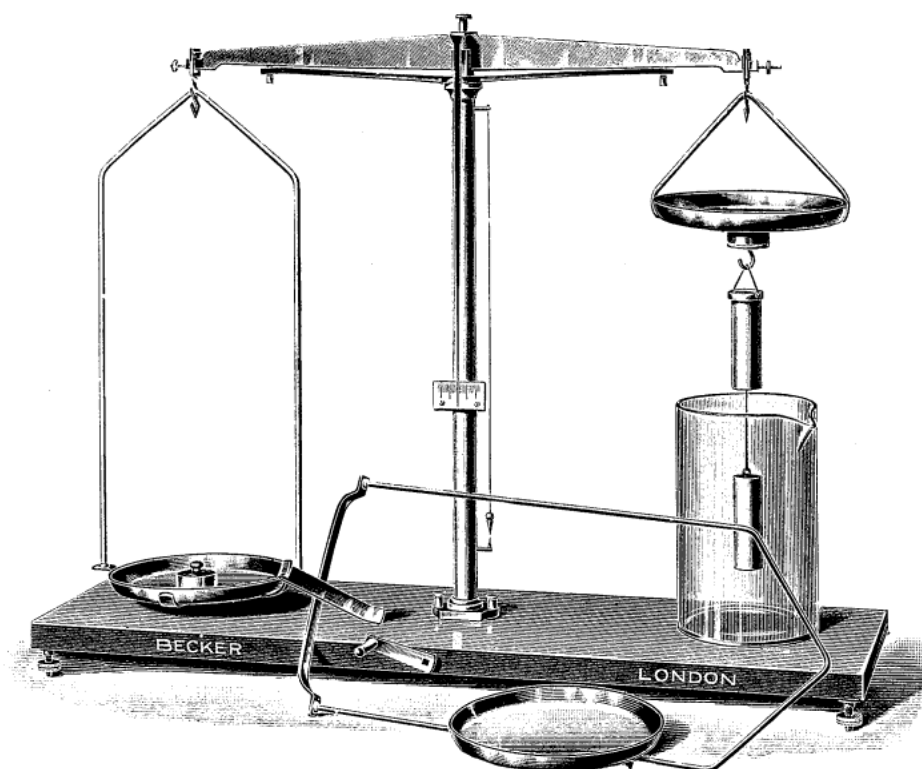
Our Balances and Weights have achieved World-wide Reputation: *vide* Opinions of the Leading Scientific Press

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W. & J. GEORGE (LONDON), LTD., PROPRIETORS

## F. E. BECKER & Co.'s PHYSICAL BALANCE

### "College" Pattern



390

390.—F. E. BECKER & Co.'s "COLLEGE" PATTERN PHYSICAL BALANCE. Length of beam, 19½in.; height of brass pillar, 18in.; diameter of pans, 6in. This balance will carry 1,200 grammes in each pan and turn with 10 milligrammes. Steel knife-edges and planes; beam support; plumb bob; short pan for specific gravity work, bucket and cylinder to prove Archimedes' Law, glass jar, etc.

A. Price of Balance only, including short pan

**£4 : 15 : 0**

B. Price, including bucket and cylinder and glass jar as figured

**£4 : 19 : 6**

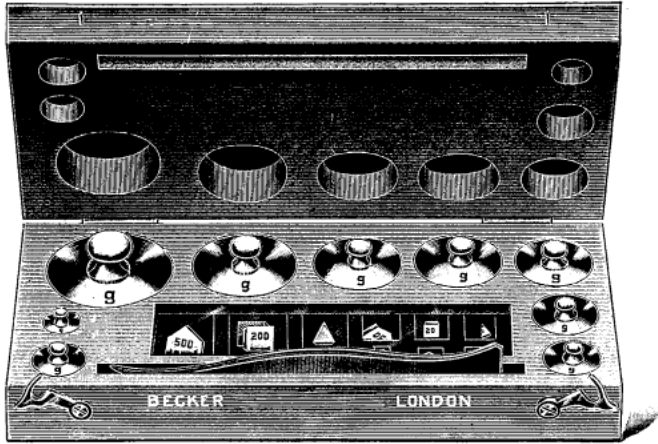
Every requisite for Chemical, Physical, and Bacteriological work supplied, from a test tube to the complete furnishing of the largest laboratory

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F. E. BECKER & Co.'s SETS OF GRAMME WEIGHTS



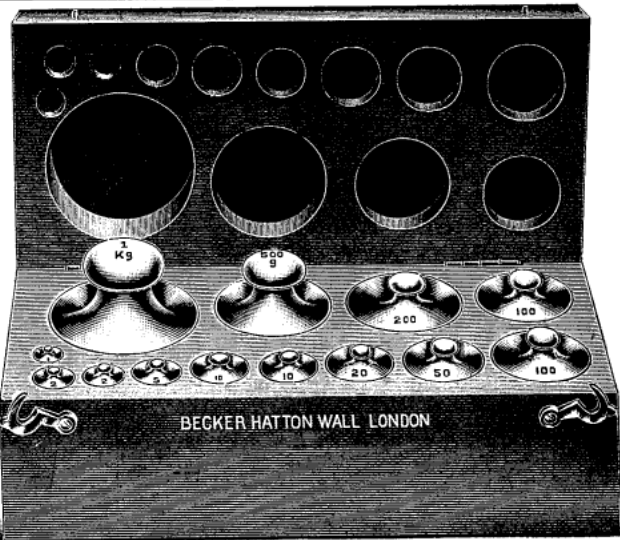
391

391.—F. E. Becker & Co.'s Sets of Gramme Weights for Students, in polished box with hinged lid and forceps. The fractions are of nickel silver and aluminium covered by a glass slab.

- A. 100 grammes to 1 milligramme per set 7/6
- B. 200 grammes to 1 milligramme per set 10/6

392.—F. E. Becker & Co.'s Sets of Gramme Weights, without fractions or forceps, in polished box, as illustrated.

- A. 1 gramme to 100 grammes .. 6/-
- B. 1 gramme to 200 grammes .. 9/-
- C. 1 gramme to 500 grammes .. 13/-
- D. 1 gramme to 1,000 grammes .. 20/-



392



393

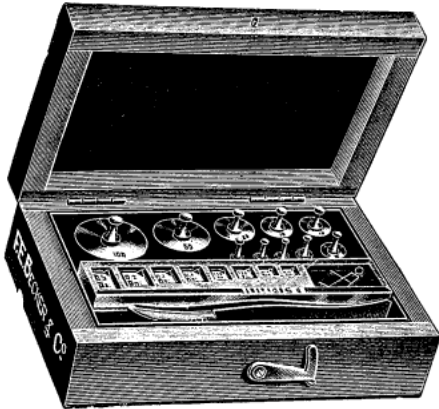
393.—F. E. Becker & Co.'s Special Set of Gramme Weights, at a very low price, yet made accurate enough for all ordinary work. As seen by the illustration, the weights total up to 300 grammes and are enclosed in a nicely polished box with forceps. The fractions are made of aluminium, and go from 10 milligrammes to 500 milligrammes.

Price .. .. . 15/-

Every requisite for Chemical, Physical and Bacteriological work supplied, from a test tube to the complete furnishing of the largest laboratory

F. E. BECKER & CO., NIVOC HOUSE, HATTON WALL, LONDON, E.C.1  
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## F. E. BECKER & Co.'s ANALYTICAL WEIGHTS



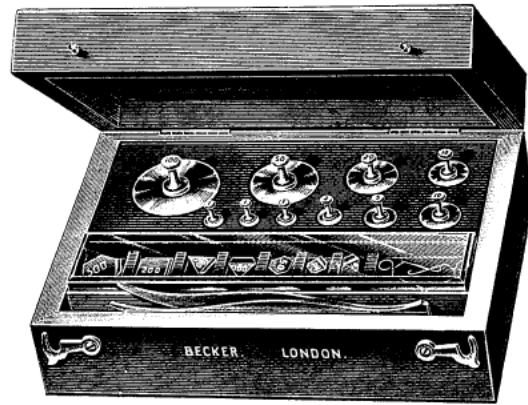
394/395

**394.—F. E. Becker & Co.'s Sets of Analytical Weights** in polished mahogany velvet lined box, fractions and two riders under glass cover with fine ivory tipped forceps. The weights from 1 gramme upwards *gold plated* and fractions of pure nickel and aluminium.

A.	B.
50	100 grammes to $\frac{1}{10}$ milligramme.
32/6	37/6 per set.

**395.—F. E. Becker & Co.'s Sets of Analytical Weights** in polished mahogany velvet lined box, fractions and two riders under glass cover with fine ivory tipped forceps. The weights from 1 gramme upwards *lacquered* and fractions of nickel and aluminium.

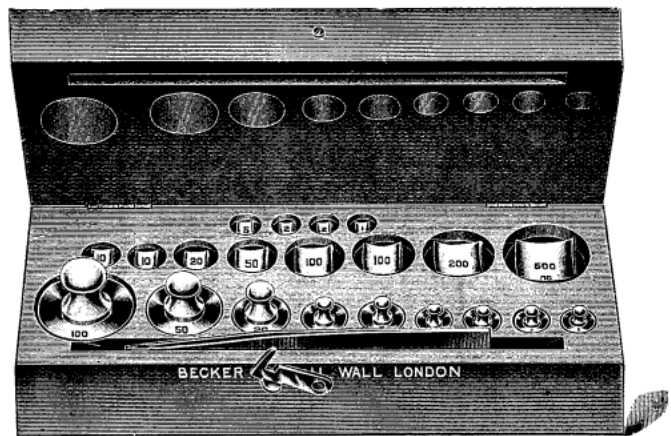
A.	B.
50	100 grammes to $\frac{1}{10}$ milligramme.
29/6	35/- per set.



396

**396.—F. E. BECKER & Co.'s SETS OF ANALYTICAL WEIGHTS** in polished mahogany velvet lined box with fractions under glass cover and forceps. The weights from 1 gramme upwards are *highly nickel plated* and the fractions are of nickel-silver and aluminium.

A.	B.	C.
50	100	200 grammes to 1 milligramme.
£1 : 2 : 6	£1 : 5 : 0	£1 : 12 : 6 per set.



397

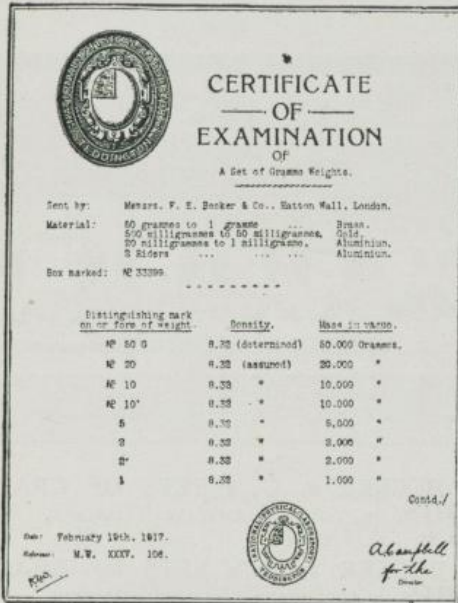
**397.—F. E. BECKER & Co.'s SETS OF GRAMME WEIGHTS**, in polished mahogany box, with forceps. The fractions are made of aluminium. These weights have been specially introduced to meet the increasing demand for an accurate box of weights at a low price.

A.	50 grammes to 1 milligramme (total 100 grammes) ..	18/0
B.	100 grammes to 1 milligramme (total 200 grammes) ..	19/6
C.	200 grammes to 1 milligramme (total 500 grammes) ..	27/6

Every requisite for Chemical, Physical and Bacteriological work supplied, from a test tube to the complete furnishing of the largest laboratory

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 W. & J. GEORGE (LONDON), LTD., PROPRIETORS

F. E. BECKER & Co.'s ANALYTICAL WEIGHTS  
 Best Quality



**CERTIFICATE OF EXAMINATION OF A Set of Gramme Weights.**

Sent by: Messrs. F. E. Becker & Co., Hatton Wall, London.  
 Material: 50 grammes to 1 gramme ... Brass.  
 50 milligrammes to 50 milligrammes ... Gold.  
 20 milligrammes to 1 milligramme ... Aluminium.  
 3 Riders ... Aluminium.  
 Box marked: N° 3339.

Distinguishing mark on or form of weight.	Density.	Mass in vacuo.
N° 50 G	8.33 (determined)	50.000 Grammes.
N° 20	8.33 (assumed)	20.000 "
N° 10	8.33 "	10.000 "
N° 10'	8.33 "	10.000 "
5	8.33 "	5.000 "
2	8.33 "	2.000 "
2'	8.33 "	2.000 "
1	8.33 "	1.000 "

Feb. 19th, 1917.  
 Ref. N.W. XXXV. 106.  
 A. Campbell for the Director.



398

**National Physical Laboratory Certificate** for any of these sets of Weights, extra ... £2 : 7 : 6  
 The Set of Weights to which this Certificate attaches was one of a batch of 50 sets taken absolutely at random and sent to the N.P.L. The Certificate speaks for itself.

CONTINUATION, Certificate of Examination of a Set of Gramme Weights, N° 3339.

Distinguishing mark on or form of weight.	Density.	Mass in vacuo.
500 MG	19.3 (assumed)	0.5000 Gramme.
200	19.3 "	0.2000 "
100	19.3 "	0.1000 "
100'	19.3 "	0.1000 "
50	19.3 "	0.0500 "
20	8.6 (assumed)	0.0200 "
10	8.6 "	0.0101 "
10'	8.6 "	0.0100 "
6	8.6 "	0.0050 "
3	8.6 "	0.0025 "
3'	8.6 "	0.0025 "
1	8.6 "	0.0010 "
1'	8.6 "	0.0010 "
Λ	8.6 "	0.0101 "
Λ'	8.6 "	0.0100 "

Feb. 19th, 1917.  
 Ref. N.W. XXXV. 106.  
 A. Campbell for the Director.

398.—F. E. BECKER & Co.'s SETS OF ANALYTICAL WEIGHTS, in polished mahogany box, each weight inlaid in velvet, fractions and two riders under glass cover, with fine ivory-pointed forceps, and the large fractions made of **Solid 18-ct. gold.**

A. 50 grammes to  $\frac{1}{10}$  milligramme. £2 : 2 : 0  
 B. 100 grammes to  $\frac{1}{10}$  milligramme. £2 : 10 : 0 per set.

399.—F. E. BECKER & Co.'s SETS OF ANALYTICAL WEIGHTS, in polished mahogany box, each weight inlaid in velvet; the weights from 1 gramme upwards gold plated; fractions and two riders under glass cover, with fine ivory-pointed forceps and the large fractions made of **Solid 18-ct. gold.**

A. 50 grammes to  $\frac{1}{10}$  milligramme. £2 : 7 : 6  
 B. 100 grammes to  $\frac{1}{10}$  milligramme. £2 : 12 : 6 per set.

400.—F. E. BECKER & Co.'s SETS OF ANALYTICAL WEIGHTS, in polished mahogany box, each weight inlaid in velvet, the weights from 1 gramme upwards gold plated; fractions and two riders under glass cover, with fine ivory-pointed forceps and the large fractions made of **Platinum.**

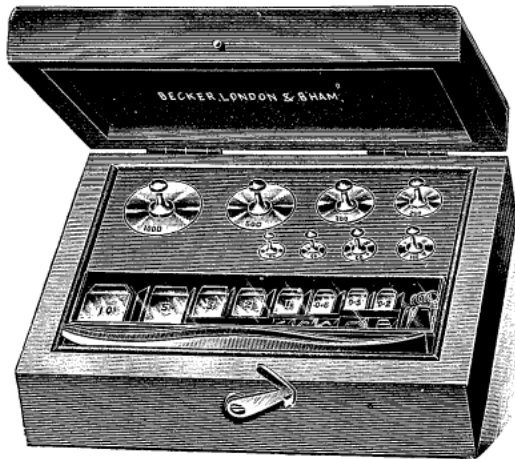
A. 50 grammes to  $\frac{1}{10}$  milligramme. £3 : 5 : 0  
 B. 100 grammes to  $\frac{1}{10}$  milligramme. £3 : 12 : 6 per set.

Our Balances and Weights have achieved World-wide Reputation: vide Opinions of the Leading Scientific Press



F. E. BECKER & CO., NIVOC HOUSE, HATTON WALL, LONDON, E.C. 1  
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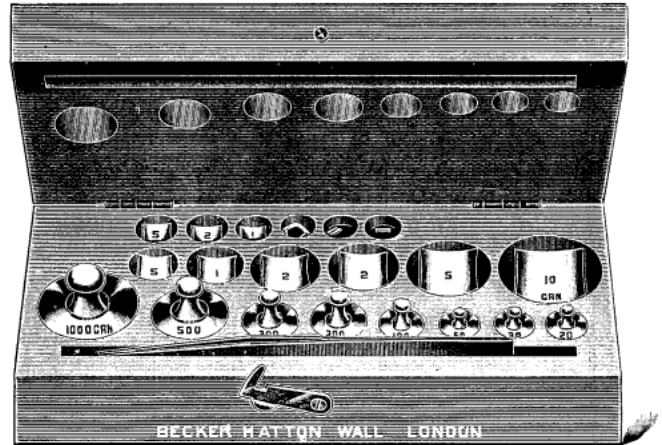
F. E. BECKER & Co.'s SETS OF GRAIN WEIGHTS



401

401.—F. E. BECKER & Co.'s SETS OF GRAIN WEIGHTS, accurately adjusted. In elegantly finished polished mahogany box, with velvet-lined lid. Aluminium fractions under glass slab, with polished brass forceps. 1,000 Grains to  $\frac{1}{100}$  Grain.

As supplied by us to Government Munition Factories, etc. . . . per set £1 : 12 : 6



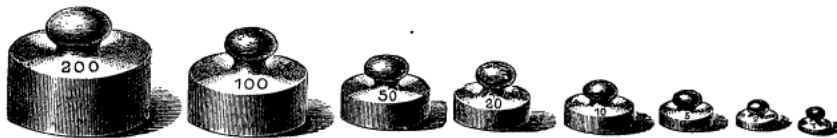
402

402.—F. E. BECKER & Co.'s SETS OF GRAIN WEIGHTS, in polished box, with forceps. 500 Grains to  $\frac{1}{100}$  Grain . . . per set £1 : 5 : 0

403.—F. E. BECKER & Co.'s SETS OF GRAIN WEIGHTS, in mahogany block with forceps, each weight fitted separately; 10 grains and downwards are made of aluminium and covered with a glass slab.

From  $\frac{1}{10}$  grain to 2,000 5,000 10,000 20,000 grains.  
 Per set . . . 18/- 22/6 27/6 39/6

LOOSE GRAMME WEIGHTS

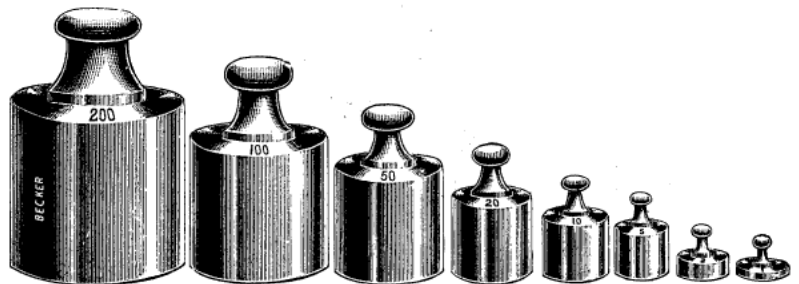


Size	1	2	5	10	20	50	100	200	500	1,000 grammes.
Each	.. 2d.	2d.	3d.	4d.	5d.	9d.	1/4	2/-	4/6	7/- each.
Per dozen	.. 1/2	1/6	2/-	3/-	4/-	8/-	14/-	—	—	—
		Size	..	..	..	..	5	..	10 kilos.	
		Each	..	..	..	..	2	..	52/6 each.	
							13/6	..	28/6	

404.—Gramme Weights, polished brass, flat form, as used in sets No. 391, page 97.

405.—GRAMME WEIGHTS, polished brass, tall form, as used in set 397, page 98.

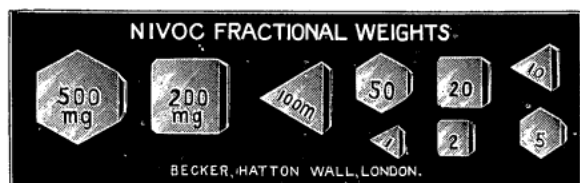
Size	1	2	5	10	20 grammes.
Price	2d.	2d.	3d.	4d.	6d. each.
Size	50	100	200	500	1,000 grammes.
Price	1/-	1/5	2/4	5/-	8/- each.



Our Balances and Weights have achieved World-wide Reputation: *vide* Opinions of the Leading Scientific Press

F. E. BECKER & CO., NIVOC HOUSE, HATTON WALL, LONDON, E.C.1  
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## FRACTIONAL WEIGHTS, RIDERS, Etc.



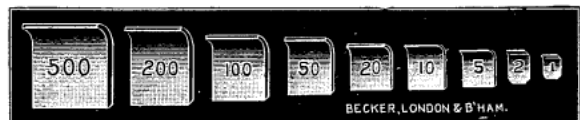
406

**406.—NIVOC FRACTIONAL WEIGHTS**, accurately adjusted. Per gross .. 7/-  
Size .. 500 200 100 50 milligrammes.  
Per dozen .. 8d. 8d. 8d. 8d.  
Size .. 20 10 5 2 1 milligrammes.  
Per dozen .. 8d. 8d. 8d. 8d. 8d.



407

**407.—NIVOC FRACTIONAL WEIGHTS**, as No. 406, in turned wooden box, each box containing 1 dozen weights, 500 to 1 milligrammes, the 200, 20 and 2 milligramme weights being duplicated.  
Per set .. .. . 8d.  
Per dozen sets .. 7/- Per gross sets .. 80/-



408

**408.—ALUMINIUM FRACTIONS**, "Bent-up" pattern. Best finish.  
Size .. 1,000 500 200 100 50 milligrammes.  
Price .. 6d. 4d. 4d. 4d. 4d. each.  
Size .. 20 10 5 2 1 milligrammes.  
Price .. 4d. 4d. 4d. 4d. 4d. each.



409

**409.—ALUMINIUM FRACTIONS**, "Concave" pattern. Best finish.  
Size .. 1,000 500 200 100 50 milligrammes.  
Price .. 6d. 4d. 4d. 4d. 4d. each.  
Size .. 20 10 5 2 1 milligrammes.  
Price .. 4d. 4d. 4d. 4d. 4d. each.



410

**410.—ALUMINIUM WIRE FRACTIONS**, Spiral pattern.  
Size .. 500 200 100 50 20 milligrammes.  
Price .. 6d. 6d. 6d. 5d. 5d. each.  
Size .. 10 5 2 1 milligrammes.  
Price .. 5d. 5d. 5d. 5d. each.



411

**411.—ALUMINIUM GRAIN WEIGHTS**.  
Size .. 10 5 2 1 0.5 0.2 grain.  
Price .. 6d. 5d. 5d. 5d. 5d. 5d. each.  
Size .. 0.1 0.05 0.02 0.01 grain.  
Price .. 5d. 5d. 5d. 5d. each.



412

**412.—BALANCE RIDERS**, made of aluminium wire.  
Size .. 1 centi-gramme. 1 milli-gramme. 2 milli-grammes. 5 milli-grammes. 12 milli-grammes. 1 grain. 1-10th grain.  
Price .. 6d. 6d. 6d. 6d. 6d. 6d. 6d.



413

**413.—PLATINUM FRACTIONS**, guaranteed accurate and finest finish—  
Gramme .. .001 .002 .005 .01 .02  
Price .. 5d. 5d. 5d. 3/- 3/8 each.  
Gramme .. .05 .1 .2 .5  
Price .. 5/- 6/- 8/- 16/- each.  
*Prices vary according to the market price of platinum.*

Every requisite for Chemical, Physical and Bacteriological work supplied, from a test tube to the complete furnishing of the largest laboratory

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 W. & J. GEORGE (LONDON), LTD., PROPRIETORS



414

**414.—BLACK POLISHED BLOCK**, for fractions 0.01 to 0.5 gramme.

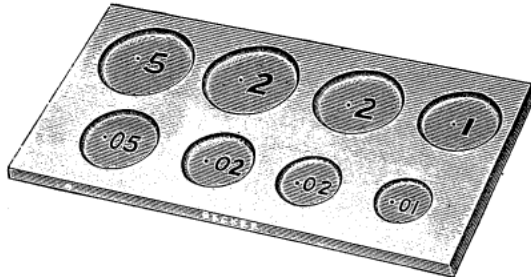
Price not including fractions .. .. . 1/6



414 A

**414 A.—POLISHED BOX**, with glass sliding lid, complete with fractions.

1-500 milligrammes, as figured .. .. each 3/6



414 B

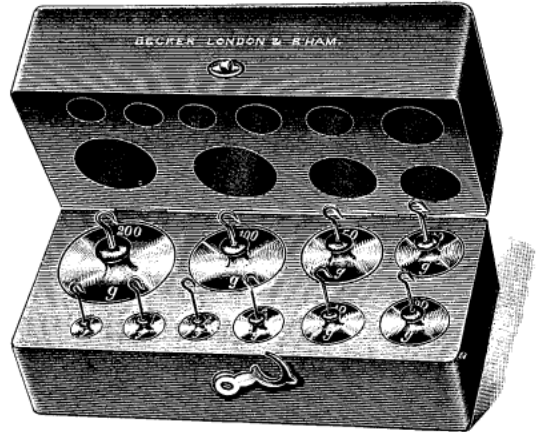
**414 B.—OPAL SLABS FOR PLACING INSIDE BALANCE CASES.**

The eight circular cavities are made shallow so that fractions can easily be taken hold of by means of forceps.

*The black figures show up well and any shortage of weights is quickly observed.*

The slabs are 84mm. long by 44mm. wide, and have polished edges.

A. Price, each .. .. . 1/9  
 B. Price, per dozen .. .. . 19/6

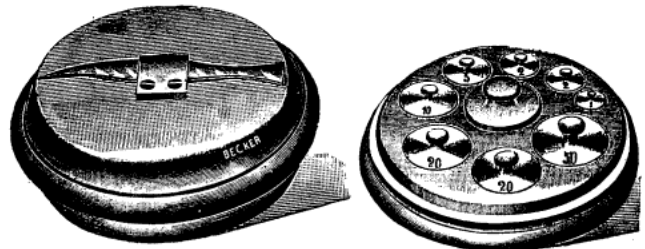


414 D

**414 C.—F. E. BECKER & Co.'s SETS OF HOOKED PHYSICAL WEIGHTS**, very convenient for experiments with pulleys. Made of brass and lacquered, each weight being fitted with a hook. Price, complete in box:

Set consisting of eight weights, viz.:—one each .. 1, 2, 5, 10, 20, 50, 100 and 200 grammes.  
 Per set .. 15/-

**414 D.—Set consisting of ten weights, viz.:—1, 2, 2, 5, 10, 20, 20, 50, 100 and 200 grammes.**  
 Per set .. 18/6



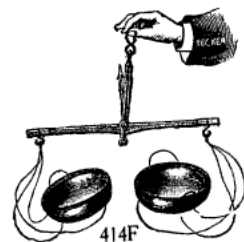
414 E

**414 E.—SET OF GRAMME WEIGHTS**, in polished circular boxes with forceps on cover, from 10 milligrammes upwards, all the 2's being in duplicate.

From 10 milligrammes to .. 50 .. 100 grammes.  
 Price, per set .. .. . 5/6 .. 6/6

**414 F.—Brass Hand Scales**, with horn pans on silk cords.

Length of beam...	12	17	19	cms.
Capacity ..	25	50	100	grammes
Each ...	5/6	7/-	8/-	
Length of beam	30	35	cms.	
Capacity ...	250	500	grammes	
Each ...	12/-	15/-		



414 F

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## BALANCE ACCESSORIES



415 A

**415 A.—Spirit Level**, brass, best quality.  
Length,  $3\frac{1}{2}$  in.

Each .. .. . 2/6  
Per dozen .. .. . 27/6



415 D

**415 D.—Brass Forceps—**  
Ivory points .. each 2/6



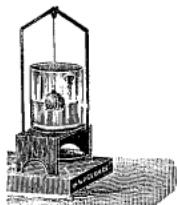
415 E

**415 E.—Forceps**, for balances, nickel-plated .. 6/- per dozen; each 7d.



415 H

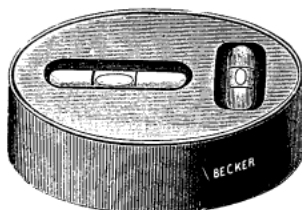
**415 H.—Feet** for protecting benches and tables from indentations caused by the adjusting of levelling screws; each 9d.



415 J

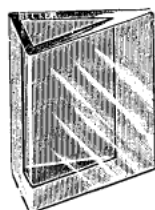
**415 J.—Glass Vessels for Specific Gravity work.**

Each .. .. . 1/-  
Per dozen .. .. . 11/-



415 B

**415 B.—Circular Cross Spirit Levels**, best quality.  
Nickel-plated .. each 5/6



415 F

**415 F.—Triangular Desiccators**, polished on all sides, for placing inside balance cases.

2in. by  $1\frac{3}{4}$ in. .. each 1/3  
 $3\frac{1}{2}$ in. by  $2\frac{1}{4}$ in. .. each 1/6



415 C

**415 C.—Circular Spirit Levels**  
best quality.

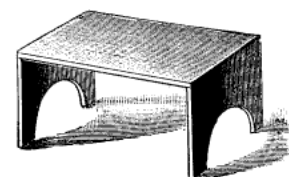
A. 1in. diameter .. each 4/9  
B.  $1\frac{1}{2}$ in. " .. " 5/9  
C. 2in. " .. " 6/9



415 G

**415 G.—Powerful Lens**, on metal foot, for magnifying the divisions of index scales on analytical balances; each 8/6

**415 K.—Mahogany Stools**, best quality for specific gravity work. These may be used with 100 gramme or 250 gramme size balances; each 1/-



415 K



415 L

**415 L.—Camel Hair Brushes** for dusting balance pans; each 6d.

Every requisite for Chemical, Physical and Bacteriological work supplied, from a test tube to the complete furnishing of the largest laboratory

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## GRIMLEY'S PROSPECTOR'S BALANCE

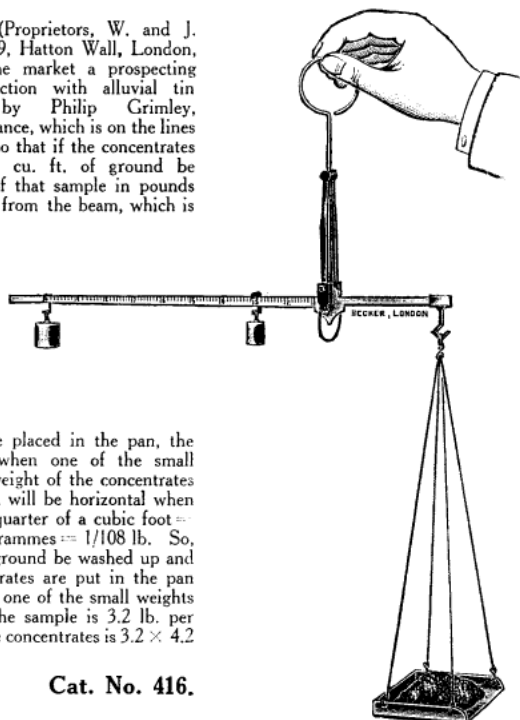
For Alluvial Tin Concentrates.

Value of sample in lbs. per cubic yard read direct from the beam. Also weight of sample can be ascertained, enabling specific gravity to be taken, and tin contents to be estimated.

Reprinted from "The Mining Magazine" for October, 1921.

F. E. BECKER & Co. (Proprietors, W. and J. GEORGE), Limited, of 17-29, Hatton Wall, London, E.C. 1, are putting on the market a prospecting balance for use in connection with alluvial tin estimations, invented by Philip Grimley, Assoc. Inst. M.M. This balance, which is on the lines of a steelyard, is designed so that if the concentrates resulting from washing  $\frac{1}{4}$  cu. ft. of ground be weighed on it, the value of that sample in pounds per cubic yard can be read from the beam, which is divided into 10 units, each of which is sub-divided into tenths. In addition the weight of the concentrates can be easily ascertained. Two large and three small sliding weights are supplied. Each of the small weights has a value of 4.2 grammes.

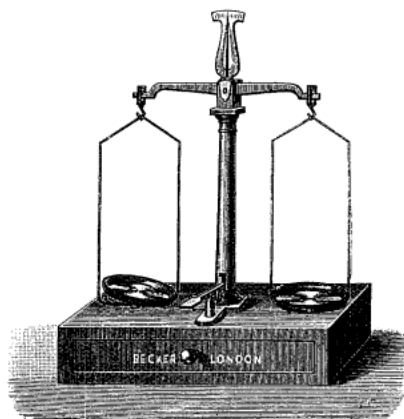
That is, if concentrates weighing 4.2 grammes are placed in the pan, the beam will be horizontal when one of the small weights is at 1, or, if the weight of the concentrates be 42.0 grammes, the beam will be horizontal when the weight is at 10. One quarter of a cubic foot =  $\frac{1}{108}$  cub. yd., and 4.201 grammes =  $\frac{1}{108}$  lb. So, for example, if  $\frac{1}{4}$  cu. ft. of ground be washed up and when the resulting concentrates are put in the pan the beam is horizontal with one of the small weights at, say, 3.2, the value of the sample is 3.2 lb. per cu. yd. and the weight of the concentrates is  $3.2 \times 4.2$



Cat. No. 416.

grammes. If only one of the small weights be used, concentrates of a higher value than 10 lb. per cu. yd. have to be weighed in two or more portions, and the beam readings must be added together. But with, for example, one small weight at the mark 10 on the beam, and another of the small weights at 4, a value of 10 plus 4 = 14 lb. per cu. yd. can be read. Similarly, with the medium weight (which is twice as heavy as one of the small weights) at 10, and a small weight at 3 (as illustrated), a value of  $2 \times 10$  plus 3 = 23 lb. per cu. yd. can be read; or, with the largest weight at 10 and one of the small weights at 3, a value of  $3 \times 10$  plus 3 = 33 lb. per cu. yd. can be read. In all the above cases the value in lb. per cu. yd.  $\times 4.2$  = weight of concentrates in grammes. Further, should it, at times, be desirable to wash samples of  $\frac{1}{2}$  cu. ft., then the medium-sized weight at, say, the mark 7, would indicate a value of 7 lb. per cu. yd. (Should any of the small weights be used when samples of  $\frac{1}{2}$  cu. ft. are washed, its beam reading must be halved.) When  $\frac{1}{2}$  cu. ft. samples are taken, the weight of concentrates in grammes = value in lb. per cu. yd.  $\times 8.4$ . The apparatus is simple and not likely to get out of order when taken on a prospecting expedition. It weighs, in its wooden box, only 1 $\frac{1}{2}$  lb., and the dimensions of the box are 14 in. by 4 $\frac{1}{2}$  in. by 1 $\frac{1}{2}$  in. One advantage of the instrument is that it can be carried while prospecting so that the samples can be immediately tested, thus obviating error and misadventure, and giving the required information promptly.

Price, complete in case, £3 : 3 : 0.



417

417/1.—F. E. BECKER & Co.'s PRECISION BALANCE (M.V.1), Load 60 grammes; sensitive to 8 milligrammes; lacquered brass beam carrying needle-pointer swinging in front of an ivorine scale; middle knife-edge made of hardened steel; pillar, suspenders, and pans made of brass nicely lacquered. All the parts can be quickly taken to pieces and placed in drawer of box. The beam is raised by means of the eccentric lever. The box is made of polished mahogany. Movable pans. Price £1 : 5 : 0

417/2.—F. E. BECKER & Co.'s PRECISION BALANCE (M.V.2). Specification as (M.V.1), but weighing to 120 grammes and sensitive to 9 milligrammes . . . . . Price £1 : 8 : 6

417/3.—F. E. BECKER & Co.'s PRECISION BALANCE (M.V.3). Specification as (M.V.1), but weighing to 250 grammes and sensitive to 10 milligrammes . . . . . Price £1 : 12 : 6

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 W. & J. GEORGE (LONDON), LTD., PROPRIETORS



418

**418.—LABORATORY SCALES,** superior quality and finish. Suitable for weighing chemicals, etc.; double beam; mounted on nicely finished walnut box; with white marble top, and provided with two movable brass pans.

To weigh	...	...	1	2	5	10	kilos.
Diameter of pans	...	...	16	18	20	22	cms.
Each	...	...	42/6	50/-	75/-	92/6	

**419.—F. E. BECKER & Co.'s LARGE LECTURE BALANCE.**—This balance is fitted with double-handled eccentric for raising or lowering, a pair each of long and short suspenders with pans, a rider-scale, and flat centre plane. The beam has two pointers, each of them oscillating on a sextant, the one facing the lecturer, the other the audience. The short suspenders may be used in the place of the long ones.

Sensitive to 10 milligrammes when loaded with 5,000 grammes in each pan.

The balance may be used also for ordinary purposes and the following instructive experiments:

Uniform knife-edges and such, in the proportion of 1 : 2.

Long or short pointers.

Elongation of lever.

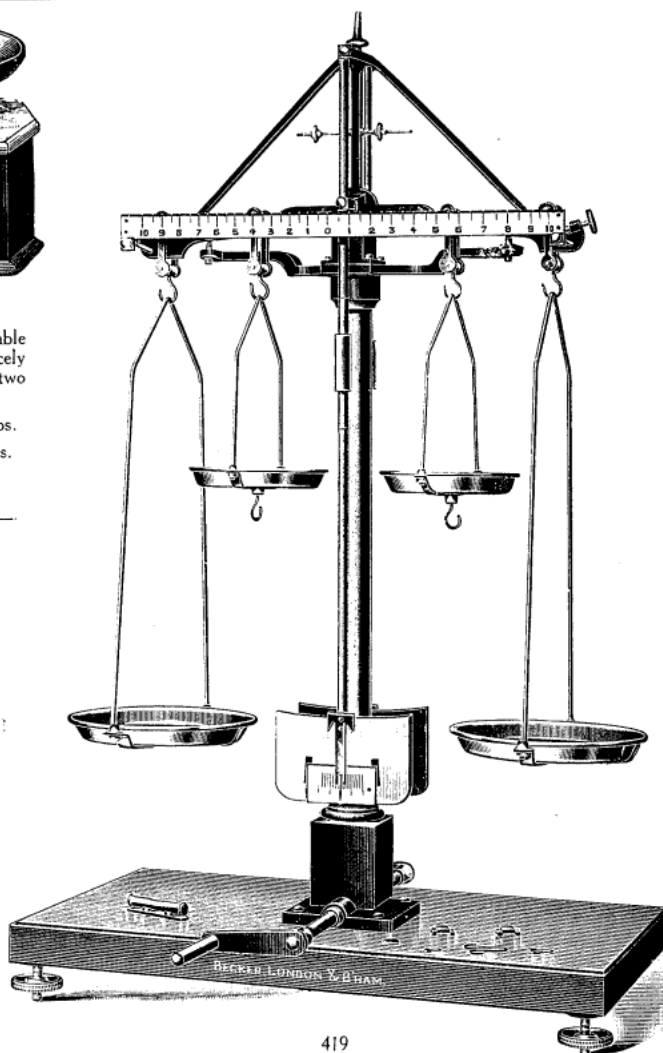
Moving the level of plane up or down.

Alteration of the point of gravity.

Weighing with the rider-scale.

Specific gravity experiments.

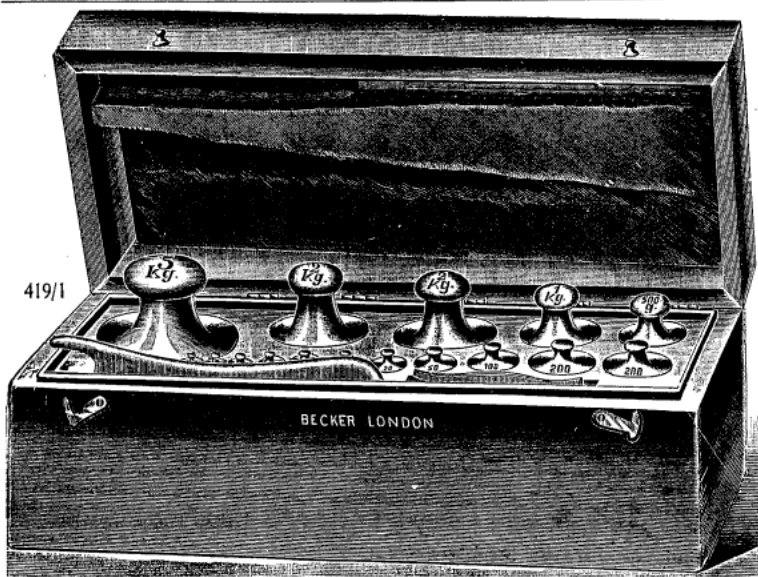
Price complete ... £17 : 0 : 0



419

**419/1.—SETS OF LARGE DEMONSTRATION GRAMME WEIGHTS,** in fine polished box, lid lined with velvet. With fork for lifting out the large weights and brass forceps for use with small weights. The 2, 20, 200, and 2,000 gramme weights in duplicate—

Set of 1 gramme to 2 kilogrammes	5 kilogrammes.
Price	£3 : 0 : 0      £4 : 12 : 6
10 kilogrammes.	
	£7 : 10 : 0



419/1

**419/2.—SETS OF FLAT BRASS WEIGHTS.**

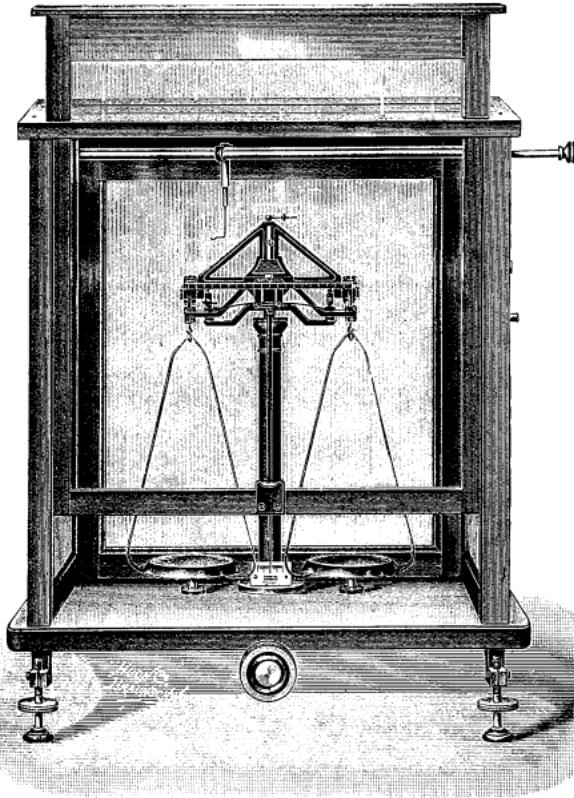
- A. ¼oz. to ½lb. per set 4/6
- B. ¼oz. to 1lb. .. 7/6
- C. ¼oz. to 2lb. .. 14/-
- D. ¼oz. to 4lb. .. 26/6



419/2

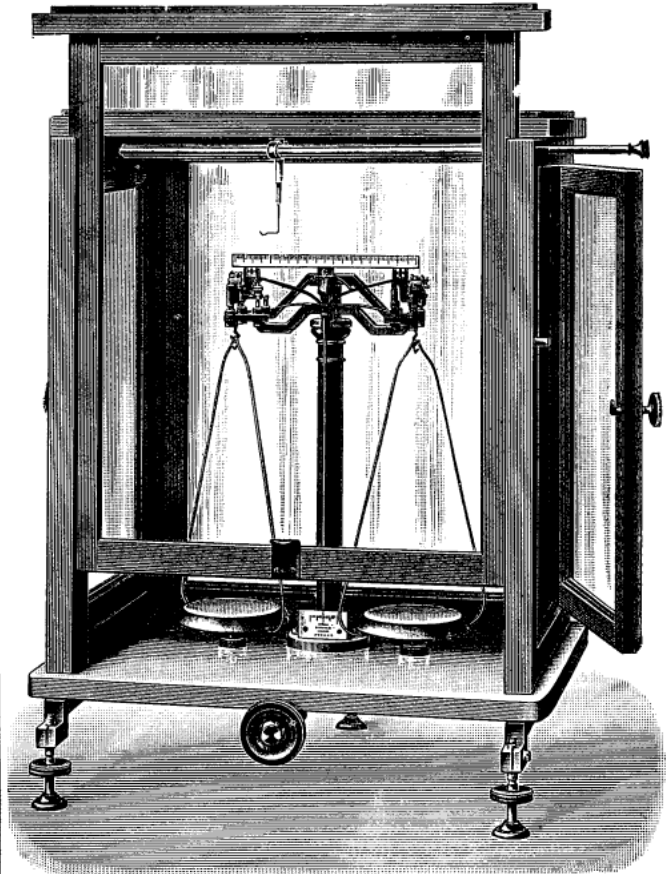
F. E. BECKER & CO., NIVOC HOUSE, HATTON WALL, LONDON, E.C. 1  
W. & J. GEORGE (LONDON), LTD., PROPRIETORS

## OTHER MAKES OF BALANCES AND WEIGHTS



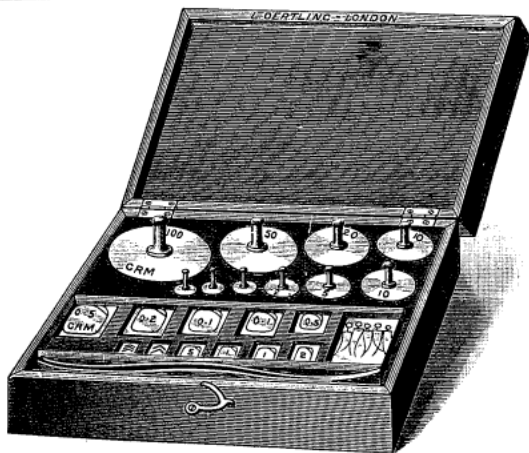
**SARTORIUS ANALYTICAL BALANCE "U.S.A. MODEL,"** agate knife-edges and planes, triangular aluminium graduated beam, gilt compensated suspensions, circular movement for releasing and arresting the beam, adjustable pan supports, rider apparatus. In oak glazed case with counterpoised sliding front window. Mounted on black glass base with levelling screws. Capacity 200 grammes and sensitivity 1/10th milligramme.

Price ... £14 : 10 : 0



**SARTORIUS ANALYTICAL BALANCE No. 5,** with straight aluminium beam 14 cms. long, agate knife-edges and planes, improved rider apparatus, circular movement for releasing and arresting the beam. In polished oak glass case with counterpoised front sliding window, mounted on black glass base with levelling screws.

Price ... £25 : 0 : 0



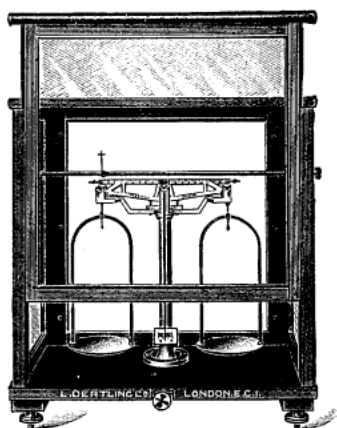
**OERTLING ANALYTICAL WEIGHTS** in mahogany boxes with forceps and fractions under glass slab.

- A. 200 grammes to '001 and riders .. per set £4 : 15 : 0
- B. 100 grammes to '001 and riders .. per set £4 : 0 : 0
- C. 50 grammes to '001 and riders .. per set £3 : 5 : 0
- D. Platinum fractions '5 to '01 gramme for any of the above sets .. extra £1 : 10 : 0
- E. 10,000 grains to '01 grain and riders, per set £7 : 0 : 0
- F. 6,000 grains to '01 grain and riders, per set £6 : 5 : 0

Every requisite for Chemical, Physical and Bacteriological work supplied, from a test tube to the complete furnishing of the largest laboratory

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## OTHER MAKES OF BALANCES



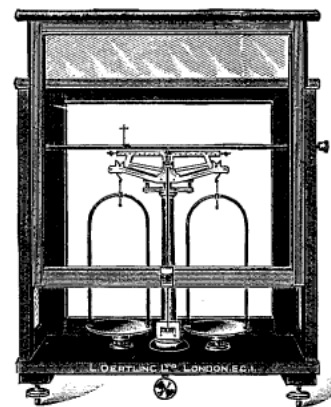
34

**OERTLING BALANCE No. 34**, with 8in. beam divided into 100 parts, to carry 200 grammes in each pan and sensitive to 0.2 milligramme; agate knife-edges and planes, instead of bearings; single rider-slide traversing total length of beam; adjustable pan supports, 4-in. concave pans, polished mahogany glass case fitted with counterpoise weights to front slide and with levelling screws and plummet

Price .. £15 : 15 : 0

**OERTLING BALANCE No. 38**, with 6in. horizontal beam divided into 100 parts, to carry 200 grammes in each pan and turn with 0.1 milligramme; agate knife-edges working on agate planes; single rider-slide traversing total length of beam; pan-supports; 4in. concave pans; plummet; polished mahogany glass case fitted with counterpoise weights to front slide and with levelling screws.

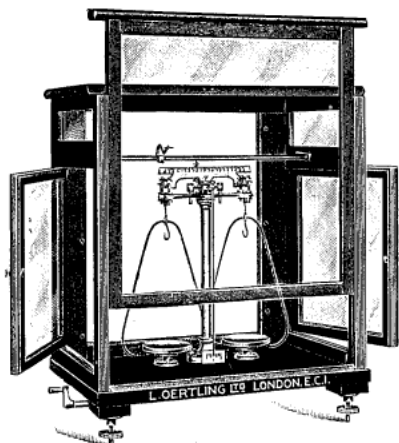
Price .. £18 : 10 : 0



38

**OERTLING BALANCE No. 31 A**, with 13 cm. gun-metal beam to carry 100 grammes in each pan and turn with 0.1 milligramme; agate knife-edges working on agate planes; pan supports; rider-slide which traverses the entire length of the beam; plate-glass to bottom of case; polished mahogany glass case with counterpoise weights to front slide, and with levelling screws and plummet. This balance is fitted with side-action.

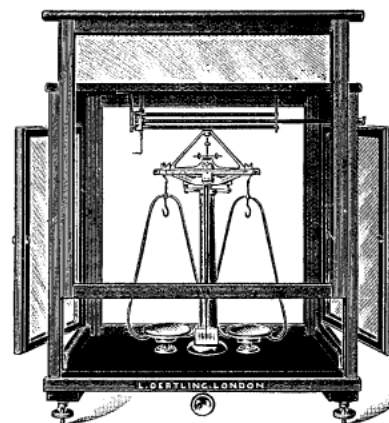
Price .. £25 : 0 : 0



31A

**OERTLING BALANCE No. 36**, made of aluminium-alloy, with 5in. triangular beam to carry 200 grammes in each pan and turn with 0.1 milligramme; agate knife-edges working on agate planes; vertical rider-slide; plummet; pan supports; rider bar on same plane as knife-edges and serrated into 100 parts, "0" in centre to "10" at each end; the pointer is of angle aluminium in order to decrease the effect of surrounding vibrations; pans gold-plated 2½in. plates, and 5½in. between wires at base; black plate-glass base to bottom of case; polished mahogany glass case fitted with counterpoise weights to front slide and with levelling screws.

Price .. £30 : 0 : 0

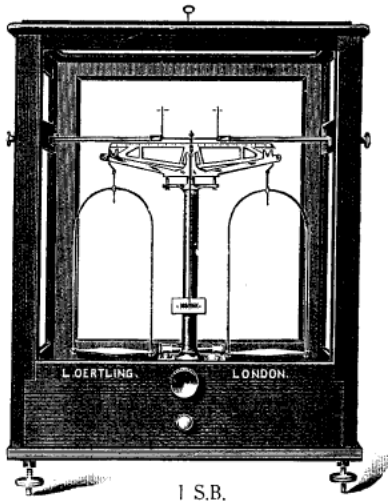


36

Our stock of pure Chemicals and Acids is very considerable; hence all orders are executed with the utmost despatch. For Prices, etc., see Chemical Apparatus Catalogue.

F. E. BECKER & CO., NIVOC HOUSE, HATTON WALL, LONDON, E.C. 1  
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## OTHER MAKES OF BALANCES



1 S.B.

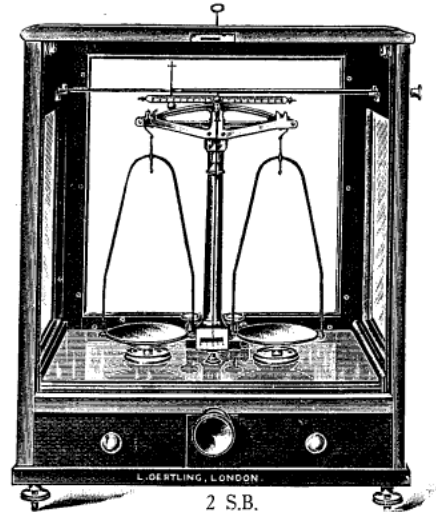
**Oertling Balance, No. 1 S.B.** with 8in. beam (20cm.) to carry 100 grammes in each pan, and turn with 0.1 milligramme; the beam is constructed with agate knife-edges working on agate planes, and divided for the use of the rider; rider-slide; pan supports; polished mahogany glass case with counterpoise weights fitted to front slide.

Price £30 : 0 : 0

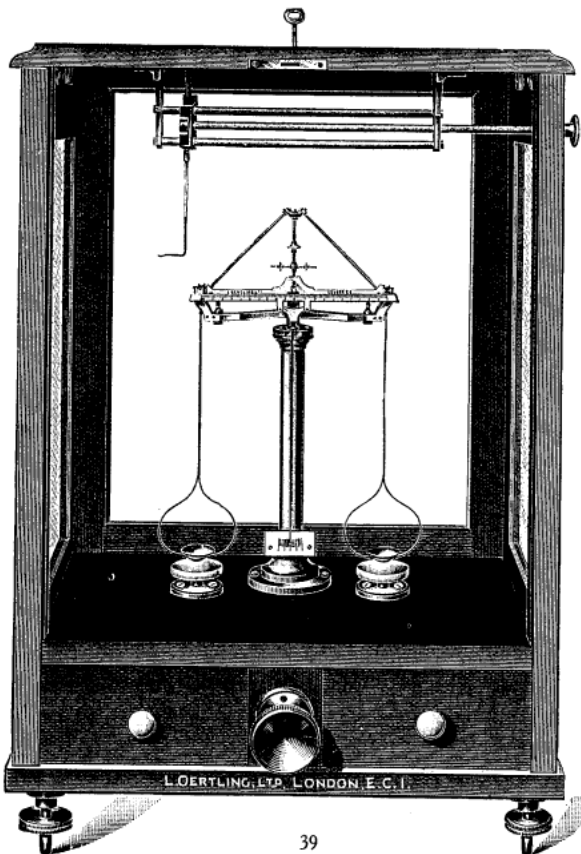
Plate glass to bottom of case Extra £2 : 5 : 0

**Oertling Balance, No. 2 S.B.** with 6in. beam (15.2cm.) to carry 200 grammes in each pan, and turn with 0.1 milligramme; agate knife-edges working on agate planes; rider-slide, which traverses the entire length of the beam; plate-glass to bottom of case; pan supports; polished mahogany glass case with counterpoise weights fitted to front slide.

Price .. £40 : 0 : 0



2 S.B.



39

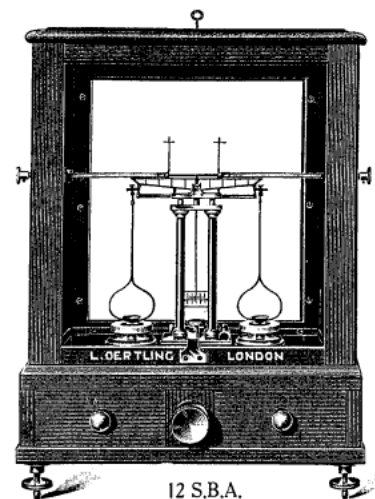
**Assay Balance, Oertling No. 39,** with 5in. triangular beam, to carry 2 grammes in each pan and turn with 0.01 milligramme. Agate knife-edges and planes; rider-bar, divided into 100 parts, on same plane as knife-edges; vertical rider-slide; pan supports, polished mahogany and glass case fitted with counterpoise weights to front slide.

Price .. .. £35 : 0 : 0

**Assay Balance, Oertling No. 12 S.B.A.,** with 6in. horizontal beam, divided into 100 parts; to carry 2 grammes in each pan and turn with 0.01 milligramme. The beam is constructed with agate knife-edges working on agate planes, **which are all relieved when not in use.** Double rider-slide, plate-glass to bottom of case, polished mahogany glass case with counterpoise weights fitted to front slide.

Price .. £50 : 0 : 0

*Other Oertling Balances not included in this list, supplied at maker's current list prices.*



12 S.B.A.

Every requisite for Chemical, Physical, and Bacteriological work supplied, from a test tube to the complete furnishing of the largest laboratory

THE FOLLOWING PAGES COMPRISE AN  
**ALPHABETICAL LIST**  
OF  
GENERAL AND MISCELLANEOUS  
**LABORATORY REQUISITES,**  
**CHEMICALS, ACIDS,**  
**REAGENTS, ETC.**

THE PRECEDING PAGES CONTAIN FULL  
DETAILS AND PRICES OF THE FOLLOWING:

Glass Beakers and Flasks, etc. . . . .	pages 2 to 5
Graduated Glassware . . . . .	„ 6 „ 11
Laboratory Porcelain . . . . .	„ 12 „ 14
Opaque Silica ("Vitreosil") Laboratory Apparatus ..	„ 15 „ 25
Transparent Silica Laboratory Apparatus .. ..	„ 26 „ 31
Nickel Laboratory Apparatus .. .. .	page 32
Filter Papers .. .. .	pages 33 to 46
Microscopes and Accessories .. .. .	„ 47 „ 76
<b>BALANCES AND WEIGHTS</b> .. .. .	„ 77 „ 108

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*A comprehensive Index will be found at the end  
of the Catalogue.*

# GENERAL LABORATORY APPARATUS

## ABSORPTION TUBES, BUNSEN'S



**420.—Absorption Tubes,**  
Bunsen's, graduated into 250 mm.

Each .. .. 2/6



**421.—Absorption Tubes,**  
Bunsen's, graduated, with bulb.

Each .. .. 2/9

## ACID JUGS

**422.—Acid Jugs,** stoneware.

- |    |                |      |     |
|----|----------------|------|-----|
| A. | 1 pint .. ..   | each | 1/2 |
| B. | 1 quart .. ..  | "    | 1/6 |
| C. | 2 quarts .. .. | "    | 2/6 |
| D. | 3 " .. ..      | "    | 3/- |
| E. | 1 gallon .. .. | "    | 3/6 |



422

**FOR GLASS JUGS, SEE INDEX.**

## ADAPTERS



**423.—Adapters,** funnel-shaped, for Gooch's Crucibles, end of stem ground off at an angle.

Internal dia. of cup 20 26 32 38 mm.

For Gooch's crucible

No. .. .. 1 2 3 4

Each .. .. 8d. 9d. 1/2 1/5

Per dozen .. 6/- 8/- 12/- 16/-



**424.—Adapters,**  
bent, 6 in. to 9 in. long.

Each .. .. 8d.

Per doz. .. .. 7/-

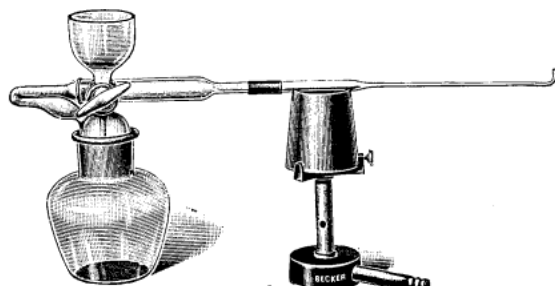


**425.—Adapters,**  
straight, 6 in. to 9 in. long.

Each .. .. 6d.

Per doz. .. .. 5/-

## GOVERNMENT LABORATORY ARSENIC APPARATUS



426

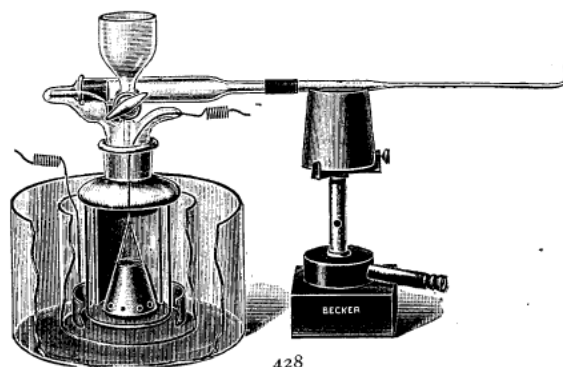
**426.—Government Laboratory Standard Arsenic Apparatus.** Zinc and Acid method.

A. Price, complete as figured, including special Bunsen Burner, star support and chimney .. 15/-

B. Ditto, glass parts only .. .. each 10/6

**427.—Spare Arsenic Tubes** for above apparatus, made out of Special Combustion Glass Tubing.

Per doz. .. .. 4/-



428

**428.—Government Laboratory Standard Arsenic Apparatus.** Electrolysis method.

Price of complete glass parts, with limb left open for fusing in the platinum parts, porous pot and special Bunsen Burner .. .. 35/-

Platinum Electrodes extra, according to weight, and charged for at the current market price of platinum.

**429.—Spare Arsenic Tubes** for above apparatus, made out of Special Combustion Glass Tubing.

Per doz. .. .. 4/-

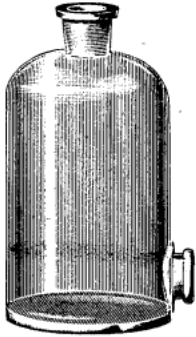
Being actual makers to the Principal Chemist of the Government Laboratories, customers may rest assured that when ordering the above apparatus from us they will be supplied with the correct articles.

The illustration No. 428 is not correct in every detail as the latest form of Standard Arsenic Apparatus, as modified by the Government Laboratory Authorities, differs somewhat from the original apparatus.

Every requisite for Chemical, Physical, and Bacteriological work supplied, from a test tube to the complete furnishing of the largest laboratory.



## ASPIRATORS AND TAPS



430

**430.—Aspirators,** strong white glass, with tubulure at bottom, ground inside.

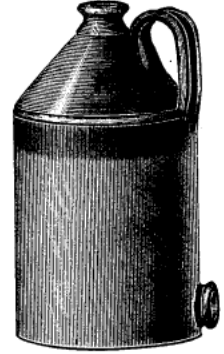
Capacity 1 2 3 4 5 ltrs.  
 Each 3/6 4/6 5/6 6/6 8/-

Capacity 6 8 10 15 20 ltrs.  
 Each 10/- 12/6 15/6 28/- 41/-

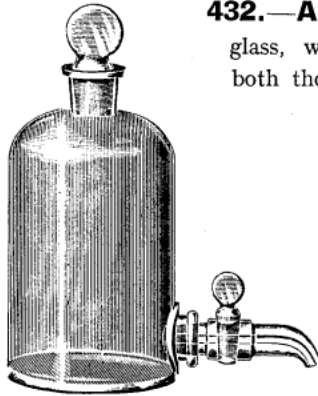
**431.—Aspirators,** stoneware, with tubulure at bottom.

Capacity 1 2 3 4 galls.  
 Price 3/8 8/- 11/- 14/6 each.

Capacity 5 6 8 10 galls.  
 Price 16/- 21/- 35/- 55/- each.



431



432

**432.—Aspirators,** white crystal glass, with stopper and stopcock, both thoroughly ground-in.

Capacity—  
 500 750 1000 c.c.  
 Price—  
 4/- 4/6 10/6 each.

Capacity—  
 2 3 4 5 litres.  
 Price—  
 12/9 14/6 17/- 19/6 each.

Capacity—  
 6 8 10 15 litres.  
 Price—  
 25/- 30/- 35/- 50/- each.

**433.—Stoneware Taps,** suitable for aspirators No. 431.

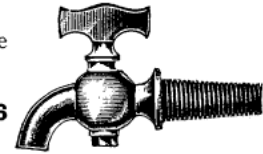
6/6 to 10/6 each according to size.



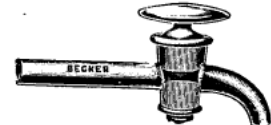
433

**434.—Brass Taps,** suitable for aspirators.

Nickel-plated .. .. 4/6



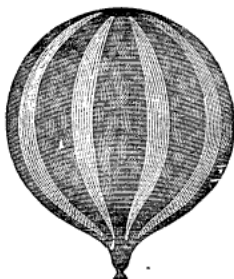
**435.—Glass Taps,** bent for aspirators.



Diam. of bore .. 4 5 7 9 mm.  
 Price, each .. 3/9 4/6 6/6 7/6

**FOR GAS ASPIRATORS, SEE INDEX.**

## BALLOONS



**436.—Goldbeater's Skin Balloons,** for Hydrogen and Coal Gas.

Diameter 6 9 10½ 12 in.  
 Price .. 1/6 2/3 2/9 3/6 each.

Diameter .. 15 18 20 in.  
 Price .. 5/- 7/6 9/9 each.



**437.—Collodion Balloons,** best quality, very thin and light, for hydrogen.

Length.. 4 6 9 12 in.  
 Price .. 2/9 3/3 4/- 6/6 each.

**438.—Brass Tobacco Pipe,** for Gas Experiments, with brass stopcock and ferrule .. .. each 6/-

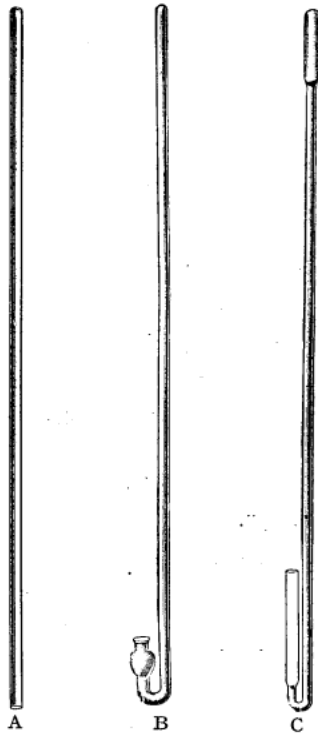
**439.—Ditto,** with ferrule, but without stopcock .. .. 3/6



Our Balances and Weights have achieved World-wide Reputation: *vide* Opinions of the Leading Scientific Press.



**BAROMETER TUBES**



**440.—Barometer Tubes.**  
 A. Plain, thick-walled each 1/2  
 B. Bulb pattern .. " 2/3  
 C. Syphon pattern .. " 2/3

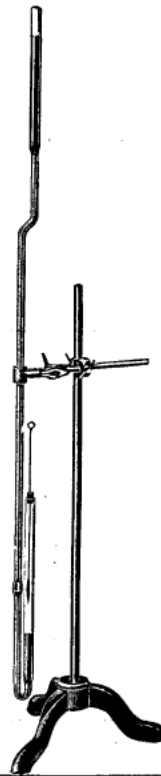
**BAROMETERS**

**441. — Bunsen's Syphon Barometer,** filled and graduated in millimetres, on white enamelled back, mounted on strong iron support with clamp—

£2 2 0

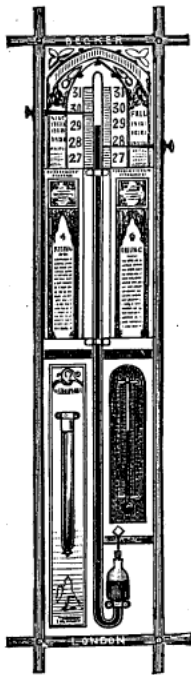
**442.—Ditto,** but not mounted—

£1 10 0



**443. — Bunsen's Syphon Barometer,** white enamelled back, graduated in millimetres, mounted on nicely-polished mahogany board—

£2 12 6



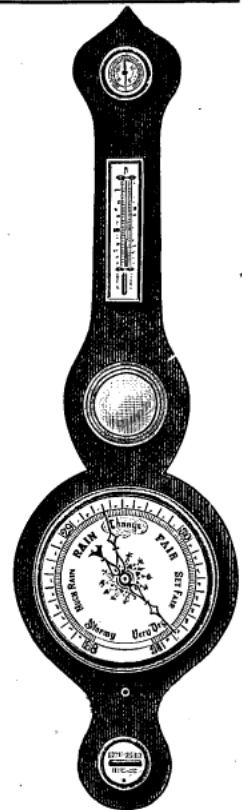
**444.—Fitzroy Barometer,** best quality, with two sliding indicators, thermometer and storm glass—  
 each £2 5 0



**445. — Model Barometer,** best quality, ivory scale, with thermometer, sliding vernier, portable screw and polished mahogany frame—  
 £2 10 0

**446. — Wheel Pattern Mercurial Barometer,** 8 in., dial, opal plates, with mirror, damp detector and level, in oak, walnut, or mahogany, as figured—

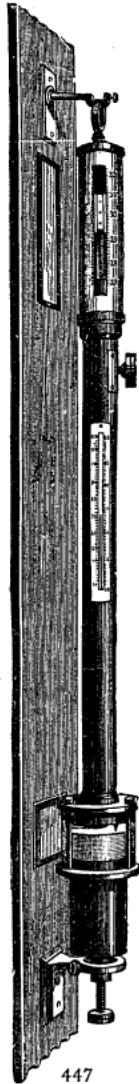
£2 10 0



Our stock of pure Chemicals and Acids is very considerable ; hence all orders are executed with the utmost despatch. See comprehensive list at end of Catalogue.

## FORTIN'S STANDARD BAROMETERS

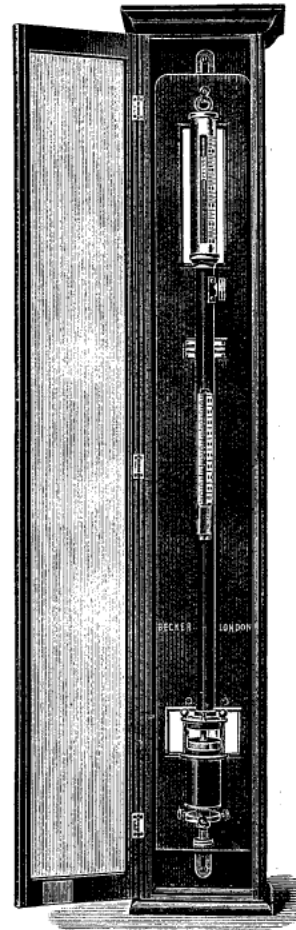
*SPECIAL NOTE.—For export orders the only tolerably safe way to send Barometers is in care of one of the Ship's Officers. When this is done, however, it is necessary for customers to arrange to take personal delivery at the Port of discharge. We guarantee the instruments to be in perfect condition when they leave our Warehouse but we cannot accept responsibility for damage during transit. For Home orders we can arrange to send in care of the guard of any specified train provided customers arrange to meet the train on its arrival.*



447



448



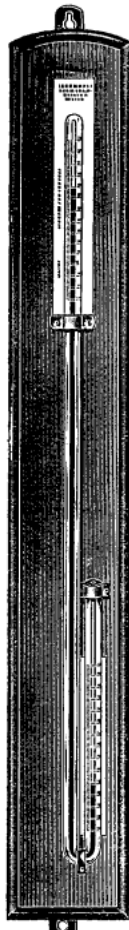
449

- 447.—Fortin's Standard Barometer**, large size, diameter of tube 0.5 in., with double vernier reading to  $\frac{1}{300}$ th of an inch, and  $\frac{1}{10}$ th of a millimetre; mounted on handsomely finished mahogany board, with opal glass reflectors, adjusting screws, etc. .. .. . **£18 10 0**
- 448.—Fortin's Standard Barometer.** This instrument has been designed to meet the requirements of those who find the need of a Barometer which will give *exact reading* and cost but a *moderate sum*, and is used for Demonstration purposes in all the principal Science and Technical Laboratories.
- We wish to emphasize that this is a Standard Barometer, made on the same principle as the larger Fortin's Barometer, and gives readings to .01 in. and .1 millimetre and is recommended for use as a "Standard" in Colleges, Schools and private Observatories.
- Price, mounted on polished mahogany board and *complete with standard thermometer* .. .. . **£7 15 0**
- A. National Physical Laboratory Certificate .. .. . extra **2 2 0**
- B. Glazed Oak or Mahogany Case to contain above .. .. . **4 4 0**
- 449.—Fortin's Standard Barometer**, as No. 447, but in elegantly finished case with lock and key **22 14 0**

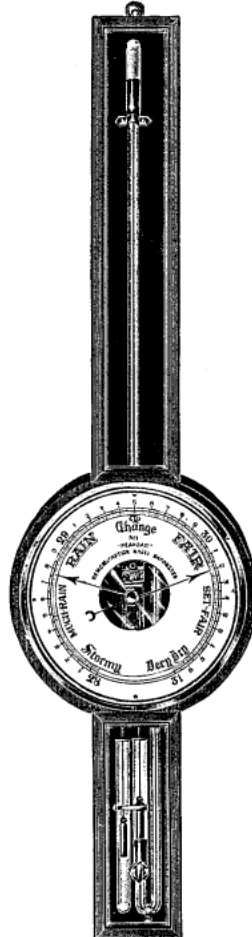
Every requisite for Chemical, Physical, and Bacteriological work supplied, from a test tube to the complete furnishing of the largest laboratory.

## BAROMETERS

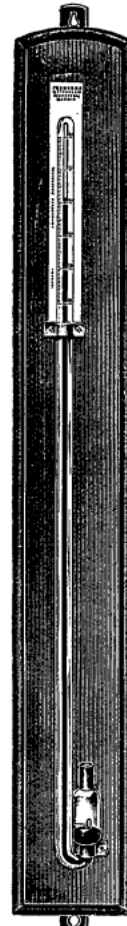
*These Instruments have been specially designed for use in science classes as, on account of their construction, the working of the tubes can be observed without dismantling the Instruments.*



450



451



452

**450.—Standard "Direct Reading" Barometer.** The scale of this Instrument is compensated to allow for the rise or fall of the mercury in the cistern, and thus gives direct readings and obviates the addition necessary in the Syphon pattern. The scale which can be either inches or millimetres is divided and etched on the glass tube, and reads to .05 inch or 1 millimetre. Mounted on polished oak or mahogany board with reflector .. .. . **£2 10 0**

**451.—Demonstration Wheel Barometer.** The 8-in. engraved and silvered metal dial is divided to  $\frac{1}{100}$ th in. from 28 to 31 inches, thus giving a very open range showing slight variations in atmospheric pressure. The spindle is hardened and polished steel and works without friction. The tube is provided with a glass stopcock so that at any time it is required to shift the position of the barometer, the mercury can be run up to the top of the tube and the tap turned, thus making it quite safe for carrying about. This Instrument is mounted in a well-made fumed and polished oak frame with strong brass bevel with domed glass and index, framed glass over top part of tube and hinged door to lower end, thus making it dust proof. Price **£3 10 0**

**452.—Standard "Syphon" Barometer.** The scales are divided and etched on the tube in millimetres, mounted on polished oak or mahogany board with reflectors .. .. . **£2 10 0**

**453.—A Thermometer** (divided and figured on the stem) can be attached to either of No. 450 or 452 Barometers at an extra charge of 5/-.

Our Balances and Weights have achieved World-wide Reputation: *vide* Opinions of the Leading Scientific Press.

## LEAD BASINS



454.—Lead Basins for Hydrofluoric Acid.

Diameter	..	..	..	..	..	..	..	..	..	5	7½	10 cm.
Price, each	..	..	..	..	..	..	..	..	..	8d.	1/-	1/6

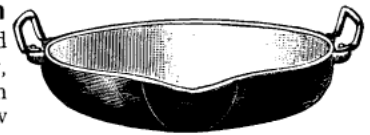
## CAST IRON BASINS



455.—Cast Iron Basins, enamelled inside, acid resisting, deep form, with spout and bow handles.

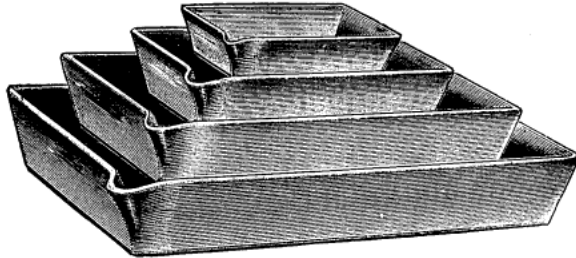
Inside diameter	6	8	10	12	15	18	22 in.
Price, each ..	3/3	4/3	6/6	9/6	18/6	28/-	39/-

456.—Cast Iron Basins, enamelled inside, acid resisting, shallow form, with spout and bow handles.



Inside diameter	6	8	10	12	15	18	22 in.
Price, each ..	3/6	4/3	6/-	9/-	17/6	26/-	39/-

## PORCELAIN BASINS

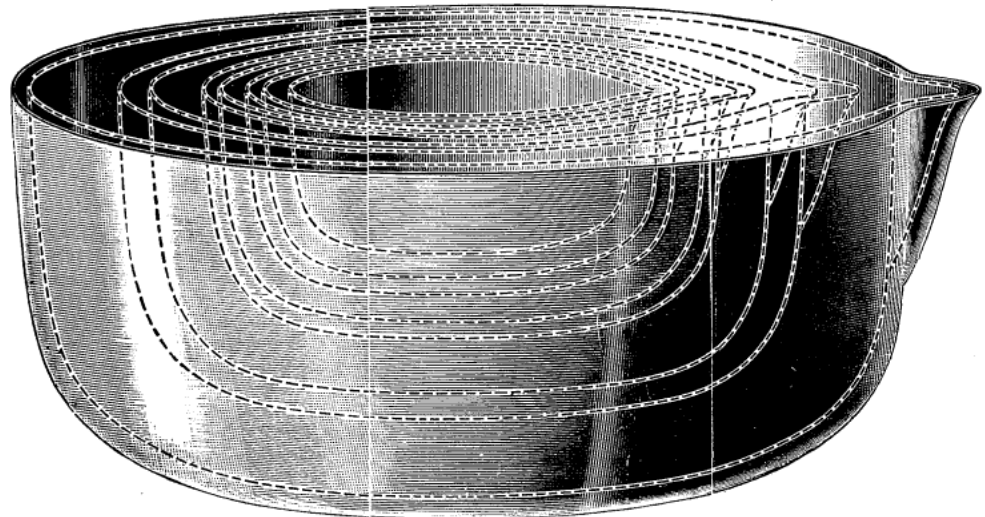


457.—Porcelain Basins, finest quality, for photographic and general laboratory use.

Inside Measurement.	Semi-Deep. Each.	Deep Each.
4½ × 3½ .. .. .	1/9	2/-
5 × 4 .. .. .	2/-	2/3
5½ × 3½ .. .. .	2/-	2/3
7 × 5 .. .. .	2/9	3/3
9 × 7 .. .. .	4/3	5/-
10 × 8 .. .. .	5/3	6/-
12 × 10 .. .. .	7/9	9/-
15 × 12 .. .. .	16/-	21/-
18 × 14 .. .. .	32/6	40/-

## PLATINUM BASINS

For  
**Glass Basins**  
 See Page 3.  
**Nickel Basins**  
 See Page 32.  
**Porcelain Basins**  
 See Pages 12, 13 and 14.



458.—Platinum Basins, highly polished, with lip. Any size made to order. Lowest prices quoted on application. When ordering please state approximate weight and capacity desired.

459.—Silver Basins. Any size made to order. Lowest prices quoted on application.

Our stock of pure Chemicals and Acids is very considerable; hence all orders are executed with the utmost despatch. See comprehensive list at end of Catalogue.

## BATTERIES

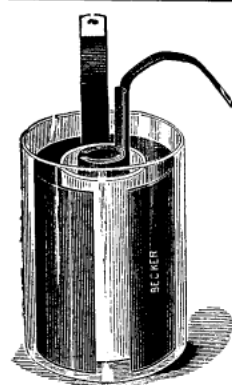
For other forms, accumulators, wire, terminals, etc., see Physical Apparatus Catalogue.



**460.—Bichromate Battery**, bottle form, with arrangement for raising and lowering the zinc.

	Each.
A. Capacity 250 c.c.	4/6
B. " 500 "	6/-
C. " 800 "	7/6
D. " 2,000 "	10/6

460



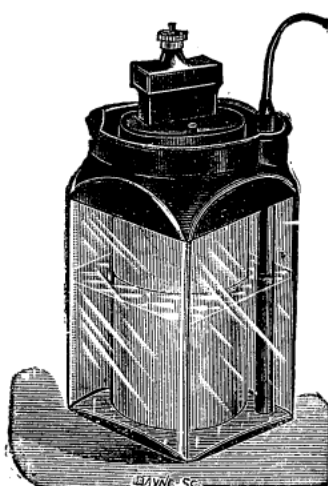
**461.—Daniell's Cells**, Colonial Government pattern. E.M.F. 1.08 volts., internal resistance 2 ohms., capacity 3 pints. Complete as figured.

5/-

**462.—Spare parts for above—**

A. Zinc .. ..	each	1/9
B. Copper .. ..	"	1/-
C. Outer Glass Jar ..	"	1/6
D. Porous Pot .. ..	"	10d.

461



**463. — Leclanché Cells**, ordinary pattern, complete with porous pot (charged), zinc rod, and outer glass vessel. Prices for best make.

A. 2-pint size ..	each	2/2
B. 3-pint " .. ..	"	3/-

463

**464.—Bunsen's Cells**, best make complete, with carbon block and terminal, zinc cylinder and terminal, porous pot and outer stoneware vessel.

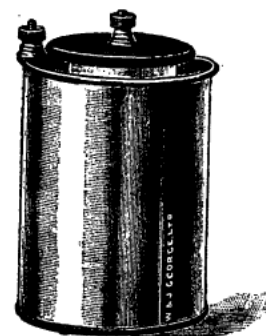
A. Pint size .. ..	each	6/-
B. Quart size .. ..	"	8/6



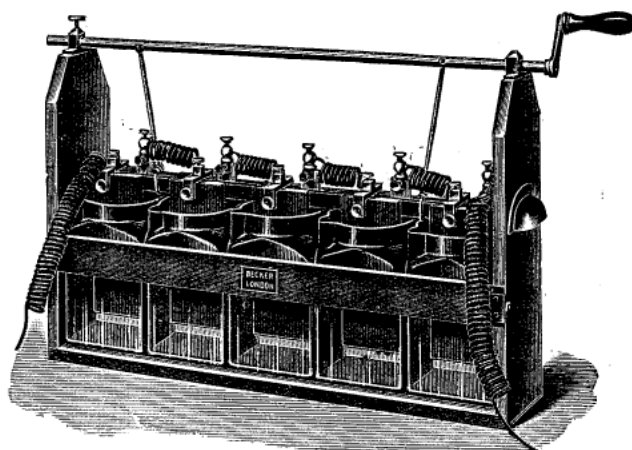
464

**465.—Daniell's Cells**, zinc rod, with mahogany cap and terminal porous pot and outer copper pot with terminal.

A. 1/2-pint size ..	each	7/-
B. 1-pint " .. ..	"	8/6
C. 2-pint " .. ..	"	11/6
D. 3-pint " .. ..	"	14/-



465



466

**466. Bichromate Battery**, Lecture Table pattern, with arrangement for lifting and lowering, 5-pint size glass cells; zinc plates, which are amalgamated ready for use, measure 6 in. x 3 in. .. £3 15 0

Every requisite for Chemical, Physical, and Bacteriological work supplied, from a test tube to the complete furnishing of the largest laboratory.

## BECKMANN'S APPARATUS (FREEZING POINT METHOD.)

467.—Beckmann's Apparatus for the determination of molecular weights. Freezing point method. The apparatus comprises :—

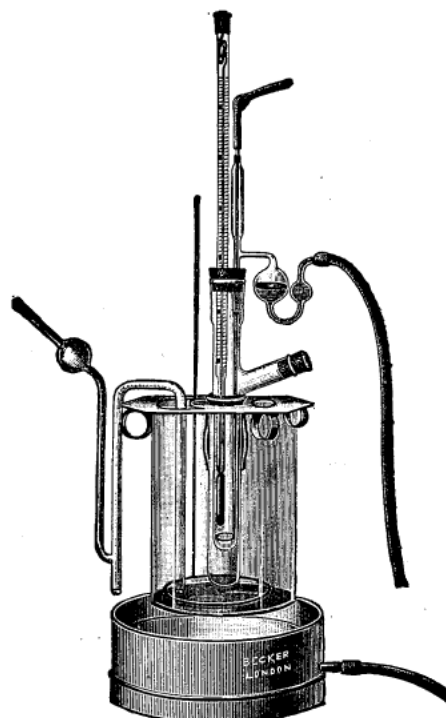
- A. Cylindrical glass cooling vessel with nickel-plated metal cover
- Zinc trough with tubulure at side
- Glass syphon
- Pure nickel wire stirrer
- Two freezing tubes with corks
- Two air jackets
- One freezing rod with cork
- Two filling pipettes
- One ordinary thermometer for taking temperature of the cylindrical cooling vessel.

Price complete £2 7 6

- B. Beckmann's Thermometer, Range 5–6° C. in  $\frac{1}{100}^{\circ}$ .

Price £1 5 0

The above apparatus is fully described in the *Magazine of Physical Chemistry*, Vol. VII, page 324.



467

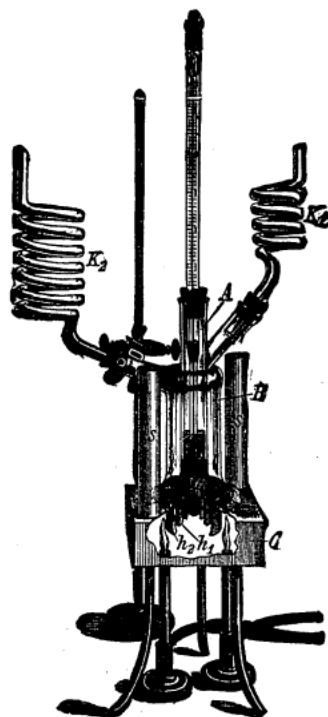
## BECKMANN'S APPARATUS (BOILING POINT METHOD.)

468.—Beckmann's Apparatus for the determination of molecular weights. Boiling point method, improved form. The apparatus comprises :—

- Boiling cylinder with platinum wire sealed through the bottom
- Glass steam jacket or
- Porcelain steam jacket
- Set of two spiral condensers
- Set of two small Liebig's condensers
- Set of two small filling tubes, beads and garnets
- Asbestos heating bath

The burners, stand and clamp are not included in following prices.

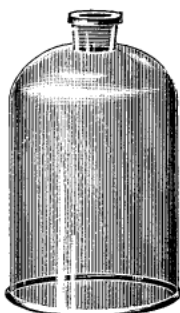
- A. Price complete, with glass steam jacket .. .. £2 7 6
- B. „ „ „ „ porcelain steam jacket .. .. 3 5 0
- C. Pastille Press, latest improved pattern .. .. 1 8 0
- D. Beckmann's Thermometer, Range 5–6° C. in  $\frac{1}{100}^{\circ}$  .. 1 5 0



468

Our Balances and Weights have achieved World-wide Reputation : *vide* Opinions of the Leading Scientific Press.

## BELL JARS



469

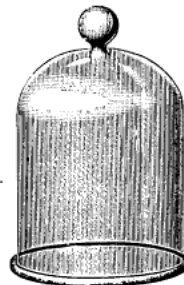
**469.—Bell Jars**, open at top, and well-ground flange at bottom for air pump work, etc.

Height ..	7	8	8	9 in.
Diameter ..	5	4	5	6 in.
Each ..	5/-	5/-	6/-	7/-

**470.—Bell Jars**, with knob and well-ground flange.

Height ..	5	6	7	8 in.
Diameter ..	5	6	7	8 in.
Each ..	3/9	5/6	7/6	8/6

Height ..	9	10	12	12 in.
Diameter ..	6½	8	6	8 in.
Each ..	8/6	9/6	9/-	12/-



470



471

**471.—Bell Jars**, stoppered with well-ground flange for air pump work, etc.

Height	6	6	8	8	9 in.
Diameter	3	4	4	6	6 in.
Each ..	3/6	3/9	5/9	8/-	8/6

Height	10	10	10	12	12 in.
Diameter	5	7	8	6	8 in.
Each ..	8/-	12/6	14/-	12/6	19/6

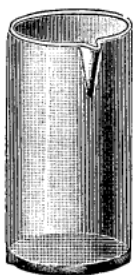
**472.—Bell Jars**, open at top, with well-ground flange and graduated into cubic centimetres.

Capacity	500	1,000	2,000 c.c.
Price ..	6/-	8/6	10/6 each.



472

## BEAKERS



473

**473.—Thick Glass Beakers**, with lip, for cold solutions, filtrates, etc.

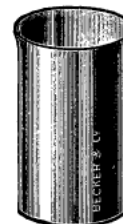
Capacity	¼	½	1	2 litres.
Each ..	1/3	1/10	2/6	3/9

Capacity ..	3	4	5 litres.
Each ..	4/6	5/6	9/-

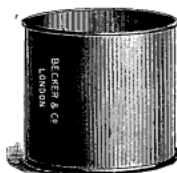
**FOR ALL OTHER GLASS BEAKERS,**  
See Pages 2 to 4.  
**PORCELAIN BEAKERS.**  
See Page 12.

**475.—Enamelled Steel Beakers.**

Capacity, approx.	8	12	18 oz.
Diameter ..	7	8	9 cm.
Each ..	1/2	1/4	1/6



475



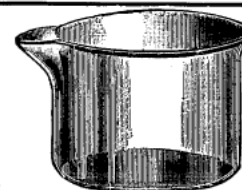
474

**474.—Zinc Beakers**, 7½ cm. × 7 cm. Sometimes used instead of glass beakers and will be found useful for specific gravity experiments, etc.

Each ..	1/-
Per doz.	10/6

**476.—Finest Quality Glass Beakers**, extra wide pattern, with lip.

4½ in. × 4½ in.	each	1/6
	per doz.	15/-

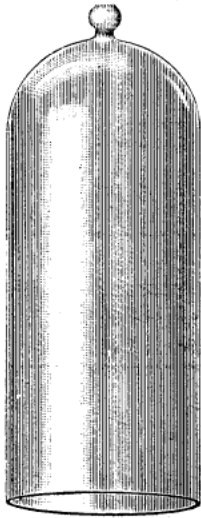


476

Our stock of pure Chemicals and Acids is very considerable; hence all orders are executed with the utmost despatch. See comprehensive list at end of Catalogue.



## BELL JARS



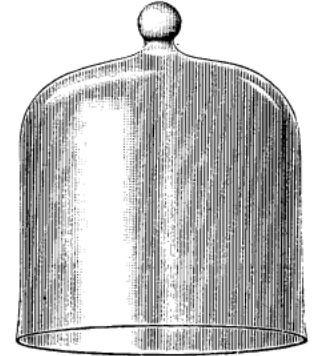
477

**477.—Bell Jars,** pale green glass, tall form, for covering instruments when not in use.

Height	6	8	10	12 in.
Diameter	4½	6	5	6 in.
Each ..	3/-	3/6	4/-	4/6
Height	14	17	20 in.	
Diameter	7	8	8 in.	
Each ..	5/6	9/-	10/6	

**478.—Bell Jars,** pale green glass, short form, for covering instruments when not in use.

Height.	Diameter.	Price, each.
5 in. ..	5 in. ..	3/-
6 " ..	6 " ..	3/6
7 " ..	7 " ..	4/-
8 " ..	8 " ..	5/6
10 " ..	10 " ..	6/9
12 " ..	12 " ..	11/-
14 " ..	14 " ..	17/6
16 " ..	16 " ..	32/-
18 " ..	18 " ..	45/-
20 " ..	20 " ..	70/-



478

**479.—Double Bell Jars,** stoppered, for use in Botanical Research, to show the action of different coloured light on growing plants.

Inside height..	..	30	40	40	35 cm.
Inside diameter	..	12	15	18	25 cm.
Price ..	..	21/6	26/6	35/6	65/- each



479

**480.—Becker's "Airtite,"** a special preparation only to be obtained from us. Price, per pot .. 1/6

N.B.—The constituents of this grease are mixed in correct proportions, so that the grease is neither too hard nor too soft. There are preparations on the market which look the same as "Airtite," but do not give satisfaction in use.

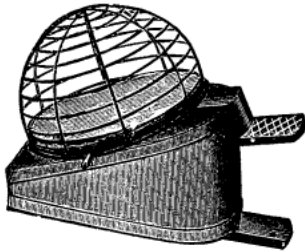


480

Every requisite for Chemical, Physical, and Bacteriological work supplied, from a test tube to the complete furnishing of the largest laboratory.

## BLOWPIPE APPARATUS

### FOOT BELLOWS.

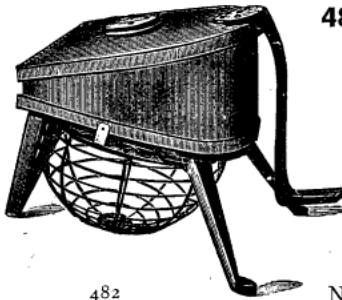


481

#### 481. — "Nivoc"

**Foot Bellows**, very strongly made, gives a steady air pressure. These bellows are fitted with the **Nivoc** Special Wire Cage, which is considered a great improvement on the old form of string net.

No. 5 size, each £2 17 6



482

#### 482. — "Nivoc"

**Foot Bellows**, very strongly made, gives a steady air pressure. These bellows are fitted with the **Nivoc** Special Wire Cage as No. 481, but the reservoir is reversed, and mounted on strong cast-iron feet, as shown in the illustration.

No. 5 size, each £3 5 0

483.—Extra Wire Cages for "Nivoc" Foot Bellows—  
each 5/6



484/5

484.—**Rubber Circles** for **Foot Bellows**, best quality, 10 in. diam. . . . . each 2/6

485.—Ditto, ditto, 12 in. diam. . . . . each 3/-

486.—**String Net**, with wire for foot bellows . . . . . each 2/- and 2/6

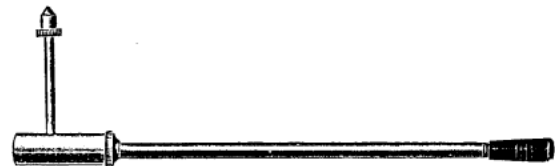
### BLOWPIPES.



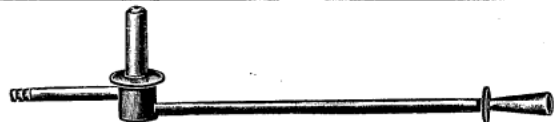
489.—**Black's Blowpipes**, ordinary pattern, japanned tin. Each 7d; per doz. 6/3



490.—**Blowpipes**, plain brass, with tinned mouthpiece. Each 9d.; per doz. 7/6; per gross 89/-

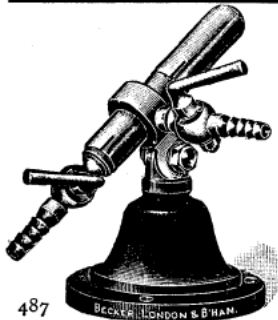


491.—**Blowpipe**, improved pattern, best finish, polished straight brass tube, with ebonite mouthpiece. Each 1/8; per doz. 18/-



492.—**Improved Form of Mouth Blowpipe** (Bucknell's Patent).

No Bunsen Burner required. Mouthpiece and Flame cannot come in contact with the bench, thus safe from an hygienic point of view, and from fire . . . . . each 4/6

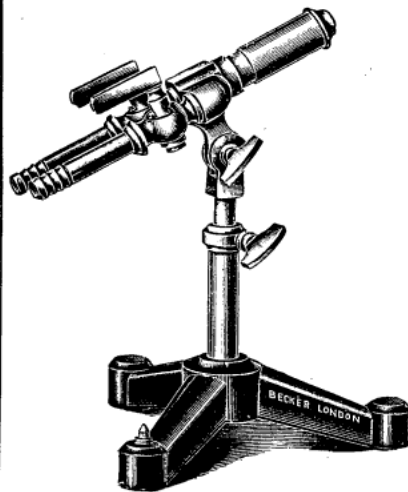


487

#### 487.—New Pattern Blowpipe,

as used by the experts in the glass-blowing industry. Of very solid construction and specially designed for intensity of flame. Size of jet can be modified by the insertion of different sizes of glass tubing in the jet tube. Easily dismantled for cleaning.

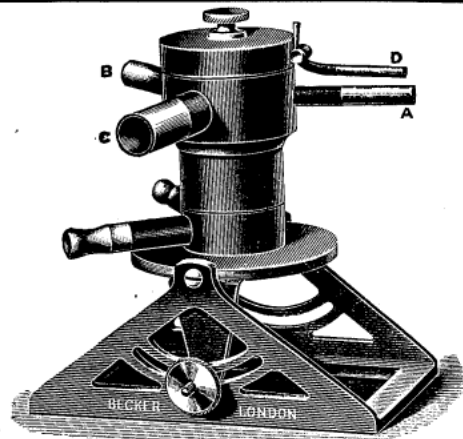
each 14/6



488

488.—**Blowpipe**, with two Stopcocks, for air and gas supply respectively.

Price, complete with three jets, small, medium and large 14/6



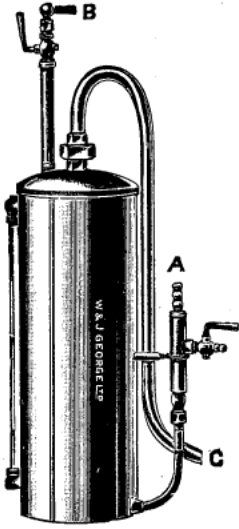
493.—**Patent "Rapid Change" Blowpipe**, gives perfect flames for all purposes.

each £2 10 0

Letters *A*, *B* and *C* represent the small, medium, and large jets, any of which can be turned round as far as *D*. *D* gives a very small flame, which serves to light the jets as they are brought immediately under.

As will be seen by the illustration, the blowpipe can be tilted to any desired angle.

## LABORATORY BLOWER



**494. — New Laboratory Blower.** Most of the blowers on the market at the present time have been found wanting in several respects. As a rule they are not easy to use, and rarely give good results. After working for a short time they get clogged, and their construction is such, that it is a most difficult matter to take them to pieces for cleaning purposes and then to re-set them accurately. Blowers of Continental make have been tried with similar results.

The blower, illustrated, consists of a strong brass tank, at the side of which the pump is fitted, and the latter must be connected with water supply at *A*. The air supply pipe is at *B*, and care must be taken when starting to keep this tap closed until water flows freely from syphon tube *C*. There is a stop valve arrangement to prevent water under any circumstances from rising to the blowpipe.

Price.  
 A. Size 24 in. × 6½ in., to serve 2 blowpipes **£2 12 6**  
 B. Size 32 in. × 7½ in., " 3 " **3 7 6**



**495. — Set of Glass Blower's Tools,** consisting of iron cone in wooden handle, iron rod in wooden handle, flat iron plate and tongs .. per set **4/-**

**496. — Ditto,** better quality, with more tools, in wooden box, with lid .. .. . **15/-**



**497. — Fletcher's Foot Bellows,** giving a steady air pressure of about 1¼ lb. per square in. No. 3 is best suited for ordinary blowpipe work, No. 5 for furnaces and large blowpipes.

Size No. 3 each **£3 0 0**

**498. — Ditto,** not on feet: each **£2 13 6**

**499. — Size No. 5,** on feet .. .. . **£3 7 6**

**500. — Ditto,** not on feet .. .. . **£3 0 0**

(For "Nivoc" Foot Bellows see previous page.)

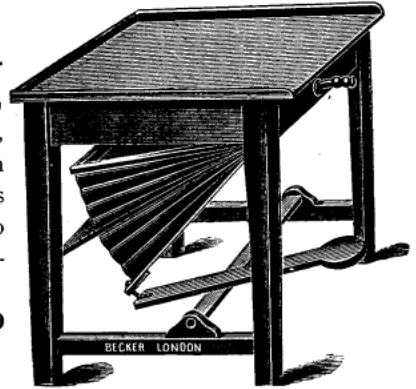


**501. — Anvils,** steel, with polished face, 1½ in. × ½ in. × ½ in. each **1/6**

**502. — Ditto,** 4 in. × 4 in. × 1 in. .. .. . **8/6**

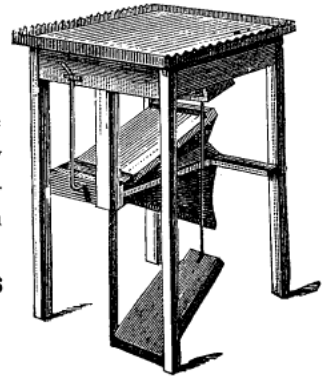
## BLOWPIPE TABLES

**503. — Blowpipe Table,** strongly made, lead covered, with double bellows, as supplied by us to the Board of Education.



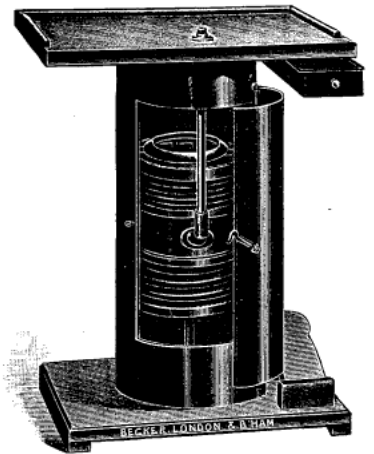
**£6 10 0**

**504. — Blowpipe Table,** with single bellows, as supplied by us to the Imperial College of Science, South Kensington.



**£5 17 6**

**505. Blowpipe Table, Improved Form, with Double Action Bellows.** This blowpipe table is very efficient, and is used by most professional glass blowers. The air pressure is easily regulated by placing weights in the receptacle at the top of the bellows.



each **£7 15 0**

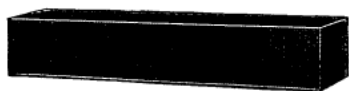
**506. — Rectangular Fire-clay Trays,** very useful for blowpipe work.



per doz. **3/6**

Our stock of pure Chemicals and Acids is very considerable; hence all orders are executed with the utmost despatch. See comprehensive list at end of Catalogue.

## BLOWPIPE APPARATUS



- 507.**—Compressed Charcoal Blocks,  
 2 in. × 1 in. × 1 in. .. .. each 4d.; doz. 3/-  
**508.**—Ditto, 3 in. × 1 in. × 1 in. .. 4d.; .. 3/9  
**509.**—Ditto, 6 in. × 1 in. × 1 in. .. 6d.; .. 5/9

**510.**—Compressed Charcoal Pastilles.



Per dozen .. .. 9d.  
 Per gross .. .. 8/6

- 511.**—Charcoal Pastille Holders, to take pastilles No. 510.  
 Each 9d. Per doz. 8/6



- 512.**—Platinum Wire Holders .. .. 1/6  
 per doz. 17/-

- 513.**—Platinum Blowpipe Foil, 2 × 1 in.  
 Price varies, each 8/6

- 514.**—Platinum Blowpipe Wire.  
 Price varies, per foot 8/6



**515** — Newth's Potassioscope.

This apparatus, which is fully described in Newth's "Manual of Chemical Analysis," 1909 Edition, page 22, consists of a small flat glass cell filled with a solution of one of the aniline blue dyes. Its utility lies in the fact that Potassium (with the exception of the extremely rare element Rubidium), when viewed through the Potassioscope, is the only metal giving a flame which appears red, whereas, when using blue or indigo glass, Lithium, Barium, Strontium and Calcium *all* appear red. Each 2/-; per dozen 23/-



- 516.**—Becker's Natural Willow Charcoal Blocks. Specially prepared for blowpipe work.  
 Size, about 6 in. × 1 in. × 1 in. .. .. per doz. 6/-



- 517.**—Charcoal Borers, for holes  $\frac{3}{8}$  in. dia. 3/-



- 518.**—Charcoal Saw in wooden handle.  
 Each .. 1/- Per doz. .. 11/-

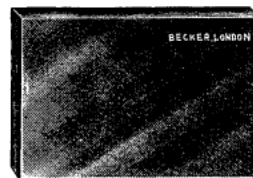


- 519.**—Platinum Foil Holders .. each 1/6  
 per doz. 17/-



- 520.**—Platinum Spoons. Lowest market price quoted on application.

- 521.**—Indigo Prism, best quality white glass with polished faces, for examination of the colours of the blowpipe flame.  
 Each .. .. 4/6

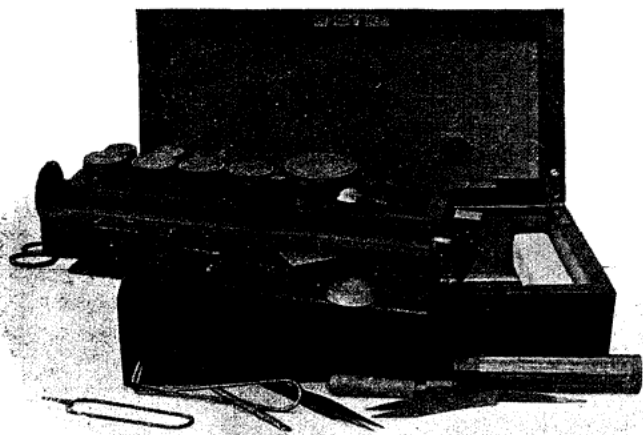


- 522.**—Cobalt Glasses.  
 each 2d.



Every requisite for Chemical, Physical, and Bacteriological work supplied, from a test tube to the complete furnishing of the largest laboratory.

## BLOWPIPE APPARATUS



**523.—Letcher's Elementary Students' Set**, in deal case, containing : Blowpipe, hammer, anvil, spirit lamp, grease lamp, scissors, lamp tweezers, brass tweezers, magnet, pastilles and pastille holder, cupel striker, platinum wire, boiling dish, open tubes, closed tubes, and glass rod.

REAGENTS.—Test papers—Litmus, turmeric and Brazil wood ; carbonate of soda, microcosmic salt, borax, bisulphate of potash, fluor spar, assay lead, bone ash, nitrate of cobalt, and tinfoil.

£1 1 0

**524.—Prize Set**, in stained deal case, containing : Blowpipe, spirit lamp, grease lamp, hammer, anvil, pestle and guard, platinum forceps, brass forceps, lamp tweezers, test-tube holder, chisel, magnet, file, scissors, cupel striker, bone spatula, platinum wire and foil, pastille and cupel holder, pastilles, boiling dish, open tubes, closed tubes, glass rod and blue glass.

REAGENTS.—Test papers—Litmus, turmeric, Brazil wood and soda ; carbonate of soda, microcosmic salt, borax, bone ash, fluor spar, assay lead, nitrate of cobalt, bisulphate of potash, oxide of copper, chloride of silver, potassic iodide and sulphur, tinfoil and magnesium ribbon. . . . . £2 2 6

**525.—Superior Set**, in polished mahogany case, with initial plate, containing in addition to No. 524 :  
 Platinum nozzle to blowpipe, agate mortar and pestle, and gold bead . . . . . 3 7 6

**526.—Best Set**, contents same as No. 525, in polished mahogany case, with the addition of a drawer containing 48 selected test minerals in tubes . . . . . 4 7 6

*These minerals afford good examples for practice to both elementary and advanced students.*

## DROP BOTTLES



**527. — Drop Bottle**, patent stopper and two grooves in stopper.

Capacity.	Each.	Doz.
30 c.c. . .	7d.	5/6
60 „ . .	7d.	6/6
100 „ . .	10d.	8/6



**528. — Drop Bottle**, with pipette stopper and india-rubber teat.

Capacity.	Each.	Doz.
15 c.c. . .	1/-	10/6
30 „ . .	1/2	12/6
60 „ . .	1/4	14/3



**531.—Sets of Dropping Bottles in Wooden Stand**, fitted either with pipettes or rods complete.

	Set of 6	8	12
Fitted with bulb pipettes . . each	8/6	10/-	12/-
Fitted with rods „	7/-	8/-	10/-



**529.—Drop Bottle**, with pipette stopper and caoutchouc top.

Capacity.	Each.	Doz.
15 c.c. . .	7d.	6/-
30 „ . .	8d.	7/-
60 „ . .	9d.	8/-



**530. — Dropping Pipettes** with rubber teat . . each 4d.

Our Balances and Weights have achieved World-wide Reputation : *vide* Opinions of the Leading Scientific Press.

## BOTTLES

### 532. — Schuster's Drop Bottle.

- A. Plain each 11d.  
B. Ditto, stoppered each 1/5



### 533.—Drop Bottle, for Canada Balsam, with loose glass rod.

Capacity.	Each.
1 oz. ..	10d.
2 " ..	1/-
3 " ..	1/3
5 " ..	2/-
6 " ..	2/3
8 " ..	2/9



### 536. — Pressure Bottles, stout glass— each 2/-



### 534.—Ether Bottles, best crystal glass, stoppered and with glass cap, well ground on.

Capacity.	Price each.	Price per doz.
1 oz. ..	3/-	35/-
2 " ..	3/3	38/-
4 " ..	3/9	44/-
6 " ..	4/6	53/-
8 " ..	5/-	59/-
16 " ..	6/6	77/-
20 " ..	7/6	88/-
40 " ..	9/-	105/-



### 535.—Oil Bottles, with tube stopper, ground on cap and trap for collecting drops of oil and returning same to bottle.

Capacity	10	20	30	40 oz.
Price, each	6/6	8/6	10/-	12/-



### 537. Pressure Bottles, with removable brass clamp. each 5/-

**STONEWARE JARS FOR STORING CHEMICALS, ETC., SEE INDEX.**

**FOR WOLFF'S BOTTLES, SEE INDEX.**



A

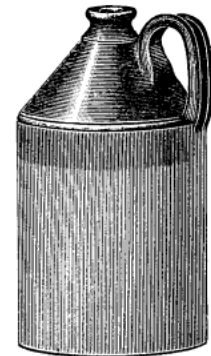
### 538. — Amber Coloured Bottles, best quality with flat head stoppers thoroughly ground into necks.



B

		1		2		4		6		8 oz.	
A. Narrow mouth—		1		2		4		6		8 oz.	
Capacity	.. .. .	..	..	..	..	..	..	..	..	..	..
Price, per doz...	.. .. .	5/6	6/-	7/6	7/9	8/9	8/9	8/9	8/9	8/9	8/9
		10		12		16		20 oz.		20 oz.	
Capacity	.. .. .	..	..	..	..	..	..	..	..	..	..
Price, per doz...	.. .. .	11/-	12/-	14/6	15/6	15/6	15/6	15/6	15/6	15/6	15/6
B. Wide mouth—		1		2		4		6		8 oz.	
Capacity	.. .. .	..	..	..	..	..	..	..	..	..	..
Price, per doz...	.. .. .	6/-	6/6	8/6	9/-	9/6	9/6	9/6	9/6	9/6	9/6
		10		12		16		20 oz.		20 oz.	
Capacity	.. .. .	..	..	..	..	..	..	..	..	..	..
Price, per doz...	.. .. .	12/-	13/-	15/6	17/-	17/-	17/-	17/-	17/-	17/-	17/-

(For other reagent bottles see next page.)



### 539.—Stoneware Bottles, plain.

Capacity.	Price each.
A. 1/2 gall. ..	2/-
B. 1 " ..	3/-
C. 2 " ..	6/-
D. 4 " ..	12/-
E. 6 " ..	18/-

Our stock of pure Chemicals and Acids is very considerable ; hence all orders are executed with the utmost despatch. See comprehensive list at end of Catalogue.

## BOTTLES



540

### 540.—Bottles, narrow mouthed, flat stoppered.

Best quality white glass, free from lead, for reagents, etc.

Capacity	2	4	6	8 oz.
Per doz.	5/-	6/6	7/-	8/-
Per gross	55/-	70/-	78/-	92/-

Capacity	10	12	16	20	32 oz.
Per doz.	10/-	10/6	13/-	14/-	20/-
Per gross	110/-	120/-	130/-	160/-	215/-



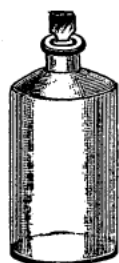
541

### 541.—Bottles, wide mouthed, flat stoppered.

Best quality white glass, free from lead, for dry salts, etc.

Capacity	2	4	6	8 oz.
Per doz.	5/6	7/-	8/-	9/-
Per gross	62/-	80/-	90/-	102/-

Capacity	10	12	16	20	32 oz.
Per doz.	11/-	12/6	14/6	17/-	21/6
Per gross	128/-	140/-	155/-	196/-	234/-



542

### 542.—Bottles, narrow mouthed, upright stoppers. White glass.

Capacity ..	1	2	4 oz.
Per doz. ..	4/6	5/6	6/6
Per gross ..	52/-	60/-	75/-

Capacity ..	6	8	10 oz.
Per doz. ..	7/6	9/-	10/-
Per gross ..	85/-	102/-	112/-

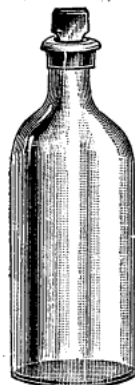


543

### 543.—Bottles, wide mouthed, upright stoppers. White glass.

Capacity ..	1	2	4 oz.
Per doz. ..	5/6	6/-	7/6
Per gross ..	64/-	70/-	85/-

Capacity ..	6	8	10 oz.
Per doz. ..	8/6	10/6	11/6
Per gross ..	98/-	118/-	126/-

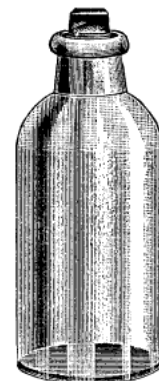


544

### 544.—Bottles, narrow mouthed. Pale green glass, well stoppered.

Capacity ..	5	10	16	20 oz.
Each ..	7d.	8d.	11d.	1/1
Per doz. ..	6/-	7/-	9/-	10/9

Capacity ..	32	40	80 oz.
Each ..	1/3	1/6	1/9
Per doz. ..	14/-	17/-	19/6



545

### 545.—Bottles, wide mouthed. Pale green glass, well stoppered.

Capacity ..	5	10	16	20 oz.
Each ..	8d.	9d.	1/-	1/3
Per doz. ..	7/-	8/-	10/6	13/-

Capacity ..	32	40	80 oz.
Each ..	1/6	1/8	2/-
Per doz. ..	17/-	19/-	23/-

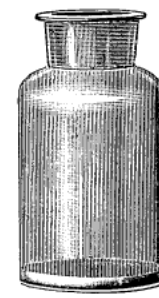


546

### 546.—Bottles, narrow mouthed, unstoppered. White glass.

Capacity	2	4	6 oz.
Per doz.	3/3	3/9	4/3

Capacity	8	10	12	16 oz.
Per doz.	5/-	6/6	6/9	8/6



547

### 547.—Bottles, wide mouthed, unstoppered. White glass.

Capacity	2	4	6	8 oz.
Per doz.	3/6	4/-	4/6	6/-

Capacity	10	12	16	20	32 oz.
Per doz.	7/-	7/6	9/-	9/6	14/-

Every requisite for Chemical, Physical, and Bacteriological work supplied, from a test tube to the complete furnishing of the largest laboratory.



## BOTTLES WITH PERMANENT LABELS

We particularly desire to draw attention to our special system of labelling and numbering of Bottles, and we invite correspondence on the subject.

It will interest clients to know that we have recently supplied a well-known College with a large number of Bottles labelled and numbered in such a manner that on taking up any Bottle it was possible to know not only the Laboratory and Bench to which it belonged, but also its exact position on the Bench, and this notwithstanding the fact that there were between 3,000 and 4,000 Bottles ordered for use in four separate Laboratories. Also, something like 4,000 Bottles with enamel labels have been supplied by us to the Board of Education for use in the Imperial College of Science and Technology, South Kensington.

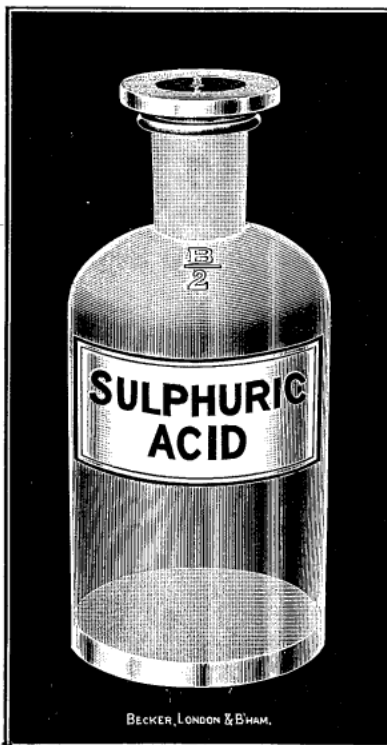
As the "burning-in" process takes several days, we cannot guarantee delivery of a large quantity under about 6 weeks. Special prices quoted for the above numbering system.



542

**542.—Enamel 542 Labelled Reagent Bottles.** Hard white enamel letters and border line. **Narrow** mouthed, flat stoppered.

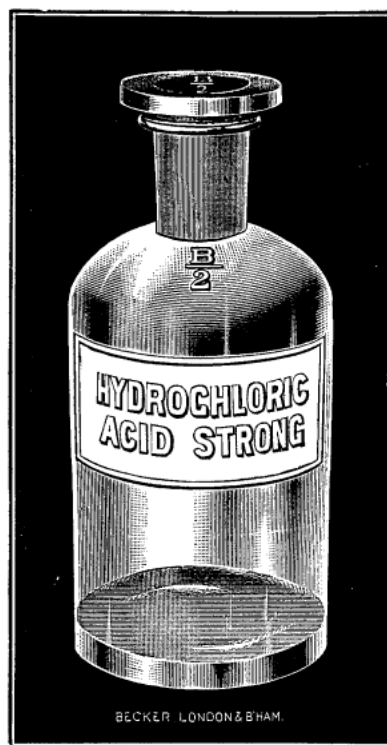
Capacity ..	2	4	6	8 oz.
Per doz. ..	20/-	21/6	22/6	23/-
Capacity ..	10	12	16	20 oz.
Per doz. ..	25/-	26/-	28/-	32/6



544

**544.—Enamel 544 Labelled Reagent Bottles.** Hard white opaque enamel shield with black lettering. **Narrow** mouthed, flat stoppered.

Capacity ..	2	4	6	8 oz.
Per doz. ..	22/-	24/-	25/-	26/-
Capacity ..	10	12	16	20 oz.
Per doz. ..	28/-	29/-	30/-	36/-



546

**546.—Enamel 546 Labelled Reagent Bottles.** Hard white opaque enamel shield, in which the letters are cut out and left transparent. **Narrow** mouthed, flat stoppered.

Capacity ..	2	4	6	8 oz.
Per doz. ..	20/-	21/6	22/6	23/-
Capacity ..	10	12	16	20 oz.
Per doz. ..	25/-	26/-	28/-	32/6

**543—Ditto, as 542 but wide mouthed, flat stoppered.**

Capacity ..	2	4	6	8 oz.
Per doz. ..	21/-	23/-	24/-	25/-
Capacity ..	10	12	16	20 oz.
Per doz. ..	26/-	27/6	30/-	36/-

**545—Ditto, as 544 but wide mouthed, flat stoppered.**

Capacity ..	2	4	6	8 oz.
Per doz. ..	24/-	25/-	27/-	28/-
Capacity ..	10	12	16	20 oz.
Per doz. ..	29/-	31/-	33/-	40/-

**547—Ditto as 546 but wide mouthed, flat stoppered.**

Capacity ..	2	4	6	8 oz.
Per doz. ..	21/-	23/-	24/-	25/-
Capacity ..	10	12	16	20 oz.
Per doz. ..	26/-	27/6	30/-	36/-

Our Balances and Weights have achieved World-wide Reputation: *vide* Opinions of the Leading Scientific Press.

## BOTTLES WITH PERMANENT SANDBLAST LABELS

**548.—Rough Sandblast Labelled Reagent Bottles.** Rough sandblast shield, with clear, transparent letters. **Narrow** mouthed, flat stoppered.



548

Capacity ..	2	4	6	8 oz.
Per doz. ..	12/-	13/6	14/-	15/-
Capacity ..	10	12	16	20 oz.
Per doz. ..	17/-	17/6	20/-	22/-

**549.—Ditto, wide mouthed, flat stoppered.**

Capacity ..	2	4	6	8 oz.
Per doz. ..	12/6	14/-	15/-	16/-
Capacity ..	10	12	16	20 oz.
Per doz. ..	18/-	19/6	21/6	25/-

**550.—Sandblast Labelled Reagent Bottles,** with letters and border line filled in with *white, blue, or red* enamel. When ordering please state which colour is required. **Narrow** mouthed, flat stoppered.

Capacity ..	2	4	6	8 oz.
Per doz. ..	15/6	16/6	17/6	18/6
Capacity ..	10	12	16	20 oz.
Per doz. ..	21/-	22/-	24/-	25/6



550

**551.—Ditto, wide mouth, flat stoppered.**

Capacity ..	2	4	6	8 oz.
Per doz. ..	15/6	17/6	18/6	19/6
Capacity ..	10	12	16	20 oz.
Per doz. ..	21/6	23/-	25/-	37/6

## BOTTLES (VARIOUS)

*For Specimen Jars, see Index.*



**552.—Gutta Percha Bottles,** for Hydrofluoric Acid.

Capacity	1	2	4	8	12	16	32 oz.
Price, each	1/6	2/-	2/9	3/9	4/6	5/6	9/-

**554.—Bottles, with extra wide neck,** flat stoppers, very useful for storing microscope slides, cover glasses, etc.



Capacity.	Height.	Inside dia. of Neck.	Price per doz.
60 c.c.	72 mm.	38 mm.	10/6
125 "	85 "	44 "	12/6
175 "	95 "	50 "	15/-
250 "	100 "	57 "	17/6
500 "	135 "	70 "	25/-
1000 "	150 "	100 "	36/-

**553.—Bottles, Clear Glass,** wide mouth, short form, complete with boxwood top corks.

Capacity.	Price, each.	Price, per doz.
1 oz.	7d.	6/6
2 "	8d.	7/-
3 "	10d.	8/3
4 "	10d.	8/9
6 "	1/-	10/6
8 "	1/1	11/6



**555.—Bottles, Clear Glass,** best quality, for samples of oils, etc.

Capacity.	Price, per doz.	Price, per gross.
2 oz.	3/-	34/-
4 "	4/6	49/-
6 "	5/-	55/-
8 "	5/6	60/-
16 "	8/-	90/-



**556.—Detonating Bottles,** stoppered, strong glass for exploding mixed gases.



Each ..	..	..	..	4/-
Per dozen ..	..	..	..	46/-

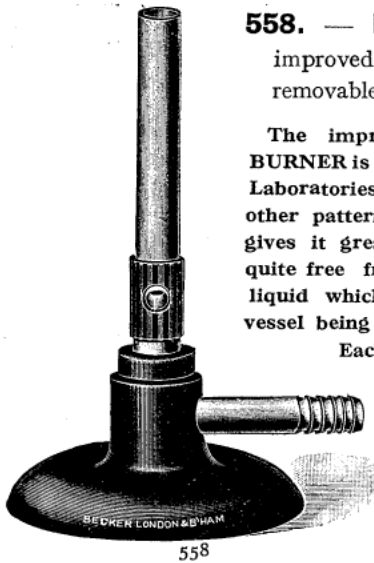
**557.—Specimen Tubes,** white glass, flat bottomed.

Height..	1 1/2	2	3	3	3	3	4 in.
Diameter	3/8	1/2	1/2	3/8	3/4	1	1 1/2 in.
Per gross with corks	6/-	6/9	8/-	10/-	14/6	22/-	8/6
Height..	4	4	5	5	6	6	6 in.
Diameter	3/8	1/2	3/8	3/4	3/8	3/4	1 in.
Per gross with corks	11/6	16/6	13/6	18/6	15/-	21/6	32/-



Our stock of pure Chemicals and Acids is very considerable ; hence all orders are executed with the utmost despatch. See comprehensive list at end of Catalogue.

## BUNSEN BURNERS, Etc.



**558.** — Nivoc Bunsen Burner, improved pattern, very strongly made, removable solid jet, gas and air regulation.

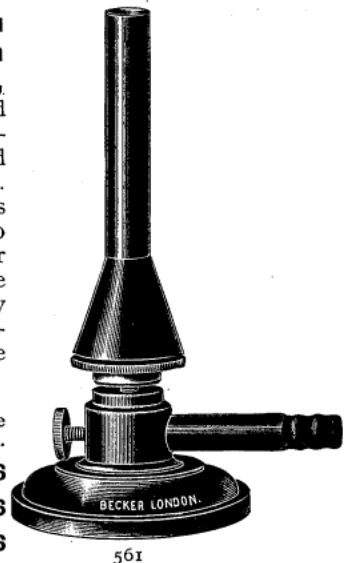
The improved pattern NIVOC BUNSEN BURNER is being generally adopted in Science Laboratories as it has many advantages over other patterns. The dome-shaped heavy base gives it greater stability, and as the base is quite free from interstices it cannot retain liquid which occasionally boils over from the vessel being heated.

Each, 1/6 ; per dozen, 15/6

**559.**—Ditto, size larger, diameter of tube,  $\frac{5}{8}$  in. .. each 2/8  
 per doz. 30/-

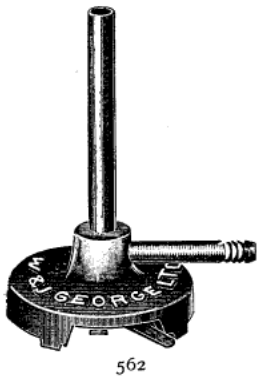
**560.**—Ditto, diameter of tube  $\frac{3}{4}$  in. .. .. each 4/3  
 per doz. 48/-

**561.**—Teclu Bunsen Burners, with cone and disc for regulating the air and gas supplies. These burners give 50 to 60 per cent. higher temperature than ordinary Bunsen burners of the same size.



Diameter Price of Tube. each.

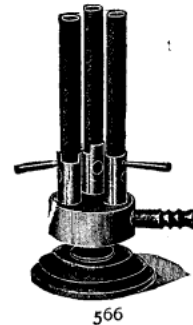
- A.  $\frac{1}{2}$  in. 4/6
- B.  $\frac{5}{8}$  „ 5/6
- C.  $\frac{3}{4}$  „ 7/6



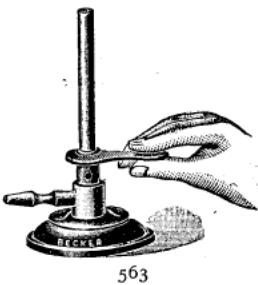
**562.**—Dr. Marshall's Patent Bunsen Burner. In this form of burner the interior gas jet is dispensed with; the gas passing through a fine hole placed in the side tube—hence the burner cannot get choked.

Price of burner with air regulator .. each 1/9

**566.**—Compound Bunsen Burners, with lever handles to air regulators.



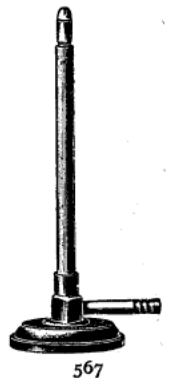
With 2 3 4 tubes.  
 Price .. 4/- 5/- 6/- each.



**563.**—Bunsen Burner with simultaneous Gas and Air regulation. The construction of this burner is such that the gas and air are always admitted in the correct proportion, and it is impossible for it to light back even when the smallest flame is being used .. .. each 4/-

**567.** — Gas Burner with Batswing Jet for lighting or glass bending.

8 in. .. 1/9  
 12 „ .. 2/-



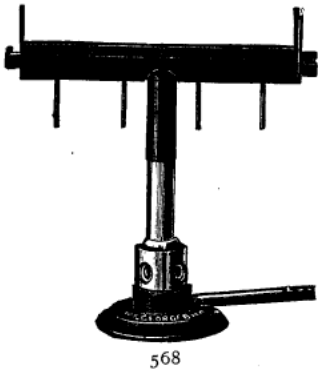
**564.** — Argand Burner with Stopcock, as supplied by us to the Principal Chemist of the Government Laboratory. each 16/6



**565.**—Small Bunsen Burner, with star support and copper chimney, for use with Government Standard Arsenic Apparatus. each 5/-

Every requisite for Chemical, Physical, and Bacteriological work supplied, from a test tube to the complete furnishing of the largest laboratory.

## BUNSEN BURNER FURNACES



**568.** — Professor Ramsay's Gas Furnace, as used in the University College, London, made to fit on a Bunsen burner  $\frac{3}{4}$  in. .. each **14/6**

**569.**—Ditto, complete, with  $\frac{3}{4}$  in. burner as figured .. each **18/6**

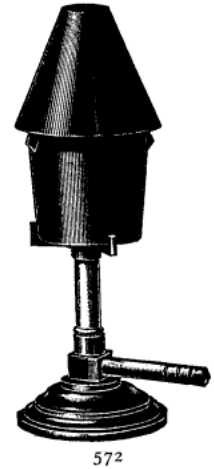


**570.**—Student's Furnace, gives a very hot flame; very useful for heating small hard glass tubes.

Price complete with burner and tube holder. each **3/6**

**571.**—Tube Holder only, to fit ordinary Bunsen burner. each **2/6**

**572.**—Nivoc "Dwarf Pattern" Furnace, gives three times the heat of an ordinary Bunsen burner, although the quantity of gas consumed is exactly the same. Marble can be reduced to quicklime in ten minutes.



No. .. .. 1 2  
Price .. .. 5/- 7/6 each.

**573.**—Curved Attachment, with foot, for fitting on burner No. 570 so that it can be laid down lengthways, as is necessary at times where space is limited .. each **2/3**

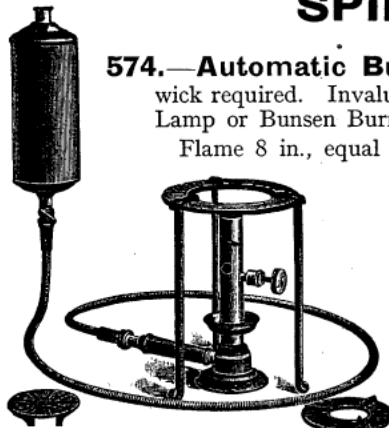


## SPIRIT BUNSEN BURNERS

(See also next page.)

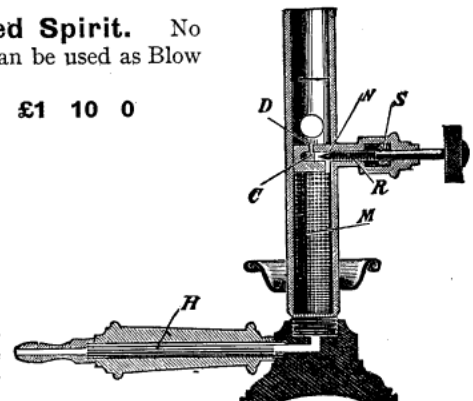
**574.**—Automatic Bunsen Burner for Methylated Spirit. No wick required. Invaluable where gas cannot be obtained. Can be used as Blow Lamp or Bunsen Burner.

Flame 8 in., equal to 2 Bunsen Burners .. .. each **£1 10 0**



**Instructions.**—Join one end of the flexible metallic tubing to the container, and the other end to the Bunsen burner. Fill the container with methylated spirit, about  $1\frac{1}{2}$  pints, and hang it 3 ft. above the bench or table (not higher).

To LIGHT UP the Bunsen burner, first open the tap underneath the container, give the methylated spirit time to fill the flexible tube, then screw the regulating valve R of the burner half a turn to the left, and let some spirit overflow into the saucer, till same is about one-third filled. Then close the regu-



lating valve and set light to the spirit in the saucer; this having burnt out, open the valve half a turn only, and set light to the spirit vapour escaping at the mouth of the burner.

When the spirit in the saucer has been lit, any spirit remaining in the parts of the burner this side of the valve will give a large flare, which will quickly disappear. When the burner is first lit up the flame will not at once burn quite steadily, but it will be perfect after a while. Such unsteadiness must not be mistaken for the irregular yellowish flame which appears if the burner has not been sufficiently warmed up; in the latter case, turn the flame down a little till the burner is sufficiently heated and vapour forms steadily.

**REGULATION.**—By the screw regulating valve the flame can be regulated large or small, but the flame should never be smaller than  $1\frac{1}{2}$  in. To extinguish the burner, close the valve C.

After continued use renew the wire gauze, which should always rest on the four spikes inside the tube. For a stronger flame take a wider mesh gauze.

**CLEANING THE BUNSEN BURNER.**—Deposit from the methylated spirit will, in the course of time (500 to 1000 hours' use), clog the passage in the handle H and the body M, also occasionally the nozzle of the burner D and the valve C. The flame will then burn one-sided or irregularly and too short. Use the pricker, which accompanies each burner, for pricking out the nozzle; but never use other instruments, such as pins, needles, etc., for if the hole in nozzle is enlarged the burner cannot act properly. It will be necessary occasionally to unscrew the burner, to clean the valve C and to take out, clean and replace the wire in passages H and M, as these wires serve to collect the impurities contained in the methylated spirit. When cleaning it is necessary to take care that none of the wires are lost, and that the whole number of the wires is replaced in their original position, the thick piece of wire in the centre. The asbestos packing S of the valve must be renewed when worn. All parts must be screwed up vapour-tight, so that vapour cannot escape except at the nozzle of the burner.

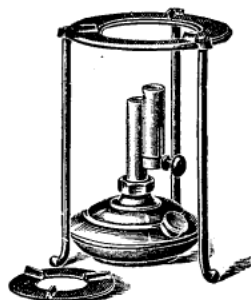
*N.B.*—As the flame of the Bunsen burner is of considerably greater heat than gas Bunsen burners, it is necessary, when heating vessels over wire gauze, to use none but IRON wire gauze; brass will melt.

Our Balances and Weights have achieved World-wide Reputation: vide Opinions of the Leading Scientific Press.

H

## SPIRIT BUNSEN BURNER

(See also previous page.)



575

**575.—Automatic Bunsen Burner, for Methylated Spirit,** can be used as a Blow-Lamp or Bunsen Burner. This is a simple and efficient spirit lamp and Bunsen burner, giving a perfectly steady blue flame of about 6 to 7 inches in height.

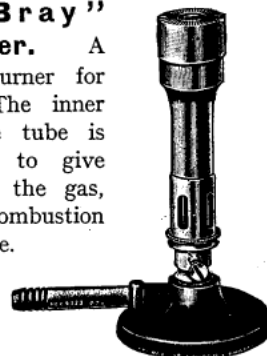
A. Bunsen Burner only .. .. 15/-  
B. Ditto, complete with Tripod, Ring, Lighting Clip, spare Wick and Gauzes .. .. 19/6

**Instructions.**—Charge container, not quite full. Screw down cap tightly. The lamp is started by means of the asbestos lighting-clip, which is saturated with methylated spirit, then lit, and held round the wick tube. In about half a minute vapours issue from the nozzle in the blow-pipe, and are ignited. By raising or lowering knob of the slide the flame can be regulated. The wick only requires renewal at long intervals, provided that the spirit used is pure and the wick not allowed to burn dry and thereby become charred. A charge at full flame will burn for about two hours.

## HIGH TEMPERATURE BURNERS

### 576. — The "Bray" Bunsen Burner.

A very high-power Burner for Laboratory use. The inner construction of the tube is specially arranged to give adequate mixing of the gas, ensuring perfect combustion and a very hot flame.

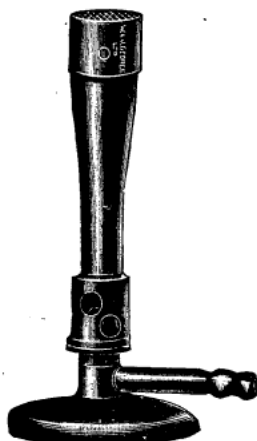


576

Each 4/6

Per doz. 50/-

## MECKER HIGH TEMPERATURE BURNERS



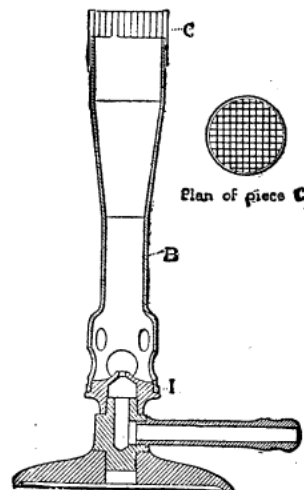
577

Used exactly in the same way as the ordinary simple Laboratory Bunsen, that is without any forced air draught. As shown in figure 1 it consists of a tubulure leading the gas to:—

- 1—The injector pierced with an outlet hole.
- B—A chimney pierced with holes in its lower part where it is screwed on to injector 1, and having at the top
- C—A kind of deep lattice work which is characteristic of the Mecker Burner.

The base of the Burner and the regulation of the gas orifice are so determined that the gas in escaping can draw up a sufficiently large quantity of air to form a mixture in which the proportion of air is required to produce a flame of maximum temperature, having regard to the quantity of gas actually used. The temperature required naturally depends upon the nature and size of the objects to be submitted to the flame.

In this system of lattice work the heat absorbed when in contact with the flame is returned to the gas as it passes through the canals. The whole lattice work is Nickel.



577. Fig. 1.

The lattice work remains always at a relatively low temperature, if therefore by accident any molten metal falls on the surface, it immediately solidifies and does not penetrate the interior, and can be brushed off the top of the burner when cool. No regulating ring is required with these burners.

*The top part of the chimney is so formed, that the gas and air which are brought there mix perfectly, and the mixture burns above the lattice work very rapidly, a rapidity which increases as the pressure of gas used increases.*

*Note.*—Never enlarge in any way the injector hole in the burner for the gas; to clean use a wood splinter, never a metal instrument.

**Burner No. 1.** Smallest size made. Giving a small but extremely hot flame. Useful for sealing Glass Tubes, etc.

**Burner No. 2.** Equivalent to the ordinary Bunsen Burner as regards use although having a much smaller gas consumption. Test Tubes, Flasks, Beakers, etc., can be rapidly heated with this Burner without risk of breakage and Glass Tubing can be easily worked with it.

**Burner No. 3.** Larger than Burner No. 2 and useful for similar work.

**Burner No. 4.** Larger than Burner No. 3 and giving a more powerful flame. For many purposes it replaces the ordinary gas Blowpipe. Being silent, consuming less gas and requiring no attention it has obvious advantages.

### 577.—Mecker High Temperature Burners.

Size No. .. .. .	I	2	3	4
Height .. .. .	115	130	155	185 mm.
Section of flame .. .. .	16	20	25	30 mm.
Each .. .. .	4/6	5/-	9/-	12/9

Our stock of pure Chemicals and Acids is very considerable; hence all orders are executed with the utmost despatch. See comprehensive list at end of Catalogue.

## BUNSEN BURNER ACCESSORIES, Etc.



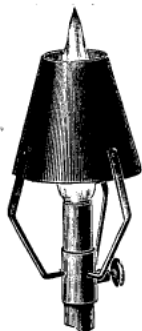
**578. — Flame Spreaders** to fit on to Bunsen burners so as to provide a good flame for bending glass tubing.  
 each 1/-; per doz. 10/-



**579. — Brass Blowpipe Jets.**  
 To fit ..  $\frac{7}{16}$   $\frac{5}{8}$   $\frac{3}{4}$  in. Bunsen.  
 Each .. 4d. 6d. 8d.



**580. — Brass Roses** for Bunsen burners.  
 To fit ..  $\frac{7}{16}$   $\frac{5}{8}$   $\frac{3}{4}$  in. Bunsen.  
 Each .. 10d. 1/3 1/9



**581. — Chimney with clamping Screw** for fixing on Bunsen burner.  
 each 1/6

**582. — Star Supports,** with clamping screw.

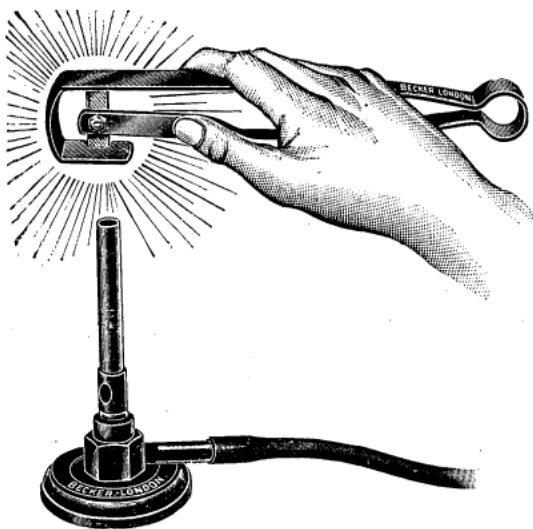


To fit ..  $\frac{7}{16}$   $\frac{5}{8}$   $\frac{3}{4}$  in. Bunsen.  
 Each .. 9d. 1/- 1/4

**583. — Sheet-iron Chimneys** for placing on star supports.



For ..  $\frac{7}{16}$   $\frac{5}{8}$   $\frac{3}{4}$  in. Bunsen.  
 Each .. 4d. 4d. 5d.  
 Per doz. 3/- 3/6 4/-



**584. — Cheap Gas Lighter,** for lighting Bunsen Burners, Boiling Burners, Incandescent Burners, etc., etc.

On pressing the spring handle, sparks are emitted from a special kind of stone rubbing against a file causing gas to ignite. This lighter gives about 1,000 flashes, and can be carried in the pocket without any danger.

Price complete .. .. each 6d.



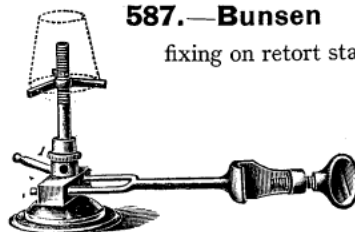
**585. — Ring Bunsen Burners with Boss,** for fitting on retort stands.

Diameter 7 10½ 13 cm.  
 Each .. 8/- 9/- 10/-



**586. — Ring Bunsen Burner with Boss,** as No. 585, but with stop-cock.

Diameter 7 10½ 13 cm.  
 Each 9/6 10/6 13/6

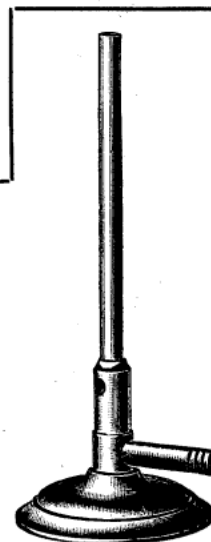


**587. — Bunsen Burner with Boss,** for fixing on retort stands .. .. each 4/6

**588. — Acetylene Bunsen Burner,** for use in districts where ordinary gas is unobtainable.

This burner gives a perfectly non-luminous flame with great heat, at a pressure of from 4 to 6 in. water column.

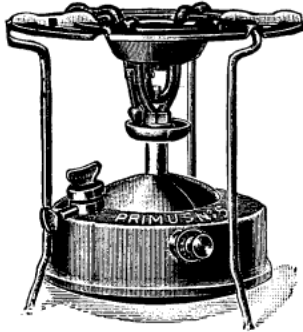
each 5/6



588

Every requisite for Chemical, Physical, and Bacteriological work supplied, from a test tube to the complete furnishing of the largest laboratory.

## WICKLESS PARAFFIN STOVES



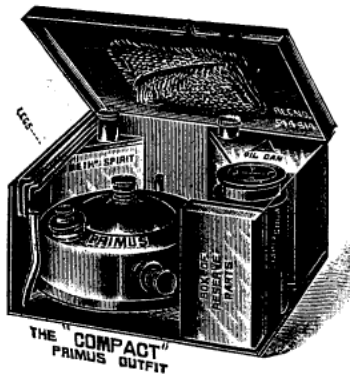
589/90

**589.—“Primus” Paraffin Stove,** made of brass, polished. This stove gives a very powerful non-luminous flame; it burns as quietly as a gas stove, and the flame lights itself. No pumping is therefore necessary until a convenient time after the stove is alight. Pumping afterwards is only required once every hour.

Size No. 5. 2 pint size.. .. each **16/3**  
 Size No. 5A. 2½ „ „ .. „ **17/3**

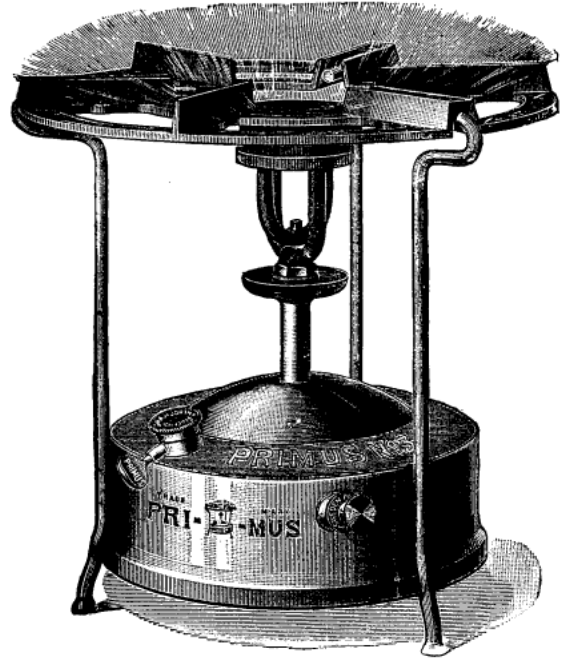
**590.—Ditto, Roarer Pattern,** as above, but recommended where the roaring noise is not objected to.

No. 1. 2 pint size .. .. each **15/6**  
 No. 1A. 2½ „ „ .. „ **16/6**



**591.—Folding Primus Stoves** for travelling. Stove complete in tin box, with Oil Can, Spirit Can, Draught Shield, Swab, and Box of Spare Parts.

No. 1. Size of Box 7½ in. × 5½ in. × 4 in.  
 1 pint size .. .. Price **22/-**  
 No. 2. Size of Box 9¼ in. × 7½ in. × 4 in.  
 1½ pint size .. .. Price **27/-**



592/3

### Extra Large Primus Paraffin Stoves.

Same construction as No. 589, but being made with a large oil tank and with extra powerful burner they are especially recommended for laboratory use where large vessels are to be heated.

### 592.—Roader Patterns.

Size	Capacity.	Price complete.
No. 2.	4 pints	each <b>27/-</b>
No. 3.	6½ „	„ <b>42/6</b>

No. 2 will boil 10 gallons of water in 60 minutes.  
 Oil consumption, 1 pint per hour.  
 No. 3 will boil 10 gallons of water in 34 minutes.  
 Oil consumption, 1½ pints per hour.

### 593.—Silent Patterns.

Size	Capacity.	Price complete.
No. 6.	4 pints	each <b>27/-</b>
No. 7.	6½ „	„ <b>45/-</b>

No. 6 will boil ½-gallon of water in 5½ minutes.  
 No. 7 will boil 10 gallons of water in 60 minutes.  
 Oil consumption, 1½ pints per hour.



**594. — Repair Outfit** and Box of Accessories. The outfits contain everything generally needed for keeping the various “Primus” lamps in perfect order.

A. For “Roader” patterns—  
 each **2/3**  
 B. For “Silent” patterns—  
 each **3/6**

Our Balances and Weights have achieved World-wide Reputation: *vide* Opinions of the Leading Scientific Press.



## BLOW LAMPS



**595. — Paraffin Blow-Lamp,** capacity 1 pint, weight 2½ lb. each 22/-

This lamp gives a pure and a very hot flame, registering 3,600° Fahrenheit. It burns upside down or in any other position. The length of the flame is 10 in. The consumption of paraffin is one half-pint per burning hour. This lamp will melt a copper rod from ¼ to ½ in. thick in the open flame.



**596. — Paraffin Blow-Lamps,** as above, only with inclined burner.  
 each 22/-

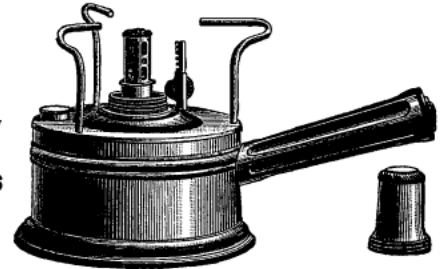
## SPIRIT LAMPS

**597. — Spirit Lamps,** with ground cap, wick-holder and wick.

Capacity .. .. .	2	4	8 oz.
Each .. .. .	1/9	2/-	3/-
Per doz. .. .. .	18/9	22/-	34/-



**598. — Spirit Lamp,** metal double current, very powerful.  
 each 2/6



**599. — Brass Spirit Lamps,** with rack and pinion for wick and brass cap.

Capacity .. .. .	150 c.c.
Price, each .. .. .	2/6



**600. — Reform Spirit Lamp.**

**ADVANTAGES :—**

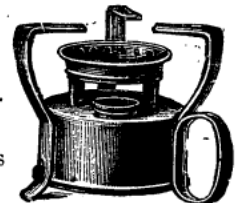
It boils more quickly than any other lamp.  
 It is absolutely safe, as explosions cannot occur.  
 The consumption of spirit is extremely small.  
 The wick does not char, and so never requires renewal.

It remains absolutely clean.

It does not smoke, and therefore no soot is formed.

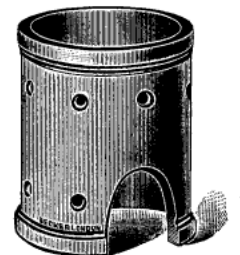
**DIRECTIONS FOR USE.**—Light the small wick in screw cap, and in a few seconds the spirit gas issuing from the holes of the ring burner will ignite, when the small flame should be blown out. To fill with spirit, unscrew the small wick screw cap.

each 3/6



**601. — Stoneware Spirit Lamp**

**Screens,** for spirit lamps up to 12 oz. capacity .. .. . each 2/-



Our stock of pure Chemicals and Acids is very considerable ; hence all orders are executed with the utmost despatch. See comprehensive list at end of Catalogue.

## BURETTE STANDS AND BURETTE CLIPS

### 602. The "W.J." Burette Stand.

Invented and patented by the Rev. A. Wentworth Jones, M.A.

This burette stand is made of selected Teak wood and will stand an enormous amount of wear and tear. It is the simplest ever devised and has the following advantages over all other patterns:—

There are no screws to turn or get out of order.

It is extra strongly made and will therefore withstand a great deal of wear and tear. One hand only is needed.

Burette is simply dropped on to a ledge—no force required.

Impossible for Burette to drop out.

Burette is always vertical.

Graduations are not hidden.

Will take Burettes of all sizes.

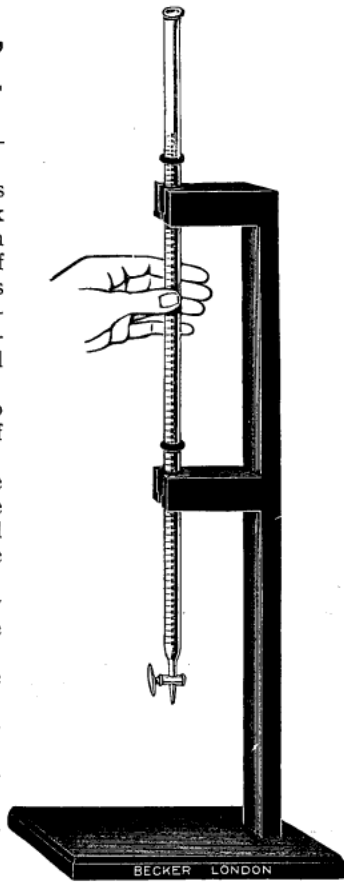


FIG. 1.

Burette being dropped into position.

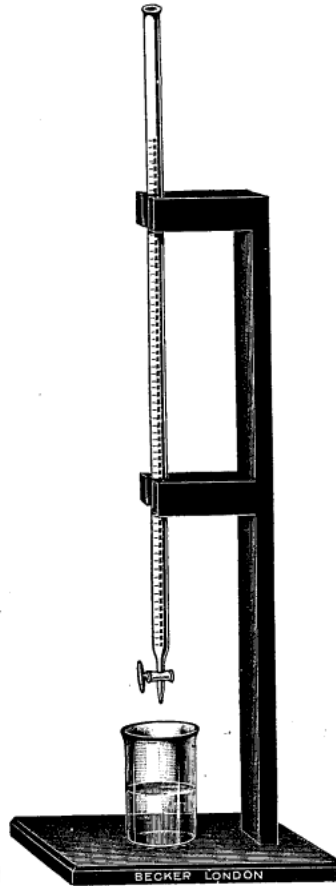


FIG. 2.

Burette in Stand ready for use.

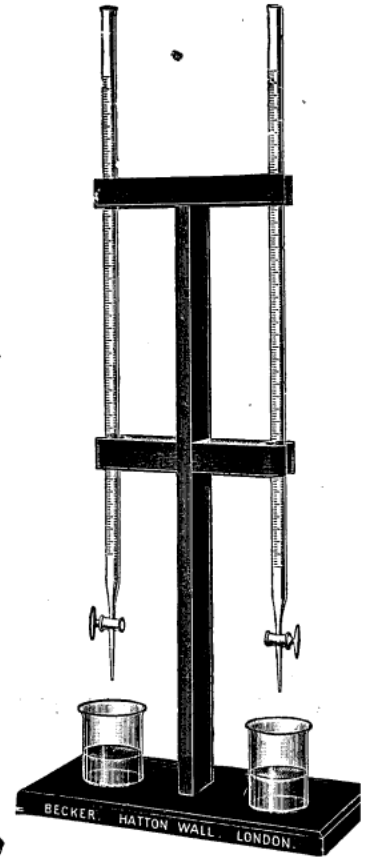


FIG. 3.

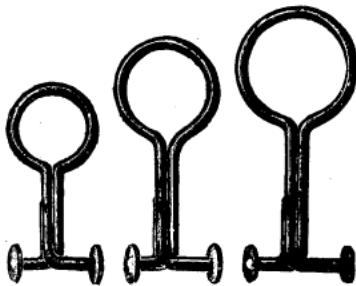
Double Burette Stand.

### PRICES.

A. To take one burette, see Figs. 1 and 2, including two india-rubber rings .. .. .	each	5/-
B. To take two burettes, see Fig. 3, including four india-rubber rings .. .. .	„	6/9
C. <i>India-rubber Rings</i> for above .. .. .	„	2d.

N.B.—These rings are made specially for use with the above stands, and are not ordinary umbrella rings which, although much cheaper, are not nearly so efficient.

## BURETTE CLIPS

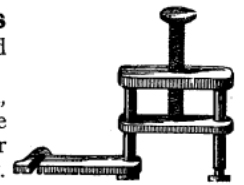


### 603.—Mohr's Burette Clips, brass, nickel-plated.

	Small.	Medium.	Large.
Each ..	4d.	4d.	5d.
Per doz.	2/9	3/3	4/6

### 604.—Screw Clips nickel-plated, improved pattern.

The lower bar is hinged, so that the clip may be removed from the rubber tubing without unscrewing.



	A	B	C
Inside width, in. ..	$\frac{1}{2}$	$\frac{3}{4}$	1
Price, each ..	8d.	9d.	11d.
Price, per doz. ..	6/6	7/6	9/-

Every requisite for Chemical, Physical, and Bacteriological work supplied, from a test tube to the complete furnishing of the largest laboratory.

## BURETTE STANDS AND CLAMP SUPPORTS

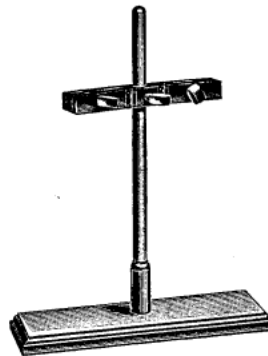


**605.—Burette Stands,**  
 white hard wood for 1  
 Burette .. .. each **3/3**

**606.—Burette Stands,**  
 white hard wood for 2  
 Burettes .. .. each **4/3**

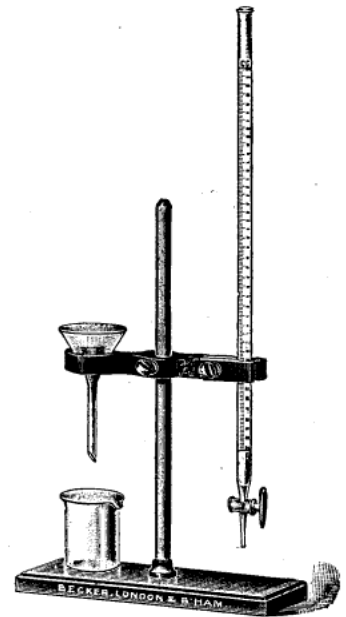
**607.—Burette Stands,**  
 hard teak, with boxwood  
 screws, for 1 Burette each **4/9**

**608.—Burette Stands,**  
 hard teak, with boxwood  
 screws, for 2 Burettes each **5/9**



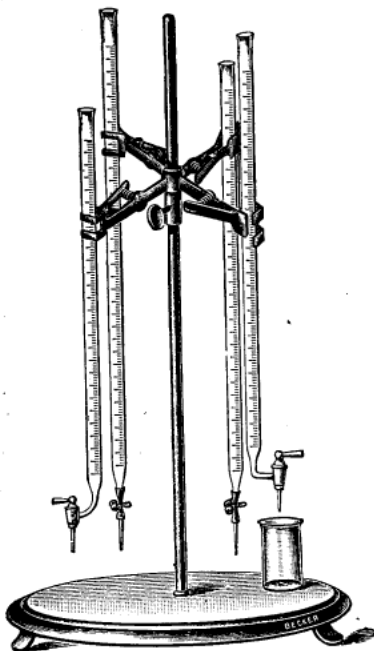
**609.—Burette Stands,** polished mahogany,  
 with boxwood screws, for 1 Burette .. each **5/6**

**610.—Burette Stands,** polished mahogany,  
 with boxwood screws, for 2 Burettes .. each **6/9**

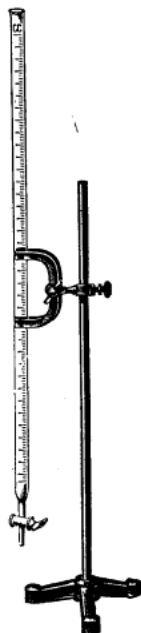


616

**616.—Combined Funnel and Burette Stand,** best quality, with boxwood screws.  
 Made in hard teak ... **6/-**

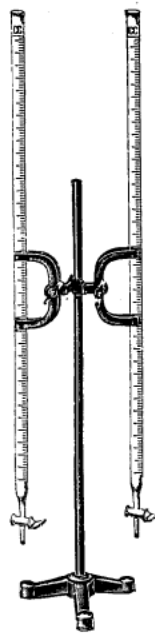


**611. — Burette Stand, Lecture Table Pattern.** Consisting of four-armed clamp mounted on inlaid porcelain base .. each **30/-**



**612. — Metal Clamp for One Burette,** horseshoe form. each **4/6**

**613.—Ditto,** complete, on metal stand, with tripod foot .. each **6/6**



**614. — Metal Clamp for two Burettes,** horseshoe form. each **6/9**

**615.—Ditto,** complete, on metal stand with tripod foot. each **8/9**

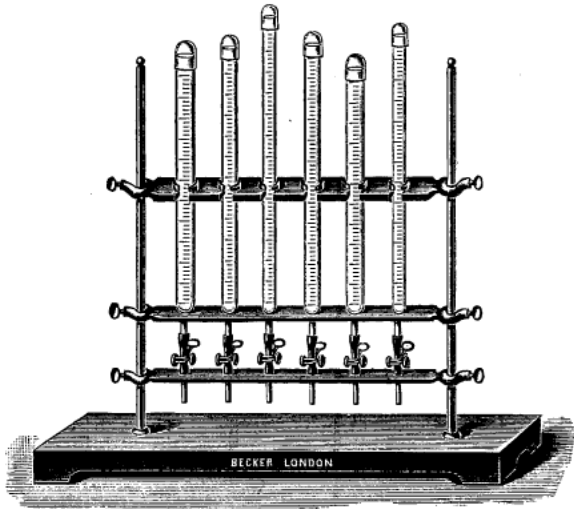


617

**617.—Bunsen's Universal Clamp Support,** polished mahogany, with loaded foot, best make and finish .. each **12/-**

Our Balances and Weights have achieved World-wide Reputation: *vide* Opinions of the Leading Scientific Press.

## BURETTE STANDS AND CLAMP SUPPORTS



**618.—Burette Stand, Lecture Table Pattern,** on well-finished polished base, with two brass uprights.

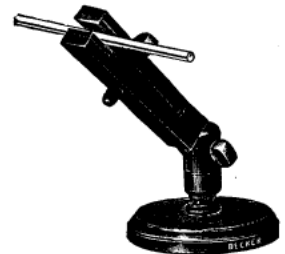
For .. .. .	4	6	burettes.
Each .. .. .	24/-	27/-	

**621.—Hinged Clamp,** polished mahogany, for holding tubes in any *inclined* position .. .. each 7/6



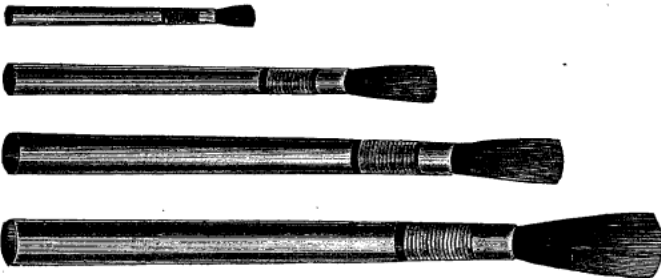
621

**622.—Hinged Clamp,** polished mahogany, for supporting tubes in any *horizontal* position, but at various elevations .. each 7/6



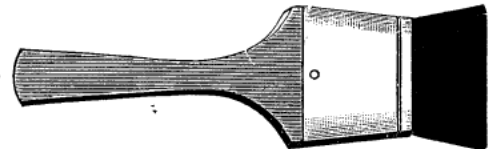
622

## BRUSHES (VARIOUS)



**619.—Camel Hair Brushes,** in Quills.

Size No. .. .. .	I	2	3	4
Per doz. .. .. .	8d.	1/1	1/3	1/6
Per gross .. .. .	7/-	11/-	13/-	16/-



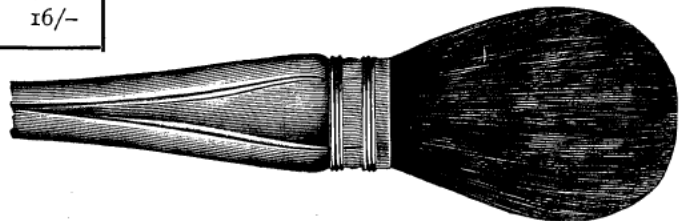
**623.—Camel-Hair Brushes,** flat form, wooden handles, tin bound.

Width	1/2	3/4	I	1 1/2	2	2 1/2	3 in.
Each	10d.	10d.	11d.	1/4	1/8	2/1	2/6
Per doz.	6/6	8/-	10/-	14/-	18/-	22/-	27/-



**620.—Glass Brush,** in Quill, for corrosives.

each 1/6

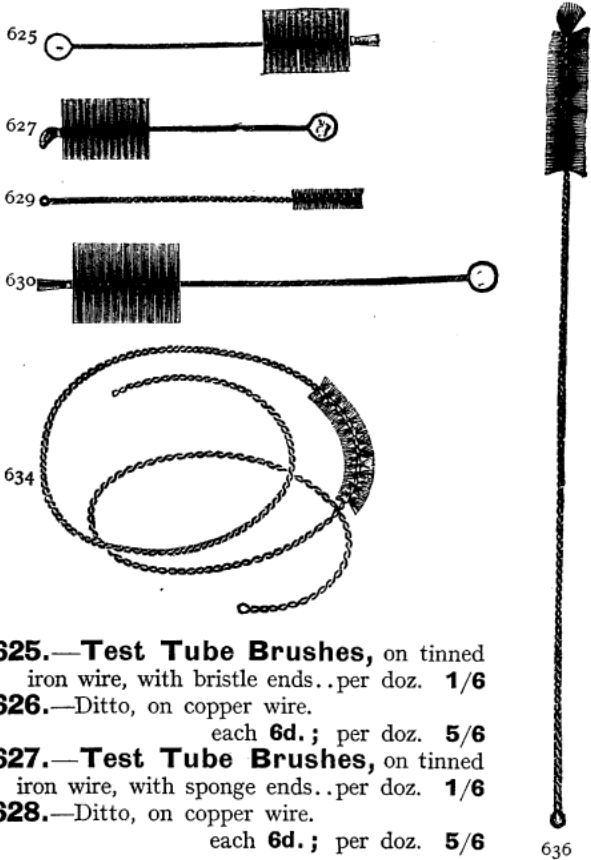


**624.—Best Camel-Hair Dabbers,** in Split Quills.

Size .. .. .	I	2	3	4	5
Each .. .. .	5d.	6d.	10d.	1/2	1/6
Per doz. .. .. .	4/3	5/3	8/9	12/3	16/6

Our stock of pure Chemicals and Acids is very considerable; hence all orders are executed with the utmost despatch. See comprehensive list at end of Catalogue.

**BOTTLE AND TEST TUBE BRUSHES**



- 625.—Test Tube Brushes, on tinned iron wire, with bristle ends..per doz. 1/6
- 626.—Ditto, on copper wire.  
each 6d.; per doz. 5/6
- 627.—Test Tube Brushes, on tinned iron wire, with sponge ends..per doz. 1/6
- 628.—Ditto, on copper wire.  
each 6d.; per doz. 5/6
- 629.—Brushes, for tubes of small bore per doz. 9d.
- 630.—Best Bristle Bottle Brushes,  
on tinned iron wire .. .. . each 6d.
- 631.—Ditto, on copper wire .. .. . 1/9
- 632.—Ditto, larger size, on tinned iron wire each 9d.
- 633.—Ditto, on copper wire .. .. . 2/9
- 634.—Brushes, with bristle in middle, for narrow tubes .. .. . each 5d.
- 635.—Ditto, for larger tubes .. .. . 8d.
- 636.—Brushes, with long tinned iron wire stems, for burettes, etc. .. .. each 8d.
- 637.—Ditto, with long copper wire stems.. .. 1/6

**642.—The William Thomson Calorimeter.**

This apparatus is similar to the Lewis Thompson Calorimeter, No. 643, page 138, but is designed for burning a weighed quantity of fuel in a platinum crucible under water, by directing a slow stream of oxygen from a gas-holder or compression-cylinder upon it.

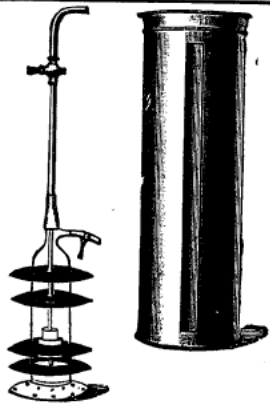
The oxygen passes down the vertical tube, which contains the stopcock. Wire-gauze baffle-discs are seen around the combustion-chamber; these serve to break up the escaping gaseous products into small bubbles, and thus to cause them to be more completely cooled by the water.

The apparatus is immersed in water contained in a glass beaker, which is again surrounded by a metal vessel with a glass slip let into its side. The fuel is then kindled by means of a small fuse, as has been already described, and the oxygen stream is started by opening the tap as soon as the chamber containing the kindled fuse has been lowered into the water.

See *Clowes & Coleman's "Quantitative Chemical Analysis,"* 1909 edition (J. & A. Churchill).

- A. Price, not including platinum crucible .. .. . £2 2 6
- B. Price, including platinum crucible .. .. . 5 10 0

(Price varies according to the market price of platinum.)



642

**638. — Test Tube Cleaners,** with vulcanised rubber end.



each, 4d.; per doz. 3/6

638

**CARBOY SUPPORT AND EMPTYING APPARATUS**

**639. — Carboy Support,** strong iron, with arrangement for preventing the carboy from falling out when tilted.



A. Without wheels.  
£3 15 0

B. With wheels.  
£4 12 6

639

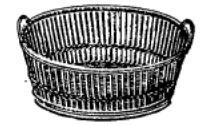
**640. — Apparatus for Emptying Carboys.** Complete with pump and syphon arrangement.  
each £3 5 0



640

**FOR GLASS SYPHONS  
SEE INDEX.**

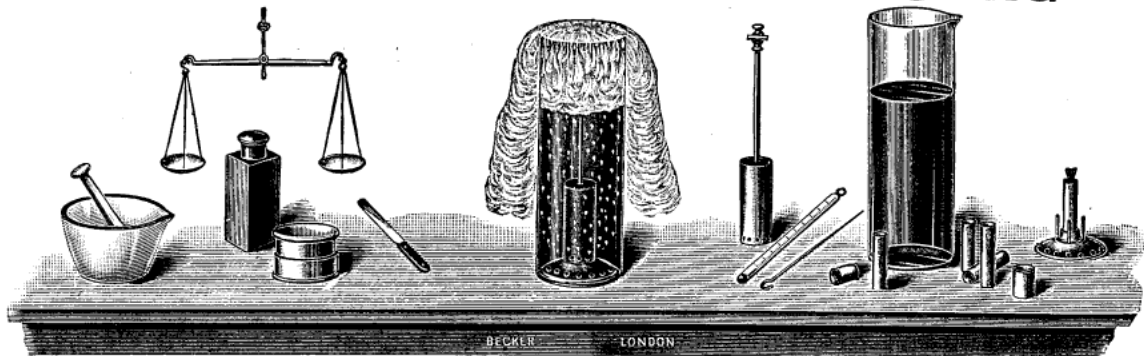
**641.—Test Tube Baskets,** for holding test tubes.



each 2/-

641

## CALORIMETERS FOR FUEL TESTING



### 643.—The Lewis Thompson Calorimeter.

In the "Lewis Thompson" Calorimeter the fuel to be tested is burnt by combined Oxygen in a small metal diving bell, under the surface of a known weight of water, and the increase in temperature of the water gives the necessary data for the calculation of the calorific value of the fuel. As supplied for commercial purposes, the instruments are graduated for use with the Fahrenheit thermometer, and consequently the latent heat of steam is taken as 967. It follows then, that if a unit weight of fuel is burnt under the surface of 967 unit weights of water, and if all the heat is imparted to the water and raises it 1°, the same amount of heat would have converted a unit weight of water at 212° Fah. into steam at the same temperature. Two grammes of the fuel in a finely divided condition are mixed with eleven times the weight of a finely powdered mixture of three parts potass chlorate to one of potass nitrate, and the mixture is pressed, a little at a time, into a small copper crucible. A small piece of wick, soaked in potass nitrate, is fixed into the upper surface of the charge, and the crucible is then placed in the combustion chamber, being held in position by means of a brass plate to which three clutch-springs are fitted. After igniting the fuse, the whole apparatus is plunged into the cylinder, which contains  $967 \times 2 = 1934$  c.c. of water at a known temperature.

The mixture ignites, and the fuel burns at the expense of the combined oxygen present in the potass chlorate and nitrate, whilst the products of combustion bubble up through the water, escaping through small holes in the

base of the chamber. When combustion is complete, the water is admitted to the chamber by opening the tap in the tube of the chamber, and the water is well agitated by raising and lowering the apparatus several times.

The apparatus is then withdrawn, and the temperature of the water taken with the thermometer; 10 per cent. is added to the number obtained as the difference between the initial and final temperatures, to allow for heat absorbed by the apparatus, radiation, etc., and the total is looked upon as giving the number of unit weights of water which a unit weight of the fuel would evaporate. As an example:—

Temperature of water before combustion	= 62° Fah.
" " " after	= 75° "
Rise in temperature .. .. .	13
Add 10 per cent. . . . .	1.3
Evaporating power .. .. .	14.3

Therefore, as a gramme of the fuel will evaporate 14.3 c.c. of water, 1 lb. will evaporate 14.3 lb.

(Vide "Liquid and Gaseous Fuels," by V. B. Lewes.)

- A. Price, complete in polished mahogany case, consisting of combustion cylinder, with separate spring clutch, base, 6 cylindrical copper furnaces, 2 short ditto, glass water cylinder, thermometer, balance and weights, iron mortar and pestle, sieve, oxygen mixture, etc., with instructions for use .. .. each **£7 15 0**
- B. As above, but with cheap scales instead of balance. each **£6 5 0**

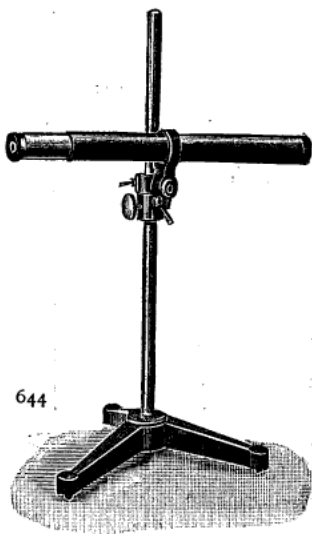
## CATHETOMETERS

**644.—Reading Telescope.** This is a simple and cheap form of instrument which may also be used as a cathetometer.

The slider carries a telescope which can be focussed from 3 metres to infinity. Telescope is furnished with cross wires and an erector, so that figures, etc., are seen in their proper position.

Mounted on heavy iron base; upright rod is nickel-plated.

Price .. .. **£3 5 0**



**645.—Telescope,** as used in apparatus No. 644, may be had separately .. .. price **£1 2 6**

**646.—Cathetometer.** cheap make and finish, millimetre scale, with sliding telescope, fine micrometre screw adjustment, eye-piece with cross wire, metal scale on heavy iron base with levelling screws

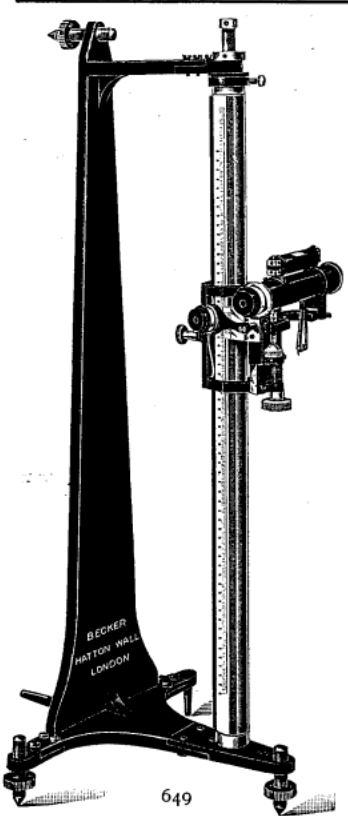
**£11 10 0**

**647.—Ditto,** better quality, with vernier **£12 15 0**

## THE "COLLEGE" CATHETOMETER

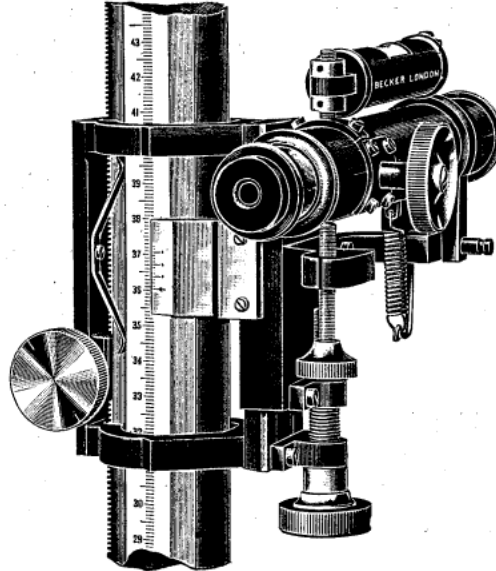
Highest Quality and Finish. Laboratory Pattern.

648.—The "College" Cathetometer is a splendid laboratory instrument, and we can recommend it with every confidence. The Telescope, which can be focussed from 3 ft. to infinity, is fitted with an object glass of 15 cm. focus, and 22 mm. aperture. The Telescope Carriage works along an accurately graduated rod over a distance of 50 cms.

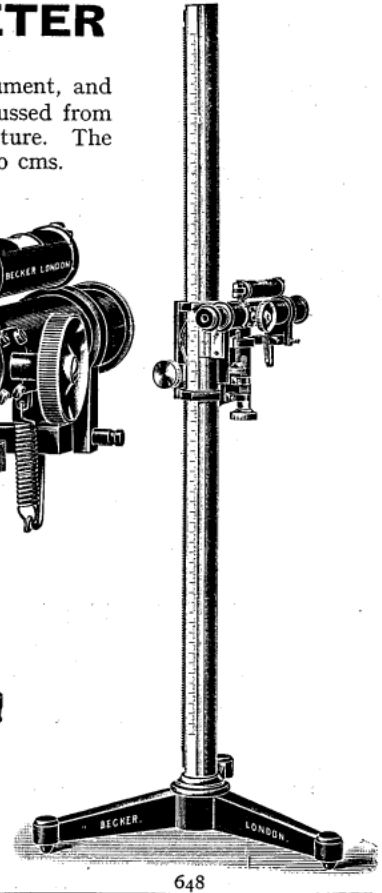


The Telescope is provided with level and cross wires, and can be set horizontal by means of a fine adjusting screw.

Prices include rack and fine vertical adjustment and rack motion focussing arrangement to Telescope, as figured, and mounted on heavy tripod foot.



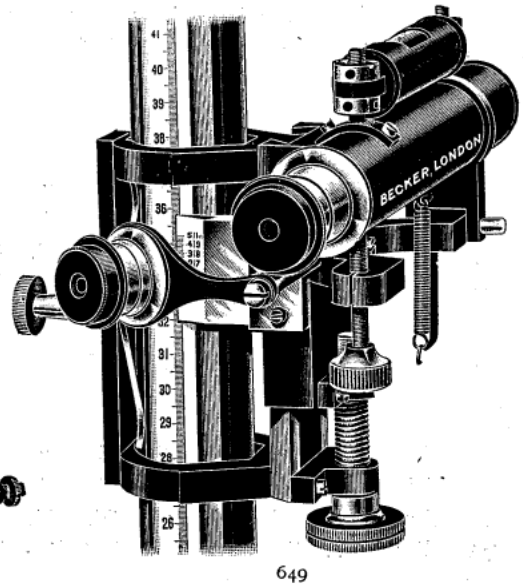
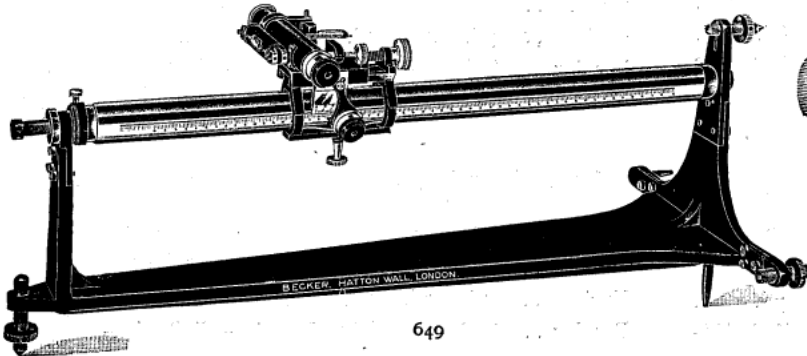
- A. Range 50 cms., reading to  $\frac{1}{80}$ th mm. Price £10 17 6  
 B. Range 50 cms., reading to  $\frac{1}{100}$ th mm. Price £12 5 0



649.—Cathetometer, Government pattern, highest quality and finish. Extra strongly made. Can be used either horizontally or vertically. A millimetre scale runs almost the entire length of the bar.

The position of the Telescope is read by means of a vernier attached to the telescope support. The Telescope, which is provided with a level and cross wires, has a focal length of about 7 in., and is adjusted horizontally. Can be focussed from infinity to within 3 ft.

- |  |          |
|--|----------|
| A. = range 50 cm. and reading to $\frac{1}{80}$ th mm. . . . .   | £12 15 0 |
| B. = range 50 cm. and reading to $\frac{1}{100}$ th mm. . . . .  | 13 15 0  |
| C. = range 100 cm. and reading to $\frac{1}{80}$ th mm. . . . .  | 16 17 6  |
| D. = range 100 cm. and reading to $\frac{1}{100}$ th mm. . . . . | 19 10 0  |
| E. = Rack motion to Telescope . . . . . extra                    | 0 17 6   |



Our stock of pure Chemicals and Acids is very considerable ; hence all orders are executed with the utmost despatch. See comprehensive list at end of Catalogue.



## CALCIUM CHLORIDE TUBES



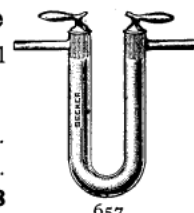
**650.—Calcium Chloride Tubes,**  
U-form, plain.

Length	4	5	6	6	7	8	10 in.
Diam.	$\frac{1}{2}$	$\frac{5}{8}$	$\frac{5}{8}$	$\frac{3}{4}$	$\frac{3}{4}$	$\frac{3}{4}$	1 in.
Each	6d.	7d.	7d.	8d.	9d.	rod.	1/4.
Per doz.	4/6	5/6	6/-	7/-	8/-	9/-	14/-

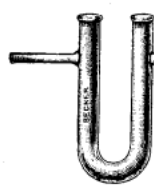
650

**657. — Calcium Chloride Tubes,** with bored stoppers, well ground in, and leading tubes.

Length	..	4	5	6	8 in.
Diam.	..	$\frac{1}{2}$	$\frac{1}{2}$	$\frac{5}{8}$	$\frac{3}{4}$ in.
Each	..	2/6	3/-	4/-	4/8



657



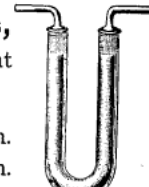
**651.—Calcium Chloride Tubes,** U-form with side tubes.

Length	4	5	6	6	7	8	10 in.
Diam.	$\frac{1}{2}$	$\frac{5}{8}$	$\frac{5}{8}$	$\frac{3}{4}$	$\frac{3}{4}$	$\frac{3}{4}$	1 in.
Each	7d.	rod.	rod.	rod.	1/1	1/2	1/7
Per doz.	6/3	8/9	9/-	10/-	11/-	12/-	17/-

651

**658.—Calcium Chloride Tubes,** with well-ground-in stoppers and bent leading tubes.

Length	4	5	6	7	8	10 in.
Diam.	$\frac{1}{2}$	$\frac{5}{8}$	$\frac{5}{8}$	$\frac{3}{4}$	$\frac{3}{4}$	1 in.
Each	1/6	1/10	2/1	2/6	3/6	4/9



658



**652.—Calcium Chloride Tubes,** Wohler's, with 3 bulbs.

Length	4	5	6	6	7	8	10 in.
Diam.	$\frac{1}{2}$	$\frac{5}{8}$	$\frac{5}{8}$	$\frac{3}{4}$	$\frac{3}{4}$	$\frac{3}{4}$	1 in.
Each	8d.	9d.	10d.	1/1	1/3	1/5	1/11

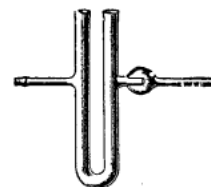
652

**653.—Ditto,** stoppered and bent outlet tubes.

Each	2/10	3/-	3/3	3/6	3/9	4/-	4/9
------	------	-----	-----	-----	-----	-----	-----

**659.—Calcium Chloride Tubes,** with long limb and bulb for successive sealings.

Each	..	..	1/9
Per doz.	..	..	20/-



659



**654.—Calcium Chloride Tubes,** Marchand's form, with cork and leading tube.

Length	4	5	6	6	7	8	10 in.
Diam.	$\frac{1}{2}$	$\frac{5}{8}$	$\frac{5}{8}$	$\frac{3}{4}$	$\frac{3}{4}$	$\frac{3}{4}$	1 in.
Each	9d.	9d.	rod.	1/1	1/2	1/4	1/9
Doz.	8/-	10/-	10/-	11/-	12/6	14/-	18/9

654

**660.—Calcium Chloride Tubes,** Fresenius' form.

Length	4	5	6	6	7	8	10 in.
Diam.	$\frac{1}{2}$	$\frac{5}{8}$	$\frac{5}{8}$	$\frac{3}{4}$	$\frac{3}{4}$	$\frac{3}{4}$	1 in.
Each	9d.	rod.	rod.	1/-	1/2	1/8	2/-
Per doz.	7/9	8/9	9/9	10/-	12/-	16/-	21/-



660



**655.—Calcium Chloride Tubes,** straight form, with 1 bulb.

Length ..	4	5	6	6	7	8	10 in.
Diam. ..	$\frac{1}{2}$	$\frac{5}{8}$	$\frac{5}{8}$	$\frac{3}{4}$	$\frac{3}{4}$	$\frac{3}{4}$	1 in.
Each ..	3d.	4d.	4d.	5d.	5d.	6d.	7d.
Per doz...	2/6	3/-	3/3	3/6	4/-	4/6	5/6

655

**661.—Calcium Chloride Tubes,** bent form, with 1 bulb.

Length ..	4	5	6	6	7	8	10 in.
Diam. ..	$\frac{1}{2}$	$\frac{5}{8}$	$\frac{5}{8}$	$\frac{3}{4}$	$\frac{3}{4}$	$\frac{3}{4}$	1 in.
Each ..	3d.	4d.	4d.	5d.	5d.	6d.	7d.
Per doz...	2/6	3/-	3/3	3/6	4/-	4/6	5/6



661



**656.—Calcium Chloride Tubes,** straight form, with 2 bulbs.

Length ..	4	5	6	6	7	8	10 in.
Diam. ..	$\frac{1}{2}$	$\frac{5}{8}$	$\frac{5}{8}$	$\frac{3}{4}$	$\frac{3}{4}$	$\frac{3}{4}$	1 in.
Each ..	4d.	5d.	5d.	6d.	6d.	7d.	8d.
Per doz...	3/6	3/9	4/6	4/9	5/-	5/6	7/-

656

**662.—Calcium Chloride Tubes,** bent form, with 2 bulbs.

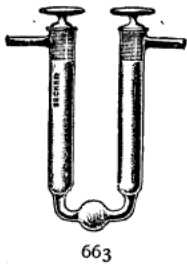
Length ..	4	5	6	6	7	8	10 in.
Diam. ..	$\frac{1}{2}$	$\frac{5}{8}$	$\frac{5}{8}$	$\frac{3}{4}$	$\frac{3}{4}$	$\frac{3}{4}$	1 in.
Each ..	4d.	5d.	5d.	6d.	6d.	7d.	8d.
Per doz...	3/6	3/9	4/6	4/9	5/-	5/6	7/-



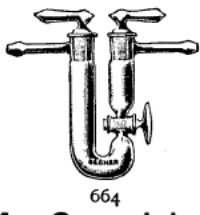
662

Every requisite for Chemical, Physical, and Bacteriological work supplied, from a test tube to the complete furnishing of the largest laboratory

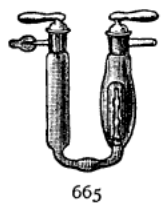
## CALCIUM CHLORIDE TUBES, JARS, Etc.



**663.** — Improved Calcium Chloride Tubes, with well-ground-in bored stoppers, and with bulb at bottom. Size 5 in.  $\times$   $\frac{3}{4}$  in.  
 Each .. .. . 4/-  
 Per dozen .. .. . 46/-



**664.** — Combined Calcium Chloride and Soda Lime Tube, Dennstedt's, with well-ground-in drilled stoppers and stopcock .. each 11/-

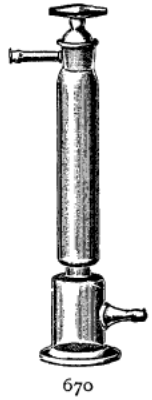


**665.** — Calcium Chloride Tubes, Schmitz pattern, limbs about 8 in. long. each 7/6



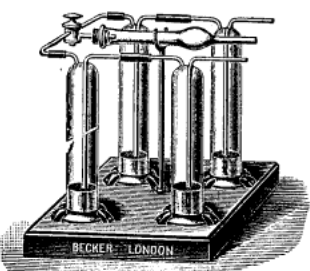
**669.** — Plain Calcium Chloride Jars, made of white crystal glass, with tubulure near bottom.

Height.	Diam.	Price each.
8 in.	$\times$ 1 $\frac{1}{2}$ in.	.. 3/6
10 "	$\times$ 2 "	.. 3/9
12 "	$\times$ 2 "	.. 4/-
16 "	$\times$ 2 $\frac{1}{2}$ "	.. 4/3

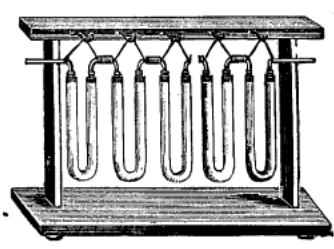


**670.** — Stopped Calcium Chloride Jars.  
 Height .. 8 10 12 14 16 in.  
 Price .. .. 8/- 9/6 11/- 12/- 13/- each.

**FOR POTASH BULBS  
SEE INDEX.**

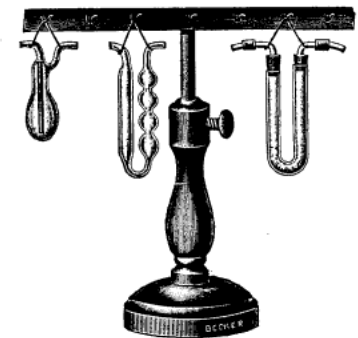


**666.** — Drying Apparatus, Bonn University Pattern, complete on stand price £2 7 6



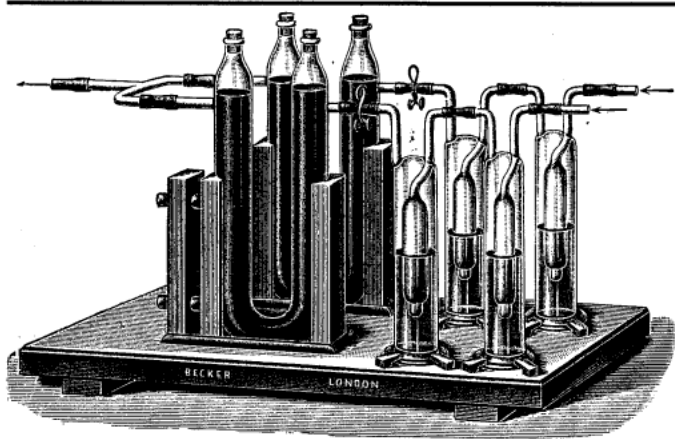
**667.** — Stand for supporting CaCl<sub>2</sub> Tubes, etc., polished teak, with three hooks each 5/-

**668.** — Ditto, larger size with six hooks.. .. . each 6/6

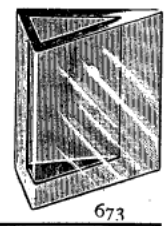


**671.** — Stand for supporting CaCl<sub>2</sub> Tubes, polished teak, with three hooks .. each 6/-

**672.** — Ditto, larger size, with six hooks.. .. . each 7/6



**673.** — Triangular Calcium Chloride Vessels, polished on all sides, for placing inside balance cases.  
 2 in.  $\times$  1  $\frac{3}{4}$  in. .. each 1/4  
 per doz. 15/-

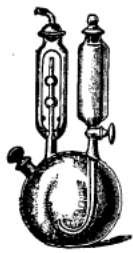


**674.** — Drying Apparatus, Berlin University Pattern, complete, with four wash bottles and two U-tubes, on nicely polished stand .. .. . £2 12 6

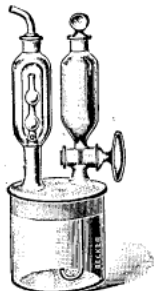
**675.** — Ditto, but with only two wash bottles and one U-tube, complete .. .. . 1 12 0

Our Balances and Weights have achieved World-wide Reputation: *vide* Opinions of the Leading Scientific Press.

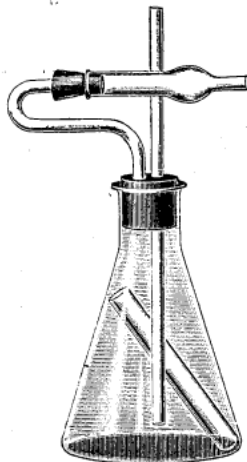
## CARBONIC ACID APPARATUS



**676.**  
**Schrotter's**  
**CO<sub>2</sub>**  
**Apparatus.**  
Each .. 7/6



**677.—Schrotter's CO<sub>2</sub>**  
**Apparatus,** improved  
form, with lower part ground  
on, so that the apparatus  
can be easily cleaned out  
and dried .. each 8/-



**678.—Parnell's CO<sub>2</sub>**  
**Apparatus.** Com-  
plete as figured.  
each 2/-  
per doz. 22/-

carbonate (difference in mass = weight of carbonate used). Into the small test tube *C*, put a few drops of strong Sulphuric Acid. Remove stopper *D*, and by suction, fill the pipette *A* with acid, say HCl, pinch the rubber tube *B*, and replace *D*. Put into *E* a little water, replace the stopper *F*, and hang the whole to the Specific Gravity hook of a balance and then weigh. Slightly squeeze the rubber tube *B* between the finger and thumb, and allow a few drops of acid to drop from *A*. The liberated gas escapes through the drying apparatus *G*. When the action is over remove the stopper *D*, and attach *B* to a suitable apparatus, and aspirate until the CO<sub>2</sub> in *E*, is eliminated. Replace *D*, and weigh the whole apparatus—the loss of weight represents the evolved CO<sub>2</sub>.

Price each 3/6

### 679.—Cooper's Apparatus for determining the percentage of Carbon Dioxide in a Carbonate.

This apparatus is an improvement upon existing forms in its comparative cheapness, extreme lightness, and the ease and rapidity with which it can be used. The following comparison with Schrotter's form will speak for itself.

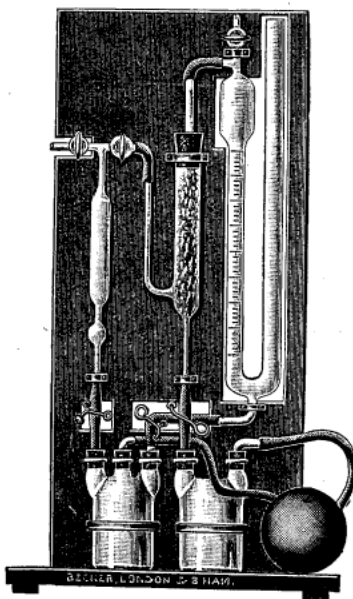
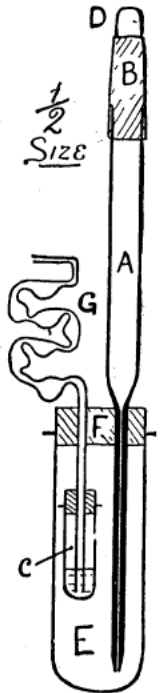
#### SCHROTTER'S.

1. Price 7/6.
2. Weight 100 grams.
3. Cleaning and drying—at least  $\frac{1}{2}$  an hour.
4. Once broken—no further use.

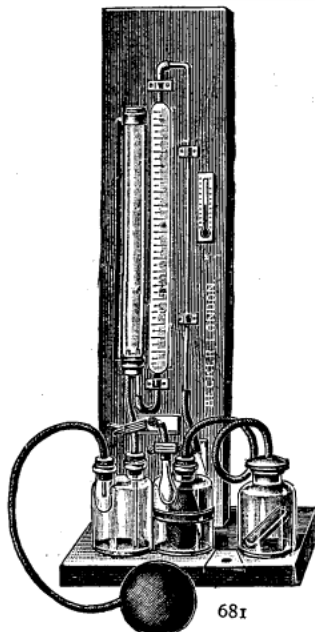
#### COOPER'S.

1. Price 3/6.
2. Weight 35 grams (loaded).
3. Cleaned and dried in 5 minutes.
4. Every part can be replaced.

To use the apparatus, remove the rubber stopper *F* carrying the pipette and drying bulb *G*, weigh the test tube, both before and after putting in the carbonate. Into the small test tube *C*, put a few drops of strong Sulphuric Acid. Remove stopper *D*, and by suction, fill the pipette *A* with acid, say HCl, pinch the rubber tube *B*, and replace *D*. Put into *E* a little water, replace the stopper *F*, and hang the whole to the Specific Gravity hook of a balance and then weigh. Slightly squeeze the rubber tube *B* between the finger and thumb, and allow a few drops of acid to drop from *A*. The liberated gas escapes through the drying apparatus *G*. When the action is over remove the stopper *D*, and attach *B* to a suitable apparatus, and aspirate until the CO<sub>2</sub> in *E*, is eliminated. Replace *D*, and weigh the whole apparatus—the loss of weight represents the evolved CO<sub>2</sub>.



680  
**680.—Calcimeter,**  
**Schiebler - Burk -**  
**Howard's,** for the deter-  
mination of CO<sub>2</sub> in saturated  
gases.  
Complete as figured £3 15 0



## CALCIMETERS

### 681. Schiebler's Calcimeter,

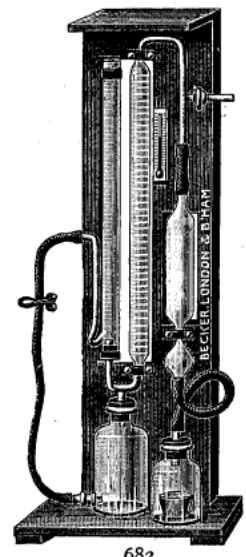
for volumetrically esti-  
mating the amount of  
Carbon Dioxide in Cal-  
cium Carbonate, native  
carbonates, etc.

(Full working details  
on application.)

A. Complete as figured.  
£4 5 0

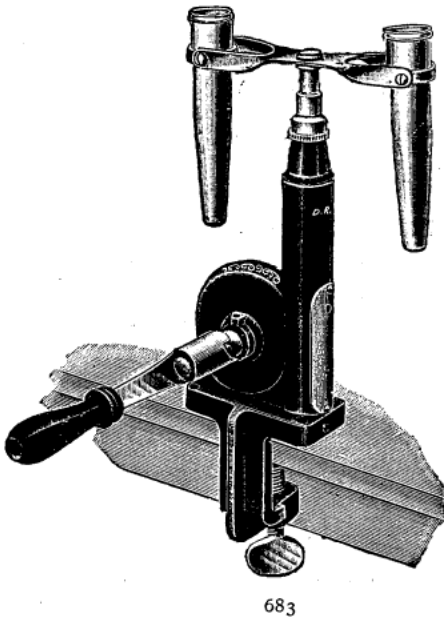
### 682. Calcimeter, Schiebler- Finkener's.

Complete as figured.  
£3 5 0



Our stock of pure Chemicals and Acids is very considerable ; hence all orders are executed with the utmost despatch. See comprehensive list at end of Catalogue.

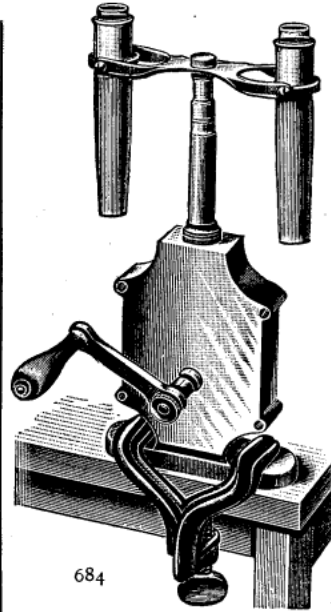
## CENTRIFUGAL MACHINES



**683.—Centrifugal Machine,** making 3,000 revolutions per minute, and with clamp for fixing to table. Well finished and strongly made.

- A. Centrifuge with 2 tubes, each 15 c.c. capacity. **£1 10 0**  
 B. Ditto, with 4 tubes, each 15 c.c. capacity. **£1 17 6**

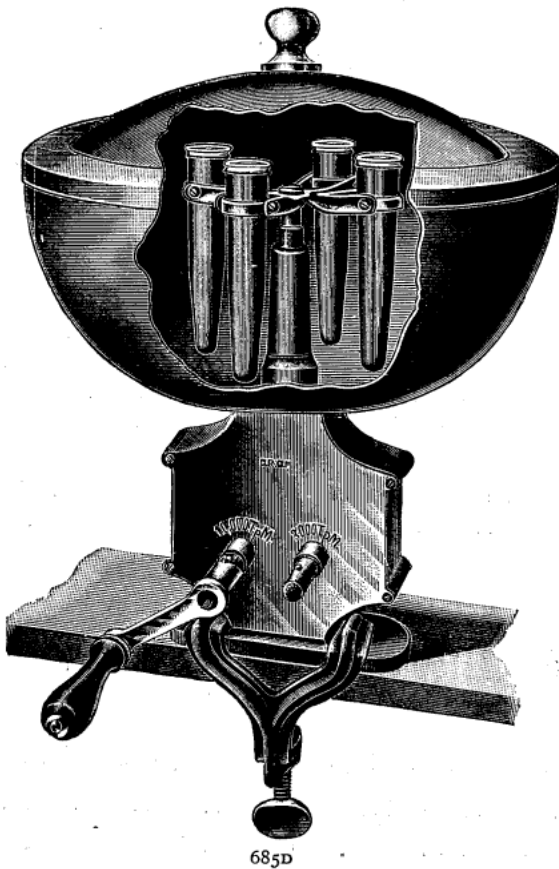
683



**684.—Centrifugal Machine.** Complete with clamp for fixing to table, and fitted for two or four tubes, each 15 c.c. capacity. The machine makes 3,000 revolutions per minute, and is most useful for obtaining sediment in blood, urine, etc.

- A. With 2 tubes. **£2 0 0**  
 B. With 4 tubes. **£2 7 6**

684



**685.—Two-Speed Centrifugal Machine.** This apparatus is geared for two speeds, namely, 3,000 and 10,000 revolutions per minute, and is made either for two or four tubes, and with or without a protecting cover and lid (as illustrated).

- A. Centrifuge for 2 tubes and provided with hæmatocrite head for blood testing, etc., but without protecting cover and lid .. .. . **£2 15 0**  
 B.—Ditto, for 2 tubes, with protecting cover and lid **3 15 0**  
 C. Ditto, for 4 tubes, without protecting cover and lid **3 3 0**  
 D. Ditto, for 4 tubes, with protecting cover and lid **4 4 0**

685D

**686.—Plain Tubes for Centrifugal Machines,** capacity 15 c.c. .. each **4d.**  
 per doz. **3/6**

**687.—Graduated Tubes for Centrifugal Machines,** capacity 15 c.c. each **1/2**; per doz. **12/-**

**688.—Graduated Tubes for Centrifugal Machines,** with necks for milk analysis. each **1/3**; per doz. **12/6**



686



687



688

Every requisite for Chemical, Physical, and Bacteriological work supplied, from a test tube to the complete furnishing of the largest laboratory.

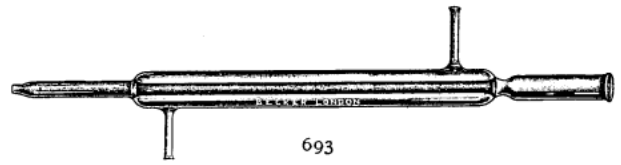
## CONDENSERS



689

**689.—Liebig's Condensers.** Glass body and glass inner tube complete, with rubber connections.

Length of body	8	12	15	18	21	24	30 in.
Diam. of body..	1	1 1/8	1 1/4	1 1/2	1 3/4	1 7/8	1 7/8 in.
Each .. ..	2/6	2/9	3/6	4/-	4/9	5/3	6/-



693

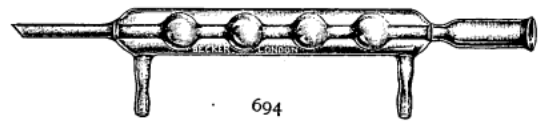
**693.—Liebig's Condensers.** All glass, with inner tube fused into outer body.

Length of body	10	12	15	18	21	24	30 in.
Diam. of body	1	1 1/8	1 1/4	1 1/2	1 3/4	1 7/8	1 7/8 in.
Each .. ..	4/-	4/8	5/3	6/3	6/9	7/9	9/6



**690.—Inner Glass Tubes** for Liebig's Condensers.

Length of stem	12	16	19	22	24	28	34 in.
Each .. ..	1/2	1/4	1/6	1/8	1/10	2/-	2/4



694

**694.—Allihn's Condensers.** Ordinary pattern all glass, inner tube with bulbs fused into outer body.

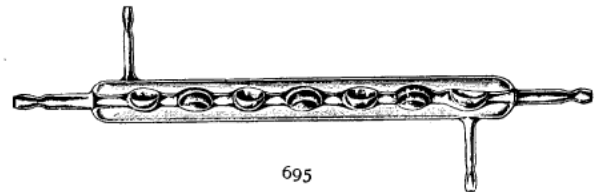
Length of body	8	10	12	16	20	24 in.
Each .. ..	4/-	4/6	5/-	5/9	7/-	9/-



691

**691.—All Glass Spiral Condensers,** with long glass spiral fused into outer jacket.

Length of body ..	10	12	16	20 in.
Each .. ..	7/-	8/6	10/6	15/-

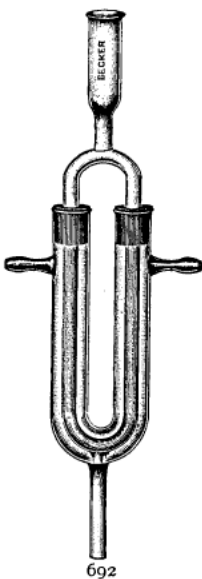


695

**695.—Improved Allihn's Condensers.**

This form of condenser is a great improvement on No. 694, in that the inner tube is made up of a large number of concavo-convex bulbs, which offers a much greater cooling surface, causing the condensation to be much more rapid.

Length of body ..	10	12	16	20 in.
Each .. ..	6/6	7/6	8/6	9/6



692

**692.—Improved shortened Liebig's Condensers.**

This condenser has many advantages over the ordinary form, its length being only about 10 inches, but despite its short length *it will give the same result as an ordinary Liebig's condenser having a length of 20 to 24 inches.* As will be seen from the illustration it is very compact, hence much easier to handle and more convenient for connecting up.

each 6/6



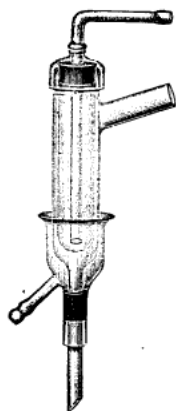
696

**696.—Dr. Graham's Condensers.** Complete, with adapter and side tubes. Body, 30 in. by 1 in.

A. Fitted with ordinary corks .. ..	each	4/6
B. Fitted with indiarubber corks .. ..	..	6/-

Our Balances and Weights have achieved World-wide Reputation: *vide* Opinions of the Leading Scientific Press.

## DOUBLE SURFACE CONDENSERS

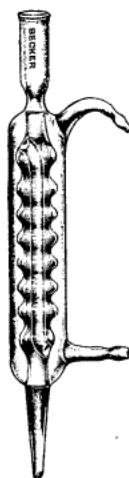


697

**697. — Cribb's Double Surface Condensers.**

Length of body 4  $\frac{3}{8}$  8 in.  
 Diam. of body 1  $\frac{1}{8}$  1  $\frac{1}{2}$  in.  
 Each.. .. 6/6 9/6

**697A. — Double Surface Condenser,** for fractional distillations, King's College pattern. Complete with cork and tubes.  
 each 3/-

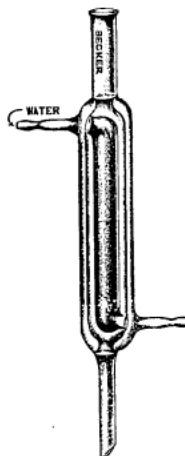


698

**698. — Double Surface Condensers,**

new pattern. Specially made by us for and in general use in the Government Laboratory.

each 12/6

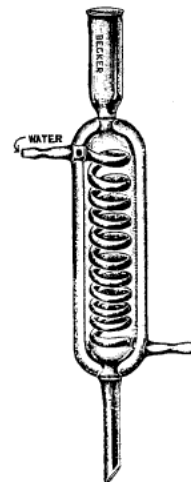


699

**699. — Improved Double Surface Condensers.**

All glass. Very efficient and having a large condensing surface.

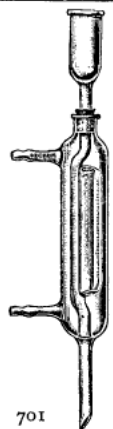
Length of body 4 6 8 10 in.  
 Diam. 1  $\frac{1}{4}$  1  $\frac{1}{2}$  1  $\frac{3}{4}$  1  $\frac{1}{2}$  in.  
 Each 9/6 10/6 12/6 14/-



700

**700. — New Combination Double Surface and Spiral Condenser.**

Maximum cooling surface giving rapid condensation. Spiral 36 inches long. The semi-sealed-in water delivery tube ensures a constant supply of cold water to both spiral and outer jacket—each 21/-



701

**701. — Double Surface Condensers,** with central double tube. Improved pattern.

*Having a large condensing surface it does its work rapidly, and there is no escape of ether vapour when used as a reflux condenser.*

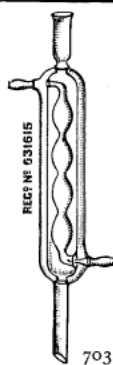
each 8/6



702

**702. — All-glass Ball Condenser,**

improved form. The two concentric glass bulbs form an effective water-jacket and large cooling surface .. each 9/6

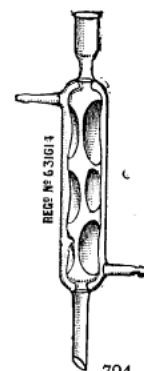


703

**703. — Paul's Double Surface Condenser**

of great efficiency. Its structure and compactness make it particularly suitable for refluxing purposes.

Length of body 10 15 cm.  
 Each .. 7/9 9/6  
 Length of body 20 25 30 cm.  
 Each .. 10/6 15/- 16/6



704

**704. — Clarke's Single Surface Condenser.**

Condensing efficiency equal to the ordinary double surface pattern.

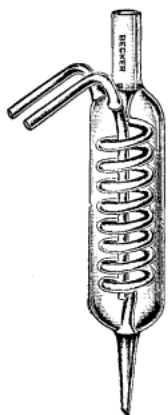
Length of body 10 15 cm.  
 Each .. 6/- 7/6  
 Length of body 20 25 30 cm.  
 Each .. 9/- 10/6 12/-

Our stock of pure Chemicals and Acids is very considerable ; hence all orders are executed with the utmost despatch. See comprehensive list at end of Catalogue.

I

## CONDENSERS

(For Copper Stills and Condensers, see Index.)



705

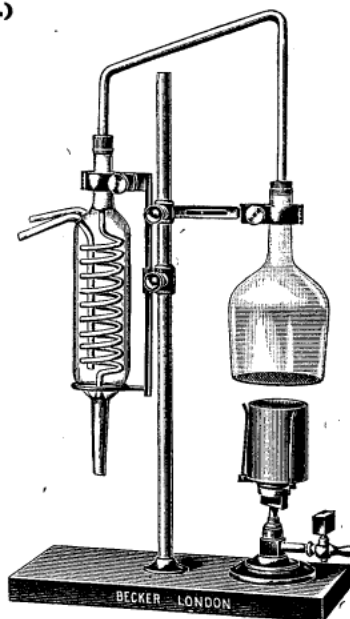
**705.—Inland Revenue Condenser.** Latest improved pattern, with body of correct diameter and correct number of spirals, and as made specially by us for the **Government Laboratories** each 15/-

**706.—Sir Edward Thorpe's Inland Revenue Still,** as supplied by us to the **Government Laboratories.**

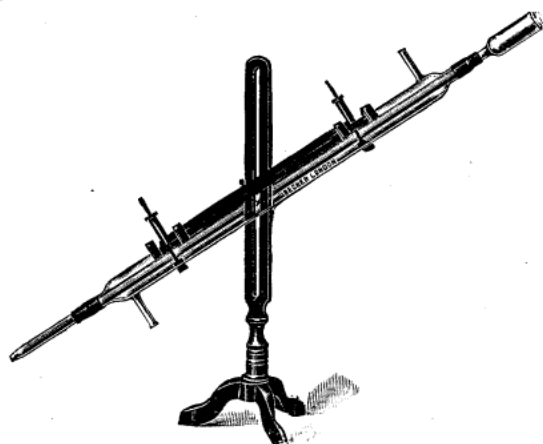
- A. Price, complete on stand, with burner, as illustrated .. .. . £3 18 0
- B. Price, complete on stand, without burner .. .. . £3 1 6

**707.—Spare parts for above as follows:—**

- A. Distilling Flask, latest pattern .. 2/3
- B. Bent Glass Connecting Tube, with two india-rubber corks .. .. . 2/3
- C. Stand with special clamps and teak base .. .. . £2 2 0
- D. Argand Burner, with steatite top and stop-cock .. .. . 16/6
- E. Special Spiral Condenser, latest improved and correct pattern, as No. 705 .. 15/-



706A

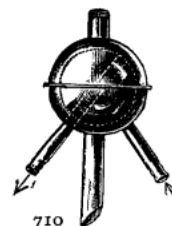


708

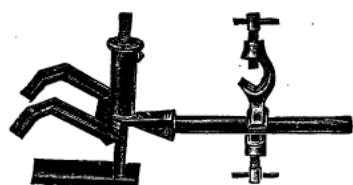
**708.—Condenser Stand,** strongly made, with double oxidised brass clamps all in one piece, adjustable to various heights, and made to take any size condenser .. .. . each 17/6

**710.—Soxhlet's Ball Condenser,** consisting of two balls, one inside the other.

- A. Brass nickel-plated .. 12/-
- B. All glass .. .. . 8/-

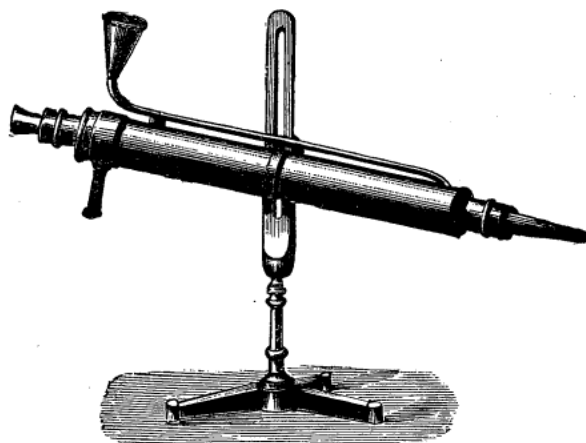


710



709

**709.—Special Condenser Clamp,** oxidised brass, for condensers of all sizes, and to fit any size retort stand rod. .. .. . each 6/6



711/2

**711.—Liebig's Condenser,** with copper body 18 in. long, on adjustable tripod stand, and glass inner tube about 32 in. long by 1 in. diameter.. each 31/6  
**712**—Ditto, with copper body, 24 in. long, on adjustable stand .. .. . each 42/-

Every requisite for Chemical, Physical, and Bacteriological work supplied, from a test tube to the complete furnishing of the largest laboratory.



## CORKS, CORK RINGS AND CORK MATS

For Prices and details of **Rubber Corks**, see Index.

**713.—Ordinary Corks**, finest quality, picked for chemical purposes. Cheaper qualities are not recommended for Chemical Laboratory work.

Diameter, narrow end	$\frac{3}{8}$	$\frac{1}{2}$	$\frac{5}{8}$	$\frac{3}{4}$	$\frac{7}{8}$ in.
Price .. .. .	1/9	2/3	3/-	3/9	4/8 gross.
Diameter, narrow end	1	1 $\frac{1}{8}$	1 $\frac{1}{4}$	1 $\frac{3}{8}$	1 $\frac{1}{2}$ in.
Price .. .. .	6/9	8/6	10/-	11/6	14/- gross.

**714.**—The above sizes assorted .. .. . per gross 4/-

**715.—Shives** (for wide-mouth bottles), about  $\frac{1}{2}$  in. to  $\frac{5}{8}$  in. thick.

Diam., narrow end	$\frac{3}{4}$	$\frac{7}{8}$	1	1 $\frac{1}{8}$	1 $\frac{1}{4}$	1 $\frac{3}{8}$	1 $\frac{1}{2}$ in.
Price .. .. .	2d.	2d.	3d.	4d.	5d.	6d.	7d. doz.
Diam., narrow end	1 $\frac{5}{8}$	1 $\frac{3}{4}$	1 $\frac{7}{8}$	2	2 $\frac{1}{2}$	3	3 $\frac{1}{2}$ 4 in.
Price .. .. .	8d.	10d.	1/-	1/3	1/5	2/6	3/- 4/- doz.

**716.—Common Bungs**, for bottles and jars, about 1 in. to 1 $\frac{1}{2}$  in. thick.

Diam., narrow end	1 $\frac{1}{2}$	2	2 $\frac{1}{4}$	2 $\frac{1}{2}$ in.
Price .. .. .	1/-	1/3	2/-	2/3 doz.
Diam., narrow end	2 $\frac{3}{4}$	3	3 $\frac{1}{4}$	3 $\frac{1}{2}$ in.
Price .. .. .	2/6	7/-	7/6	8/- doz.

**717.—“Suberit” Compressed Corks.** These corks are made from clean new granulated Cork and bound together under pressure. They are not affected by Water, Steam, Carbon Bisulphide, Turpentine or Benzine, but owing to the nature of the binding medium they should not be used with acetic acid, acetone, ether, nitrobenzene, alcohol, or methylated spirits.

Diam. of narrow end	12	14	16	18 mms.
Price per gross	2/-	2/3	2/9	3/6

Diam. of narrow end	20	22	25	30 mm.
Price per gross	4/2	5/-	7/8	10/9



**720.—Cork Borers**, best make, with rod.

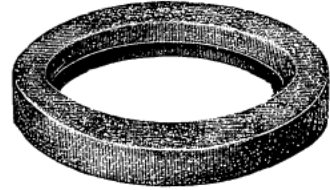
A. Set of Three	.. .. .	per set	1/8
B. „ Six	.. .. .	„	3/-
C. „ Nine	.. .. .	„	4/9
D. „ Twelve	.. .. .	„	7/-

**723.—Japanned Tin Cases**, cylindrical, suitable for Cork Borers Nos. 720.

	A.	B.	C.	D.
For set of	3	6	9	12 borers.
Price .. .. .	6d.	8d.	9d.	10d. each.

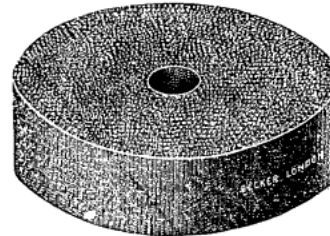
**724.—Japanned Tin Cases**, flat form, with lid, suitable for Cork Borers Nos. 721 and 722.

	A.	B.	C.	D.
For set of	3	6	9	12 borers.
Price .. .. .	1/9	2/-	2/9	3/3 each.



**718.—“Suberit” Cork Rings** for hot flasks, beakers, etc.

No. .. .. .	1	2	3	4	5
Outside diam.	9 $\frac{1}{2}$	7 $\frac{1}{2}$	6	4 $\frac{1}{2}$	3 $\frac{1}{2}$ in.
Inside diam.	7 $\frac{3}{4}$	6 $\frac{1}{8}$	4 $\frac{5}{8}$	3 $\frac{1}{4}$	1 $\frac{7}{8}$ in.
Price, each	2/9	2/6	2/1	1/7	1/3



**719.—“Suberit” Cork Mats** for hot flasks, beakers, etc.

No. .. .. .	1	2	3	4	5	6
Diam. .. .. .	4 $\frac{3}{4}$	4 $\frac{3}{4}$	4 $\frac{3}{4}$	4 $\frac{3}{4}$	4 $\frac{3}{4}$	4 $\frac{3}{4}$ in.
Thickness	1 $\frac{1}{2}$	1 $\frac{1}{2}$	1	1	1	1 in.
Price, each	1/11	1/10	1/8	1/6	1/6	1/-

## CORK BORERS AND CASES



**721.—Cork Borers**, nickel-plated, with separate handle to each borer.

A. Set of Three	per set	2/6
B. „ Six	.. .. .	4/9
C. „ Nine	.. .. .	7/6
D. „ Twelve	.. .. .	10/-



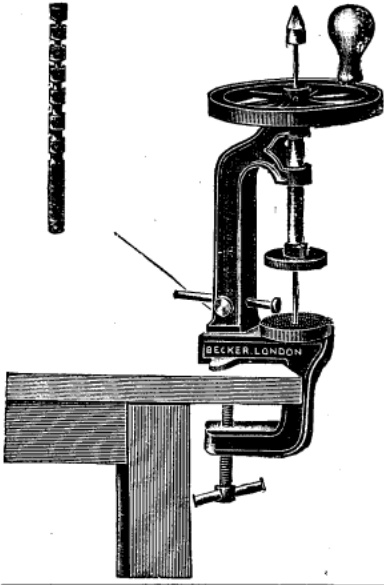
**722.—Cork Borers**, Special Quality for Lecture Table, all steel tube, with separate handle to each borer

A. Set of Three	per set	4/-
B. „ Six	.. .. .	8/-
C. „ Nine	.. .. .	12/-
D. „ Twelve	.. .. .	16/-



Our Balances and Weights have achieved World-wide Reputation: *vide* Opinions of the Leading Scientific Press.

## CORK BORERS, KNIVES AND SQUEEZERS



**725.—Apparatus for Boring India-Rubber Corks.** Strongly made with clamp for fixing to bench; complete, with set of nickel-plated cork borers.

- A. With 15 borers to bore holes from  $\frac{3}{16}$  in. to 1 in. diameter .. .. . 57/6
- B. Extra sets of 15 borers .. .. . 26/-

**726.—Apparatus for Boring India-Rubber Corks,** as No. 725, but with holes in base to screw to bench.

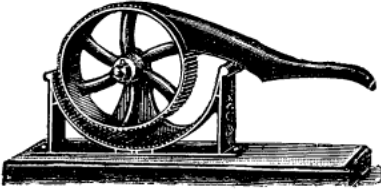
- A. With 15 borers to bore holes from  $\frac{3}{16}$  in. to 1 in. diameter .. .. . 50/-
- B. Extra sets of 15 borers .. .. . 26/-



**727.—Knives for Cutting Corks** .. .. . each 1/9



**728.—Cork Borer Sharpener,** with steel knife each 2/-



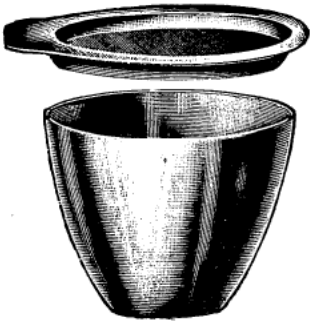
**729.—Cork Squeezers,** improved form to take corks of any size. each 8/-



**730.—Cork Squeezers,** iron, best quality each 4/-

## CRUCIBLES

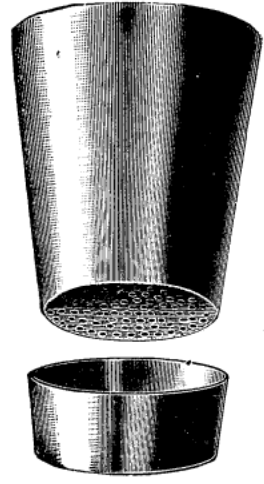
For **PORCELAIN CRUCIBLES**, see pages 12-14.  
 For **SILICA CRUCIBLES**, see pages 17, 18 and 27.  
 For **NICKEL CRUCIBLES**, see page 32.



**731.—Silver Crucibles,** highly finished, with covers. Any size made to order. (Lowest prices on application.)

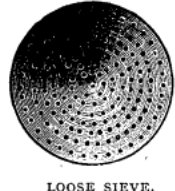
Diameter	in.	Depth	$\frac{3}{8}$ in.	Capacity	drachm	Prices on application.
"	$\frac{1}{4}$	"	"	"	2	
"	$\frac{1}{2}$	"	"	"	4	
"	$\frac{3}{4}$	"	"	"	5	
"	$1\frac{1}{4}$	"	"	"	7	
"	$1\frac{1}{2}$	"	"	"	$1\frac{1}{4}$ ounce	
"	$1\frac{3}{4}$	"	"	"	$1\frac{3}{8}$ "	

A platinum crucible, capacity 1 oz., weighs approximately 1 oz.



Prices vary according to the market price of platinum.

(Quotation on application.)



LOOSE SIEVE.

**733.—Gooch Crucibles,** made of Platinum.  
 Size A. 20 c.cm. 1.0 oz. Troy = 30 grammes.  
 " B. 30 c.cm. 1.3 oz. Troy = 40 grammes.  
 " C. 40 c.cm. 1.7 oz. Troy = 50 grammes.

Our stock of pure Chemicals and Acids is very considerable; hence all orders are executed with the utmost despatch. See comprehensive list at end of Catalogue.

## CRUCIBLES (Continued)

### 734.—Fireclay Crucibles, "London round."

No. ..	1	2	3	3½	4	4½	5	5½	6	6½	7	8	9	10	11	12
Height ..	2½	2¾	3⅛	3¼	4	4½	5	5½	6	6½	7	8	9	10	11	12 in.
Price, per doz.	2/6	3/9	4/9	5/9	6/9	8/6	10/6	13/6	15/-	18/9	24/6	37/6	51/-	66/-	85/-	112/6



### 735.—Covers for London Round Crucibles.

For No. ..	1	2	3	3½	4	4½	5	5½	6	6½	7	8	9	10	11	12
Price, per doz.	3/-	3/-	3/9	5/6	5/6	6/9	7/9	7/9	10/3	10/3	12/6	15/9	18/-	22/6	31/6	40/6



### 736.—Fireclay Crucibles, "Battersea Round."

Size ..	A	B	C	D	E	F	G	H	J	K	L	M	N	O
Height ..	2⅝	3	3½	4	4½	5	5⅝	5⅞	6⅝	7¼	8	8½	9⅝	10 in.
Diameter ..	1⅝	1⅞	2¼	2⅝	2⅞	3	3⅝	3⅞	4⅝	4⅞	5¼	5⅝	6½	7 in.
Price, per doz.	2/6	3/3	4/6	5/6	6/6	7/9	10/-	12/-	15/3	19/6	28/6	32/6	45/9	61/-

Covers for above.

Per doz. ..	2/3	2/3	3/-	3/-	4/6	5/6	6/9	6/9	7/9	10/3	10/3	12/6	15/9	18/-
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### 737.—Fireclay Crucibles, "Battersea Triangle."

Size.	Height.	Width.	Price per doz.	Covers for same. per doz.
S	4½ in.	4 in.	13/3	7/9
T	4 "	3¾ "	10/6	7/9
U	3½ "	3¼ "	8/-	6/9
V	3¼ "	2⅞ "	6/9	5/6
W	2⅝ "	2⅞ "	4/3	4/6
X	2½ "	2¼ "	3/6	4/6
Y	2 "	1⅞ "	3/-	3/-
Z	1¾ "	1¾ "	2/9	3/-
YY	1½ "	1¼ "	2/3	2/3
ZZ	1¼ "	1 "	1/9	2/3



### 741.—Battersea Fluxing Crucibles, soft fine clay.

No.	Height.	Diameter.	Price per doz.
0	2 in.	1⅝ in.	2/3
1	2½ "	1¾ "	2/6
2	2⅝ "	1⅞ "	3/-
3	2¾ "	1⅞ "	4/-
4	3 "	1¾ "	4/9
5	3⅝ "	2 "	5/3
6	3⅞ "	2½ "	6/-
7	4¼ "	2½ "	7/-
8	4¾ "	2⅞ "	8/3
9	5¼ "	2⅞ "	10/-
10	5⅞ "	3½ "	12/6



### 738.—Crucibles, Fireclay, Cornish Shape, for copper, Juleff's.

Height ..	2½	2⅝	3⅝	3¾ in.
Diameter ..	2⅞	2⅞	3¼	3½ in.
Price, per dozen ..	5/9	5/6	7/6	9/6



### 739.—Salamander Crucibles, not affected by moisture or frost, and require no annealing.

Each number represents a capacity of about 2 lb. For example, No. 2 = 4 lb. capacity.

Crucibles No. ..	3/0	2/0	0	1	2	3	4	5	6	8	10	12
Height ..	2⅞	2¼	2¼	2⅞	4¼	4¾	5¼	5⅞	6	6⅞	7	7⅞ in.
Price, each ..	5d.	6d.	8d.	9d.	1/5	2/1	2/9	3/4	3/10	5/-	6/1	7/2
.. per doz. ..	4/-	5/4	6/8	8/-	15/-	22/6	30/-	36/-	42/-	54/-	66/-	78/-



### 740.—Roasting Dishes.

Diameter ..	2½	3	4	5 in.
Price, per doz.	5/-	5/9	6/9	8/3



### 742.—Scorifiers, clay.

Outside diam.	1	1¼	1½	2	2¼	2½	2¾	3	3½	4 in.
Price per gross	18/-	20/3	22/6	24/9	27/-	29/3	36/-	42/9	54/-	63/-



Every requisite for Chemical, Physical, and Bacteriological work supplied, from a test tube to the complete furnishing of the largest laboratory.

## CRUCIBLES—(Continued)



**743.—Skittle Pots, fireclay.**

Height	3	4	5	6	8	10	12
Per doz.	7/9	11/3	13/6	15/9	23/9	41/-	61/-



**745.—Sheet Iron Crucibles, with covers.**

Diameter	..	1 3/8	2 1/4	2 3/4	3 1/2 in.
Price, each	..	1/6	1/9	2/3	2/9

**746.—Crucibles, copper, spun in one piece.**

Top Diameter	..	..	2 3/8	2 5/8	3 3/8 in.
Height	..	..	2	2 3/8	2 3/4
Price	..	..	3/-	3/6	4/-

### FOR PORCELAIN, SILICA AND NICKEL CRUCIBLES

See Pages 12-14, 17, 18, 27 and 32.

**744.—Annealing Cups, for gold assay.**



Height	..	..	1 1/8	1 1/4	1 1/2	2	2 3/8
Diameter	..	..	1 1/8	1 1/4	1 1/2	1 3/4	1 7/8
Price, per doz.	..	..	6/9	7/6	8/3	9/-	10/6

**747.—“Nivoc” White Fireclay Crucible Supports.**

Very convenient for use with desiccators (see No. 791)—  
each 2d.  
per doz. 1/6



**748.—Porcelain Capsules, best quality, for evaporations, ignitions, weighing, etc.**

No.	..	..	..	..	1	2
Diameter	..	..	..	..	2 1/2	4 cms.
Price, each	..	..	..	..	6d.	10d.
„ per doz.	..	..	..	..	4/9	8/2



## CRUCIBLE AND FURNACE TONGS



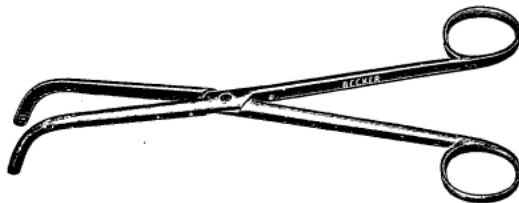
**749.—Crucible Tongs with Bow, dull iron, strongly made and well finished, 8 in. long.**

Each	..	..	..	..	10d.
Per doz.	..	..	..	..	9/-



**752.—Crucible Tongs with bow, best quality and strongly made, 8 in. long.**

	Each.	Doz.
A. Polished Brass	.. .. 1/10	21/-
B. Gun-metal	.. .. 2/2	23/6
C. German Silver	.. .. 2/6	29/-
D. Pure Nickel	.. .. 7/3	86/-



**750.—Crucible Tongs. Straight, dull iron. Same quality as No. 749. Strongly made and well finished. 8 in. long** .. .. each 9d.; per doz. 7/6



**753.—Crucible Tongs fitted with Platinum Shoes, with bow.**

Price varies according to the market price of platinum.

A. Gun-metal	..	..	..	each	35/-
B. German Silver	..	..	..	„	37/6
C. Pure Nickel	..	..	..	„	37/6

**751.—Crucible Tongs. Polished brass. Best quality. 8 in. long** .. each 1/8; per doz. 18/-




**754.—Scorifier Tongs, with spring.**


Length..	..	..	24	32 in.
Price	..	..	3/6	4/6 each.

Our Balances and Weights have achieved World-wide Reputation: *vide* Opinions of the Leading Scientific Press.


## CRUCIBLE TONGS




**755.—Iron Tongs, straight.**  
 Length .. 14 18 24 in.  
 Price .. 3/- 3/6 4/- each.



**756.—Iron Tongs, bent.**  
 Length .. 14 18 20 in.  
 Price .. 3/- 3/6 4/- each.




**757.—Bow Tongs, iron, with bend.**  
 Length .. .. 14 20 in.  
 Price .. .. 4/6 5/6 each.




**758.—Bow Tongs, iron.**  
 Length .. 14 18 24 in.  
 Price .. 3/6 4/- 4/6 each.




**759.—Iron Bar Scrapers.** .. 4/- each.




**760.—Wrought Iron Ladles.**  
 Diameter .. 3 4 5 6 in.  
 Price .. 1/9 2/3 2/9 3/6 each.



**761.—Basket Tongs, iron.**  
 Length .. 24 28 32 in.  
 Price .. 24/- 27/- 30/- each.



**762.—Cupel Tongs.**  
 Length .. .. 30 36 in.  
 Price .. .. 5/- 5/9 each.



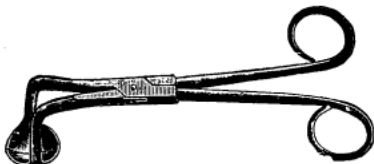
**763.—Charcoal Tongs.**  
 Length .. 14 16 18 in.  
 Price .. 2/6 3/- 3/6 each.



**764.—Iron Bar Scrapers.**  
 3/- each.



**765.—Iron Bar Scrapers, chisel end.**  
 4/- each.

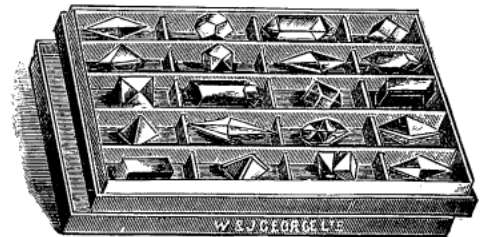


**766.—Mercury Tongs, with cup for picking up small globules of mercury.**  
 Polished iron .. .. each 3/-

## MODELS OF CRYSTALS

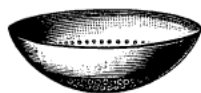
**767.—Glass Models of Crystals, cut and polished, for illustrating the six systems of Crystallography.**

A. Set of 20, about 3 cm., complete in box .. .. .	£2 15 0
B. „ 40 „ „ „ „ „ .. .. .	3 17 6
C. „ 60 „ „ „ „ „ .. .. .	5 10 0



Our stock of pure Chemicals and Acids is very considerable ; hence all orders are executed with the utmost despatch. See comprehensive list at end of Catalogue.

## CRYSTAL DRAINERS, TILES, Etc.



**768. — Porcelain Crystal Drainers**, with perforated bottoms, for draining or filtering.

Diameter .. ..	4½	5½	5¾	6½ in.
Capacity .. ..	6	10	14	16 oz.
Price .. ..	3/-	3/6	4/-	4/6 each.



**769. — Porous Plates**, about 9 in. diam., for drying crystals.

each 8d.; per doz. 7/-

**770. — Porous Saucers**, about 5 in. diam., for drying crystals .. .. each 5d.; per doz. 4/-



**771. — Circular Porous Tiles** for drying crystals.

Diameter .. ..	6	8 in.
Price .. ..	1/2	1/8 each.



**772. — Becker's Compressed Filter Mats**, special quality.

These mats will be found very useful in the laboratory for drying crystals or as bench pads for hot beakers, flasks, etc.

Per doz. 3d. Per 100 2/- Per 1,000 18/-

**773. — White Porcelain Tiles**,

glazed both sides—



Size .. ..	5	6	7	8 in. square,
Price .. ..	2/3	2/9	3/-	3/6 each.

**774. — Ditto**, but glazed on one side only.

Size .. ..	3	5	6	7	8 in. square
Price .. ..	1/3	1/6	2/-	2/4	2/9 each.

**775. — Ditto**, biscuit porcelain for arsenic testing, size 4 in. × 2½ in... .. each 1/-

**776. — White Porcelain Tiles**,

with three cavities .. .. each 1/9



**777. — White Porcelain Tiles**,

with six cavities .. .. each 2/3

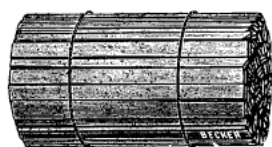


**778. — White Porcelain Tiles**,

with twelve cavities .. each 3/-



## DEFLAGRATING SPOONS, Etc.



**779. — Wood Splints** for Oxygen experiments, etc.

per bundle 3d.

**780. — Cedar Wood Splints.**

per bundle 1/-



**782. — Wire Taper Holders**,

for gas experiments.

each 6d.

per doz. 5/6

**781. — Porcelain Capsules** for floating on water.



Each .. 5d. Per doz. .. 4/9

**783. — Deflagrating Spoons**, best

make, complete with brass cap .. each 10d

per doz. 8/6

**784. — Spoons only**, brass cup on iron

rod, but without cap .. .. each 5d.

per doz. 4/-



**785. — Deflagrating Spoons on Stand**,

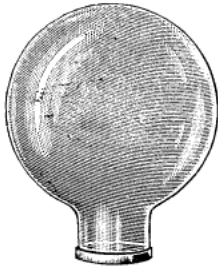
polished brass for P<sub>2</sub>O<sub>5</sub> experiment, etc.

each 3/6



Every requisite for Chemical, Physical, and Bacteriological work supplied, from a test tube to the complete furnishing of the largest laboratory.

## DEFLAGRATING GLOBES, Etc.



**786. Deflagrating Globes**  
 for burning Phosphorus in  
 Oxygen.  
 Diameter .. .. 8 10 12 in.  
 Price, each .. 4/8 6/8 14/-

**788.—Deflagrating Jars**, made of  
 very thin glass, best quality, closed at  
 bottom.  
 Capacity .. 300 700 1500 2000 c.c.  
 Price .. .. 1/3 2/- 2/3 2/9 each.



**787.—Detonating Bottles**, stoppered,  
 strong glass for exploding mixed gases.  
 Each .. .. . 4/-  
 Per dozen .. .. . 47/-

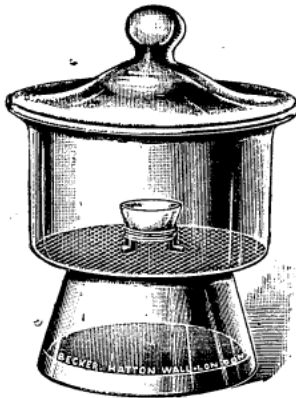


**789. — Eprouvettes**,  
 strong glass, on glass foot.  
 Each .. .. . 1/-  
 Per dozen .. .. . 11/-



**790.—Eprouvettes**, strong glass, for  
 explosions. Size about 9 in. x 1 3/4 in.  
 Each .. 1/- Per doz. .. 11/-

## DESICCATORS

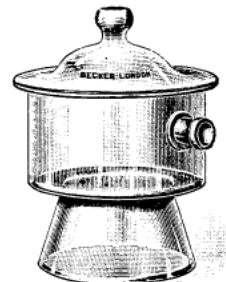


**791. — Desiccators**,  
 Schiebler's, with ground-  
 glass cover and perforated  
 zinc disc.  
 Inside dia. 4 5 6 7 in.  
 Each 5/- 5/6 7/- 11/-  
 Inside dia. 8 9 10 in.  
 Each .. 16/6 21/- 27/6

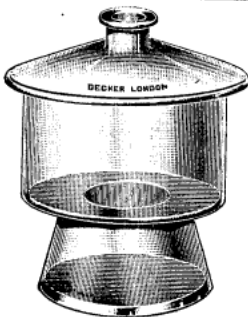
791

**794.—Desiccators**,  
 Schiebler's, with tubulure at  
 side without stopcock.

Inside diameter 4 5 6 in.  
 Each .. .. 6/9 7/6 8/6  
 Inside diameter 7 8 in.  
 Each .. .. 14/- 19/3



794

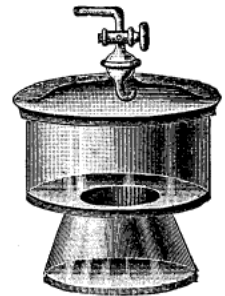


**792.—Desiccators**,  
 Schiebler's, for vacuum, with  
 well-ground glass cover, and  
 tubulure in centre of cover.  
 Inside dia. 4 5 6 7 in.  
 Each .. 6/9 7/6 8/6 14/-  
 Inside dia. 8 9 10 in.  
 Each .. .. 19/6 23/- 30/-

792

**795. — Schiebler's  
 Desiccators**, as No.  
 792, but with well-ground-in  
 glass stopcock, with hook and  
 perforated zinc disc.

Inside diam. 4 5 6 in.  
 Each .. 13/9 15/6 17/6  
 Inside diameter. 7 8 in.  
 Each .. .. 22/6 30/-



795

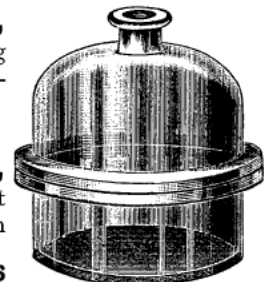


**793.—Professor Schiff's Im-  
 proved Desiccator**, with well-  
 ground-in glass stopcock, with glass hook.  
 Internal diameter .. 10 12 1/2 cm.  
 Each .. .. . 14/- 16/-

793

**796.—Desiccators**,  
 for vacuum, made of strong  
 white glass, 6 in. inside dia-  
 meter.  
 Each .. .. . 14/-

**797. Desiccators**,  
 for vacuum, as No. 796, but  
 fitted with glass stopcock, with  
 hook and indiarubber cork.  
 Each .. .. . 19/6



796

Our Balances and Weights have achieved World-wide Reputation: vide Opinions of the  
 Leading Scientific Press.



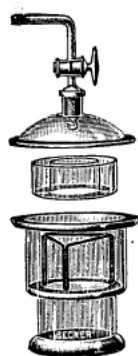
## DESICCATORS

(See also previous Page.)



**798.—Hempel's Improved Desiccators**, with well-ground glass cover with knob, separate acid dish and wire tripod.

Inside diameter ..	4	5	6 in.
Price, each ..	8/-	9/-	11/-



**799.—Hempel's Improved Desiccators**, as No. 798, with separate acid dish and wire tripod, but with cover fitted with well ground-in glass stopcock with hook.

Diameter .. ..	4	5	6 in.
Price, each .. ..	15/-	17/-	22/6



**800.—Hempel's Improved Desiccators**, with well-ground-in stopper and stopcock with glass

hook. As will be seen from the illustration the drying medium (sulphuric acid) is placed in the *upper* part of the desiccator. As dry air has a higher specific gravity than moist air, the moist air rises to the upper part, and desiccation proceeds more rapidly than in desiccators which have the drying medium in the *lower* part.

Inside Diameter .. ..	4	5	6 in.
Price .. ..	17/6	21/-	26/-



**801.—"Nivoc" White Fireclay Crucible Supports.**

Very convenient for use with desiccators (see No. 791).  
 Each 2d.; per doz. 1/6

**FOR BELL JARS WITH GROUND GLASS FLANGES,  
 SEE PAGE 118.**

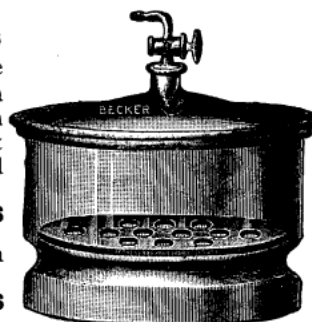
**802.—Frühling's Desiccators**, inside diameter 8 in., with ground-on cover with knob, but without the perforated porcelain support.



each 18/9

**803.—Perforated porcelain support** for above.  
 each 8/6

**804.—Frühling's Desiccators**, inside diameter 8 in. with ground-on cover with stopcock and hook, but without the perforated porcelain support.



each 26/6

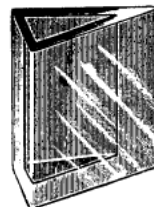
**805.—Perforated porcelain support** for above.  
 each 8/6

**806.—Sulphuric Acid Desiccator Dish**, for supporting capsules, etc.



Diameter 4 1/8 in. .. .. each 6/-

**807.—Triangular Desiccators**, polished on all sides, for placing inside balance cases.



A. 2 in. x 1 3/4 in. .. ..	each 1/3
B. 3 1/8 x 2 1/4 in. .. ..	1/6

**808.—Square Glass Plates**,



1/4 in. thick and ground on one side, for desiccators, bell jars, etc.

Size .. ..	5	6	8	10	12	14 in.
Price, each ..	1/6	1/9	2/-	3/-	4/-	6/6

**809.—Discs of Perforated Zinc** for Desiccators.

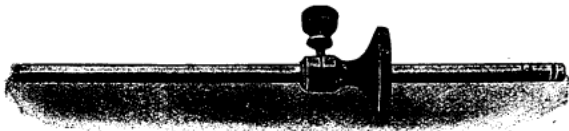
Diameter .. ..	10	12	14 1/2	17	19 cm.
Each .. ..	3d.	5d.	6d.	8d.	10d.
Dozen .. ..	2/9	4/6	5/6	7/6	9/6

Our stock of pure Chemicals and Acids is very considerable; hence all orders are executed with the utmost despatch. See comprehensive list at end of Catalogue.

**DIAMONDS, TUBE CUTTERS AND GREASE PENCILS**



**810.—Glaziers' Diamonds**, guaranteed best London make, for cutting crown and sheet glass, etc. each 15/-



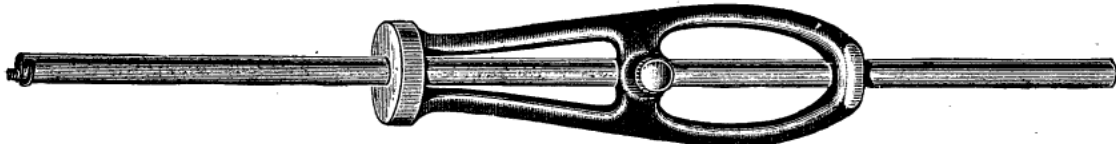
**811.—Gauge Glass Tube Cutters**, with diamond and steel rod, as figured.

Length of rod .. .. .	18	24	30 in.
Price .. .. .	20/-	21/-	22/-
A.—Ditto, graduated in inches or millimetres .. each	26/-	27/-	28/-



**812.—Diamonds for writing on glass**, guaranteed best London make and superior quality.

Size .. .. .	No. 1.	No. 2.
Price, each .. .. .	9/-	12/6



**813.—Improved Glass Tube Cutter**, for cutting glass tubes of various diameters and lengths. The cutting wheel may be changed when worn out, making this practically an everlasting tool. This cutter is largely used by professional glass blowers.

INSTRUCTIONS FOR USE :—Place the tube to be cut on a table or other level surface, insert the rod, and bring the wheel in contact with the glass. Bear down slightly on the tool, and at the same time impart a rotary motion to the tube with the palm of the left hand. The cutter wheel will then mark a perfect circle on the inner surface of the tube, and a gentle tap will cause it to break off with a clean smooth fracture.

For longer lengths break off the glass tube roughly and trim the ends with the cutter.

A. With 8½ in. Rod .. .. .	each	5/-
B. " 15 " " and loose Metal Disc 2 in. diameter .. .. .	"	6/-
C. Extra Cutting wheels for above .. .. .	per dozen	10/6

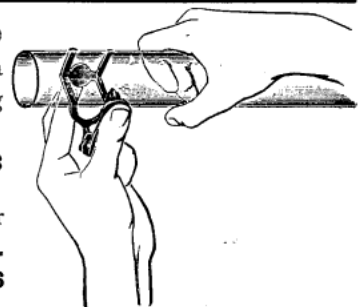


**814.—Glass Tube Cutters**, small size each 3/-  
**815.—Extra wheels for same** each, 11d. ; per doz. 10/6



**816.—Glass Cutting Knife**, made of specially tempered steel, with handle .. .. each 1/6

**818.—Glass Tube Cutters**, extra large size for cutting tubing of large bore. each 4/3



**819.—Extra wheels for same** .. each 11d. Per doz. 10/6



**817.—Grease Pencils for writing on glass**, best quality.

	Each.	Per dozen.
A. Red .. .. .	5d.	4/6
B. Blue .. .. .	5d.	4/6
C. Yellow .. .. .	5d.	4/6

**820.—Sebatier's Ink**, for writing on glass. In gutta-percha bottle. Per bottle .. .. . 2/9

**FOR TRIANGULAR FILES, SEE PAGE 179.**



Every requisite for Chemical, Physical, and Bacteriological work supplied, from a test tube to the complete furnishing of the largest laboratory.

## DIALYSERS



### 821.—Graham's Dialyser.

This form of Dialyser consists of two rings of pure gutta-percha, one fitting over the other, and between which is tightly stretched a sheet of Dialysis Paper. The mixed solution is poured into this ring, and the latter with its contents is then placed in a glass basin containing a large quantity of water, on which it floats. After a period of about two days a more or less complete separation of the mixed solution will have taken place.

A. Gutta Percha Rings 4 6 8 10 in. diam.  
 Price .. .. 3/6 5/- 7/6 10/6 per pair.

B. Glass Basins, suitable for above—  
 To take Ring 4 6 8 10 in. diam.  
 Price .. .. 2/- 3/- 5/5 7/6 each.

### 822.—Bell-shaped Glass Dialysers, with two flanges.



Diameter .. 3 4 5 in.  
 Price .. 1/- 1/4 1/8 each.

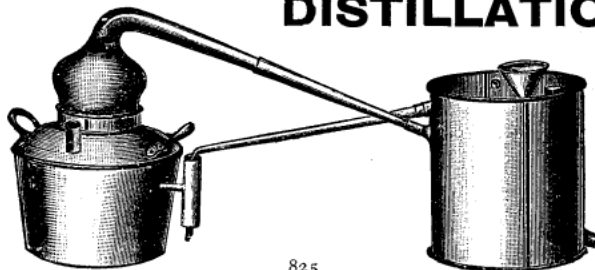
### 823.—Cylindrical Jars for above, without feet.

Diameter .. .. 6 x 4 8 x 5 9½ x 6¼ in.  
 Price .. .. 8d. 1/2 2/- each.

### 824.—Dialysis Papers, cut into squares.

Size .. .. 5 6 8 10 in. square.  
 Price .. .. 9d. 10d. 1/3 1/9 per doz.

## DISTILLATION APPARATUS

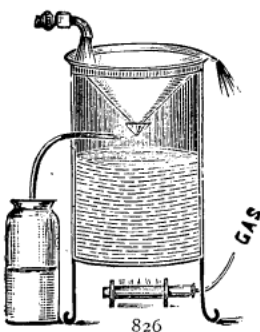


### 825.—Stout Copper Still with pure Tin Worm Condenser, in zinc cylinder, complete with constant level and self-filling arrangement.

Capacity of Still, galls.	Price each.
½ .. .. .	£3 10 0
1 .. .. .	4 10 0
2 .. .. .	6 10 0

### 826.—Cheap Form Still for Students' Use.

This Still is simple in construction and there is nothing to get out of order.



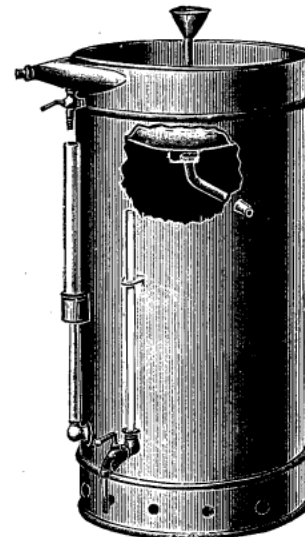
**DIRECTIONS FOR USING.**—Put the water into cylinder, fix on cover and place the still over heating apparatus, which can be a spirit stove, oil lamp, gas or ordinary fire. Allow a gentle stream of cold water to pass through the conical cover. When the water in the cylinder boils, the steam rises, settles on the inner surface of the cone, and being condensed by the cold water outside, drops into the funnel, and is caught on the outside by a bottle or other vessel placed for that purpose. The cone and funnel should be kept scrupulously clean, otherwise impurities are apt to get into the distillate.

Made of stout tin plate with copper bottoms.

Size A. .. .. each 18/6  
 Size B. .. .. ,, 27/6

### 827.—Improved Still of stout sheet copper, as made by us for the India Office and other Government Departments. This still is very economical in use, simple in construction, and with fair use will last a number of years without getting out of order.

Full working details and instructions are sent out with each still.



827

- A. Capacity 2 gallons, producing about 4 pints of distilled water per hour .. .. £5 7 6
- B. Capacity 4 gallons, producing about 6 pints of distilled water per hour .. .. £6 17 6
- C. Capacity 6 gallons, producing about 8 pints of distilled water per hour .. .. £9 17 6

**Our Balances and Weights have achieved World-wide Reputation: vide Opinions of the Leading Scientific Press.**

## STILLS

### ELECTRIC STILLS.



828

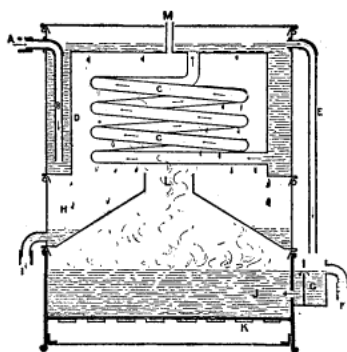
From the sectional illustration it will be seen that the cold water enters at (A) where it should be controlled by screw-down water tap. It passes through the pipe (B) to the outside of the condensing chamber and coil (C and D). After filling the tank and coil, the overflow water passes through the pipe (E) into the small feed tank (G), which is so arranged that there is no loss of heat at this point and no disturbance of the constantly boiling water in the evaporating chamber (J). The overflow water is taken by the pipe (F) to a suitable waste drain.

The Heating Elements (K) are mounted on the underside of the evaporating chamber, and when the water is flowing and the current is switched on, the water rapidly boils. The steam given off rises through the cone (L) and impinges on to the various surfaces of the walls and coil in the condensing chamber, where it rapidly condenses the drops of distilled water falling into the distillate chamber (H) from whence it flows through the outlet (I) into a suitable receptacle.

It will be seen that the action is simple and automatic; absolutely no attention is required, so long as the water is flowing, nothing can go wrong.

For economy in working, it is suggested that the flow of the feed water should be so regulated that the temperature of the waste water is about 150° F.; at this point the still is working at its greatest efficiency.

All parts of the still are easily detachable and accessible, including the elements. Its construction is robust and its design particularly suitable for workshop use.



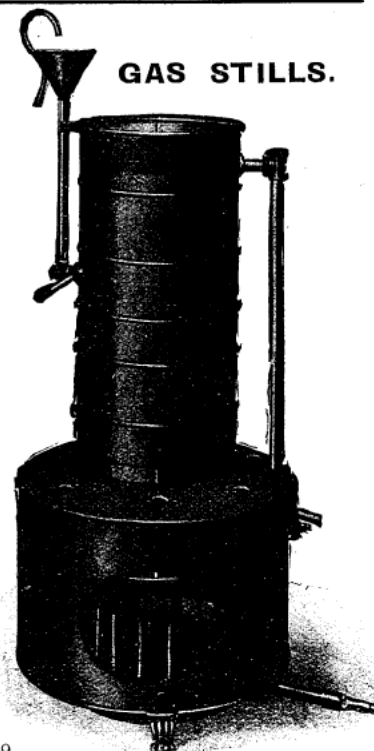
Section of 828

**828.—Electric Still**, as above, size 18 × 17 in., output 4 pints per hour, weight 20 lb., consumption 2,000 watts.

Price .. .. .	£13 10 0
No. of elements fitted.. .. .	8
A. Price of spare elements .. .. .	3/- each.

(Please state voltage when ordering.)

### GAS STILLS.



829

### 829.—Improved Patent Automatic Still (Patent No. 6916),

made of stout copper, tinned inside and so constructed that it can be readily taken in half for cleaning purposes.

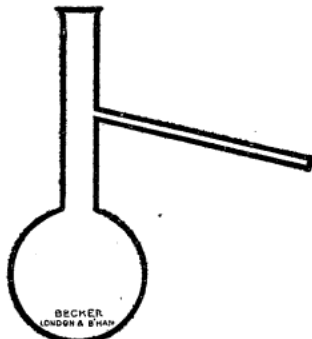
In the small stills producing 6 and 7 pints of distilled water per hour, the boiler capacity is only 5 pints, and the Inland Revenue Authorities will allow their use free of licence on application. In the large size making 3½ gallons per hour, the capacity of the boiler is under 1 gallon. Permission may be obtained for the use of the large one free.

- A. Small size to produce 6 pints of distilled water per hour .. £5 0 0
- B. Ditto, to produce 7 pints of distilled water per hour .. £6 15 0
- C. Gas Burner and Stand for either of above .. .. £0 9 0
- D. Medium size, to produce 1½ gallons of distilled water per hour £10 0 0
- E. Combined Burner and Stand for above .. .. £2 10 0
- F. Medium size Still and Tubular Boiler to produce 2½ galls. per hour .. £13 0 0
- G. Combined Burner and Stand for above .. .. £2 10 0
- H. Large size Still to produce 3½ to 4½ galls. of distilled water per hour .. £27 10 0
- K. Combined Burner and Stand for above .. .. £3 10 0

Our stock of pure Chemicals and Acids is very considerable; hence all orders are executed with the utmost despatch. See comprehensive list at end of Catalogue.

## DISTILLATION APPARATUS

### FLASKS.

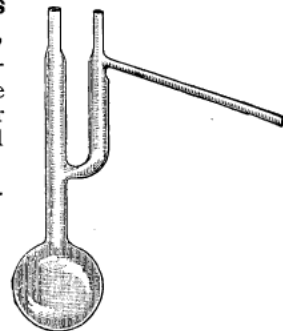


**830.—Resistance Glass Distillation Flasks.** Round bottom, with side tube in middle of neck. Best quality.

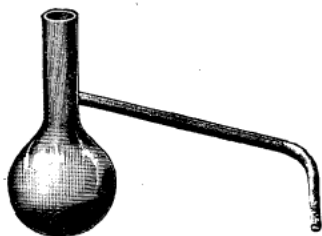
Cap.	30	50	100	125	175	c.c.
Each	1/9	2/-	2/3	3/-	3/6	4/6
Dozen	9/9	10/6	12/9	13/9	17/9	

Cap.	250	350	500	750	1000	1500	c.c.
Each	1/9	2/-	2/3	3/-	3/6	4/6	
Doz.	20/6	23/6	26/6	35/-	41/-	53/-	

**832. — Claisen's Distilling Flasks,** with two necks for fitting with capillary tube and thermometer, or capillary tube and separating funnel.



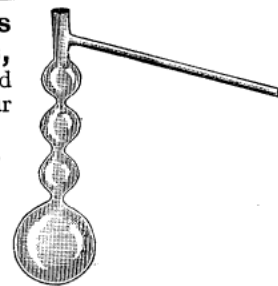
Capacity.	Price, each.
30 c.c.	2/-
50 "	2/6
100 "	2/9
150 "	3/-
250 "	3/6
500 "	4/6



**831.—Copper Distillation Flasks,** with brazed joints and side tube.

Capacity	300	500	1000	c.c.
Price, each	18/-	22/6	30/-	

**833. — Ladenburg's Distillation Flasks,** made of well-annealed glass, with three and four bulbs in neck.



Capacity.	Each.	Per doz.
100 c.c.	2/-	23/-
150 "	2/3	26/-
250 "	2/8	31/-
500 "	3/3	38/-
1000 "	5/-	59/-

### DISTILLATION TUBES.

**834.—Fractional Distillation Tubes.** Professor Young's design.

No. of Pears ..	4	8	12
Price, each ..	3/-	5/-	7/-
Per dozen ..	35/-	59/-	83/-

**835.—Fractional Distillation Tubes.** Professor Young's design.

No. of Discs ..	15	20
Price, each ..	3/-	3/6

**836.—Fractional Distillation Tubes.** Young and Thomas' pattern.

With	3	5	8	sections.
Each	15/-	22/6	34/6	

834

835

**837. — Glynsky's Distillation Tubes,** with glass beads.

A. With 2 bulbs ..	4/9
B. " 3 " ..	8/-
C. " 5 " ..	10/6

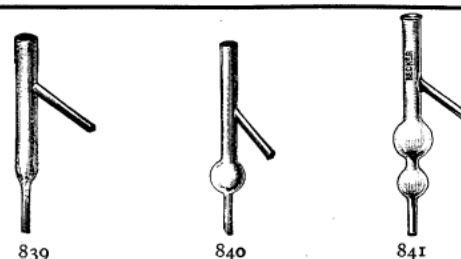
**838.—Le Bel & Heninger's Distillation Tubes.**

No. of Bulbs ..	2	3	4
Price, each ..	3/3	4/9	6/6
No. of Bulbs ..	5	6	
Price, each ..	9/6	12/-	

837

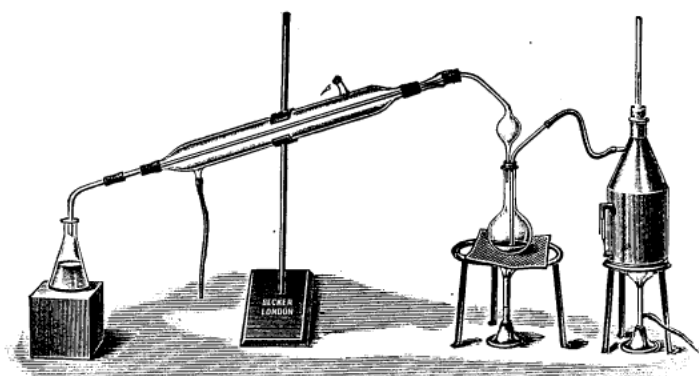
838

- 839.—Distillation Tubes,** straight, plain each 10d.
- 840.—Distillation Tubes,** with one bulb ,, 1/2
- 841.—Distillation Tubes,** with two bulbs ,, 1/7



Every requisite for Chemical, Physical, and Bacteriological work supplied, from a test tube to the complete furnishing of the largest laboratory.

## DISTILLATION APPARATUS



**842.—Distillation Apparatus**, for determining the volatile acids in wine.

Price, complete as illustrated .. .. . **37/6**

ferred to a 200 c.c. measuring flask. The total volatile acids are determined by titrating back with decinormal sulphuric acid. The neutral soap solution is now treated with excess of decinormal silver nitrate solution, and 10 per cent. of solid sodium nitrate is dissolved in the liquid in order to salt out all the sparingly soluble silver salts. After making up to 200 c.c., the precipitated silver salts are filtered off, and the excess of silver nitrate is determined volumetrically in the filtrate. The volatile fatty acids are thus determined as soluble and insoluble silver salts.

The ratios of soluble to insoluble silver salts derived from Butter and Coco-nut Fats respectively, differ considerably from one another, and afford a ready means of determining these substances in presence of one another.

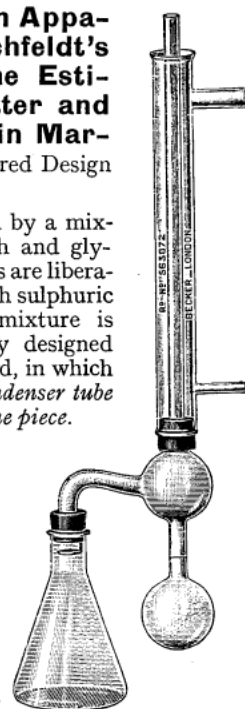
A full report of the Paper read by Mr. S. H. BLICHFELDT before the Society of Chemical Industry may be seen in the *Journal of the Society of Chemical Industry*, dated July 15, 1910. No. 13. Vol. XXIX.

Complete, as figured, with conical flask, made of resistance glass .. .. . **15/-**

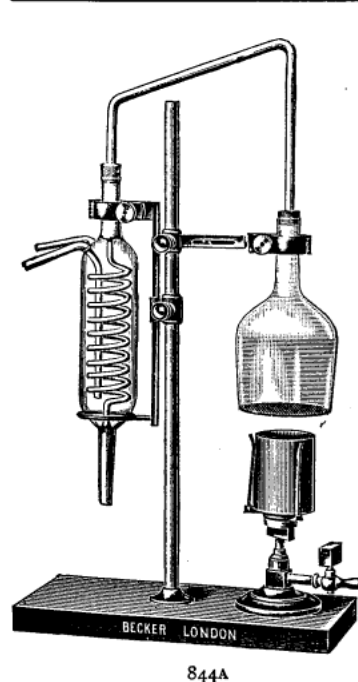
**843.—Distillation Apparatus for Blichfeldt's Method for the Estimation of Butter and Coco-nut Fat in Margarine.** (Registered Design No. 563872.)

The fat is saponified by a mixture of aqueous potash and glycerol, and the fatty acids are liberated by acidification with sulphuric acid. The resulting mixture is distilled in a specially designed apparatus, as illustrated, in which the connecting tube, condenser tube and receiver are all in one piece.

The distillate is treated with an excess of decinormal soda solution and trans-



843



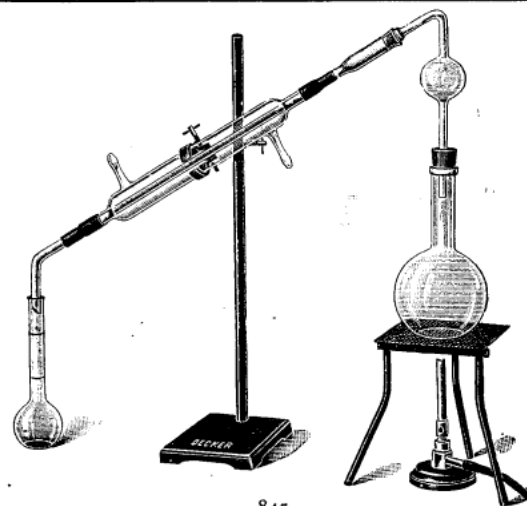
844A

**844.—Sir Edward Thorpe's Revenue Still**, as supplied by us to the Principal Chemist of the Government Laboratories.

- A. Price, complete on stand, with burner, as illustrated. **£3 18 0**
- B. Ditto without burner. **£3 1 6**

**845.—Spare parts for above as follows:—**

- A. Distilling Flask, latest pattern .. .. . **2/3**
- B. Bent Glass Connecting Tube, with two india-rubber corks .. .. **2/3**
- C. Stand with special clamps and teak base— **£2 2 0**
- D. Argand Burner, with steatite top and stopcock **16/6**
- E. Special Spiral Condensers. **15/-**



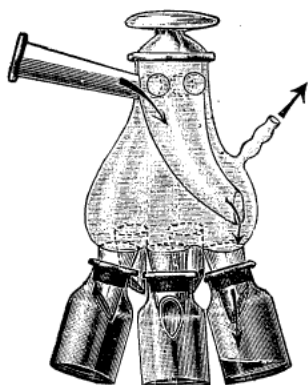
845

**845.—Reichert - Wollny Apparatus**, for determining the volatile fatty acids in butter and margarine.

(See "*The Analyst*," December, 1909, Pages 309 to 313.)  
 Price, including tripod stand and burner, but without retort stand and clamp .. .. . **18/-**

Our Balances and Weights have achieved World-wide Reputation : *vide* Opinions of the Leading Scientific Press.

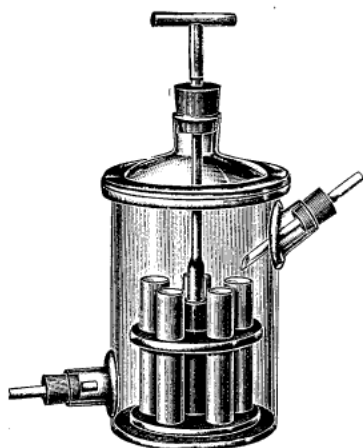
## DISTILLATION APPARATUS



**846. — Raikow's Distillation Apparatus,** for fractional distillation in vacuum. Complete with five receiving vessels.

("Chemik-er-Zeitung," 1888, page 693.)

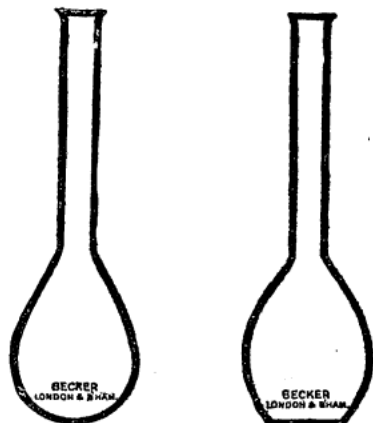
Each .. .. 15/-



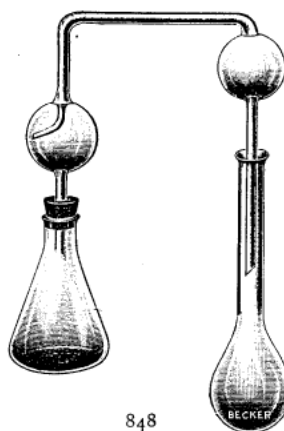
**847.**

**Brühl's Apparatus for Fractional Distillation under reduced Pressure.**

- A. Small size, with five tubes. Capacity 25 c.c. each **30/-**
- B. Medium size, with five tubes. Capacity 40 c.c. each **42/-**
- C. Large size, with five tubes. Capacity 80 c.c. each **48/-**



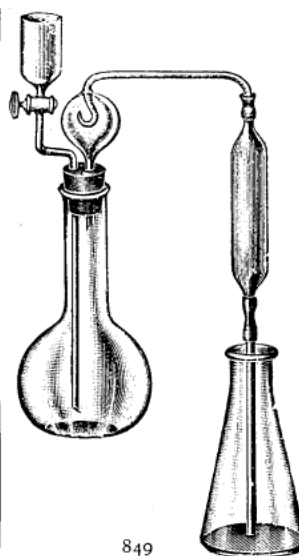
For prices and sizes of Kjeldahl Flasks see page 3.



848

**848.—Kjeldahl's Distillation Apparatus,** consisting of conical flask made of resistance glass, rubber cork, Kjeldahl splash head and resistance glass Kjeldahl flask, as illustrated.

- A. Complete .. .. **6/6**
- B. Splash heads only, with 2 bulbs and trap .. .. **3/-**



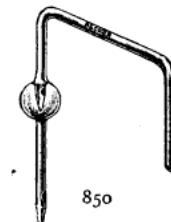
849

**849.—Kjeldahl's Distillation Apparatus,** complete as illustrated, with stoppered cylindrical separating funnel and flasks made of resistance glass.

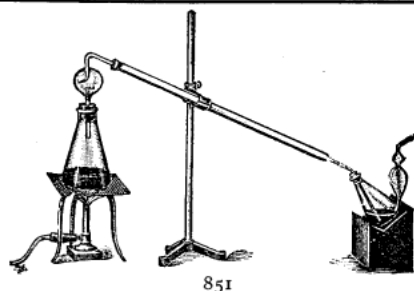
- A. Complete .. .. **15/-**
- B. Splash head only **2/6**

**850.—Kjeldahl's Still Heads,** as made by us for the Government Laboratories.

Each .. .. **2/6**



850



851

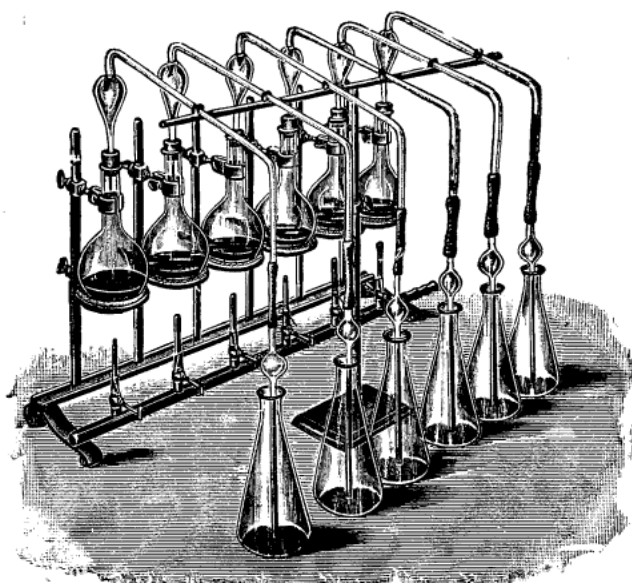
**851.—Kjeldahl's Distillation Apparatus,** as illustrated.

- A. Glass parts only .. .. **9/6**
- B. Complete, as figured .. .. **17/6**

Our stock of pure Chemicals and Acids is very considerable ; hence all orders are executed with the utmost despatch. See comprehensive list at end of Catalogue.

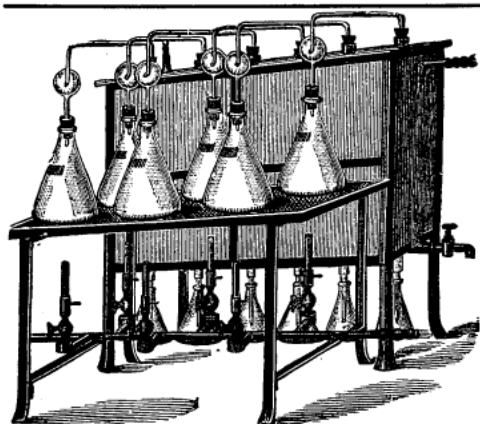


## DISTILLATION APPARATUS



**852.—Kjeldahl's Apparatus for the Estimation of Nitrogen.** Prices for the complete apparatus are as follows:—

For .. .. .	3	4	6 tests.
Complete as figured, including all glass parts	£3 17 6	£5 2 6	£7 5 0

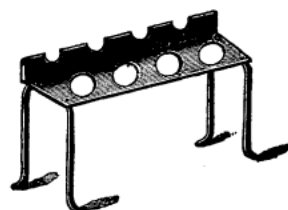


**853.**  
**Kjeldahl's Apparatus for the Estimation of Nitrogen,** complete with all glass parts and vertical condensing vessel.

For .. .. .	A	B	C
Each .. .. .	3	4	6 tests.
	£5 5 0	£6 5 0	£7 15 0

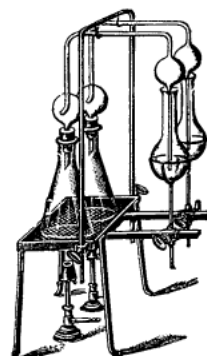
**856.—Kjeldahl's Apparatus for Nitrogen Determination,** consisting of heating stand with Bunsen burner, copper condenser and separate heating stand, with burners for digestion flasks. Complete with glass parts.

For .. .. .	A	B	C
Each .. .. .	3	4	6 tests.
	£6 10 0	£8 10 0	£12 10 0



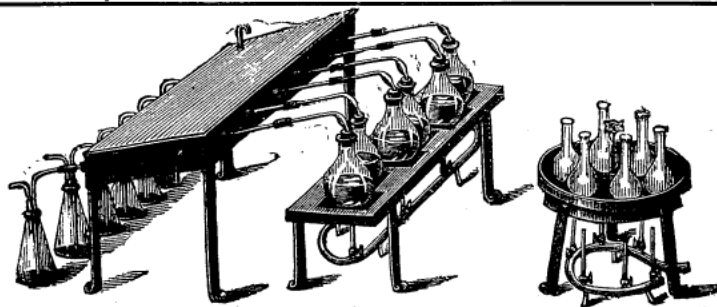
**854.—Wagner's Nitrogen Estimation Apparatus,** complete as figured, including glass parts and separate iron digesting stand, but without burners.

For .. .. .	A	B	C
Each .. .. .	2	4	6 tests.
	52/6	72/-	90/-



**855.—Stand and Set of Burners for Kjeldahl's Nitrogen Test,** as figured, but without the flasks.

For .. .. .	A	B	C
Each .. .. .	3	4	6 tests.
	41/-	45/-	52/6



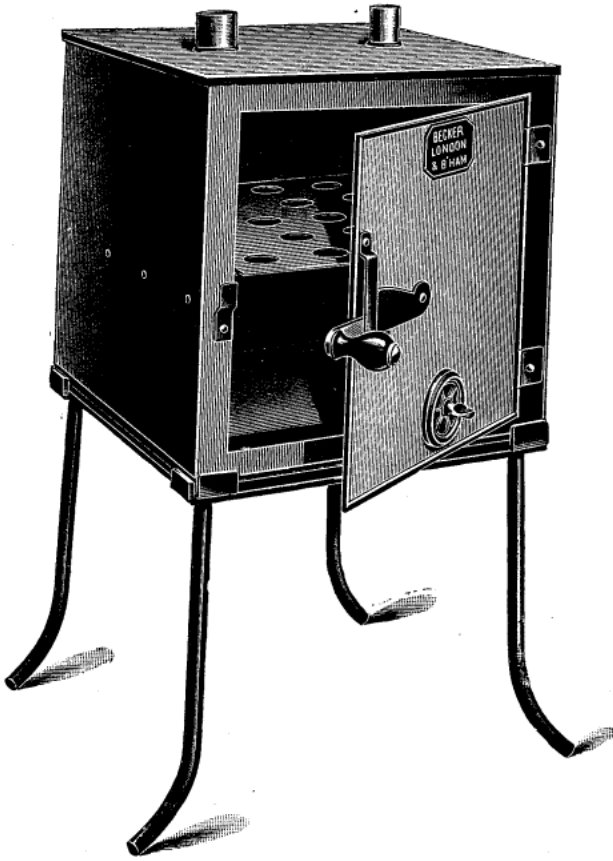
Every requisite for Chemical, Physical, and Bacteriological work supplied, from a test tube to the complete furnishing of the largest laboratory.

K

## DRYING OVENS

All our copper ovens are made from best selected copper sheets which are specially rolled for us.

*We are prepared to quote for cheaper quality ovens made of thinner sheet copper, but these are not to be recommended where the ovens are likely to be put to continual use.*

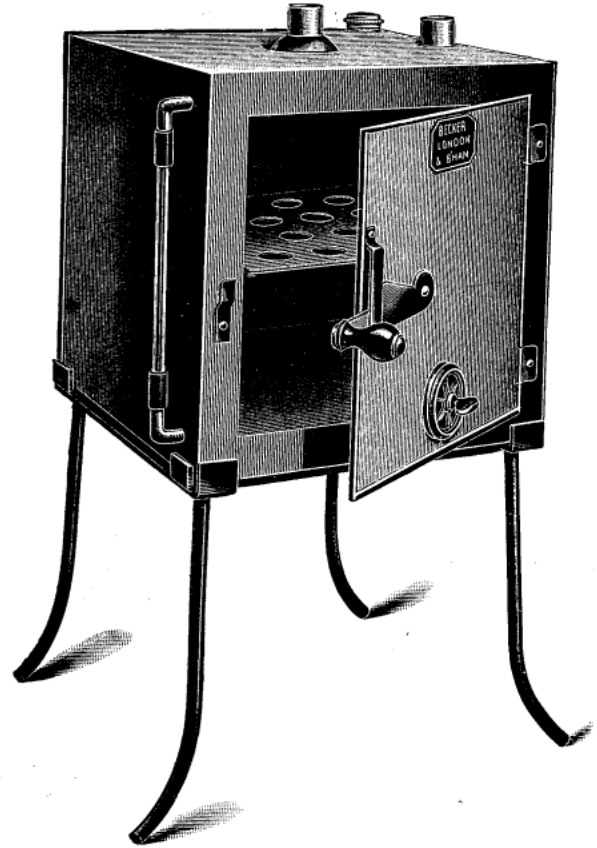


**857.—Hot Air Drying Ovens**, strongly made of best hard sheet copper, and fitted with copper perforated shelf sliding on copper ledges; two tubulures for thermometer and thermostat; and air regulator.

Height	inside	..	A	B	C
Width	"	..	6	7	8 in.
Back to front	"	..	6	7	8 "
Price, each ..	..	..	24/-	27/6	35/-
Height	inside	..	D	E	F
Width	"	..	9	10	10 in.
Back to front	"	..	9	10	12 "
Price, each ..	..	..	40/-	47/-	60/-

**858.—Strong Iron Quadrupods** for above.

For oven ..	..	..	A	B	C
Price, each ..	..	..	4/-	4/6	4/6
For oven ..	..	..	D	E	F
Price, each ..	..	..	5/-	5/3	5/6



**859.—Hot Water Drying Ovens**, strongly made of best hard sheet copper, and fitted with copper perforated shelf sliding on copper ledge; hinged door with air regulator; two tubulures for thermometer and thermostat; tubulure with screw cap for filling; and water gauge.

Height	inside	..	A	B	C	
Width	"	..	6	7	8 in.	
Back to front	"	..	6	7	8 "	
Price, each ..	..	..	39/6	52/6	65/-	
Height	inside	..	D	E	F	G
Width	"	..	9	10	10	12 in.
Back to front	"	..	9	10	12	14 "
Price, each ..	..	..	78/6	95/-	105/-	125/-

**860.—Strong Iron Quadrupods** for above.

For oven ..	..	..	A	B	C	
Price, each ..	..	..	4/-	4/-	4/6	
For oven ..	..	..	D	E	F	G
Price, each ..	..	..	5/-	5/3	6/6	8/-

Our Balances and Weights have achieved World-wide Reputation: *vide* Opinions of the Leading Scientific Press.

## DRYING OVENS

### 861.—Improved Type Drying Ovens.

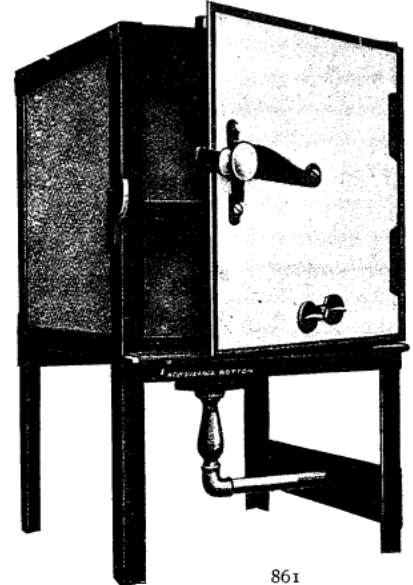
The illustration shows an entirely new form of Drying Oven. They are strongly built up of angle-iron framing and legs, with "Eternite" sides and door. The "Eternite" is  $\frac{3}{8}$  in. thick, and has all the heat and fire resisting properties of asbestos, but is very much stronger, being as hard as slate, and is unaffected by the laboratory atmosphere. Its durability is considerably above metal, and ovens made of this material will outlast several copper or iron ones. The bottom consists of an iron plate, and is renewable in a few seconds at a cost of 6d., which renders the oven as good as new. Another feature is that these ovens do not warp or twist out of shape, as is usually the case with copper air ovens. Temperatures up to 300° C. easily obtained. A great saving of gas is also made, as very little radiation takes place.

The following are stock sizes. Other sizes made to order at prices quoted on receipt of size required.

Prices, inclusive of burner.

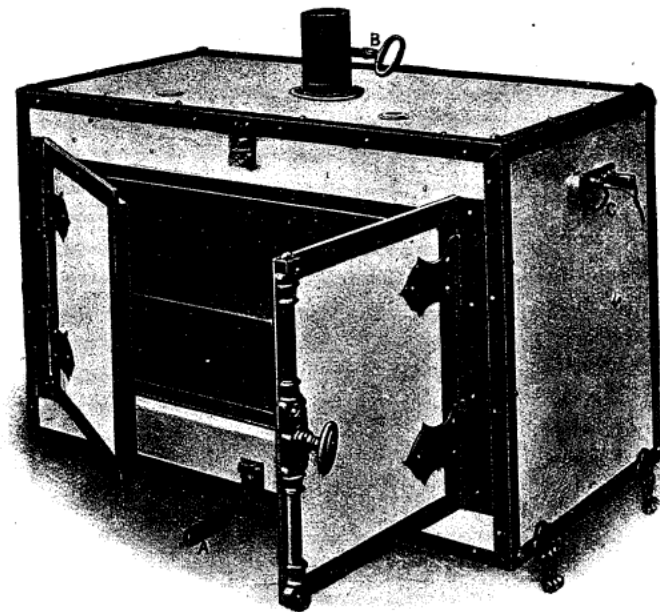
	Inside size of Oven.										
	Height.	Width.	Depth.								
	inches.	inches.	inches.								
A.	8	8	8	..	..	..	..	..	..	..	£2 14 6
B.	10	10	10	..	..	..	..	..	..	..	£3 10 0
C.	12	12	12	..	..	..	..	..	..	..	£4 15 0
D.	14	14	14	..	..	..	..	..	..	..	£6 18 6

A comparison of prices will show that the initial cost of this new form of oven is slightly above copper ovens, but their many advantages and great durability make them very much cheaper.



861

## ELECTRICALLY HEATED OVENS



862/3

**Electrically Heated Drying Ovens.**—Constructed of strong angle iron frame with Uralite panels. Wound internally with high resistance coils of alloy having a melting point above 1,000° C. Two windings or circuits are used, with 3-way indicating switch, of series-parallel type, giving minimum, medium and maximum amperage. These ovens are suitable for use between 70° and 500° C. Voltage and maximum temperature required should be stated on enquiries and orders. The large sizes only are fitted with double doors as illustrated. Sizes between 8 in. and 14 in. have single door. These ovens may be used on either D.C. or A.C., and may be wired for voltages between 100 and 260. (Please state voltage required when ordering.)

### 862.—Hot Air Ovens.

A.	8	8	8	in.	..	..	each	£8 0 0
B.	10	10	10	"	..	..	"	£10 15 0
C.	12	12	12	"	..	..	"	£12 10 0
D.	14	14	14	"	..	..	"	£14 5 0
E.	18	12	12	"	..	..	"	£21 10 0

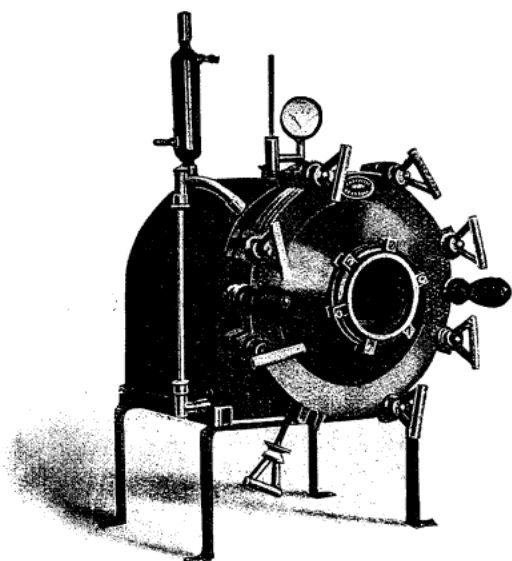
### 863.—Hot Water Ovens.

F.	8	8	8	in.	..	..	each	£9 15 0
G.	10	10	10	"	..	..	"	£11 0 0
H.	12	12	12	"	..	..	"	£13 5 0
J.	14	14	14	"	..	..	"	£16 0 0

PRICES INCLUDE CONTROLLING SWITCH AND CONNECTING PLUG.

(Please state voltage required when ordering.)

Our stock of pure Chemicals and Acids is very considerable; hence all orders are executed with the utmost despatch. See comprehensive list at end of Catalogue.



## VACUUM DRYING OVEN

Vacuum drying ovens are made to order of any required size for heating by gas, steam or electricity, and fitted with either water or air jacket. The illustration represents a gas heated, water-jacketted copper vacuum oven, with removable front and window each end. Internal size 10½ in. diameter by 14 in. deep, fitted with shelf.

<b>864.—Vacuum Oven,</b> as per Specification and illustration .. ..	<b>£28 10 0</b>
A. If electrically heated .. .. extra	<b>£4 0 0</b>

Other standard sizes are 7½ in., 13 in., 18 in. diameter internal, for which quotation will be given on receipt of requirements.

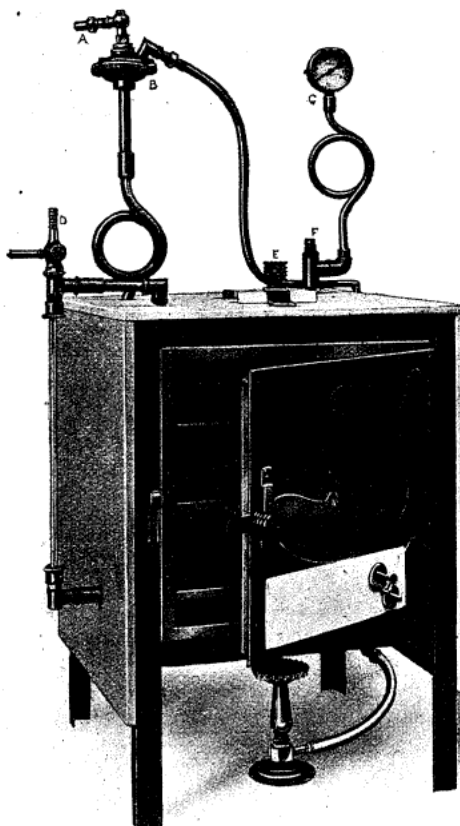
## WATER-JACKETTED CONSTANT-TEMPERATURE OVEN

This oven is designed to give a *constant temperature* of 105° C. inside, or may be adjusted to any constant temperature between that and 100° C. It is brazed and riveted, with water jacket and air jacket. By means of the automatic gas regulator A B, a constant pressure is maintained in the water jacket; this pressure is adjusted 1½ lb., to give an internal temperature of 105° C. This regulator is perfectly automatic, and as there is no escape of steam the oven may be left day and night—in fact, it is an advantage to have it constantly in use, as the strain of seams and joints caused by the contraction of cooling is minimised.

**865.—Water-Jacketted Constant Temperature Oven,** as Specification above.

Internal dimensions.

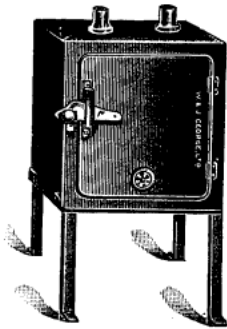
A. 10 × 10 × 10 in. deep .. ..	<b>£20 10 0</b>
B. 12 × 12 × 14 in. „ .. ..	<b>£23 10 0</b>
C. 12 × 12 × 18 in. „ .. ..	<b>£27 0 0</b>



Every requisite for Chemical, Physical, and Bacteriological work supplied, from a test tube to the complete furnishing of the largest laboratory.

## DRYING OVENS

**866.—Sheet Iron Drying Ovens,** with two tubulures for thermometer and thermostat, and movable shelf.



866

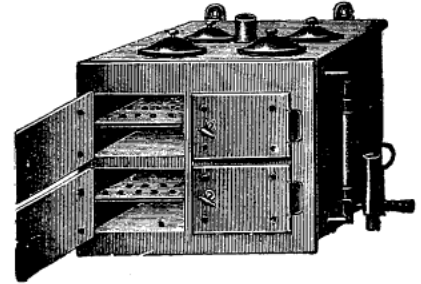
	Width.	Height.	Back to Front.
A.	7	5	5 in.
B.	8	8	8 „
C.	9	9	9 „
Price	17/6	21/-	28/6 each.

**866A.—Stands for Ditto.**

Full size A.	each	4/-
„ B.	„	4/6
„ C.	„	5/-

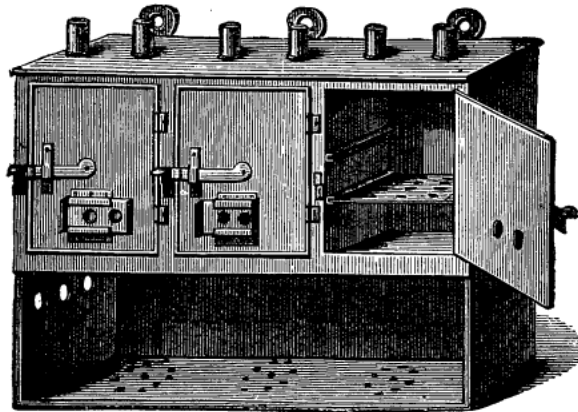
**867. — Hot Water Oven,** made of stout copper, with four compartments, which are divided into two halves by means of insert-plates.

Outside dimensions of oven:—  
 30 cm. long × 23 cm. high × 13 cm. deep.



867

Price, including gauge, constant level apparatus, and 4 holes fitted with covers .. .. . **£5 10 0**



868

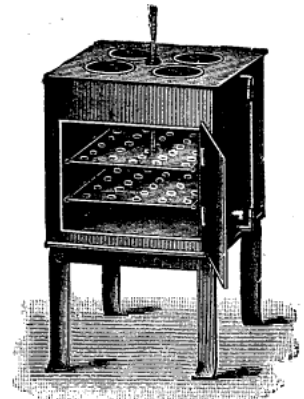
**868.—Triple Copper Drying Oven,** on strong sheet iron support. Each compartment, 9 in. × 7 in. × 6 in.

Price .. .. . **£4 7 6**

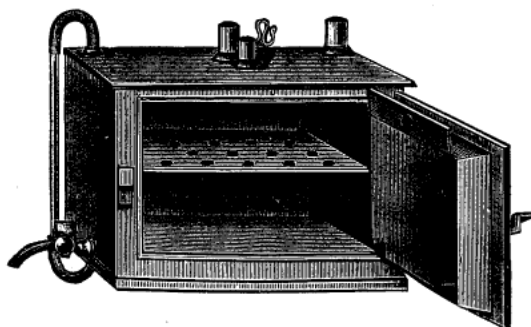
**869. — Hot Water Oven on Stand,**

made of strong copper plate with four openings at the top, each 10 cm. diameter, and fitted with concentric rings for use as water baths.

Inside Width .. 24 cm.  
 „ Height .. 20 „  
 „ Depth .. 27 „  
 Each **£5 15 0**



869



**870. — Hot Water Oven,** copper, fitted with double door for Calcium Chloride for drying the air before it passes into the air chamber: movable copper shelf, air regulator, glass gauge, and tap. Complete on stand. Size of oven 9 in. × 8 in. × 11½ in.

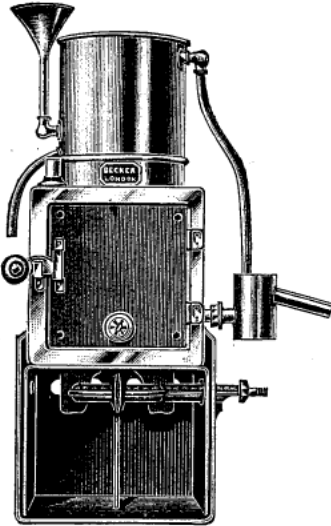
Price .. .. . **£4 17 6**

*We shall at all times be pleased to quote for Copper Laboratory Apparatus to customers' own designs and specifications on receipt of full details.*

**Our Balances and Weights have achieved World-wide Reputation: vide Opinions of the Leading Scientific Press.**

## COMBINED DRYING OVENS AND STILLS

All our stills are made from best selected copper sheets, which are specially rolled for us.



871

**871.—Cheap Combined Drying Oven and Still.** Strongly made and well finished in every detail. This apparatus will produce about 5 pints of distilled water per hour. The oven is provided with a perforated copper shelf sliding on copper ledges and the door is covered with uralite. Complete with burners.

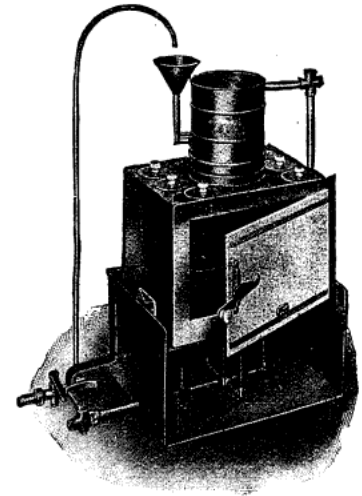
Made in three sizes as follows:—

A.	Outside dimensions of oven	9 × 9 × 9 in.	.. .. .	£5 17 6
B.	" " "	14 × 10 × 10 in.	.. .. .	£7 10 0
C.	" " "	16 × 12 × 14 in.	.. .. .	£9 17 6

**872.—Combination Drying Oven, Still and Water Bath.** This apparatus will produce about 6 pints of distilled water per hour and is fitted with still, automatic feed and burner. As will be seen from the illustration the oven is provided with six evaporating holes with covers. Size of oven 14 × 10 × 10 in.

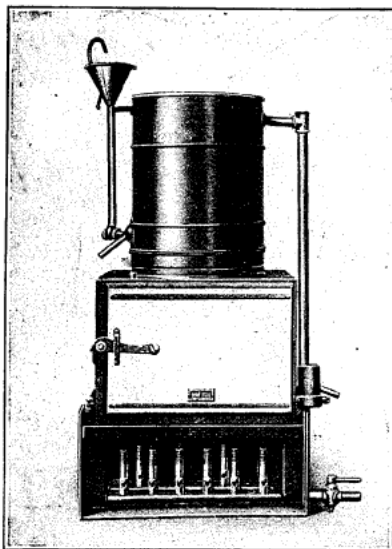
Dimensions over all 3 ft. × 2 ft. × 1 ft. .. .. . £10 9 0

**873.—Ditto,** but fitted with special tap, which makes it impossible for the water supply to be turned off unless the gas is also turned off at the same time .. £11 . 8 6



872/3

**For Colonial and Foreign use we fit a suitable oil blast furnace to ovens and stills where gas is not obtainable.**



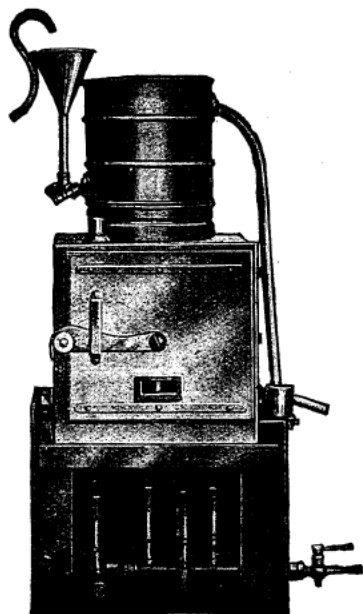
874

**874.—Combination Drying Oven and Still,** as No. 872, but constructed so as to produce 2 gallons of distilled water per hour with a gas consumption of 70 cubic feet. For this apparatus a 3/4-inch gas supply pipe is required. Size of oven 16 × 12 × 14 in.

A.	Without special tap to control water and gas simultaneously	£15 0 0
B.	With special tap to control water and gas simultaneously	£15 19 6

Our stock of pure Chemicals and Acids is very considerable ; hence all orders are executed with the utmost despatch. See comprehensive list at end of Catalogue.

## COMBINED DRYING OVENS AND STILLS



875

### 875.—Combination Still and Drying Oven.

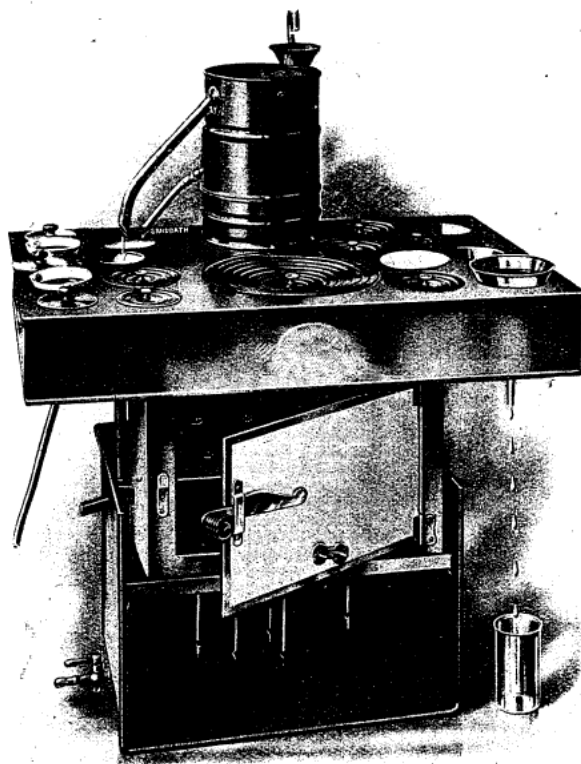
The Still-head produces between 6 and 7 pints of distilled water per hour, the oven is fitted with a removable sliding shelf. All parts becoming corroded by distillation are easily accessible for cleaning. These ovens are made by us in many sizes and any number of compartments. Glass doors may also be fitted. Full specifications, prices and particulars of larger ovens post free on application.

Made throughout of best hard rolled copper, and tinned inside. Brass fittings and burners. Prices include burner and stand complete, as illustrated.

A. Size of Oven	23 × 23 × 23 cm.	..	£7 5 0
B. „ „	35 × 25 × 25 cm.	..	£9 8 6
C. „ „	40 × 30 × 35 cm.	..	£12 2 0

See Special Note under No. 900, page 170, for heating by means of Primus Paraffin Burners, for districts not served by gas.

In designing these Ovens and Stills special attention has been paid to all parts becoming corroded by distillation. These are readily removable for cleaning and easily replaced.



876

### 876.—Patent Combination Still, Oven and Evaporating Pan.

This Combination is specially designed for Research Laboratories, Public Analysts' Laboratories, etc., where a variety of small drying and concentrating operations are frequent and numerous. The top, forming the evaporating bath, is fitted with five openings, each 2½ in. diameter, with cover; eight openings each fitted with set of concentric rings varying in diameter from 8 in. to 2 in., shallow sand bath 4 in. diameter, and three conical openings for drying funnels containing filters, etc. The still head is of the patent 6916 type (see page 157), producing continually and automatically 7 pints of distilled water per hour. The oven is fitted with constant level, sheet iron stand and gas burners. The shelf inside compartment is perforated, and slides on side runners. With the exception of the stand, the whole is made of rolled copper and tinned inside. All parts becoming corroded by lime deposits through distillation are easily accessible and removable for cleaning. Internal size of oven compartment 12 in. × 9 in. × 7½ in., size of waterbath 26 in. × 27 in. × 4 in. deep.

Price complete: Gas Heated as illustrated £18 0 0

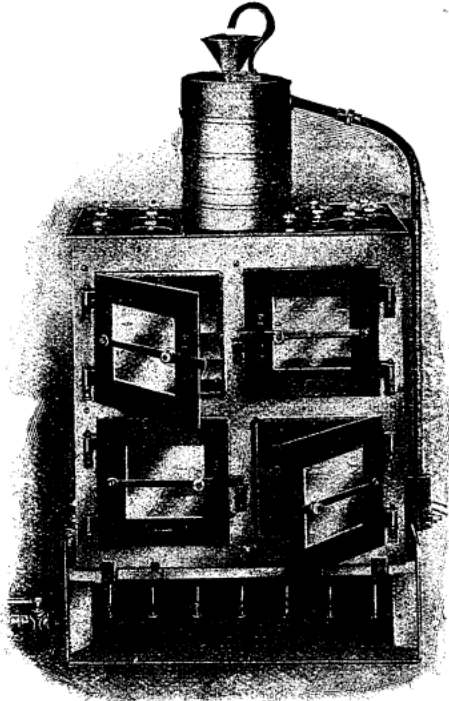
877.—Ditto, Electrically Heated .. .. £23 8 0

(Please state voltage, either A.C. or D.C. suitable).

Every requisite for Chemical, Physical, and Bacteriological work supplied, from a test tube to the complete furnishing of the largest laboratory.



## COMBINED DRYING OVENS AND STILL



878

### Combination Set of Ovens, Still and Water Bath.

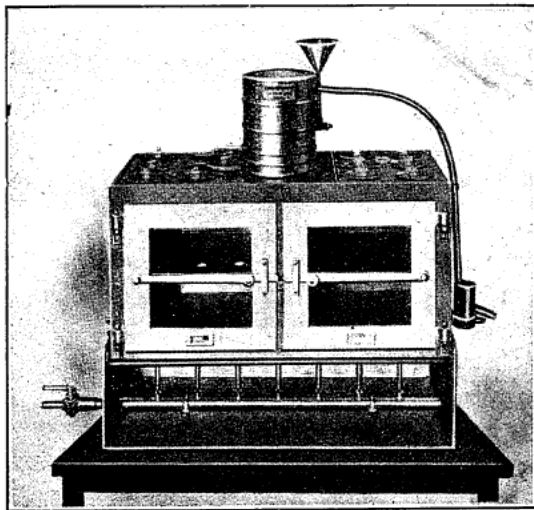
As will be seen from the illustration this apparatus consists of four separate ovens, each oven being 8 in. square and provided with perforated copper shelf sliding on copper ledges. There are also eight evaporating holes with covers. The distilling apparatus will produce about eight pints of distilled water per hour. The whole of the ovens and still are made of strong copper sheet and fitted with machined gun-metal castings. The doors of the ovens are of bronzed gun-metal and fitted with double glass panes.

The gas consumption of the apparatus is 40 cubic ft. per hour.

This apparatus can, if desired, be fitted with steam spiral for heating the water, and for this purpose a steam supply of 8 lb. pressure or above is necessary.

For Colonial and Foreign use we fit suitable oil blast furnace to ovens and stills where gas is not obtainable.

- 878.—Furnished with 8 in. ovens and glass-panelled doors, as illustrated .. .. £32 10 0
- 879.—Furnished with 10 in. ovens and glass-panelled doors .. .. . 37 10 0
- 880.—Furnished with 8 in. ovens and uralite-covered doors .. .. . 30 0 0
- 881.—Furnished with 10 in. ovens and uralite-covered doors .. .. . 33 10 0
- 882.—Special tap to control water and gas simultaneously .. .. . extra 1 5 0



883

### Combination Set of Ovens, Still and Water Baths,

specification as No. 878, but fitted with two ovens instead of four. The still head gives 7 pints per hour.

- 883.—Furnished with 8 in. ovens and uralite-covered copper doors .. .. £16 5 0
- 884.—Furnished with 10 in. ovens and uralite-covered copper doors .. .. 21 0 0
- 885.—Furnished with 8 in. ovens and glass-panelled doors .. .. . 18 10 0
- 886.—Furnished with 10 in. ovens and glass doors as illustrated .. .. 23 5 0
- 887.—Special tap to control water and gas simultaneously .. .. . extra 1 5 0

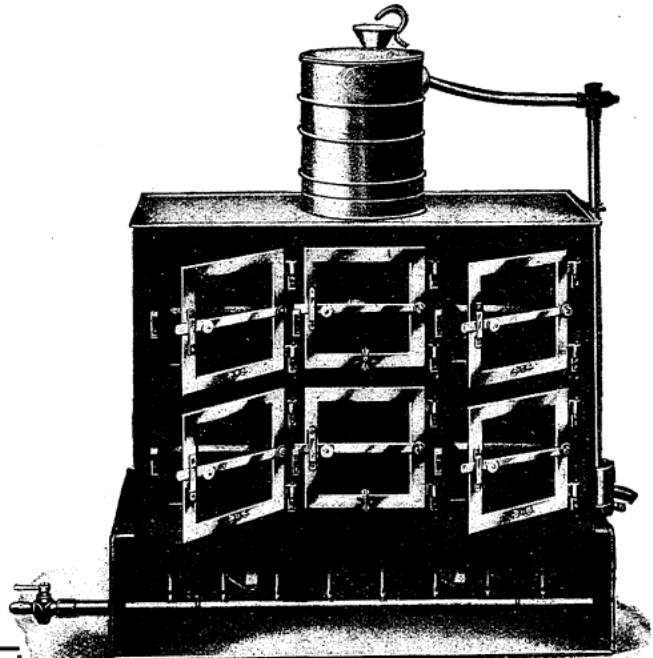
*In designing these Ovens special attention has been paid to all parts becoming corroded by distillation. These are readily removable for cleaning and easily replaced.*

**Our Balances and Weights have achieved World-wide Reputation ; vide Opinions of the Leading Scientific Press.**

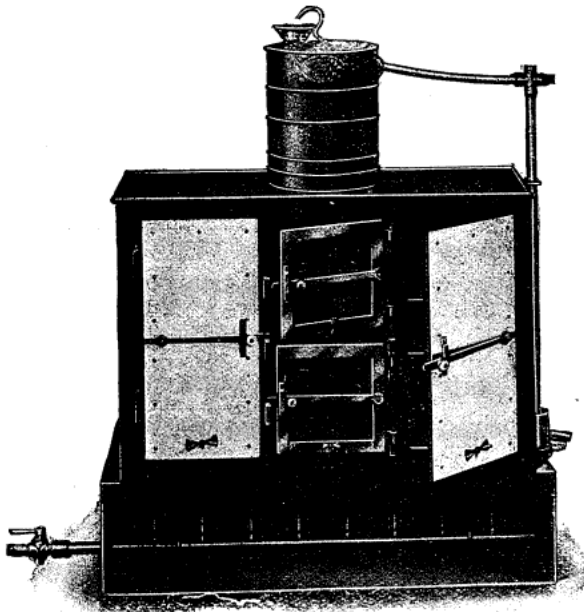
## COMBINED DRYING OVENS AND STILL

**Combined Ovens and Still**, specification as No. 878, but without evaporating holes, and furnished with *six* ovens instead of four; the distilling apparatus producing about eight pints of distilled water per hour.

- |   |         |
|---|---------|
| 888.—Furnished with 6 in. ovens and uralite-covered copper doors .. ..  | £33 0 0 |
| 889.—Furnished with 6 in. ovens and glass-panelled doors .. ..  | 35 10 0 |
| 890.—Furnished with 8 in. ovens and uralite-covered copper doors .. ..  | 36 10 0 |
| 891.—Furnished with 8 in. ovens and glass-panelled doors .. ..  | 40 0 0  |
| 892.—Furnished with 10 in. ovens and uralite-covered copper doors .. ..   | 41 0 0  |
| 893.—Furnished with 10 in. ovens and glass-panelled doors .. ..   | 44 0 0  |
| 894.—Special tap to control water and gas simultaneously .. .. extra  | 1 5 0   |
| <b>895.—Combined Ovens and Still</b> as above, but furnished with <i>nine</i> ovens, each 8 in. × 8 in. × 8 in. |         |
| A. Furnished with uralite-covered doors .. ..   | £46 0 0 |
| B. " " glass-panelled doors .. ..   | 49 10 0 |
| C. Special tap to control water and gas simultaneously .. .. extra  | 1 5 0   |



888/895



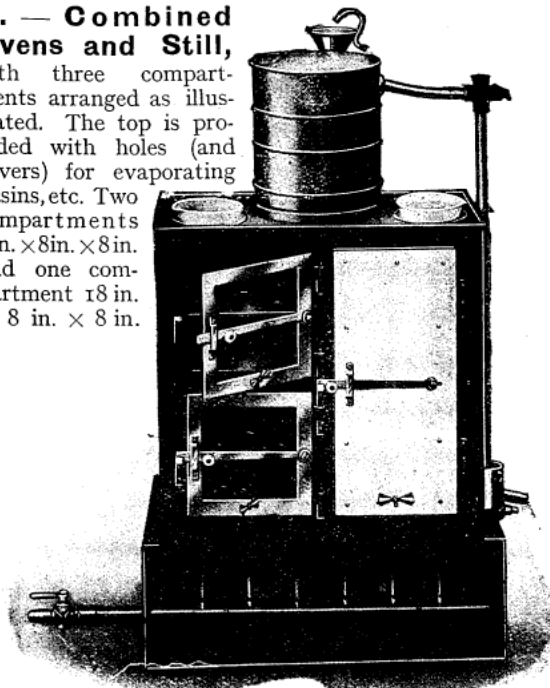
896

**896.—Combined Ovens and Still**, with four compartments, two 8 in. × 8 in. × 8 in. and two 18 in. × 8 in. × 8 in. The two small doors are provided with glass panels, and the two larger ones of sheet copper insulated with a covering of "Uralite."

- |                                   |         |
|-----------------------------------|---------|
| A. Price, as illustrated .. ..    | £38 0 0 |
| B. " if all doors of copper .. .. | 36 0 0  |
| C. " if all doors of glass .. ..  | 41 0 0  |

### 897. — Combined Ovens and Still,

with three compartments arranged as illustrated. The top is provided with holes (and covers) for evaporating basins, etc. Two compartments 8 in. × 8 in. × 8 in. and one compartment 18 in. × 8 in. × 8 in.

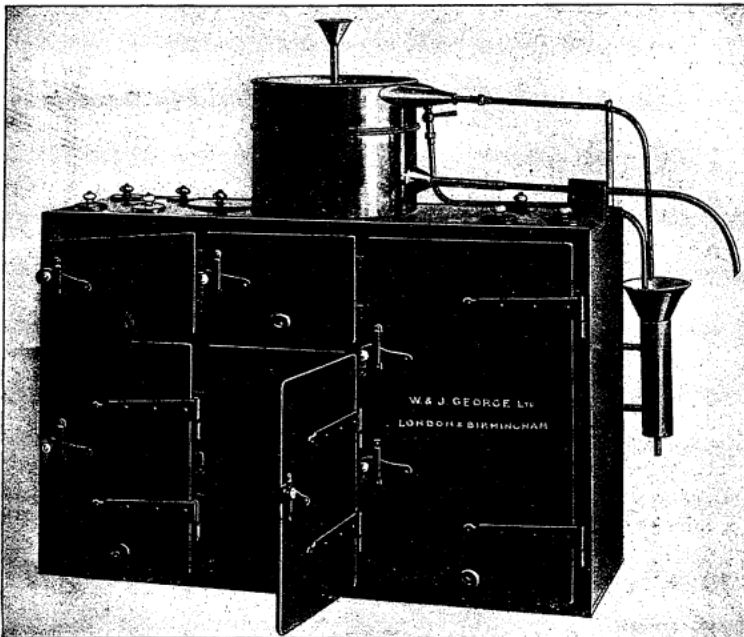


897

- |                                   |         |
|-----------------------------------|---------|
| A. Price, as illustrated .. ..    | £30 0 0 |
| B. " if all doors of copper .. .. | 28 10 0 |
| C. " if all doors of glass .. ..  | 31 5 0  |

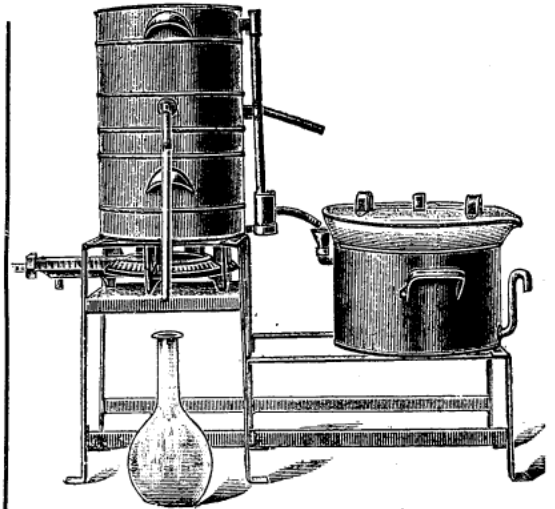
Our stock of pure Chemicals and Acids is very considerable; hence all orders are executed with the utmost despatch. See comprehensive list at end of Catalogue.

## COMBINED DRYING OVENS AND STILLS



**898.—Large Set of Combination Ovens, Still and Water Baths**, consisting of one oven measuring 20 in. × 12 in. two ovens each measuring 10 in. × 8 in., two ovens, each measuring 8 in. × 8 in.; one still capable of giving 2 galls. of distilled water per hour, and eight evaporating holes with covers. The over-all dimensions, including stand and burners, are 48 in. × 36 in. × 12 in.

A. With copper doors . . . . . **£37 10 0**  
 B. Special tap to control water and gas simultaneously extra **1 5 0**



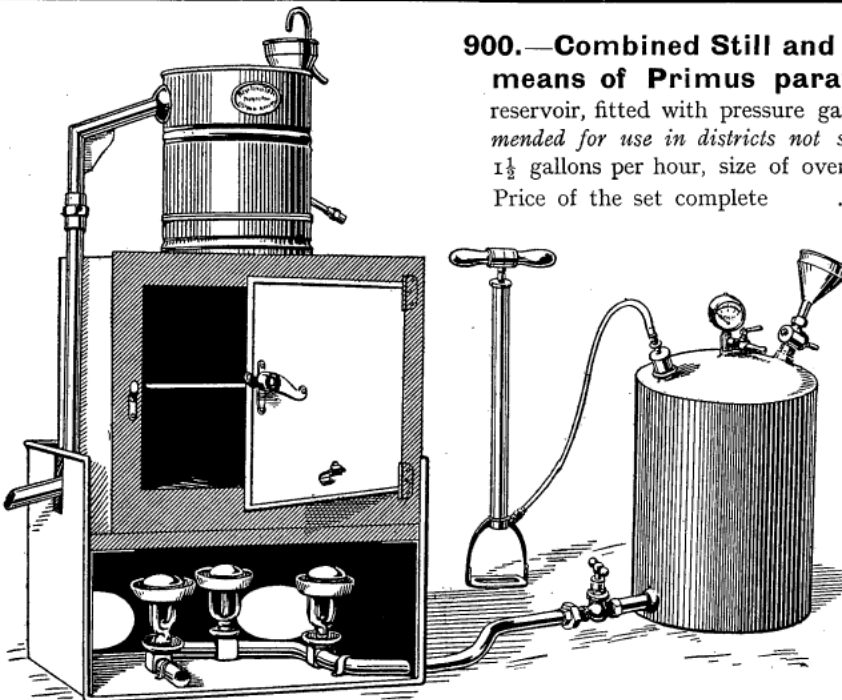
The illustration shows a Still (No. 829, page 157) in use with a drying bath. This is one of many methods of utilising the waste hot water. The hot water from constant level of Still runs through bath as seen, and can then be used also for other purposes where hot water is required.

**899.—Price, complete with Size A. Still, Cat. No. 829, as illustrated, but with our latest form of Burner (as shown in illustration on page 157).**

**£7 12 6**

**900.—Combined Still and Oven, arranged for heating by means of Primus paraffin burners**, supplied by large steel reservoir, fitted with pressure gauge and filling funnel. *Specially recommended for use in districts not served by gas.* Output of distilled water 1½ gallons per hour, size of oven 16 in. × 12 in. × 10 in. inside sizes.

Price of the set complete . . . . . **£32 0 0**



This method of heating may also be fitted to Combined Oven and Still, No. 875, page 167, at an extra cost of **£9 15s.** for either of the three sizes listed.

For No. 875 a single burner is fitted, giving 4 pints distilled water per hour.

## WATER BATHS



901

**901.—Hemispherical Water Baths,** made of stout spun copper, with set of concentric rings and two handles.

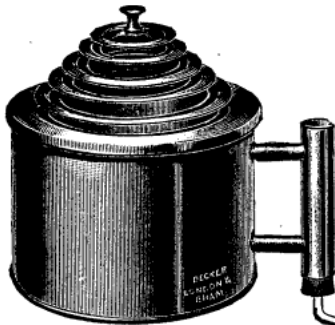
Diameter .. ..	13	15	18	20	23 cm.
Price .. ..	7/6	8/9	10/6	12/-	14/6

**902.—Ditto,** fitted with constant level arrangement.

Diameter .. ..	13	15	18	20	23 cm.
Price .. ..	13/6	15/6	17/-	18/-	21/-

**902A.—Iron stands for above.**

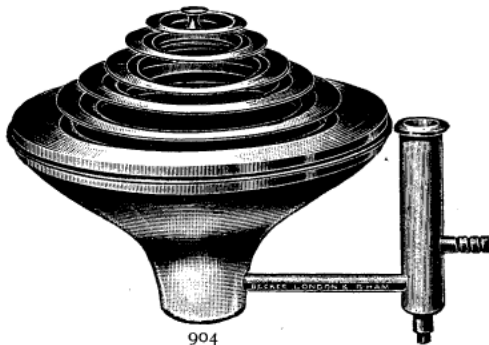
3/-	3/6	3/9	4/3	4/6
-----	-----	-----	-----	-----



903

Diameter .. ..	..	..	..	6	8 in.
Each .. ..	..	..	..	13/6	18/6

**903.—Owen's College Pattern Water Baths,** made of stout copper with set of concentric rings and fitted with constant level and overflow arrangements. Complete as illustrated.



904

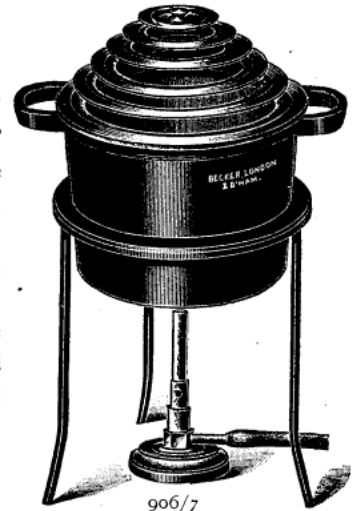
**904.—Conical Water Baths,** made of stout copper, with set of concentric rings, and fitted with constant level and overflow arrangement. Very economical in use.

Diameter .. ..	13	16	18	20	23	26 cm.
Price .. ..	13/6	15/9	17/6	21/-	24/-	27/6

**905.—Tripods for same,** with clip to keep bath in position .. 4/6 4/6 5/3 5/3 6/- 6/6

**906.—Cast-Iron Water Baths.** White enamelled inside with copper concentric rings, two handles and flange to fit on to tripod.

These baths are strongly made and will withstand a great deal of wear and tear.



906/7

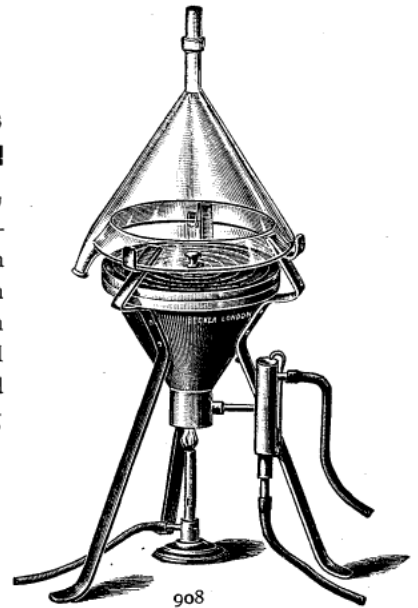
Diameter .. ..	13	15	17½	22 cm.
Price, each .. ..	6/-	8/-	10/-	14/6

**907.—Strong Tripods for same .. 3/- 3/6 3/9 4/6**

**908.—Meyer's Funnel-shaped Water Bath,**

made of stout copper, complete on tripod stand with set of porcelain rings, constant level arrangement and glass condensing funnel.

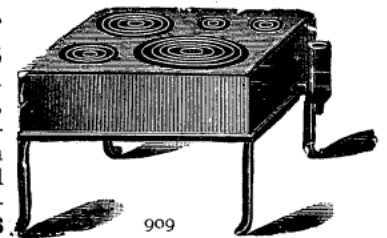
Each £3 17 6



908

**909.—Copper Water Bath,**

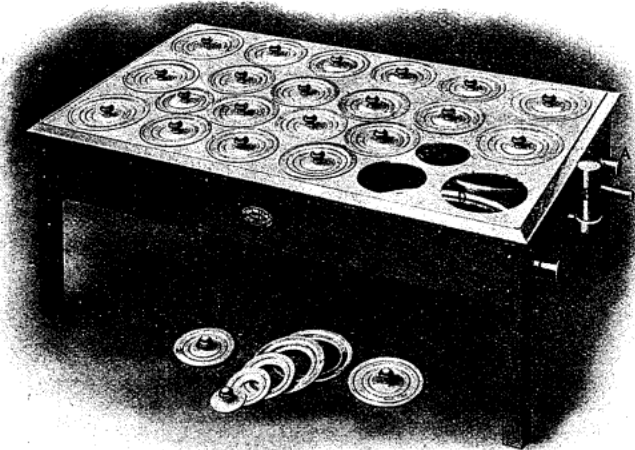
25 cm. long by 21 cm. wide by 9 cm. deep, provided with 4 openings (each fitted with rings and covers) and constant level apparatus. Price £2 7 6.



909

Our Balances and Weights have achieved World-wide Reputation: *vide* Opinions of the Leading Scientific Press.

## WATER BATHS



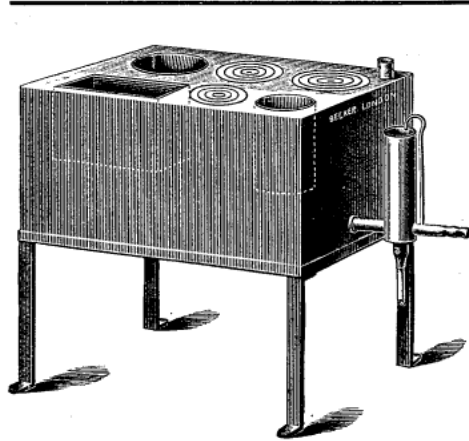
**910.—Water bath, fitted with copper steam coil (D) for heating.** The legs being high enough to allow Bunsen Burner under when steam pressure is not available. Made of hard copper-plate, tinned inside. Standard  $\frac{1}{2}$  in. sockets for steam connection, provided at A and C. B is constant level arrangement for water. Cover plates each have porcelain knob. The size and number of holes may be had to order. This type of bath is also made circular.

Price, as illustrated, with six openings each 11.5 cm., eight of 10 cm., seven of 9 cm., and two of 8 cm. with rings, a total of 23. The top measures 76 cm. by 43 cm.; depth 12 cm.; height of legs 20 cm.

£17 10 0

Other sizes quoted on receipt of particulars.

*These steam-heated Water Baths are in use in many of the leading Scientific Institutions in the Kingdom, including Government Laboratory, Royal College, Dublin, Imperial College, London, and in Colonial Universities.*



**911.—Combination Water Bath,**

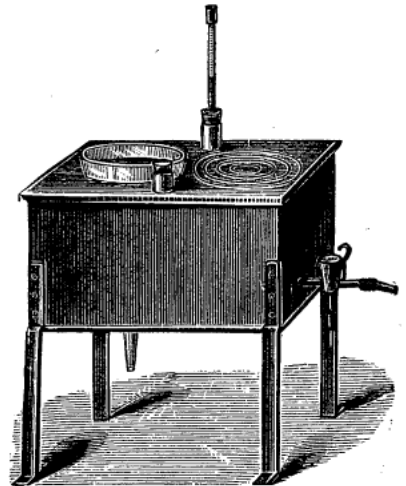
made of stout sheet copper, 34 cm. long by 20 cm. wide by 12 cm. deep, with funnel heater, three openings for evaporations, two chambers for drying, etc. Price, complete, with constant level apparatus and quadrupod,

£5 0 0

**912. Combination Water Bath,**

made of stout sheet copper, 33 cm. long, 18 cm. wide, and 12 cm. deep. The body has one opening for funnel, 5 in. diameter, one evaporating hole fitted with improved concentric rings and hole for thermometer, complete on quadrupod with constant level arrangement.

Each £2 15 0



## ELECTRICALLY HEATED WATER BATHS



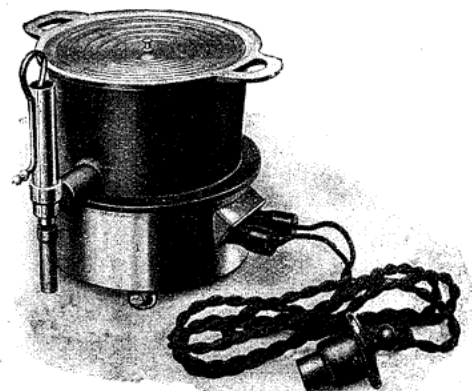
**913. Electrically Heated Water Bath**

of cast iron, white enamel inside and japanned outside, complete with copper concentric rings of improved type, 2 yards of flexible cord and plug.

913				
Diam.		Loading.		Price.
A.	13 cm.	350 watts	.. .. .	£1 12 6
B.	17 "	550 "	.. .. .	1 18 0
C.	21 "	700 "	.. .. .	2 10 0

**914. Electrically Heated Water Bath,**

as No. 913, but fitted with water inlet and constant level apparatus as per illustration.



914				
Diam.		Loading.		Price.
A.	13 cm.	350 watts	.. .. .	£2 0 0
B.	17 "	550 "	.. .. .	2 5 0
C.	21 "	700 "	.. .. .	2 17 6

When ordering, please state voltage required.

## EUDIOMETERS AND GAS TUBES



915

**915.—Cavendish's Eudiometer**, on mahogany stand, with stopcock, and screwed to fit air pump.

each £2 17 6



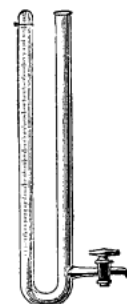
916

**916.—Ure's Eudiometers**, with platinum electrodes.

A. 25 c.c. in  $\frac{1}{5}$  .. .. . each 5/6  
 B. 50 c.c. in  $\frac{1}{5}$  .. .. . „ 7/-

**917.—Tube**, graduated, with one stopcock on open limb and platinum electrodes at the top of closed limb.

Each .. .. . 14/-



917



918

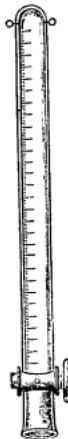
**918.—Bunsen's Eudiometers**, with platinum electrodes, graduated.

250 300 400 500 600 800 mm.  
 5/- 6/- 6/9 7/- 10/6 14/- each.

**919.—Ditto** graduated 100 c.c. in half divisions .. .. . each 9/6

**920.—Mitscherlich's Eudiometer**, with platinum electrodes and glass stopcock; graduated in c.c., extra stout tube.

Each .. .. . 8/-

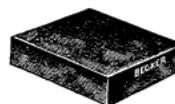


920

**921.—Lecture Eudiometer**, graduated 50 c.c. in  $\frac{1}{5}$ , with two stopcocks and platinum electrodes.

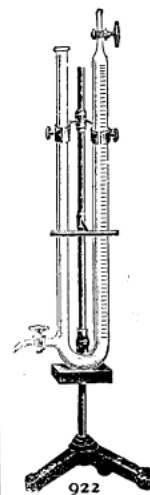
Price, not including metal stand .. 17/6

**922.—Ditto**, complete on metal stand with two terminals on base of stand 28/6



923

**923.—Stout Indiarubber Pad** for use with Eudiometers .. each 1/-



922

**924.—Gas Measuring Tubes**, graduated.



924

Capacity.	Graduated in	Price, each.
10 c.c.	$\frac{1}{10}$ c.c. .. ..	1/9
20 „	$\frac{1}{5}$ „ .. ..	2/-
25 „	$\frac{1}{5}$ „ .. ..	2/6
50 „	$\frac{1}{5}$ „ .. ..	3/-
50 „	$\frac{1}{10}$ „ .. ..	4/-
100 „	$\frac{1}{2}$ „ .. ..	4/-
100 „	$\frac{1}{10}$ „ .. ..	8/-
150 „	$\frac{1}{1}$ „ .. ..	6/-
200 „	$\frac{1}{1}$ „ .. ..	8/-

**925.—Ditto**, with well-ground-in stopcock at top.

Capacity.	Graduated in	Price, each.
25 c.c.	$\frac{1}{10}$ c.c. .. ..	6/6
50 „	$\frac{1}{5}$ „ .. ..	7/6

**926.—Eggertz' Carbon Tubes**, for the estimation of carbon in steel.

Capacity .. .. . 10 20 30 c.c.  
 Divided into .. ..  $\frac{1}{10}$   $\frac{1}{10}$   $\frac{1}{10}$  c.c.  
 Graduated tubes, per pair 3/6 5/9 7/9

**927.—Plain Tubes** for above.

Capacities as above.

Each .. .. . 8d.



926/7

Every requisite for Chemical, Physical, and Bacteriological work supplied, from a test tube to the complete furnishing of the largest laboratory



## FAT EXTRACTION APPARATUS

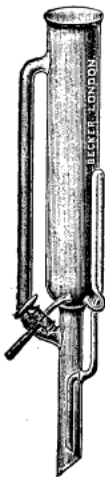


**928.—Soxhlet's Fat Extraction Apparatus**, made of well-annealed glass.

Capacity.	Inside height to top of syphon tube.	Inside diameter of body.	Inside total height of body.	Price, each.
30 c.c.	90 mms.	21 mms.	145 mms.	4/-
60 c.c.	95 mms.	31 mms.	160 mms.	4/6
100 c.c.	118 mms.	34 mms.	180 mms.	5/3
200 c.c.	140 mms.	45 mms.	208 mms.	8/-

928

**FOR SOXHLET THIMBLES,**  
SEE PAGES 39 AND 44.



**929.—Soxhlet's Fat Extraction Apparatus**, with glass stopcock on body, made of well-annealed glass.

Capacity.	Inside height to top of syphon tube.	Inside diameter of body.	Inside total height of body.	Price, each.
30 c.c.	90 mms.	21 mms.	145 mms.	7/-
60 c.c.	95 mms.	31 mms.	160 mms.	7/6
100 c.c.	118 mms.	34 mms.	180 mms.	8/6
200 c.c.	140 mms.	45 mms.	208 mms.	11/6

929

**930.—Soxhlet's Fat Extraction Apparatus**, with glass stopcock on syphon tube.

Capacity .. .. .	30	60	100	200 c.c.
Each .. .. .	7/-	7/6	8/6	11/6

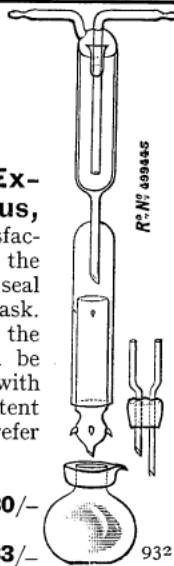


**931.—Fruhling's Fat Extraction Apparatus**, with stoppered inner tube made of well-annealed glass.  
Each, complete .. .. 13/6

931

**932.—Schidrowitz Extraction Apparatus**, designed to avoid unsatisfactory cork connections by the substitution of a mercury seal around the neck of the flask. For continuous extraction the thimble holder shown can be supplied, or it can be fitted with a syphon tube for intermittent working for those who prefer the latter.

- A. Price per set, with plain flask .. .. . 30/-
- B. Price per set, with drying stopper .. .. . 33/-



No. 1000000

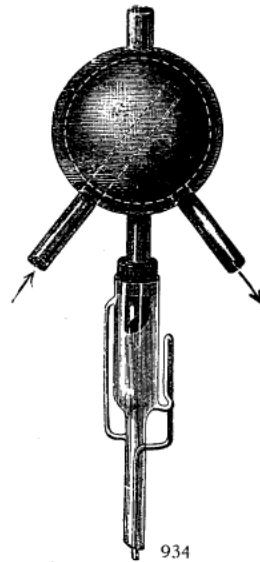
932

**933.—Government Laboratory Pattern Soxhlet Apparatus**, as supplied by us to the Principal Chemist of the Government Laboratories. Consisting of flask, Soxhlet apparatus and special spiral condenser, all ground to fit into each other.

Price, complete, with two extra flasks ground to take the Soxhlet apparatus. The three flasks are interchangeable, and each bears an identification mark.  
per set 27/6



933

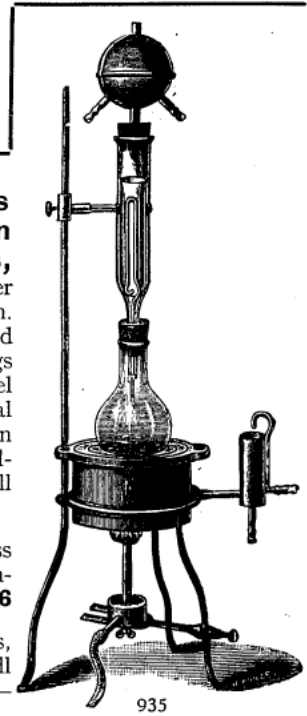


934

**934.—Ball Form Condenser**, brass nickel-plated, for use with Soxhlet's Apparatus.  
each 12/-

**935.—Soxhlet's Extraction Apparatus**, consisting of water bath 6½ in. diam. with improved concentric rings and constant level apparatus, special stand, Bunsen burner and nickel-plated metal ball condenser.

- A. Without glass parts or ball condenser .. 32/6
- B. With glass parts, but without ball condenser 40/-



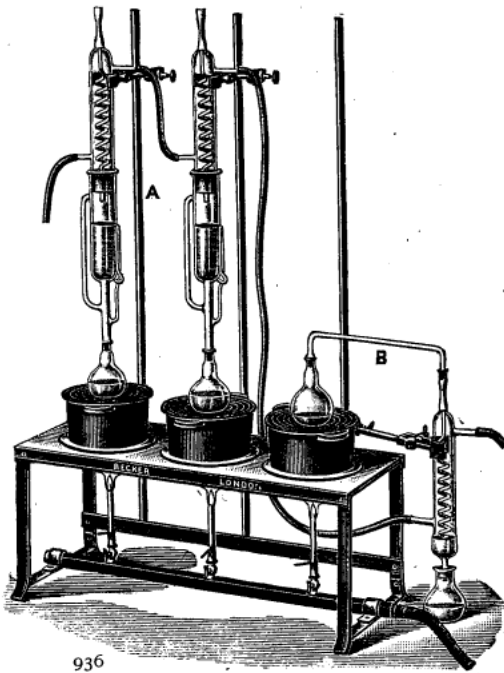
935

Our Balances and Weights have achieved World-wide Reputation : *vide* Opinions of the Leading Scientific Press.



## FAT EXTRACTION APPARATUS

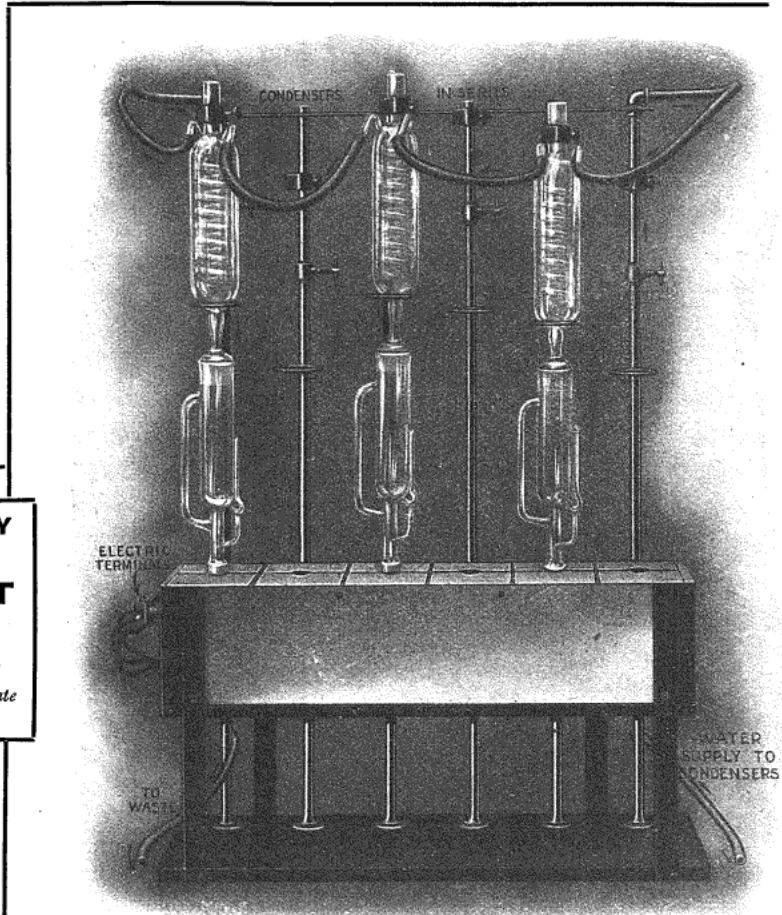
GAS HEATED.



936

**936.—Soxhlet's Extraction Apparatus**, consisting of special stand, with burners and clamps and three water baths with concentric rings, flasks, Soxhlet apparatus and spiral condensers ground to fit.

Price complete, as figured .. .. . £8 15 0



938

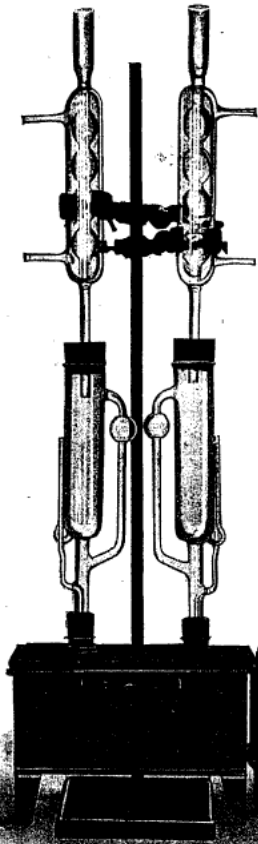
**ELECTRICALLY HEATED SOXHLET EXTRACTION APPARATUS.**

*When ordering please state voltage required.*

**937. — Soxhlet Extractor**, consisting of electrically heated water bath, with tall retort stand and two clamps. Copper bath, iron rod and clamps.

**Prices.**

- A. 1-test size £2 10 0
- B. 2-test size £3 5 0
- C. 3-test size £4 10 0



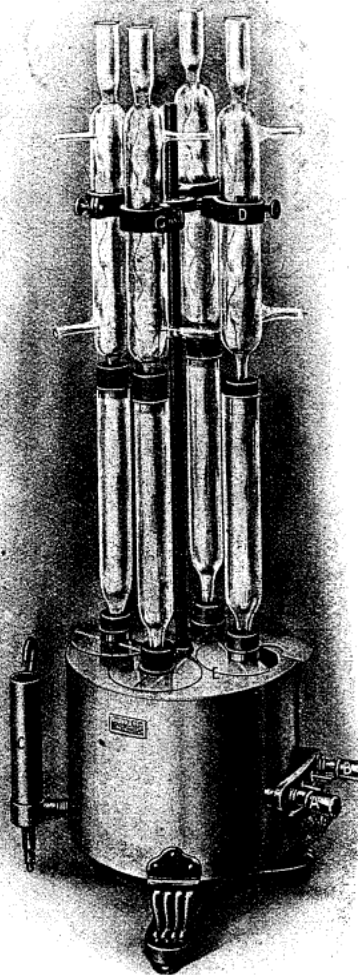
937

**938.—Soxhlet Extractor.** As supplied to the Government Laboratories, London; also to many of the leading Public and Consulting Analysts.

The water bath is of copper, tubes, clamps, etc., of oxydised gun-metal. May be wound to suit any voltage, alternating or direct current. It has two circuits, one to raise temperature of water quickly, and another lower current to maintain that temperature. When ordering it is necessary to state voltage and working temperature required in water bath. Prices quoted below are inclusive of apparatus, complete with rods, clamps, rings, etc., *but not glassware*, which is quoted separately. We shall be pleased to quote for electric bath only in cases where clamps, condensers, etc., already exist.

A. For 2 Tests	.. .. .	£6 0 0
B. " 4 "	.. .. .	9 10 0
C. " 6 "	.. .. .	12 0 0
D. " 8 "	.. .. .	17 10 0

## ELECTRICALLY HEATED SOXHLET APPARATUS



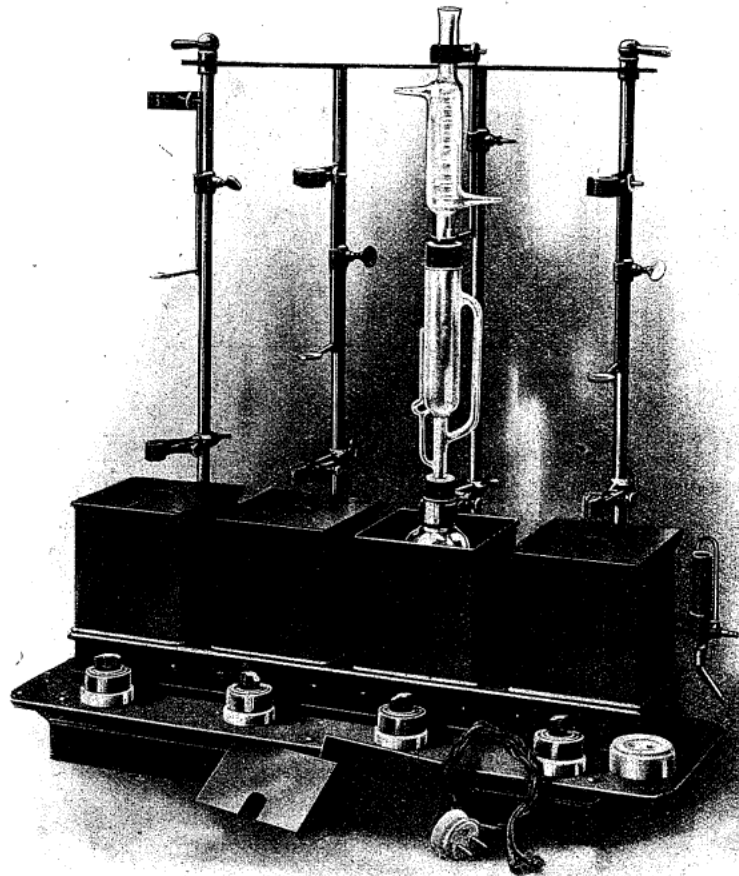
939

**939.—Circular form Electrically Heated Soxhlet Extractor,** recommended when space is limited or for fixing on small pedestal tables. Bath is detachable from central support and clamps.

**Prices.**

A. 4-test size .. ..	£8 10 0
B. 6-test size .. ..	£10 5 0

**WHEN ORDERING PLEASE STATE VOLTAGE REQUIRED.**



940

**940.—Improved Form Soxhlet Extractor,** electrically heated and arranged with separate water baths, each of which has independent heating and switch. This allows any one or more of the extractors to be used at a time, and as each has three distinct heating circuits controlled by 3-way switch, the baths may be used at varying temperatures to suit solvents in use. One connection, of the ordinary plug type, only is required. The sub-connections to each bath are incorporated with the framework of the extractor. This form of extractor will be found extremely useful in the laboratory owing to its adaptability and great economy. Where one test only is being made, the necessity of heating up enough water for 4 or 6 tests is avoided, and extractions by different solvents and on various materials may be run simultaneously at their respective correct temperature. Suitable for either A.C. or D.C. circuits. Prices do not include glassware.

**Prices.**

A. 4-test size (as illustrated) .. ..	£12 10 0
B. 6-test size .. ..	14 15 0
C. 8-test size .. ..	17 10 0

Every requisite for Chemical, Physical, and Bacteriological work supplied, from a test tube to the complete furnishing of the largest laboratory.

## FILTER PUMPS



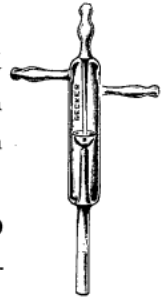
941

**941.—Filter Pumps,** cylindrical form, with *one* side tube.

Each .. .. . **2/6**  
 Per doz. .. .. . **29/-**

**946.—Filter Pumps,** improved form, with *two* side tubes, one of which may be connected to manometer, or both may be used for a double exhaust.

Each .. .. . **2/9**  
 Per doz. .. .. . **32/-**



946



942

**942.—Filter Pumps,** new form, as used at University College, London, etc.

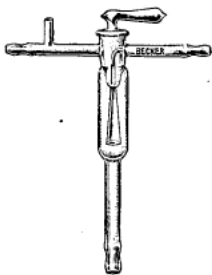
Each .. .. . **2/6**

**947.—Geissler's Filter Pumps.**

Each .. .. . **1/9**  
 Per doz. .. .. . **20/-**



947



943

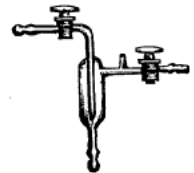
**943.—Improved Filter Pump Tube,** with stopcock and manometer tube. With this filter pump tube the air and water can be cut off simultaneously.

Each .. .. . **8/6**

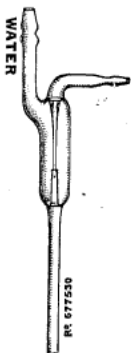
**948.—Fischer's Filter Pump Tubes,** with manometer connecting tube and two glass stopcocks.

Each .. .. . **9/6**

**949.—Fischer's Filter Pump Tubes,** with manometer connecting tube, but without stopcocks.  
 Each **2/-**; per doz. **22/-**



948



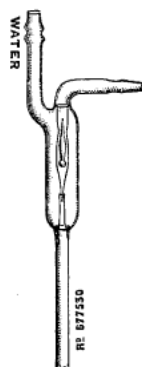
944

**944.—Filter Pump,** plain form, improved design.

Each **4/6**

**45.—As above,** but fitted with valve. The valve works quite automatically, prevents sucking back and renders the use of a "catch bottle" unnecessary.

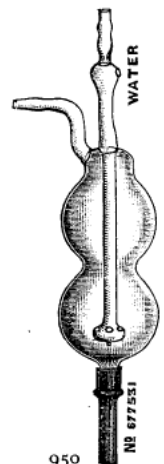
Each .. .. . **6/-**



945

**950.—Improved Form Filter Pump.** By regulating the water inlet and outlet, it gives a steady and continuous blast of air, a great asset in the laboratory. Far superior to foot bellows in its working and regulation.

Each .. .. . **15/-**

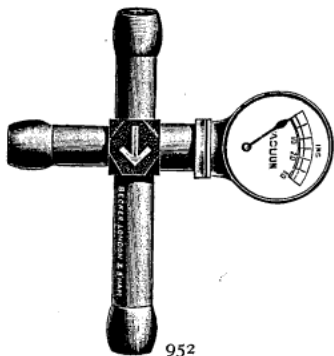


950

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L

## METAL FILTER PUMPS

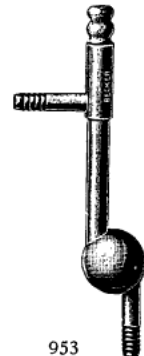


**951.—Korting's Pattern Filter Pump Tubes,** brass, without gauge. Each 10/-

**952.—Ditto,** fitted with vacuum gauge 26/-

**953.—Improved Metal Filter Pump,** strongly made in brass and nickel-plated. We can thoroughly recommend this pump, as its special construction makes it impossible for air to pass into the tube when in action, and it also gives a splendid vacuum.

Each .. .. . 7/6



## FILTER PUMP FLASKS



**954.—Filter Pump Flasks,** strong glass, with side tube.

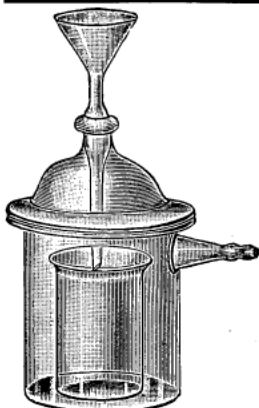
Capacity	..	125	250	500 c.c.
Each	..	2/-	2/3	2/6
Capacity	..	750	1000	1500 c.c.
Each	..	2/9	3/3	3/9
Capacity	..	2000	3000 c.c.	
Each	..	4/9	6/6	

**955.—Walther's Improved Filter Pump Apparatus,** with funnel-shaped neck with india-rubber ring to form a perfectly airtight joint when in use.

Capacity,		Price each.	Price per doz.
500 c.c.	..	3/6	41/-
750 "	..	4/3	50/-
1000 "	..	5/-	59/-

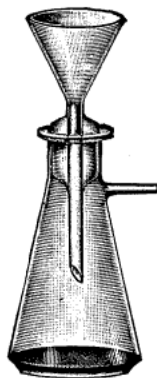


**956.—Witt's Filter Pump Apparatus,** with lid and funnel thoroughly ground to fit for rapid filtration.



Height of Cylinder.	Inside diam. of Cylinder.	Price each
11 cm.	7 cm.	15/-
14 "	9 "	18/6
16 "	11 "	21/-

**957.—Filter Pump Apparatus,** with funnel thoroughly\*ground into flask.



Capacity of Flask.	Diameter of Funnel.	Price complete.
250 c.c.	7 cm.	4/6
500 "	9 "	6/-
1000 "	12 "	8/-

**958.—Filter Pump Apparatus,** complete with funnel india-rubber stopper, bell jar with ground-in stopcock, strong beaker and ground glass plate. each 25/-



**959.—Filter Pump Apparatus,** fitted complete with Gooch's crucible, glass adapter and india-rubber cork.

Each, complete .. .. . 9/-

**960.—Filter Pump Flasks.** Wahl's pattern with stopcock, but without the funnel.

Capacity	1	2 litres.
Price, each	.. 7/-	9/6



Our stock of pure Chemicals and Acids is very considerable ; hence all orders are executed with the utmost despatch. See comprehensive list at end of Catalogue.

## FILTER PUMP APPARATUS



**961.—Adapters**, funnel-shaped, for Gooch's Crucibles, end of stem ground off at an angle.

Internal dia. of cup	20	26	32	38 mm.
For Gooch's crucible				
No. .. .. .	1	2	3	4
Each .. .. .	8d.	9d.	1/2	1/5
Per dozen .. ..	6/-	8/-	12/-	16/-

961

**962.—India-rubber Cones**, to take Gooch Crucibles, as figured.

A. For Gooch Crucible, Size 1	7d.
B. " " " " 2	8d.
C. " " " " 3	9d.
D. " " " " 4	10d.



**FOR GOOCH CRUCIBLES**

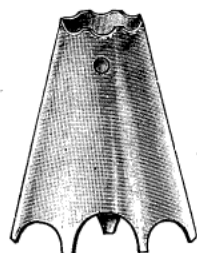
SEE PAGES 12, 13, 14, AND 18.

## FILTER CASES, DRYERS, Etc



**963.—Filter Paper Cases**, japanned tin, to hold 100 filters.

Diameter .. ..	2½	3	4	5	6	8 in.
Price, each .. ..	6d.	9d.	1/-	1/3	1/6	2/-



**965.— Filter Dryers**, tinned iron, conical.

Each .. .. .	1/-
Per dozen .. ..	11/-

965

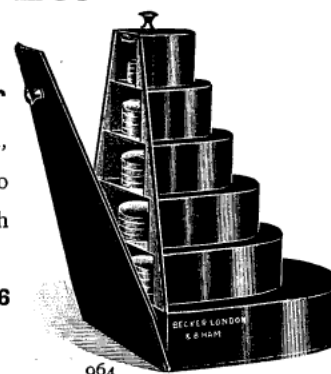


**966.—Becker's Compressed Filter Mats.** Special quality. These mats will be found very useful in the laboratory for drying crystals or as bench pads for hot beakers, flasks, etc.

Per doz. 3d.	Per 100 2/-	Per 1,000 18/-
--------------	-------------	----------------

**964.—Filter Paper Case**, japanned tin, hinged front, and made to take two packets of each size.

Each .. .. . 13/6



964

**967.—Filter Rings**, Berlin porcelain, two arms. .. each 1/-

**968.—Ditto**, three arms .. each 2/-



**969.—Filter Cones**, porcelain.

Diameter .. ..	52	72	90 mm.
Price .. .. .	1/-	1/4	2/- each



**970.—Platinum Filter Cones**, perforated. From 12/- to 25/- (price very variable).

## FILES



**971.—Triangular Files**, in polished handles, for cutting glass tubing and rod.  
 Each 9d.; per doz. 8/-

**972.—Ditto**, without handle each 7d.; per doz. 6/6



**973.—Flat File**, for sharpening cork borers .. each 9d.



**974.—Rat-tail Files**, for enlarging holes in corks .. .. . each 10d.; per doz. 9/-

**975.—Ditto**, without handle each 8d.; per doz. 7/6

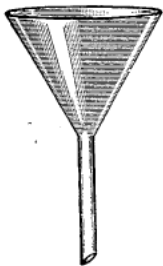
**976.—Flat File and Rasp**, 8 in. each 1/6



**FOR DIAMONDS AND GLASS TUBING CUTTERS**  
 SEE PAGE 155.

Every requisite for Chemical, Physical, and Bacteriological work supplied, from a test tube to the complete furnishing of the largest laboratory.

## FUNNELS



**977. — Funnels, correct angle, Plain.**  
Dia. 2½ 5 6½ 7½ 9 10 cm.  
Each 6d. 7d. 8d. 9d. 10d. 11d.  
Doz... 5/- 5/6 7/6 8/- 8/6 10/-

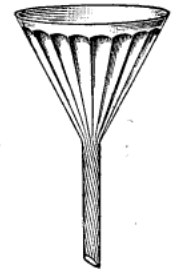
Dia. 11½ 12½ 15 18 20 23 25  
Each 1/1 1/3 1/5 2/- 2/4 3/3 4/6  
Doz. 12/- 14/- 16/- 22/- 27/- 38/- 50/-

977

**978. — Funnels, correct angle, Ribbed.**

Dia. 2½ 5 6½ 7½ 9 10 cm.  
Each 6d. 7d. 8d. 9d. 10d. 11d.  
Doz. 5/- 5/6 7/6 8/- 8/6 10/-

Dia. 11½ 12½ 15 18 20 23 25  
Each 1/1 1/3 1/5 2/- 2/4 3/3 4/6  
Doz. 12/- 14/- 16/- 22/- 27/- 38/- 50/-



978



**979. — Set of Three Small Funnels, Diameter, ½ in. to 1¼ in.**  
Per set .. .. . 1/-

**980. — Small Copper Funnels, for filling combustion tubes, etc.**  
Diameter 4½ cm. 6 cm.  
Each.. .. 1/6 2/-



980

979

**981. — Patent Funnels, very deeply fluted for quick filtering.**

Diameter.	Each.	Per doz.
7 cm.	.. 1/-	10/6
9 "	.. 1/4	14/-
11 "	.. 1/8	18/-
16 "	.. 2/5	26/-
20 "	.. 4/9	52/-
24 "	.. 7/-	76/-



981

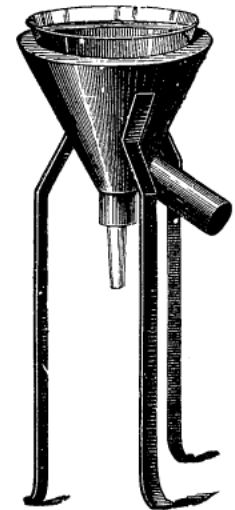


**982. — Enamelled Steel Funnel with handle.**

Diameter.	Each.
9 cm. .. ..	1/-
13 " .. ..	1/3
18 " .. ..	1/9



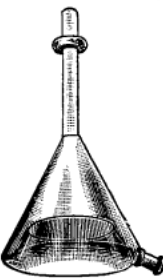
985



987

**985. — Hot Water Funnels, for hot filtrations, with tinplate jacket, complete with glass funnel and india-rubber cork.**

**987. — Hot Water Funnel, for hot filtrations, made of stout copper, complete on tripod with glass funnel 6 inches diameter and india-rubber cork Each 17/6**



**983. — Victor Meyer's Funnels, for covering evaporating dishes.**

Diameter.	Each.
15 cm. .. ..	6/-
20 " .. ..	7/6
25 " .. ..	11/6



**984. — Porcelain Funnels, Hirsch's, with perforated plate.**

Dia.	5	7	9	11	12½	14 cm.
Each	2/2	3/-	3/9	5/3	6/-	8/6

To take funnel.  
Diameter. Each.  
A. 10 cm. .. .. 9/-  
B. 13 " .. .. 10/-  
C. 15 " .. .. 11/6

**986. — Ditto, but with stout copper jackets, complete with 6-inch funnel.**

Each .. .. 15/6

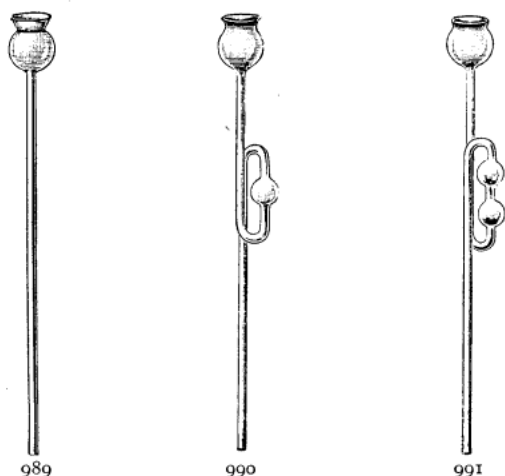
**988. — Ditto, but with double jacket.**

Each .. .. 23/-

**FOR PORCELAIN BUCHNER FUNNELS SEE PAGES 12-14.**

Our Balances and Weights have achieved World-wide Reputation ; vide Opinions of the Leading Scientific Press.

## THISTLE AND SEPARATING FUNNELS



989

990

991

**989.—Thistle Funnels**, plain, straight form.

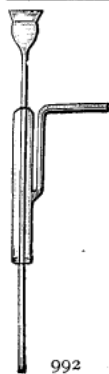
Length .. .. .	8	10	12	18 in.
Each .. .. .	4d.	4d.	4d.	6d.
Per dozen .. .. .	2/9	3/-	3/3	5/3

**990.—Thistle Funnels**, with bend and one safety bulb.

Length .. .. .	12	18 in.
Each .. .. .	10d.	1/2

**991.—Thistle Funnels**, with bend and two safety bulbs.

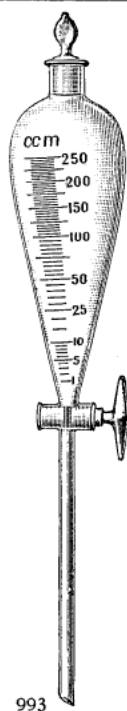
Length .. .. .	12	18 in.
Each .. .. .	1/2	1/4



992

**992.—Thistle Funnels with Side-gas leading Tubes**, clear glass.

Each 1/9 Per doz. 20/-



993

**993.— Graduated Separating Funnels**, conical shape, with stopper and stopcock, best quality clear crystal glass.

Capacity .. .. .	150	250 c.c.
Each .. .. .	9/-	10/6

**994.—Separating Funnels**, bulb form, long stems, light blown clear glass, with stopper and stopcock.



995

Capacity.	Each.
50 c.c. .. .. .	4/-
100 c.c. .. .. .	5/-
150 c.c. .. .. .	6/-
250 c.c. .. .. .	7/-
500 c.c. .. .. .	9/-
1000 c.c. .. .. .	14/6



994

**995.—Separating Funnels**, light blown clear glass, conical shape, with stopper and stopcock.

Capacity	100	250	350	500 c.c.
Price each	4/6	7/6	8/6	9/6

**996.—Separating Funnels**, cylindrical, with stopper and stopcock.



996A

Capacity. c.c.	Price each.	A	B
		Price graduated.	
150.. .. .	6/-	9/-	
250.. .. .	6/6	10/6	
500.. .. .	9/-	14/-	
750.. .. .	12/-	17/-	
1000.. .. .	14/6	20/-	
1500.. .. .	17/6	23/6	



997

**997.—Separating Funnels**, cylindrical, with stopcock, open at top.

Capacity	30	50	100	200c.c.
Price each	3/3	3/9	4/6	6/-

**998.—Funnels with short narrow stems** for filling barometer tubes, specific gravity bottles, etc.

Each .. .. .	4d.
Per doz. .. .. .	3/9



998

Our stock of pure Chemicals and Acids is very considerable ; hence all orders are executed with the utmost despatch. See comprehensive list at end of Catalogue.



## SEPARATING FUNNELS

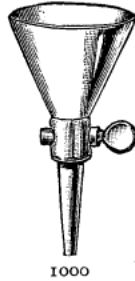


**999.—Funnels,** with stopcock and long stem.

Diameter.	Each.
7½ cm. .. .. .	4/-
10 " .. .. .	5/6
12½ " .. .. .	6/6
15 " .. .. .	8/-

**1000.—Funnels,** thick heavy glass with stopcock.

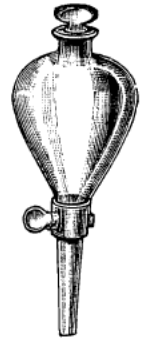
Diameter.	Each.
10 cm. .. .. .	6/-
12½ " .. .. .	7/6
15 " .. .. .	8/-
17½ " .. .. .	10/-



1000

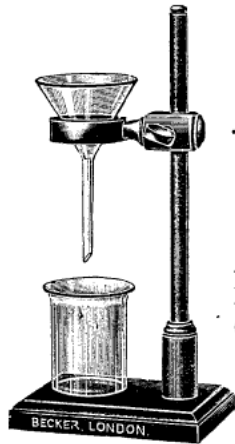
**1001.—Funnels,** made of thick heavy glass, with stopper and stopcock.

Capacity.	Each
250 c.c. .. .. .	11/-
500 " .. .. .	12/-
1000 " .. .. .	16/-
2000 " .. .. .	20/-
3000 " .. .. .	24/-
5000 " .. .. .	34/-



1001

## FUNNEL STANDS



1002

**1002.—Funnel Stands** with boxwood screw.

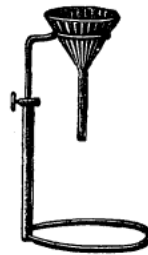
To hold one funnel.

	Each
A. White wood .. .. .	2/6
B. Hard teak wood .. .. .	5/-
C. Polished mahogany .. .. .	5/-

**1004.—Combined Funnel and Burette Stand,** best quality, with boxwood screws.

Made in hard teak.

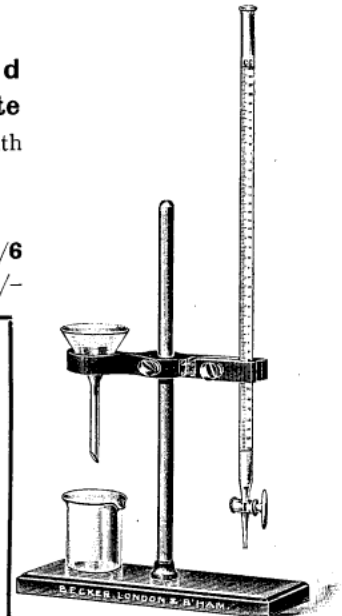
Each .. .. .	7/6
Per doz. .. .. .	80/-



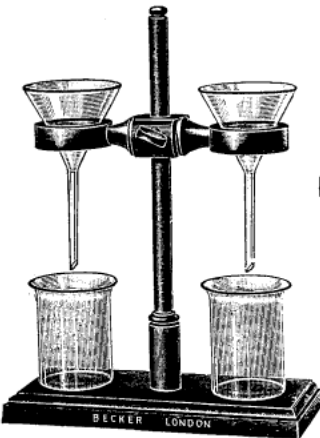
1005

**1005. Brass Funnel Stand,** with thumb-screw for adjusting to various heights.

Each .. .. .	3/-
--------------	-----



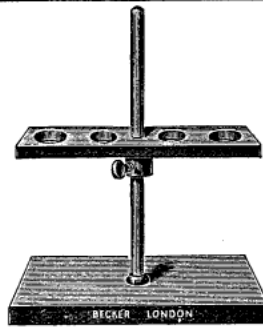
1004



1003

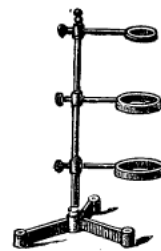
**1003. Funnel Stands** with boxwood screw. To hold two funnels.

A. White wood .. .. .	each	3/3
B. Hard teak wood .. .. .	"	6/6
C. Polished mahogany .. .. .	"	6/6



1006

**1006. — Hard Teak Wood Funnel Stands,** to take four funnels. each 7/6; per doz. 85/-

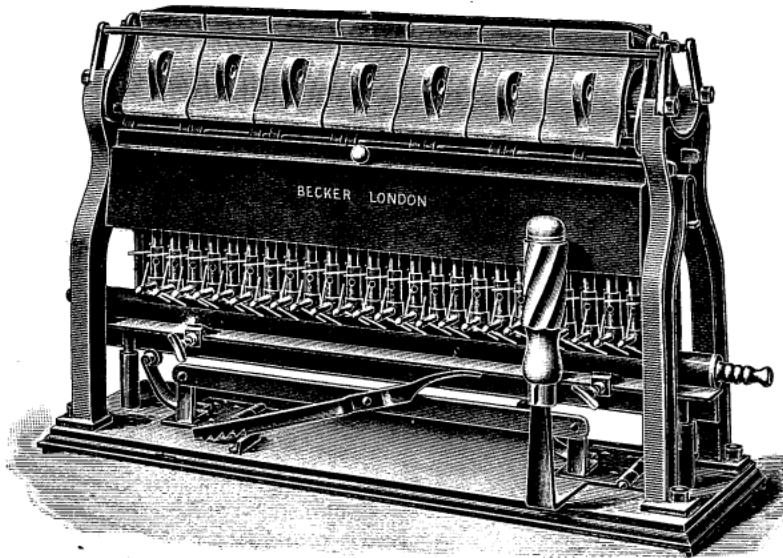


1007

**1007.—Funnel Stand,** consisting of tripod foot, rod and three brass rings lined with boxwood, with blocks and thumbscrews. each 10/6

Every requisite for Chemical, Physical, and Bacteriological work supplied, from a test tube to the complete furnishing of the largest laboratory.

## GAS COMBUSTION FURNACES



**FOR  
 HEDLEY'S  
 IMPROVED  
 COMBUSTION  
 FURNACE**  
 See page 314

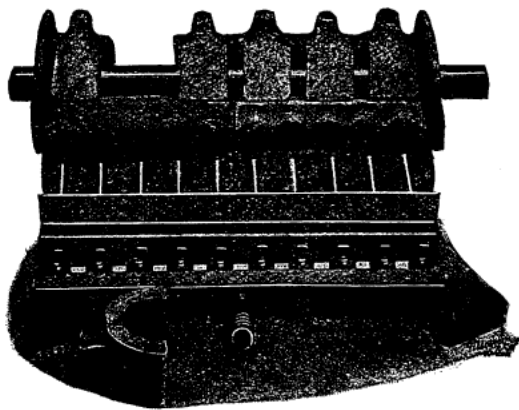
**FOR  
 ELECTRIC  
 FURNACES**  
 See pages  
 187 to 191

1008

**1008.—Becker's Improved Erlenmeyer's Combustion Furnace**, with arrangement for raising or lowering the burners. There is also a horizontal adjustment for the burners, which are provided with stopcocks with lever handles. Complete with all necessary tiles.

	A	B	C	D
No. of burners .. .. .	15	20	25	35
Price .. .. .	£7 10 0	£8 10 0	£9 10 0	£10 10 0

**1009.—Extra Tiles for above** .. .. . each 1/9 ; per dozen 20/-



1010

**1010.—Fletcher, Russell & Co.'s Combustion Furnace No. 2 Pattern.**

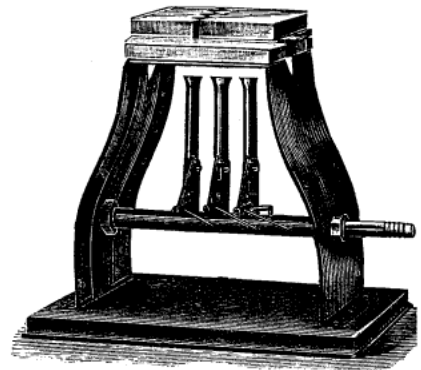
This furnace takes tubes up to 1 inch external diameter, and as the Furnace Body is made in 6 inch sections it can be made any convenient length without obstruction. Price *per 6 inch section*, complete with all necessary fireclay parts.

£2 15 0

**1011.—Turner's Furnace.**

Improved pattern for Carbon Combustions, etc. The burners are provided with stopcocks with lever handles.

Complete with tiles, etc. .. .. 38/-

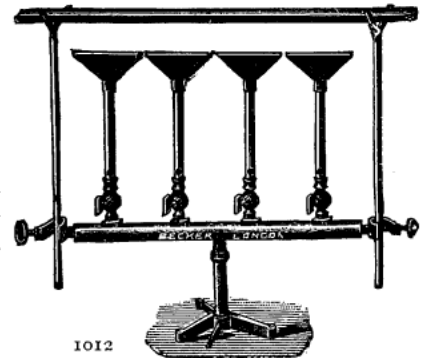


1011

**1012.—F. E. Becker & Co.'s Gas Furnace for heating tubes.**

Complete with sheet iron tray on adjustable supports, with four flat burners. Total length 16 in.

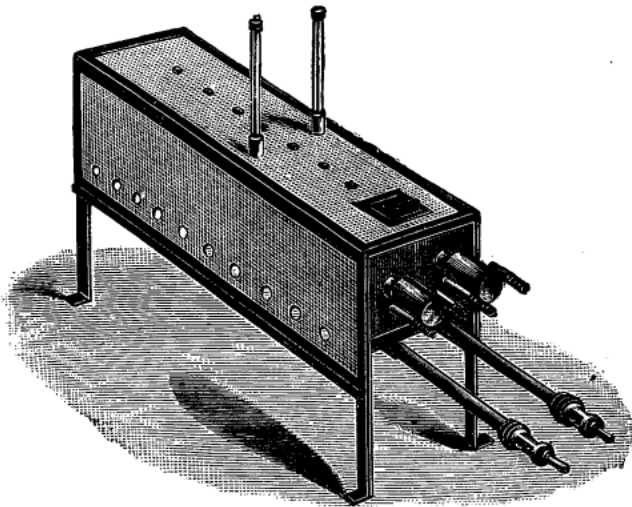
28/6



1012

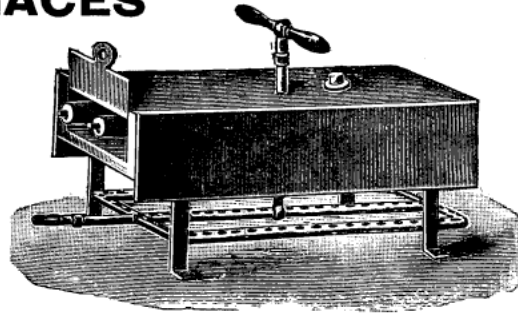
Our Balances and Weights have achieved World-wide Reputation ; *vide* Opinions of the Leading Scientific Press.

## GAS FURNACES



1013

**1013.—Uhlmann's Explosion Gas Furnace**, with two Mannesman steel tubes and condensing tubes .. .. each **£9 10 0**

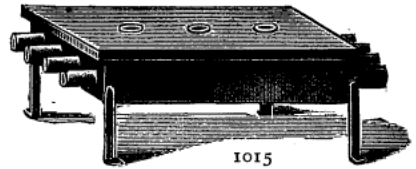


1014

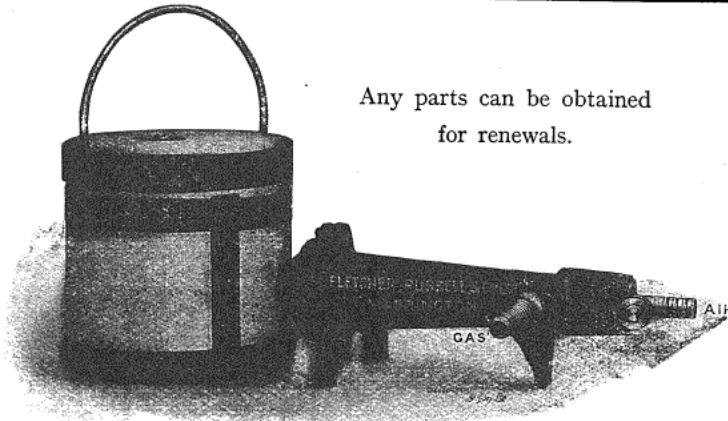
**1014.—Tube Furnace**, after Gattermann, with metal burner, and arrangement for regulating the temperature, etc.  
 Price, complete .. .. **£6 5 0**

**1015.—Erlenmeyer's Air Oven**, complete on stand, without burners.

- A. With two tubes. Each .. **£1 12 0**
- B. With four tubes. Each .. **£2 5 0**



1015



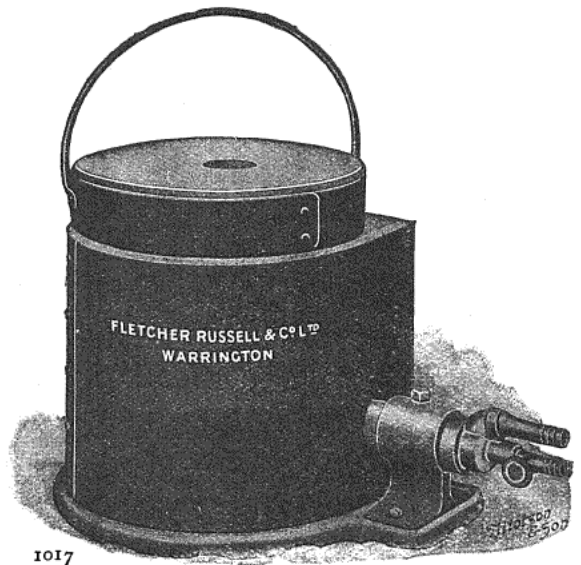
Any parts can be obtained for renewals.

1016

**1016.—Patent Injector Furnace**, strongly recommended as an improvement on the Injector Furnace for all work, not only as regards the available margin of power, but also the gauze in the burner is at a safe distance from the Furnace, and not liable to damage at very high temperatures. As with the ordinary Injector Furnace the power depends entirely on the air pressure, the bore of the air jet, and the gas supply.

**Prices.**

- A. To take No. 00 crucibles, capacity  $\frac{1}{2}$  lb. iron **£1 10 6**
- B. To take No. 1 crucibles, capacity 2 lb. iron **£1 12 6**
- C. To take No. 3 crucibles, capacity 6 lb. iron **£2 17 6**
- D. To take No. 6 crucibles, capacity 12 lb. iron **£3 12 6**



1017

**1017.—Concentric Jet Furnaces** for Chemical Laboratories, and all purposes where high temperature and rapid working are required.

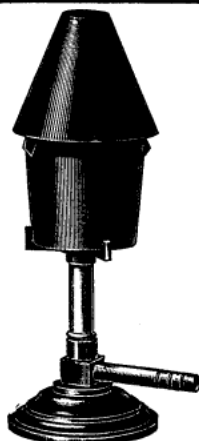
Size.	Outside Measure.	Price.
No. 00.	Taking crucibles 2 $\frac{1}{2}$ in. high, 2 in. wide	<b>£2 9 6</b>
No. 1.	Taking crucibles 3 in. high, 2 $\frac{3}{8}$ in. wide	<b>2 19 6</b>
No. 3.	Taking crucibles 4 $\frac{1}{2}$ in. high, 3 $\frac{1}{2}$ in. wide	<b>3 15 6</b>
No. 6.	Taking crucibles 6 in. high, 4 $\frac{1}{2}$ in. wide	<b>5 7 6</b>

These Furnaces will fuse wrought iron tool steel or pure nickel with a high pressure air supply.

Our stock of pure Chemicals and Acids is very considerable ; hence all orders are executed with the utmost despatch. See comprehensive list at end of Catalogue.

## GAS FURNACES

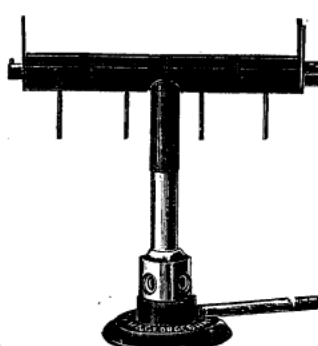
For Electric Furnaces, see pages 187 to 191.



**1018.**

**New "Dwarf" Pattern Furnace**, gives three times the heat of an ordinary Bunsen burner, although the quantity of gas consumed is exactly the same. Marble can be reduced to quicklime in ten minutes.

Size No... 1 2  
 Price .. 5/- 7/6 each.



**1019.—Professor Ramsay's Gas Furnace**, as used in the University College, London, made to fit into a Bunsen burner  $\frac{3}{4}$ -in.

Each .. .. 14/6

**1020.**—Ditto, with  $\frac{3}{4}$ -in burner .. each 18/6

**1021.—Student's Furnace**, gives a very hot flame; very useful for heating small hard glass tubes.

Price complete with burner and tube holder.. .. each 3/6



1021

**1022.—Tube Holder only**, to fit ordinary Bunsen burner.

Each .. .. 2/6

**1023.—Curved Attachment**, with foot, for fitting on above burner so that it can be laid down lengthways, as is necessary at times where space is limited.

Each .. .. 2/3



1023

**FOR BUNSEN, MECKER,  
 AND TECLU BURNERS,  
 SEE INDEX.**

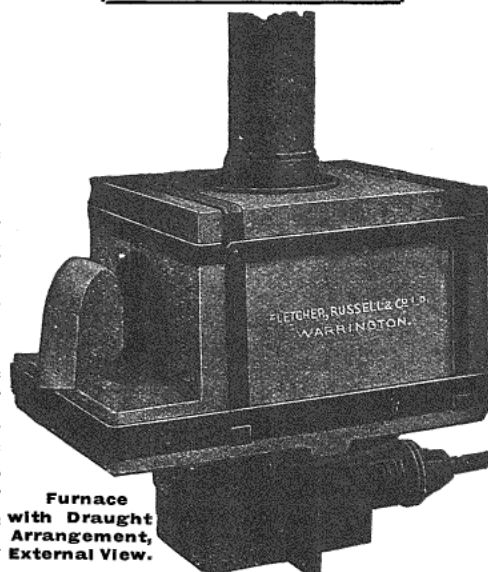
## GAS MUFFLE FURNACES

**1024.—Fletcher, Russell & Co.'s Muffle Furnace,**

*Instructions for use:—*

The gas supply tap and pipe must be large and clear, so as to give as great a pressure of gas as possible at the burner nozzle, although the actual consumption of gas is small. The indiarubber tubing used must of necessity be perfectly smooth inside. The tubing made on wire, whether the wire is removed or not, *will not work these burners satisfactorily*. All Muffle Furnaces are sent out with a 2 ft. 6 in. chimney, having a cast iron foot to enable it to stand steadily, and a short handle by which it can be readily lifted with the crucible tongs. The gas supply specified is required to work each furnace at its full power, and the flame must be visible in the chimney. If the gas supply is deficient, the furnaces can be worked at a lower heat by partially closing the top of the chimney until the flame becomes visible, or by working without chimney. If the burner plate becomes red hot, it is a sign that the gas supply is deficient. The points of blue flame are always visible when the burner is looked into sideways, unless the gas supply is too small to work the furnace satisfactorily. To light the burner without removing the upper part of the furnace, put a lighted taper through the burner casing up between the grooves in burner plate, then turn the gas on slowly. If the furnace is hot it may be necessary to cover the air opening round the gas entrance to prevent the flame descending through the gauze at the moment of lighting. The burners can be easily taken apart, and must be kept clean.

For ELECTRIC FURNACES,  
 see pages 187 to 191.



**Furnace  
 with Draught  
 Arrangement,  
 External View.**

	Cat. No. 1024/261			Cat. No. 1025/461			Cat. No. 1026/661		
	Wide.	High.	Long.	Wide.	High.	Long.	Wide.	High.	Long.
Space inside Muffle .. .. .	2 in.	2 in.	4 in.	3 $\frac{7}{8}$ in.	3 in.	6 $\frac{1}{2}$ in.	5 $\frac{3}{8}$ in.	4 $\frac{1}{2}$ in.	9 in.
Gas Supply required .. .. .	.. .. .			.. .. .			.. .. .		
Gas Consumption per hour for Draught Burner	.. .. .			60 c. feet.			70 c. feet.		
A. <b>PRICE</b> , for Draught only .. .. .	£6 10 0			£7 15 0			£9 15 0		
B. Extra Muffles, Clay .. .. .	3/-			5/6			8/6		
C. „ Grids for Burners .. .. .	5/6			5/6			5/6		
D. „ Gauzes for Burners .. .. .	2/3			2/3			2/3		

**Every requisite for Chemical, Physical, and Bacteriological work supplied, from a test tube to the complete furnishing of the largest laboratory.**

# IMPROVED ADJUSTABLE PYROMETER

(THE PYROMIKE—RUDGE-WHITWORTH PATENT).

THE LITTLE INSTRUMENT FOR BIG TEMPERATURES.

SIZE 2½" x ¼".



WEIGHT 5½ ozs.

PATENTS—

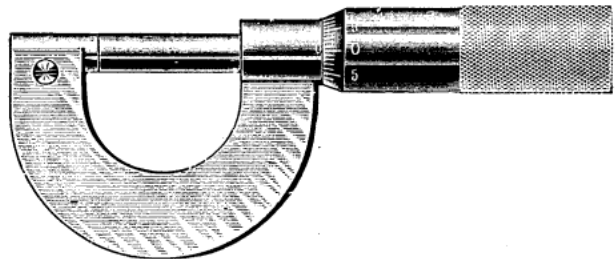
BRITISH  
10617 - 1905.  
13875 - 1913.

FRANCE  
465898 - 1913.

BELGIUM  
262845 - 1913.

ITALY  
182/521 - 1913.

U.S.A.  
844962 - 1914.



The **Pyromike** is the **pyrometric equivalent** of The **Micrometer**.

(Registered No. 303487)

**THE PYROMIKE** is only 2½ inches long and ¼ inches diameter. Its weight is only 5½ oz., and all that is necessary for ascertaining all temperatures over a wide range is comprised within this small compass.

Securely enclosed in the instrument is a glass-ended tube with collapsible sides containing dye solutions. This vessel is hermetically sealed and screened from light. By means of a screw-end, something like that of a screw micrometer, the collapsible cell is compressed, and the length of the column of dye solutions shortened. A mark on the screw-end travels over a graduated spiral on the body tube and indicates the temperature.

There are no wires, leads, mirrors, delicate electrical instruments, and no accessories.

## TO TAKE TEMPERATURES.

Look through the Pyromike at the object, i.e., port-hole in the muffle door or furnace wall. Unscrew the screw-end, when something like this will be seen.



When the disc vanishes, the temperature can be read off at once from the markings on the Pyromike.

**OBSERVING THE TEMPERATURE.**—First screw in the screw-end so as to shorten the instrument and compress the collapsible tube. Then apply the eyepiece to the eye and point the instrument toward the hot object, viewed preferably through a small hole in the muffle door, so as to ensure a dark background round the object in question. The part of the object visible should now appear as a coloured patch. If it is not visible, screw the end in further until it is. Next turn the screw-end steadily backwards until the patch just ceases to appear coloured. Then stop turning, and read the temperature on the graduated spiral.

**NOTE.**—Sometimes, after apparently disappearing, the colour comes back. If it remains, screw out again until it vanishes. It takes from ½ to 1 minute for the eye to get accustomed to the dark.

**CAUTION.**—When cold, moisture from the eye is liable to condense on eyepiece. To obviate this, the instrument should be shaken to and fro in the air and then applied to the eye again.

**AFTER USE.**—Always screw the end out as far as it will go.

This system for determining temperatures has been employed with success for many years by thousands of users of Stereo-Pyrometers. Different eyes give readings in surprisingly close agreement with one another.

The Adjustable Pyrometer is an improvement specially adapted for those who prefer an instrument capable of indicating intermediate as well as fixed temperatures.

## TEMPERATURE RANGES.

600° to 850° C.—Annealing.

700° to 1050° C.—Heat Treatment of Steel.

800° to 1200° C.—Case-hardening, Rolling, Brick-making.

850° to 1400° C.—Re-heating Bessemer Ingots, Porcelain, Glazed Bricks.

1000° to 1600° C.—Firebricks, Glazed Earthenware, Porcelain, Emery Wheels, Glass.

1200° to 1800° C.—Steel-making, Siemens Martin, Bessemer, and Blast Furnaces.

When ordering **PLEASE STATE RANGE.**

**1027.**—Improved Adjustable Pyrometer (The Pyromike), complete in neat leather case as described above .. .. . £6 6 0

**WE ARE THE SOLE MAKERS OF THIS INSTRUMENT.**

Our Balances and Weights have achieved World-wide Reputation; *vide* Opinions of the Leading Scientific Press.

## ELECTRIC LABORATORY FURNACES

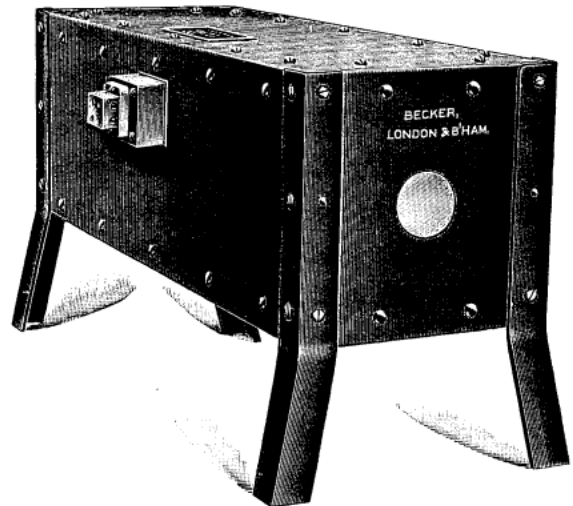
Considerable improvements have been made in Electric Muffle Furnaces, and the various types illustrated are of the latest improved patterns and the result of a long experience in their manufacture. **Our Furnaces are suitable for temperatures up to 1000° C. or for short periods up to 1200° C.** Obviously the life of the heating element will be considerably lengthened if the lower temperature (1000° C.) is only occasionally exceeded.

Great care has been taken in both the electrical and mechanical design of these furnaces. The "All Metal" construction is a great advance on all other types, as not only are the Muffles more robust, but better heat insulation is ensured. **A further point which has had considerable attention is the easy replacement of new wound heating tubes or chambers.** Our experience in correctly winding the heating chamber for the various Muffles we make is again the outcome of long experience, and we particularly desire to point out that where a long life is desired it is of the utmost importance that this highly specialised work should not be attempted by users themselves. The heating wire used for the windings is a special form of alloy, capable of withstanding reasonably high temperatures for extremely long periods. *In this connection we would emphasise the importance of installing a BARE Thermo-Couple and Pyrometer as a check to temperatures.* (For details, see page 191.)

**It is also necessary to point out that the current consumption of an Electric Muffle is no guide or check to temperatures.**

These types of Electric Muffles are largely used for carbon estimation, etc. The cases of Tube Muffles are constructed of substantial sheet iron, or aluminium, strengthened by angle iron sides and ends, the latter forming the legs. Special care and attention has been devoted to both the electrical and mechanical design and construction of these Muffles, and we are consequently able to offer a Muffle of sound construction at a reasonable price.

New wound heating chambers can be supplied from stock. Particular attention is directed to the heating winding of our Tube Muffles which, like all our other types, consists of a special alloy capable of withstanding reasonably high temperatures for lengthy periods. Care should be taken to install a bare thermo-couple and pyrometer to prevent undue temperatures being reached.



1028.

**1028.—Single Tube Electric Laboratory Muffles.** Suitable for a temperature of 1000° C. or for short periods 1200° C.

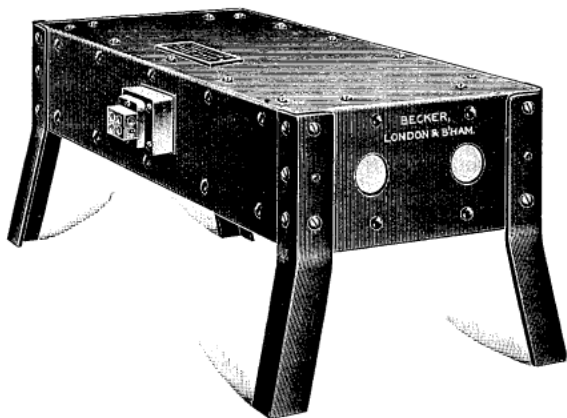
Prices include Regulating Resistances. See Page 191.

<b>1028</b> Size .. .. .	A	B	C	D	E
Length of tube in inches .. .. .	12	12	12	12	12
Internal diameter of tube in inches .. .. .	1	1½	1½	1¾	2
Units per hour .. .. .	0·6	0·7	0·75	0·8	0·85
Price of Furnace Complete .. .. .	£9 7 6	£9 10 0	£10 5 0	£10 10 0	£10 15 0
Extra Replacement Wound Chambers, each	£1 5 0	£1 7 6	£1 10 0	£1 13 0	£1 16 6
<b>1028</b> Size .. .. .	F	G	H	J	K
Length of tube in inches .. .. .	16	16	16	16	16
Internal diameter of tube in inches .. .. .	1	1½	1½	1¾	2
Units per hour .. .. .	0·8	0·9	1	1·1	1·15
Price of Furnace Complete .. .. .	£10 17 6	£11 2 0	£11 15 0	£12 0 0	£12 10 0
Extra Replacement Wound Chambers, each	£1 11 6	£1 15 0	£1 17 6	£2 0 0	£2 3 6
<b>1028</b> Size .. .. .	L	M	N	O	P
Length of tube in inches .. .. .	20	20	20	20	20
Internal diameter of tube in inches .. .. .	1	1¼	1½	1¾	2
Units per hour .. .. .	1	1·15	1·25	1·35	1·40
Price of Furnace Complete .. .. .	£11 18 0	£12 10 0	£13 10 0	£13 17 6	£14 0 0
Extra Replacement Wound Chambers, each	£1 16 6	£2 2 0	£2 5 0	£2 10 0	£2 17 6

Our stock of pure Chemicals and Acids is very considerable ; hence all orders are executed with the utmost despatch. See comprehensive list at end of Catalogue.



## ELECTRIC LABORATORY FURNACES.



Two-Tube Electric Muffle, 1029A and B.

### TUBE MUFFLES.

(For full specification of these muffles see previous page.)

The type of Rheostat for controlling temperatures is illustrated on page 191. The design of this Rheostat is a great advance upon the usual sliding type, which has many disadvantages. Our Rheostats give a wide range of control and are of superior design and construction.

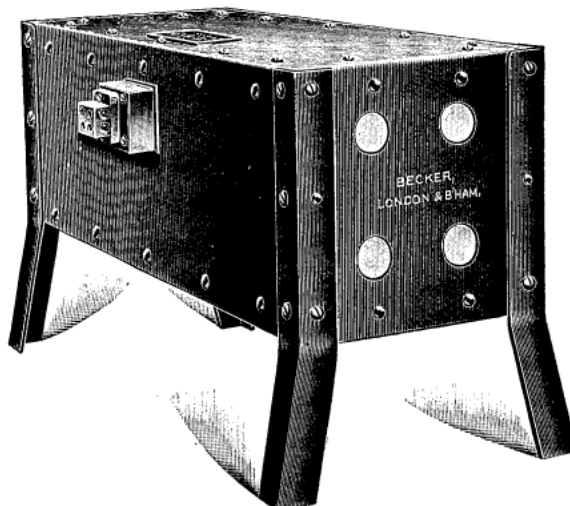
### 1029.—Two- and Four-Tube Electric Muffles.

1029 Size .. .. .	A	B	C
Number of tubes .. .. .	2	2	4
Length of tubes, inches .. .. .	12	12	12
Internal diameter of tubes, inches .. .. .	1½	1½	1½
Price of Furnace Complete .. .. .	£12 17 6	£13 17 6	£16 0 0
Extra Replacement Wound Chambers, each .. .. .	£1 7 6	£1 13 0	£1 7 6

The above prices include a Regulating Resistance, see page 191.

All Muffles illustrated and described on this and the preceding page can be supplied with tubes extending outside the muffles at a slight extra cost.

All Electric Tube Muffles are suitable for a temperature of 1000° C. or for short periods 1200° C. and can be operated by either alternating or direct current. When ordering please state voltage of circuit.



Four-Tube Electric Muffle, 1029C.

Every requisite for Chemical, Physical, and Bacteriological work supplied, from a test tube to the complete furnishing of the largest laboratory.



## ELECTRIC LABORATORY FURNACES

### 1030.—Laboratory Crucible Furnace (Vertical Pattern).

This Muffle has been specially designed for the heating of crucibles and for general laboratory work. It is cheap, reliable, and of a portable nature, and can be used for numerous experimental purposes. The chamber, of all metal construction, is 3 inches diameter by 9 inches long.

Temperatures up to 1000° C. or for short periods 1200° C. may be obtained (*see note on page 187*).

Suitable for either alternating or direct current.

- A. Price, complete with resistance .. .. . £11 11 0  
 B. Extra Replacement Wound Chambers, each .. .. . 2 10 6

*For illustration and specification of regulating rheostat, see page 191.*

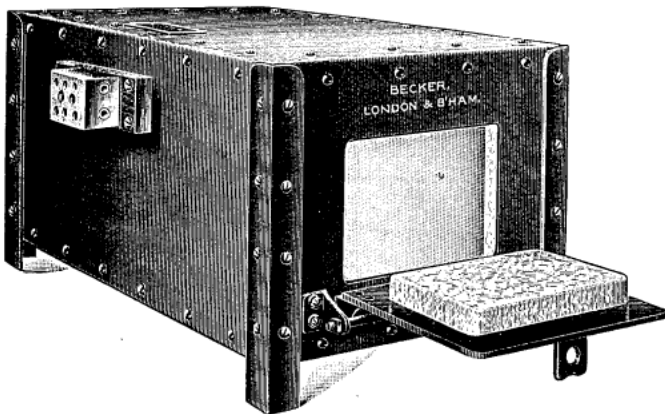
The above Muffles may be supplied in any diameter up to 12 inches, prices and particulars on application.



Electric Crucible Furnace, No. 1030.

### 1031.—Rectangular Electric Muffle.

For certain operations rectangular-shaped Muffles are desirable. The illustration shows such a Muffle with its essential features. It should be noted that the Muffle casing is equally substantial as those used in our other types of Laboratory Muffles. The metal door is hinged at the bottom, and provided with a lagged covering to prevent end heat losses. The electrical or heating winding is exactly similar to our other types of Muffles, and will be found to compare most favourably with Electric Muffles of any other make. As previously stated *all our heating windings consist of a special alloy wire*, capable of withstanding reasonably high temperatures for long periods. **In addition, special knowledge of winding and construction enables us to supply Electric Muffles which we claim are superior to any at present on the market.**



Rectangular Tube Electric Muffle, No. 1031.

*When ordering please state voltage of circuit.*

Catalogue No. 1031.	Size of Chamber in inches.	Price of Furnace complete with Regulating Rheostat (page 191).	Extra Replacement Wound Chambers, each.
A	8 × 3 × 3	£12 15 0	£1 17 0
B	11 × 3½ × 2½	£13 17 6	£2 8 6
C	15 × 6 × 3½	£17 9 0	£4 5 0
D	19 × 5 × 7½	£22 12 0	£7 2 6

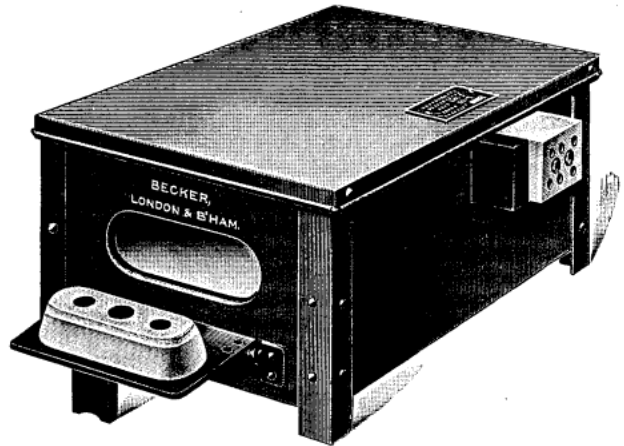
*The Muffles can be supplied with a back entry for Pyrometer at a slight extra charge.*

**Our Balances and Weights have achieved World-wide Reputation: vide Opinions of the Leading Scientific Press.**

## ELECTRIC MUFFLE FURNACES

### OVAL SHAPED MUFFLE (Regd. Design).

These Muffles are made in six different sizes, and have been specially designed to permit the use of a flat floor on which the work to be heated can be placed. The absence of sharp edges on the outside of the heating chamber provides all the advantages of smooth winding, adding considerably to the length of life of the heating winding employed, whilst the interior presents a uniform heat and the advantages of a level floor mentioned above. The outside casing of these Muffles is either substantial gauge black iron or aluminium plate, having end and side angle pieces, as a frame work. The door can either be hinged, or at a slight additional cost, a counterbalanced door can be substituted. In the former case it is advisable to specify inlet at back for thermo-couple.



Oval Electric Muffle, No. 1032.

Flat Oval Muffles are made in the following sizes :—

Cat. No. 1032.	Voltage Range.	Internal Dimensions of Heating Chamber in inches.				Power Consumption in Watts.	Price of Furnace Complete.	Extra Replacement Wound Chamber.
		Length.	Width.	Flat Floor.	Height.			
A	100-250	13	2 $\frac{3}{4}$	1 $\frac{3}{4}$	1	700	£20 17 6	£2 17 6
B	100-250	13	4 $\frac{1}{2}$	2 $\frac{3}{8}$	1 $\frac{1}{2}$	1000	23 5 0	3 7 6
C	100-500	13	5 $\frac{1}{2}$	3 $\frac{1}{2}$	2	1400	25 10 0	5 2 6
D	100-500	15	8 $\frac{1}{4}$	5 $\frac{1}{4}$	3	2600	32 0 0	7 10 0
E	100-500	17	11	7 $\frac{1}{4}$	4	4200	40 3 0	14 7 6
F	200-500	23	16 $\frac{1}{2}$	10 $\frac{1}{2}$	6	9500	55 4 0	24 17 6

The muffle chambers used in our Oval Muffles are of a special refractory composition, capable of withstanding high temperatures. In addition to the many uses which these muffles can be put to in the laboratory they are also largely used for production purposes in numerous industries.

NOTE.—The above Furnaces can be supplied with counterbalanced sliding doors at 10 per cent. extra on above prices.



Control Panel, No. 1033.

#### 1033.—Control Panels.

All Muffles can be supplied with Control Panels consisting of a double pole switch, two fuses, connecting plug and ammeter for measuring the current, mounted on base board as illustration. This combination, together with a pyrometer, makes a complete installation.

	Price.
A. Up to 5 amps. . . . .	£4 5 0
B. „ 10 „ . . . . .	4 15 0
C. „ 12 „ . . . . .	5 2 6

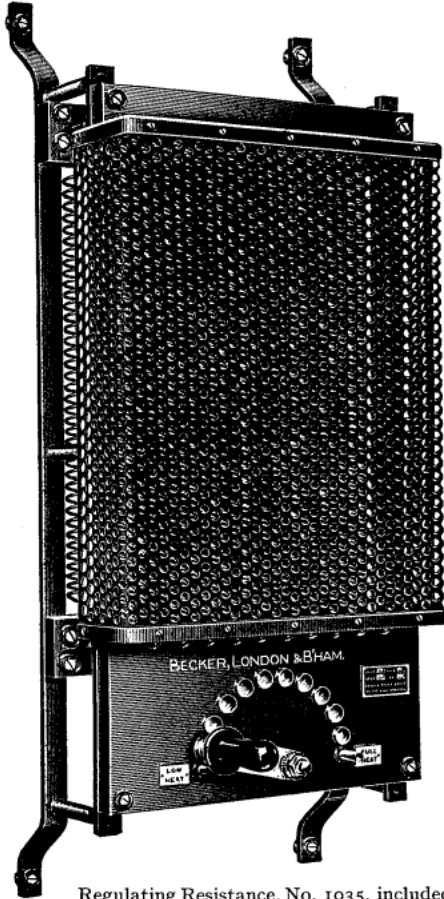
*Prices of larger control panels than above quoted on receipt of full particulars.*

To prevent overheating and possible damage to the heating elements of our Electric Muffle Furnaces a **PATENT AUTOMATIC CUTOUT, No. 1034**, which operates at 960° C., may be supplied at an extra cost of £5 5s. These cutouts, however, cannot be fitted to the small tube muffles.

Our stock of pure Chemicals and Acids is very considerable ; hence all orders are executed with the utmost despatch. See comprehensive list at end of Catalogue.

## RHEOSTATS AND PYROMETERS

FOR USE WITH ELECTRIC FURNACES.

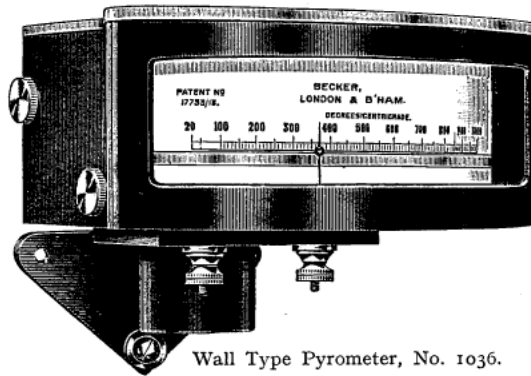


Regulating Resistance, No. 1035, included in all prices on previous pages.

### 1035.—Regulating Rheostat.

The type of regulating resistance supplied with our various sizes of Electric Muffles is illustrated herewith, and all prices include this resistance. We do not favour the type of sliding resistance, chiefly on account of mechanical and electrical disadvantages. Our resistances, as will be seen from the illustration, consist of a slate panel with adjustable laminated brass handle, making contact on solid brass studs, which are in turn mounted on the slate base. The whole frame carrying the spiral resistance coils and slate base, etc., is mounted on iron frame with lug ends for fixing on wall. The spirals are covered with a perforated metal cover, allowing excellent ventilation. The whole arrangement provides for temperature control over a wide range.

*For Control Panels to work in conjunction with these Rheostats, see page 190.*



Wall Type Pyrometer, No. 1036.

### 1036.—Wall Type Pyrometer for use with Electric Muffles.

A most reliable instrument, having an aluminium case, hard stove enamelled with brass terminals and is fitted with an anti-parallax mirror. The instrument is mounted in a cast aluminium wall-bracket which allows it to be rotated to face any convenient direction. The Compensating Leads provided with the Pyrometer make the cold junction the actual terminals of the Indicator, which is in accordance with the most approved practice.

**With Electric Muffles the use of BARE Thermo Couples is strongly recommended, as the absence of a protective sheath very much reduces the "lag" and sluggishness otherwise inseparable from the use of enclosed couples.**

For purposes where a protective sheath is essential, however, we manufacture an Enclosed Couple, which is supplied with the Pyrometer if specially ordered. *Bare Couples are sent unless such special instructions are given.*

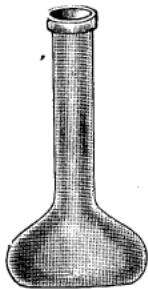
Standard Pyrometers as above are calibrated to 1,000° C., but for temperatures over 1000° C. a Platinum Rhodium Couple is necessary.

Prices on application.

Price of Pyrometer Equipment, calibrated to 1000° C., complete, comprising Wall Type Indicator, Compensating Leads and 12 Bare Couples or one Enclosed Couple .. .. . £16 0 0

**Every requisite for Chemical, Physical, and Bacteriological work supplied, from a test tube to the complete furnishing of the largest laboratory.**

## FLASKS



**1037.—Pfeffer's Porous Flasks**  
 for the preparation of Potassium  
 Ferrocyanide membranes.

A. Capacity 50 c.c.	..	each	<b>2/6</b>
B. „ 150 c.c.	..	„	<b>3/-</b>
C. „ 1,000 c.c.	..	„	<b>8/-</b>



**1039. — Beer Distillation  
 Flasks**, with convex bottom, as  
 supplied by us to the *Government  
 Laboratories* for use with Sir Edward  
 Thorpe's Revenue Still. British Re-  
 sistance Glass.

Each .. .. .	<b>2/3</b>
Per dozen .. .. .	<b>26/-</b>

**FOR DEWAR'S VACUUM FLASKS  
 and other VACUUM VESSELS see  
 INDEX and PHYSICAL APPA-  
 RATUS CATALOGUE.**

**1038. — Funnel-shaped  
 Conical Flasks, with deep  
 gutter for Iodine Deter-  
 minations,** with hollow  
 stoppers carefully ground into necks.



Capacity ..	125	250	500 c.c.
Each ..	<b>3/-</b>	<b>5/-</b>	<b>6/6</b>

**1040. Assay Bulb Flasks,** finest  
 quality.

Capacity .. .. .	30	60	90	125 c.c.
Each.. .. .	<b>8d.</b>	<b>10d.</b>	<b>1/-</b>	<b>1/2</b>
Per dozen .. .. .	<b>7/-</b>	<b>8/6</b>	<b>11/-</b>	<b>13/-</b>



**1041.—Assay Flasks,** finest white  
 glass.

Capacity .. .. .	100 c.c.	..	250 c.c.
Each .. .. .	<b>1/3</b>	..	<b>1/9</b>



**FOR ALL OTHER FLASKS  
 see Pages 2-5.**

## COPPER BOILING FLASKS



**1042.—Boiling Flasks,** made of strong  
 copper round bottom, with long necks.

Capacity ..	4	8	16	32	48 oz.
Price, each ..	<b>10/6</b>	<b>13/6</b>	<b>18/6</b>	<b>25/6</b>	<b>35/-</b>

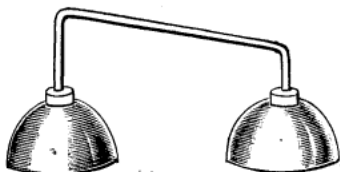
*For copper Distillation Flasks see Index.*

**1043.—Boiling Flasks,**  
 made of strong copper, flat  
 bottom.

Capacity	1	2 litres.
Price, each ..	<b>27/6</b>	<b>31/-</b>



## FLUORIC ACID APPARATUS



**1044. —Brunners,** made  
 of lead.

Each .. .. .	<b>£1 7 6</b>
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**1045.—Lead Capsules.**

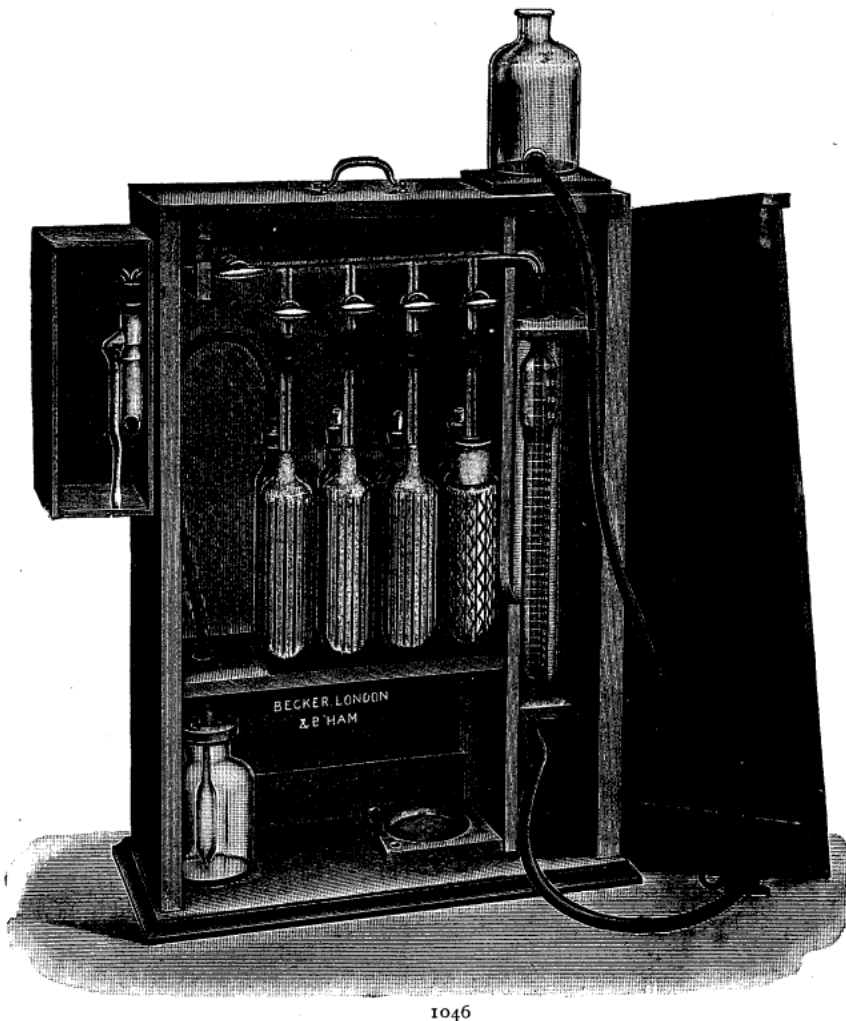
Diameter ..	5	7½	10 cm.
Price, each	<b>9d.</b>	<b>1/6</b>	<b>2/3</b>



*For Gutta Percha Bottles for holding Fluoric Acid,  
 see Index.*

**Our Balances and Weights have achieved World-wide Reputation ; vide Opinions of the  
 Leading Scientific Press.**

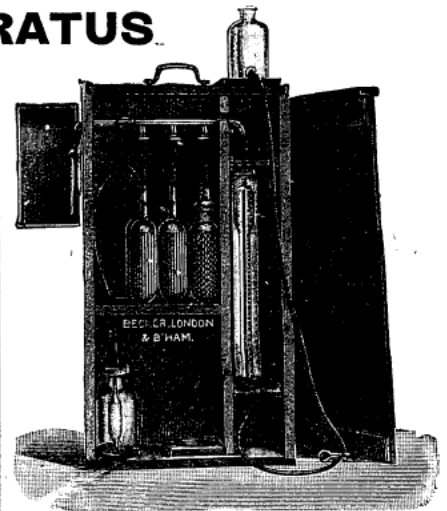
## GAS ANALYSIS APPARATUS.



1046

**1046.—Orsat's Gas Analysis Apparatus**, for the analysis of furnace gases, etc.; latest improved pattern. We can thoroughly recommend this apparatus, as it is very compact and easily manipulated.

- |   |         |
|---|---------|
| A. Price complete with four absorption tubes, and palladium asbestos tube in well-finished wooden case with sliding doors | £8 5 0  |
| <i>Spare parts for the above apparatus as follows:—</i>   |         |
| B. Capillary connecting tube with five stopcocks .. each  | £1 10 0 |
| C. Graduated burette, with jacket and india-rubber stoppers .. each   | 0 16 0  |
| D. Absorption pipettes filled with glass tubes .. .. .  | 0 9 6   |
| E. " " with ground-in stopper and copper spiral .. each   | 0 12 0  |
| F. Tubulated bottle .. .. .   | 0 2 6   |



1047

**1047.—Orsat's Gas Analysis Apparatus**, as No. 1046, but with *three* absorption tubes and capillary connecting tube with four stopcocks, complete in case **£5 10 0**

**1048.—Spare Capillary Tube** with four stopcocks for above

£1 6 6

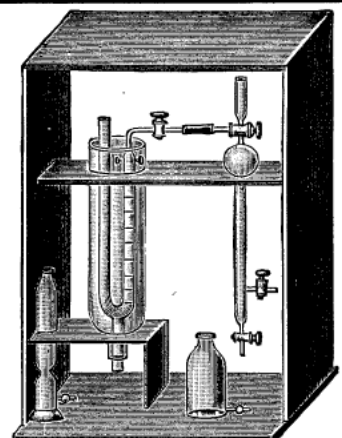
(For prices of other spare parts see No. 1046.)

**1049.—Orsat's Gas Analysis Apparatus**, as No. 1046, but with *two* absorption tubes, complete in case .. .. . **£4 10 0**

**1050.—Spare Capillary Tube** with three stopcocks for above **21/-**

**1051.—Stead's Gas Analysis Apparatus**, complete **£8 10 0**

**1052.—Bone and Wheeler's Gas Analysis Apparatus**, complete .. .. . **£34 0 0**

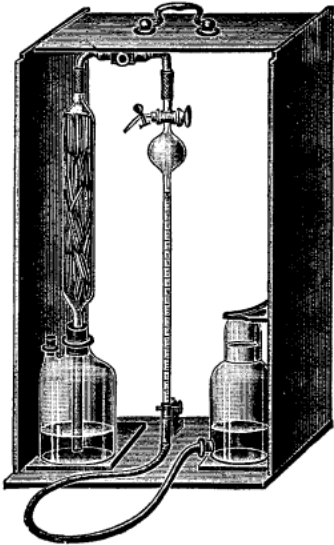


**1053.—Allen's Gas Analysis Apparatus**, for the analysis of furnace gases—

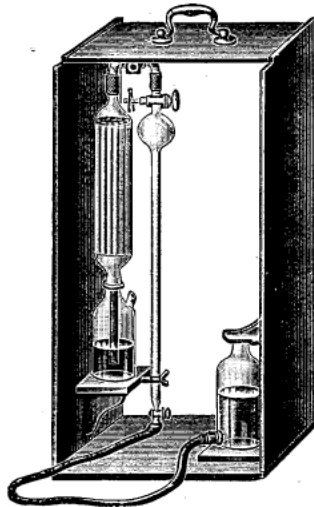
- |                               |         |
|-------------------------------|---------|
| A. Glass parts only ..        | £2 17 6 |
| B. Complete in wooden case .. | £3 15 0 |

M

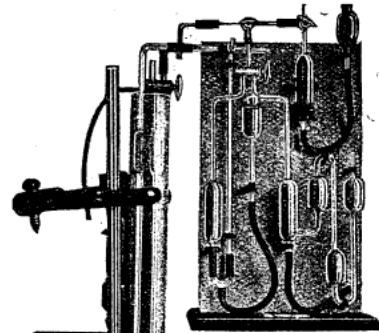
**GAS ANALYSIS APPARATUS**



**1054. — Lindemann's Gas Analysis Apparatus,** for the determination of oxygen.  
 A. Glass parts only £1 15 0  
 B. Complete in wooden case £2 15 0



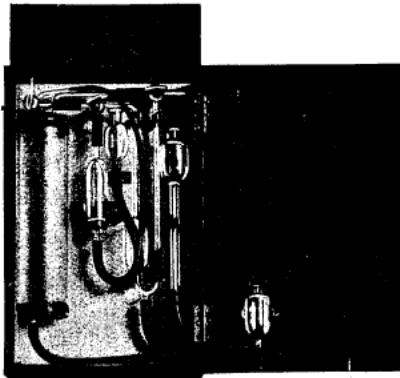
**1055.—Winkler's Gas Analysis Apparatus,** for the determination of carbon dioxide.  
 A. Glass parts only £1 15 0  
 B. Complete in wooden case £2 15 0



**1056.—Dr. Haldane's Laboratory Apparatus,** for the determination of carbonic acid, oxygen, nitrogen and fire-damp. As Fig. 5, page 10, of Dr. Haldane's book, "Methods of Air Analysis."

A. Price, complete as illustrated, but without rheostat £7 7 0  
 B. Price of rheostat £1 1 0

1056



**1057.—Dr. J. S. Haldane's Portable Apparatus for Analysis of Mine Gases.**

(See "The Investigation of Mine-Air," by Sir C. Le Neve Foster and Dr. Haldane, 1905, page 116.)

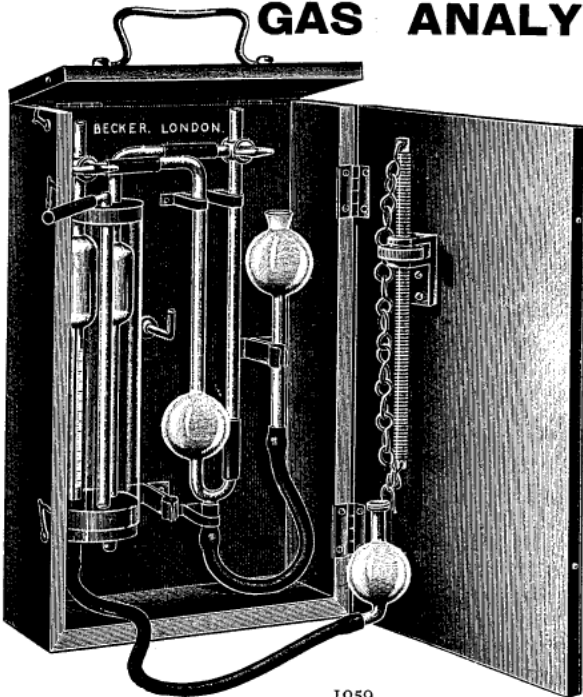
The Apparatus is arranged in a portable Mahogany Cabinet, with a rod to screw into the base, so that it may be stood against the sides of a gallery in the mine, and the analysis made on the spot. The external dimensions of the cabinet are 13 × 7½ × 3½ inches, and the weight when charged ready for use is about five pounds.

Price of complete apparatus, as illustrated, but without rheostat .. £7 7 0  
 Price of Rheostat .. .. . 1 1 0

1057

Every requisite for Chemical, Physical, and Bacteriological work supplied, from a test tube to the complete furnishing of the largest laboratory.

**GAS ANALYSIS APPARATUS**



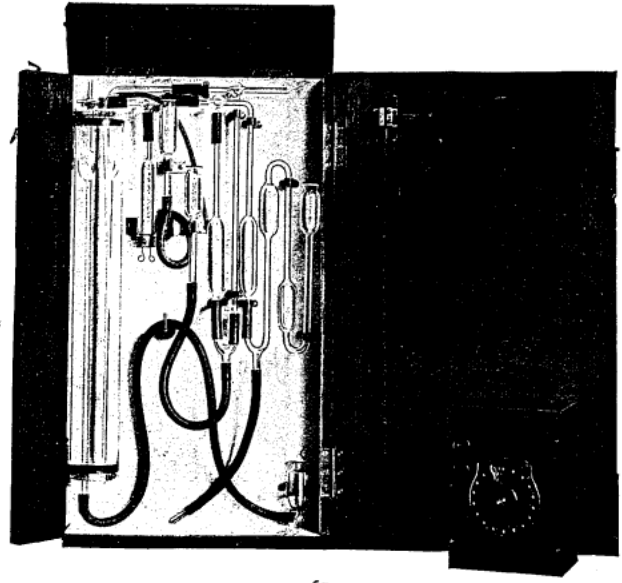
1059

**1059.—Dr. Haldane's Portable CO<sub>2</sub> Apparatus.** Latest improved pattern for use in factories and workshops.

For full description, see Blue-Book containing report of Committee on "The Ventilation of Factories and Workshops" (cd. 1302), 1902, and "Methods of Air Analysis," by Dr. Haldane, page 63.

Price complete, in elegant polished mahogany case, with handle for carrying .. .. . **£6 0 0**

**1060.—Dry Battery and Rheostat for No. 1059.**  
 Price .. .. . **£1 1 0**



1061

**1061.—Dr. Haldane's Portable Apparatus**

for general air and gas analysis. As Fig. 10, page 48, of Dr. Haldane's book, "Methods of Air Analysis."

A. Complete apparatus as figured .. .. . **£8 8 0**

B. Dry battery and rheostat for ditto .. .. . **£1 1 0**

**1062.—The Stonedust Meter,** designed to measure rapidly the percentage of ash in a mine dust, and thus giving an indication of its explosibility. The procedure is briefly as follows :—

Wipe the instrument perfectly dry throughout, and insert graduated tube after vaselining the ground portion in order to make a perfect air-tight joint.

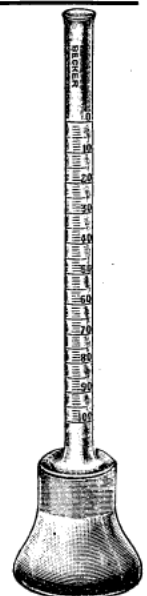
Methylated Spirits should now be slowly run in from a burette until the level of the liquid reaches the 100 mark on the graduated tube. Read the volume of methylated spirits required—say 58·8 c.c. Deduct from this a constant, viz. 8·8 c.c. This leaves (58·8 - 8·8) = 50·0 c.c., and 50·0 c.c. is the quantity of spirit to be used when testing the dusts. It is best to mark the burette at this point.

In testing a mine dust, weigh out 25 grms. (of the sieved dust not dried) to the nearest 0·1 grm. and transfer to the bottom flask portion of the apparatus. Insert graduated tube, after vaselining it as before, and add from the burette about 30 c.c. of methylated spirits. *Now shake very thoroughly in order to wet the dust and remove all air bubbles, this is all important.* Next add the residual methylated spirits until the total quantity added is (in the case of this instrument) 50·0 c.c. The percentage of ash is then read off directly by the level of the surface of the liquid in the graduated tube.

For full details see papers by J. W. Whitaker, B.Sc., A.I.C. (Lecturer in the Mining Department of University College, Nottingham), on "An Alternative Method of Testing the Mine Dust." Excerpt from the transactions of the Institute of Mining Engineers, Feb. 1923, Vol. LXIV., pages 191-202.

Price, complete as above .. .. . **15/-**

For Burettes and Burette Stands, see Index.

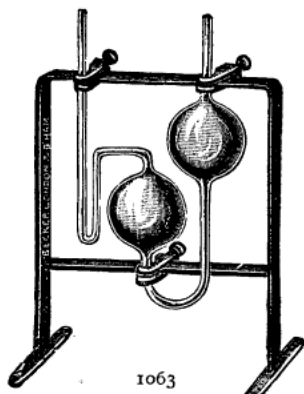


1062

**Our Balances and Weights have achieved World-wide Reputation ; vide Opinions' of the Leading Scientific Press.**

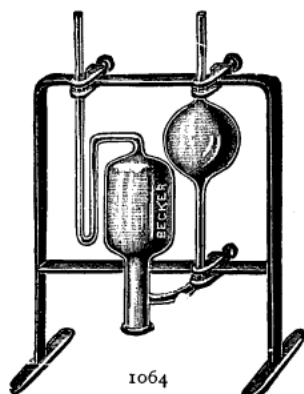


## HEMPEL'S GAS ANALYSIS APPARATUS



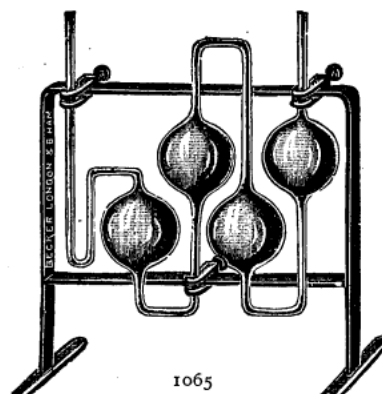
1063

**1063.—Hempel's Simple Absorption Pipette** for liquids.  
A. Glass parts only .. .. 4/9  
B. Complete on iron stand .. 9/6  
C. Complete on improved wooden stand .. .. 10/-



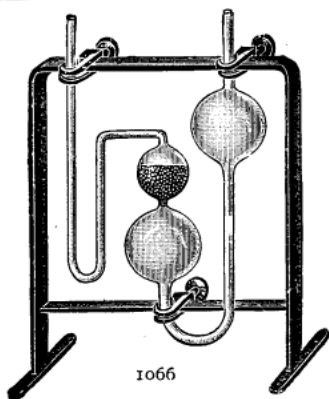
1064

**1064.—Hempel's Simple Absorption Pipette** for solids.  
A. Glass parts only .. .. 5/-  
B. Complete on iron stand .. 10/-  
C. Complete on improved wooden stand .. .. 11/6



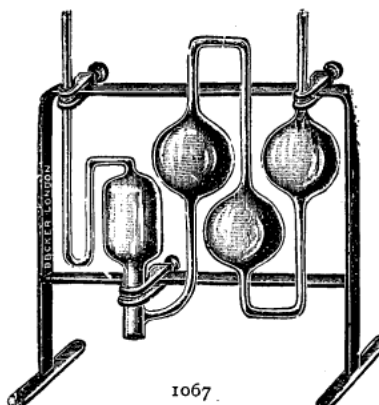
1065

**1065.—Hempel's Compound Absorption Pipette** for liquids.  
A. Glass parts only .. .. 7/-  
B. Complete on iron stand .. 13/-  
C. Complete on improved wooden stand .. .. 12/6



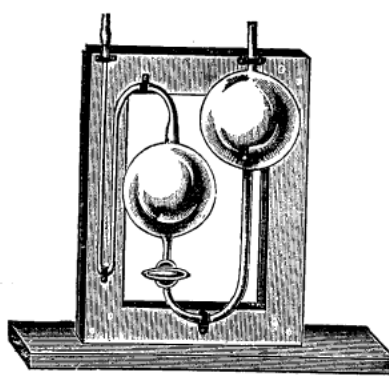
1066

**1066.—Hempel's Absorption Pipette**, with top bulb filled with glass beads.  
A. Glass parts only .. .. 7/-  
B. Complete on improved wooden stand .. .. 11/6  
C. Complete on iron stand .. 15/-



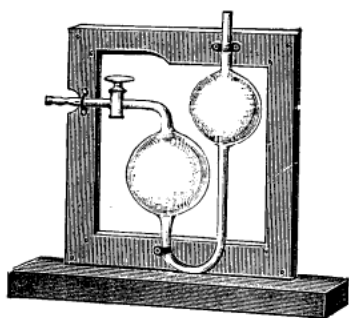
1067

**1067.—Hempel's Compound Absorption Pipette** for solids.  
A. Glass parts only .. .. 7/6  
B. Complete on iron stand .. 15/-  
C. Complete on wooden stand.. 12/6



1068

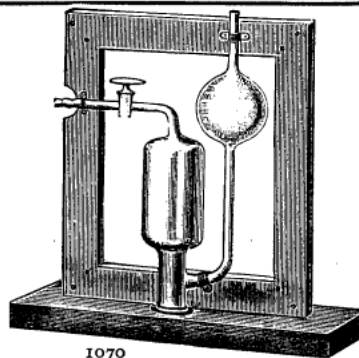
**1068.—Hempel's Explosion Pipette**, with stopcock and platinum electrodes.  
A. Glass parts only .. .. 14/-  
B. Complete on improved wooden stand, as illustrated 18/6



1069

**1069.—Hempel's Simple Absorption Pipette**, for solids, fitted with well-ground-in glass stopcock for connecting direct to Hempel's Burette.  
Complete on improved wooden stand.. 12/6

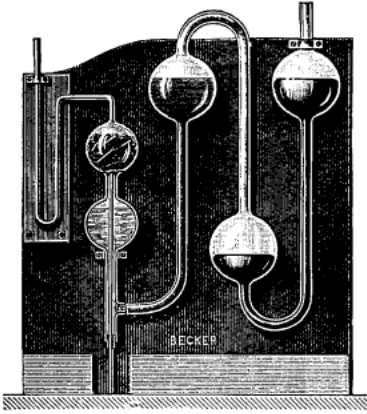
**1070.—Hempel's Simple Absorption Pipette**, for liquids, fitted with well-ground-in glass stopcock for connecting direct to Hempel's Burette.  
Complete on improved wooden stand.. 12/6



1070

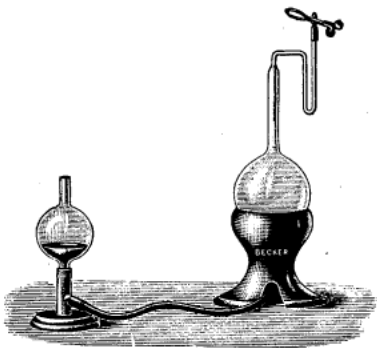
Our stock of pure Chemicals and Acids is very considerable ; hence all orders are executed with the utmost despatch. See comprehensive list at end of Catalogue.

## HEMPEL'S GAS ANALYSIS APPARATUS



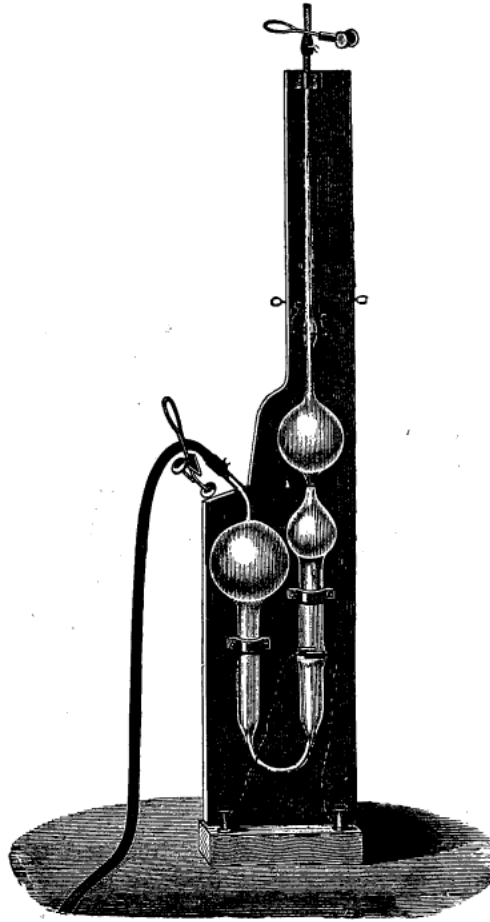
1071

**1071.—Hempel's Hydrogen Pipette.** Complete on wooden stand as illustrated.  
 Each .. .. . 19/6



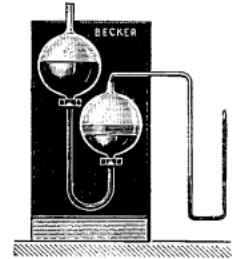
1072

**1072.—Hempel's Explosion Pipette.** Complete on wooden supports, with reservoir as illustrated .. .. 17/6



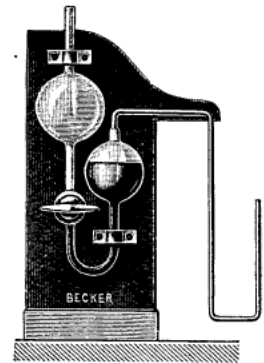
1074

**1074.—Explosion Pipette,** improved form, with platinum electrodes, rubber tubing and pinchcocks.  
 A. Glass parts only .. .. 18/-  
 B. Complete on wooden stand with terminals. 28/6



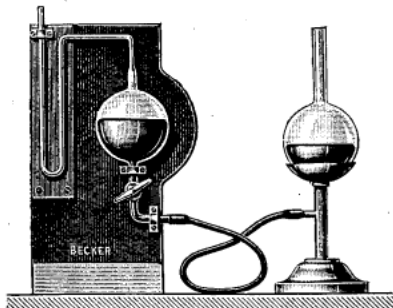
1075

**1075.—Ettlign's Gas Pipette** for liquids. Mounted on stand .. .. 12/-



1076

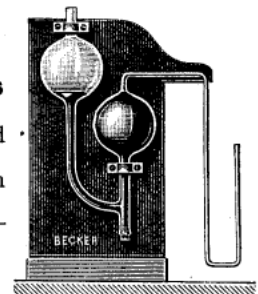
**1076.—Explosion Pipette.** Mounted on stand .. 17/-



1073

**1073.—Hempel's Explosion Pipette.**—Mounted on stand.  
 Each .. £1 1 0

**1077.—Ettlign's Gas Pipette,** for solid absorbents. Mounted on stand .. .. 12/-



1077

Every requisite for Chemical, Physical, and Bacteriological work supplied, from a test tube to the complete furnishing of the largest laboratory.

## APPARATUS FOR GAS ANALYSIS

**1078.—Lunge's Nitrometer**, for the convenient and accurate method of Analysis of Saltpetre. Improved form.

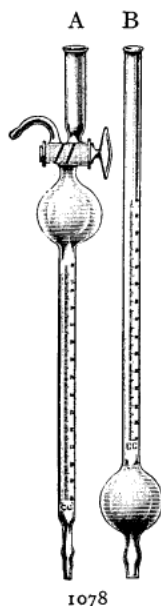
Professor Lunge in his article on page 15 of the *Journal of the Society of Chemical Industry*, January, 1882, points out that this is a modification of his instrument originally adapted to the direct estimation of Nitric Acid in Nitre, and so constructed as to admit of the evolution of a larger volume of gas than 50 c.c.

The bulb below the three-way stopcock in part A has a capacity of about 100 c.c., and the portion below is graduated from 100 to 140 c.c. in  $\frac{1}{2}$  c.c.

The levelling tube B, with a bulb of about 100 c.c. capacity, terminates above the bulb in a graduated tube, the graduations having reference to length rather than to volume.

The apparatus is made of thick, strong glass.

Price complete as figured, with graduated levelling tube .. .. **£1 4 0**



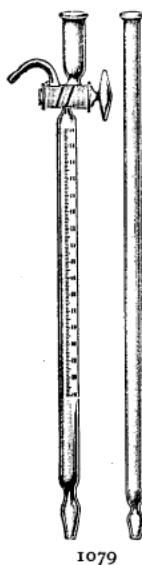
1078

**1079.—Lunge's Nitrometer**, original pattern.

The graduated tube carries a three-way patent stopcock, and has a capacity of 50 c.c. divided into  $\frac{1}{2}$  c.c., with plain levelling tube. All made of thick, strong glass.

Price complete as figured, with plain levelling tube,

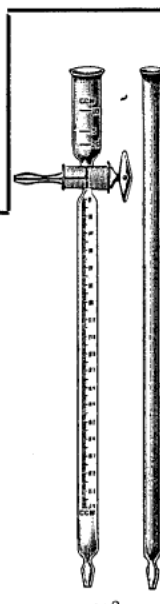
**14/6**



1079

**1080.—Allen's Nitrometer.** The filling cup is graduated at 3 points, viz., 2.5, 5, and 10 c.c. The graduated tube has a capacity of 50 c.c., divided into  $\frac{1}{2}$  c.c., with plain levelling tube. All made of thick, strong glass.

Price complete as figured, with plain levelling tube .. .. **16/-**



1080



1081

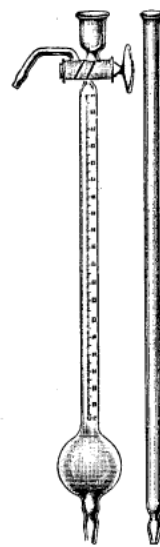
**1081.—Nitrometer**, as No. 1078, but the filling cup in part A graduated to 10 c.c. in  $\frac{1}{2}$  c.c., and the graduated tube with bulb graduated 100 c.c. to 140 c.c. in  $\frac{1}{10}$  c.c. Plain levelling tube. All made of thick, strong glass.

Price complete as figured, with plain levelling tube .. .. **£1 1 0**

**1082.—Tennant's Nitrometer.**

The graduated tube carries a three-way patent stopcock, with funnel at top and bulb at bottom. Plain levelling tube. The capacity of the graduated part is 50 c.c., and divided into  $\frac{1}{2}$  c.c. All made of thick, strong glass.

Price complete as figured, with plain levelling tube .. .. **27/-**



1082

**1083.—Tennant's Nitrometer**,

as above, but graduated part 100 c.c., divided into  $\frac{1}{2}$  c.c.

Price complete, with plain levelling tube, **32/-**

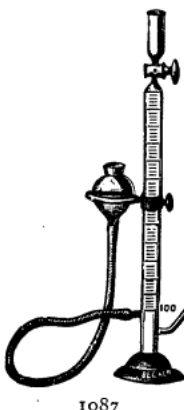
Our Balances and Weights have achieved World-wide Reputation: *vide* Opinions of the Leading Scientific Press.

## GAS ANALYSIS APPARATUS HEMPEL'S BURETTES.


**1084.—Hempel's Gas Burette**, with pinch tap 100 c.c. in  $\frac{1}{2}$ , on loaded feet, without india-rubber pressure tubing .. .. . **£1 1 0**  
 A. Ditto Glass parts only .. .. . **15/-**

**1085.—Hempel's Gas Burette**, as No. 1084, but with glass stopcock at top and three-way stopcock at bottom .. .. . **£1 12 6**  
 A. Ditto Glass parts only .. .. . **1 6 0**

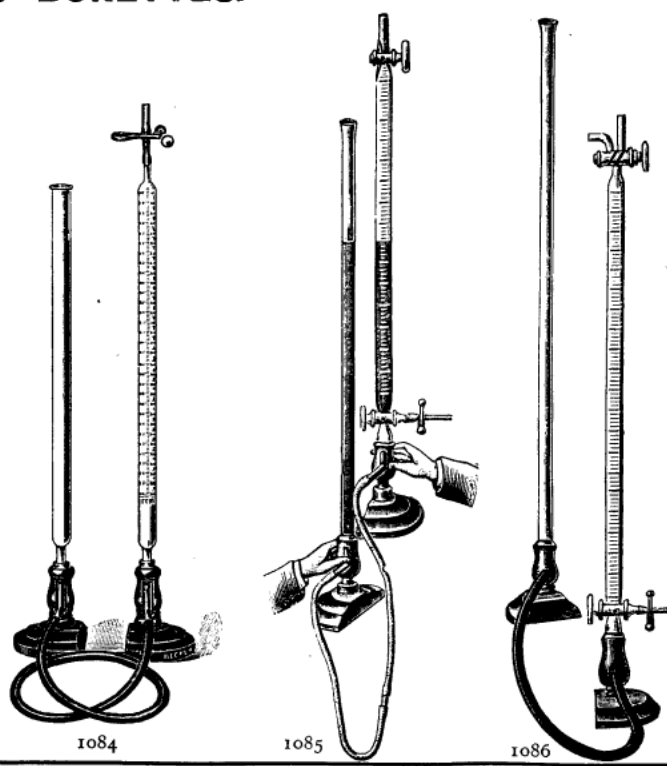
**1086.—Hempel's Gas Burette**, as No. 1084, but improved glass stopcock with oblique bore .. .. . **£1 16 0**  
 A. Ditto Glass parts only .. .. . **1 11 6**



**1087.—Schiff's Nitrometer**, improved form, with mercury reservoir and india-rubber tubing.  
 Complete, each **£1 2 6**



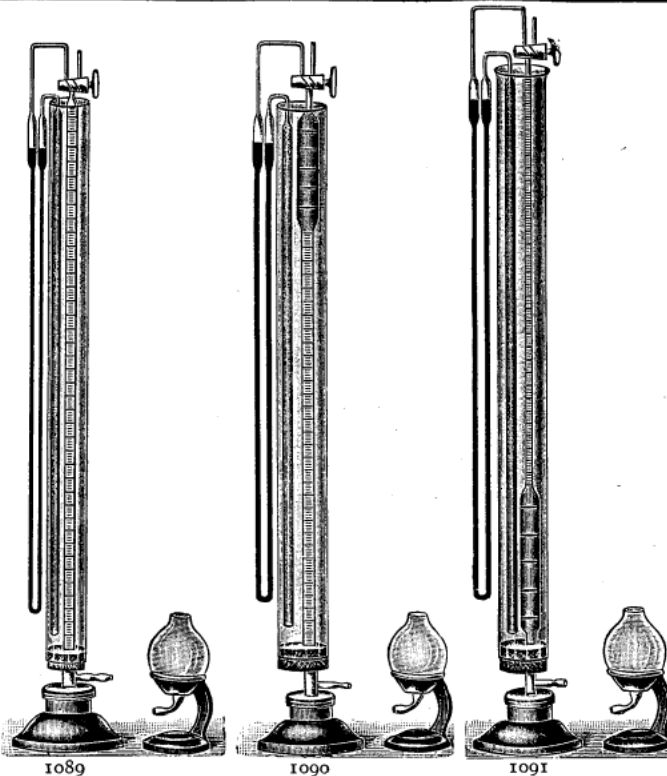
**1088.—Crum's Graduated Nitrogen Tubes**, with stopcock.  
 A. 30. c.c. in  $\frac{1}{16}$  .. **8/-**  
 B. 50 c.c. in  $\frac{1}{16}$  .. **9/-**



**1089.—Hempel's Improved Gas Burette**, not affected by change of temperature or atmospheric pressure, for measuring volumes up to 100 c.c., complete on stand with levelling reservoir and holder.  
 Complete as figured .. .. . **£3 7 6**  
*See Hempel's "Methods of Gas Analysis," 1902, page 61.*

**1090.—Hempel's Improved Gas Burette**, not affected by change of temperature or atmospheric pressure, as No. 1089, but for measuring volumes up to 150 c.c.  
 Complete as figured .. .. . each **£3 19 6**

**1091.—Hempel's Improved Gas Burette**, as No. 1089, but for measuring volumes up to 10 c.c. and especially for the estimation of gases generated in the cultivation of Bacteria.  
 Complete as figured .. .. . each **£3 19 6**



Our stock of pure Chemicals and Acids is very considerable; hence all orders are executed with the utmost despatch. See comprehensive list at end of Catalogue.

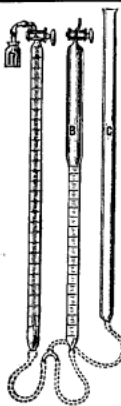
## LUNGE'S IMPROVED GASVOLUMETERS

(See *Journal of Society for Chemical Industry*, May, 1890, page 547.)



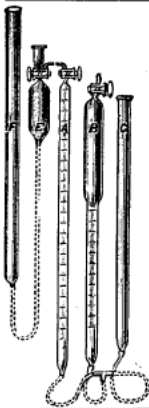
**1092.—Lunge's Apparatus**, for the estimation of saltpetre and other soluble salts.

- A. Complete with stout india-rubber pressure tubing .. **£1 11 6**  
 Spare parts as follows—  
 B. Gas measuring tube *A* .. .. **16/3**  
 C. Reduction tube *B* .. .. **8/-**  
 D. Plain glass pressure tube *C* .. .. **1/6**



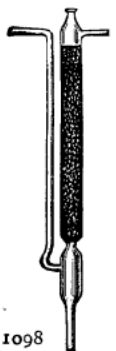
**1094.—Lunge's Apparatus**, for the analysis of manganese, chloride of lime, etc.

- A. Complete with stout india-rubber pressure tubing.. **£2 0 0**  
 Spare parts as follows—  
 B. Gas measuring tube *A* .. .. **14/6**  
 C. Reduction tube *B* .. .. **15/-**  
 D. Small generating flask with rubber stopper .. .. .. **5/-**  
 E. Plain glass pressure tube *C* .. .. **1/6**



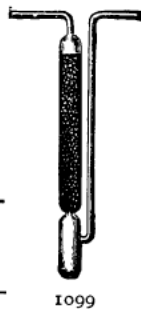
**1097.—Lunge's Apparatus**, for the analysis of saltpetre, nitrose, nitrocellulose and dynamite.

- A. Complete, with stout india-rubber pressure tubing **£2 17 6**  
 Spare parts as follows—  
 B. Gas measuring tube *A* .. .. **12/6**  
 C. Reduction tube *B* .. .. **11/-**  
 D. Plain glass pressure tubes *C* and *F* .. .. per pair **3/-**



**1098. — Emmerling's Absorption Tubes.**

Each .. .. . **4/9**

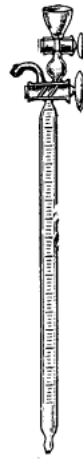
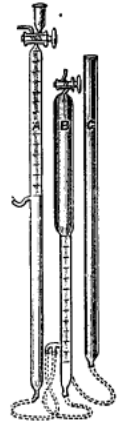


**1099.—Babo's Absorption Tubes.**

Each .. .. . **4/-**

**1093.—Lunge's Apparatus**, for the estimation of nitrogen in elementary organic analysis.

- A. Complete with stout india-rubber pressure tubing .. **£2 5 0**  
 Spare parts as follows—  
 B. Gas measuring tube *A* .. .. **£1 1 0**  
 C. Reduction tube *B* .. .. **18/-**  
 D. Plain glass pressure tube *C*.. .. **1/6**

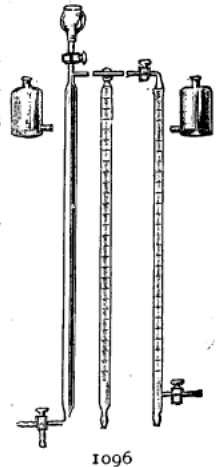


**1095.—Horn's Nitrometer** for the examination of smokeless powders, nitrocellulose, etc. (see Sanford's *Nitro Explosives*, 1906, Fig. 43).

Each .. .. . **30/-**

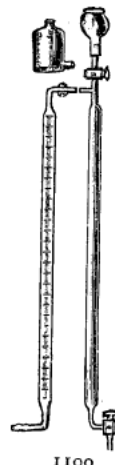
**1096.—Elliott's Gas Analysis Apparatus** (see *Chemical News*, Oct. 19th, 1883).

Complete as illustrated—  
**£2 15 0**



1095

1096

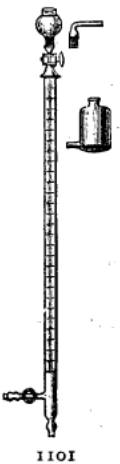


**1100.—Elliott's Gas Analysis Apparatus**, simple form.

Each .. .. . **£1 5 0**

**1101.—Explosion Burette** for Elliott's Gas Analysis Apparatus.

Each.. .. . **£1 0 0**



1100

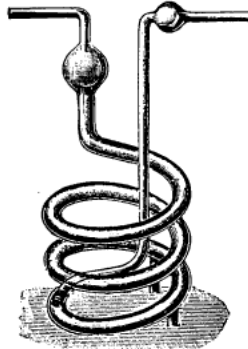
1101

Every requisite for Chemical, Physical, and Bacteriological work supplied, from a test tube to the complete furnishing of the largest laboratory.

**GAS ANALYSIS APPARATUS**



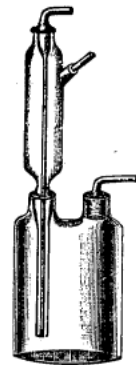
**1102. — Wanklyn's Gas Bottle,** 100 oz. capacity.  
 (See Wanklyn's "Gas Engineer's Manual.")  
 Each .. .. . **10/6**



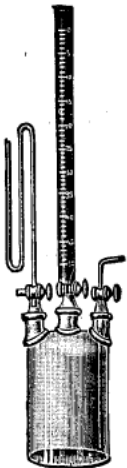
**1103. — Wanklyn's Gas Tubes.**  
 Small .. .. . **3/-**  
 Medium .. .. . **5/6**  
 Large .. .. . **10/6**



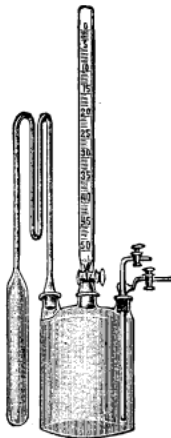
**1104. — Chancel's Flask,** for taking the specific gravity of gases.  
 Each .. .. . **11/6**



**1105. — Winkler's Gas Absorption Apparatus.**  
 Each .. .. . **10/6**



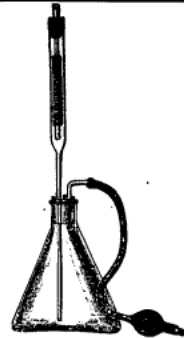
**1106. — Rudorff's Apparatus,** for estimating carbon-dioxide in coal gas by titration.  
**£1 5 0**



**1107. Rudorff's Apparatus,** for estimating carbon-dioxide, improved form, with Pettersson's compensating tube.  
 Each .. **32/6**



**1108. — Lunge's Gas Analysis Apparatus,** modified by Hesse .. **9/-**

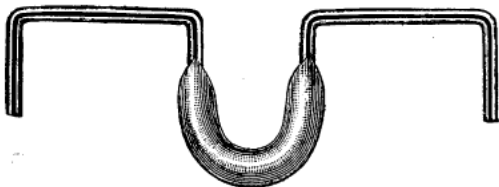


**1109. — Lunge's Gas Analysis Apparatus,** modified by Winkler.  
 Price, not including india-rubber ball .. **6/-**

**1110. — Palladium Tube.**

(Price varies.)

*Lowest price on application.*



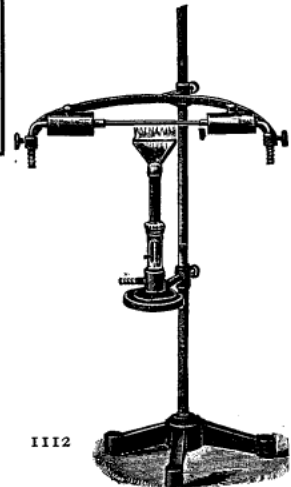
**1111. — Palladium Tube,** filled with palladium asbestos. (Price varies.)  
*Lowest price on application.*

**1112. — Palladium Tube,**

with stand and burner.

(Price varies.)

*Lowest price on application.*



1112

Our Balances and Weights have achieved World-wide Reputation ; *vide* Opinions of the Leading Scientific Press.

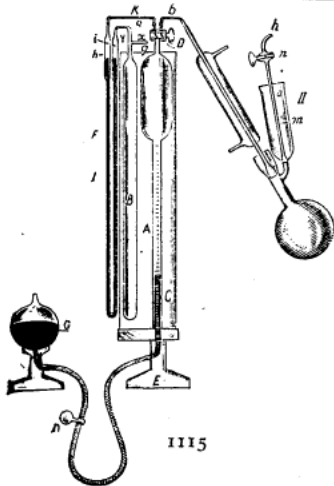
## GAS ANALYSIS APPARATUS



**1113.—Sheard's Absorption Bulbs** for carbonic acid. Each 3/6

**1114.—Sheard's Apparatus for Estimation of CO<sub>2</sub> in Coal Gas**, consisting of two bulbs, aspirator with glass tap, graduated flask and rubber connections, all complete on stand .. 30/-

See Hornby's *Gas Engineers' Laboratory Handbook*.



**1115.—Hempel's Apparatus**, for the estimation of carbon in iron.

Complete on stand, £5 15 0

**1116.—Ditto**, glass parts only, £3 7 6



**1117.—Gas Sampling Tubes**, clear glass, bulb form.

Each .. .. . 1/4  
 Per doz. .. .. . 15/-



**1118.—Gas Sampling Tubes**, with two well-ground-in glass stopcocks.

Each .. .. . 6/6



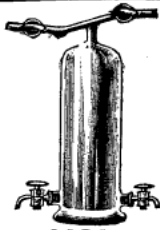
**1119.—Cylindrical Gas Sampling Tubes**, about 9 in. x 1 1/8 in., with two well-ground-in glass stopcocks.

Each .. .. . 8/6



**1120.—Cylindrical Gas Sampling Tubes**

Each .. .. . 1/6  
 Per doz. .. .. . 17/-



**1121. Stead's Gas Sampling Bottle**, complete, with well-ground-in glass stopcocks. Each.. 15/-



1122

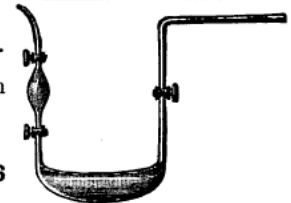
**1122.—Gas Condensation Tubes**, with stopcocks on the horizontal tubes .. .. each 8/-



1123

**1123.—Gas Condensation Tubes**, with stopcocks on the vertical tubes.

Each .. .. . 8/-



1124

**1124.—Gas Condensation Tubes**, with three stopcocks and bulb.

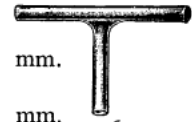
Each .. .. . 13/6



1125

**1125.—Gas Condensation Tubes**, straight form, with three stopcocks and two bulbs.

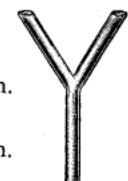
Each .. .. . 12/-



1126

**1126.—Three-way Tubes, T-form.**

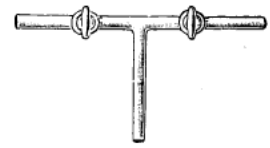
Length of limbs	25	35	35	35	50	50	mm.
Outside dia. of limbs	5	6	7	8	9	10	mm.
Each ..	2d.	3d.	4d.	5d.	6d.	6d.	



1127

**1127.—Three-way Tubes, Y-form.**

Length of limbs	25	35	35	35	50	50	mm.
Outside dia. of limbs	5	6	7	8	9	10	mm.
Each ..	2d.	3d.	4d.	5d.	6d.	6d.	



1128

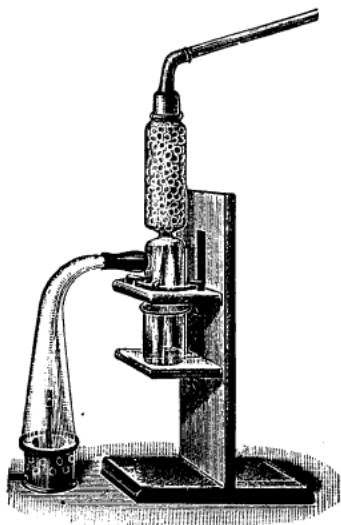
**1128. — Three-way Tubes. T-form**, with two well-ground-in glass stopcocks.

Each .. .. . 4/6

Our stock of pure Chemicals and Acids is very considerable; hence all orders are executed with the utmost despatch. See comprehensive list at end of Catalogue.



## GAS ANALYSIS APPARATUS



1129

**1129.—Gas Analysis Apparatus for Sulphur Compounds.**

- A. Bunsen Burner, steatite top, metal stand, with air-holes and depression, for wide end of trumpet tube **20/-**
- B. Trumpet tube **6/-**
- C. Glass cylinder, with hole in bottom **10/-**
- D. Glass marbles, per hundred .. **2/6**
- E. Beaker .. **10d.**

- F. Condenser tube, bent .. .. . **6/-**
- G. Adjustable table support .. .. . **15/-**
- H. India-rubber cap .. .. . **2/-**
- J. India-rubber tube, to suit above, 1 in. bore per ft. **4/6**

**1130.—Bale's Apparatus** for the estimation of sulphur in spent oxide— **12/6**

**1131.—Spent Oxide Flask** only— **5/-**

The weighed quantity of the spent oxide to be tested is placed in the small inner tube, and carbon bisulphide is placed in the flask, care being taken that this does not reach above the bottom of the oxide tube. By means of a water bath, or other suitable arrangement, the bisulphide is vaporised and passes through the hole in the upper portion of the oxide tube, and being again liquefied in the condenser, percolates through the oxide and dissolves out the sulphur. The bisulphide is distilled off and the sulphur weighed. The apparatus is also suitable for extraction of oils, resins, alkaloids, etc., by means of alcohol, ether or other volatile solvent.



**1132. — Oettel's Apparatus for the Determination of Fluorine as Silica Tetra Fluoride.**

Each .. .. . **18/6**

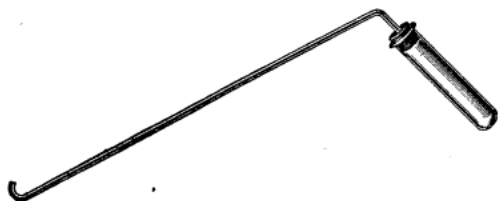
**1133.—Stand, clamps and india-rubber tubing for same** **12/6**



**1134. — Ammonia Saturator,** consisting of cylinder filled with glass beads .. .. each **13/-**

- A. Wood stand for above, to hold two.. .. **10/6**
- B. Burette, 100 septems graduated, with pinchcock, rubber tube, and glass jet, 100 divisions .. **6/6**
- C. Burette stand, for above .. .. . **7/6**
- D. Pipette, to deliver 25 septems .. .. **1/8**
- E. Ditto .. 50 .. .. **2/3**

## GAS GENERATORS, Etc.



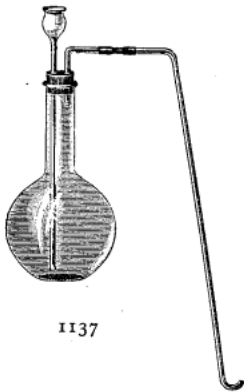
**1135.—Gas Generator for Oxygen,** extra hard glass combustion tube fitted with cork and delivery tube.  
 Each .. .. . **1/-**



**1136.—Gas Preparation Flask,** with cork and delivery tube, for oxygen, etc.  
 Capacity of flask .. 250 500 750 1000 c.c.  
 Price .. .. . **1/3 1/6 1/9 2/-** each.

Every requisite for Chemical, Physical, and Bacteriological work supplied, from a test tube to the complete furnishing of the largest laboratory.

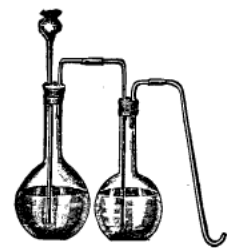
## GAS GENERATING APPARATUS



**1137.—Gas Preparation Flask**, complete as figured, for Hydrogen, Chlorine, etc.

Capacity of Flask.	Price, each.
500 c.c. .. .. .	<b>1/10</b>
750 " .. .. .	<b>2/-</b>
1000 " .. .. .	<b>2/6</b>
1500 " .. .. .	<b>3/-</b>

1137



**1138.—Gas Generating Flask**, capacity 40 oz. with wash bottle, capacity 32 oz., fitted complete as illustrated. **5/-**

1138

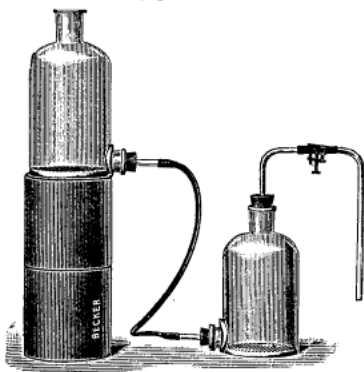


**1139.—Gas Generating Flask**, with bent tube and thistle funnel in one piece, and ground thoroughly into neck.

Capacity.	Each.
250 c.c. .. .. .	<b>3/9</b>
500 " .. .. .	<b>4/6</b>
1000 " .. .. .	<b>4/9</b>

1139

**1140.—Apparatus for Constant Supply**,

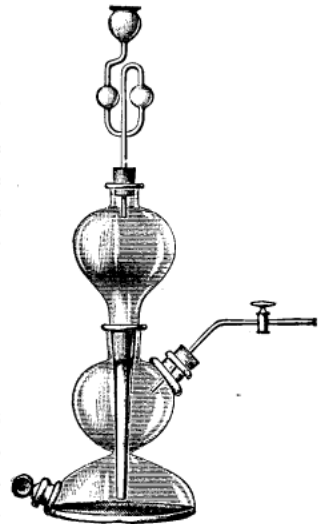


1140

consisting of two bottles, with two tubulures at bottom, connected by rubber tube, one for holding the dilute  $H_2SO_4$ , the other for the  $FeS$ .

- A. Complete, 20 oz. capacity .. **5/6**
- B. Complete, 40 oz. capacity .. **9/6**

**1141.—Kipp's Sulphuretted Hydrogen Apparatus**, of latest improvement, white crystal glass, broad base and wide tubulure to take large pieces of iron sulphide.

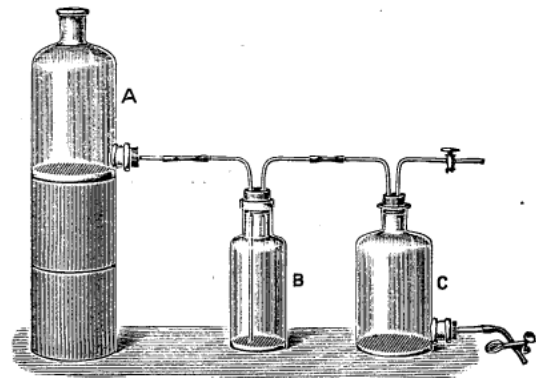


1141

Diameter of centre bulb.	Capacity of centre bulb.	Price, each.
3 in.	$\frac{1}{4}$ litre.	<b>19/6</b>
4 " "	$\frac{1}{2}$ " "	<b>22/-</b>
5 " "	1 " "	<b>32/-</b>
7 " "	2 " "	<b>40/-</b>

**1142.—Kipp's Sulphuretted Hydrogen Apparatus**, as above, but *without* safety funnel and stopcock.

Capacity of centre bulb ..	$\frac{1}{4}$	$\frac{1}{2}$	1	2 litres.
Each .. .. .	<b>10/6</b>	<b>13/6</b>	<b>21/-</b>	<b>30/-</b>



1143

**1143.—Sulphuretted Hydrogen Apparatus** for constant supply.

Place aspirator *A* upon a block or shelf. Continue pouring  $HCl$  into *A* until it completely fills *B*, and allow a little to fall upon the Iron Sulphide in *C*. Turn off the glass stopcock, and after a time sufficient gas will have been given off to force  $HCl$  in *B* back into *A*, leaving *B* full of  $H_2S$  ready for use.

- A. Complete, 40 oz. capacity .. .. . **12/6**
- B. " 80 " " .. .. . **15/6**

Our Balances and Weights have achieved World-wide Reputation ; *vide* Opinions of the Leading Scientific Press.

## GAS GENERATING APPARATUS

**1144.**—The “Hirsch” Gas Generating Apparatus (Patent No. 161681), for producing Sulphuretted Hydrogen, Carbon Dioxide, Hydrogen, etc.

The well-known defects and waste which accompany the usual forms of gas generators have been overcome by having under control a top feed of acid, which is admitted a drop at a time to the surface of the reacting material, contained in a tower, constructed to prevent rapid subsidence of the said material, and of sufficient length to ensure the complete neutralisation of the acid, before passing to the spent-liquor receiver below.

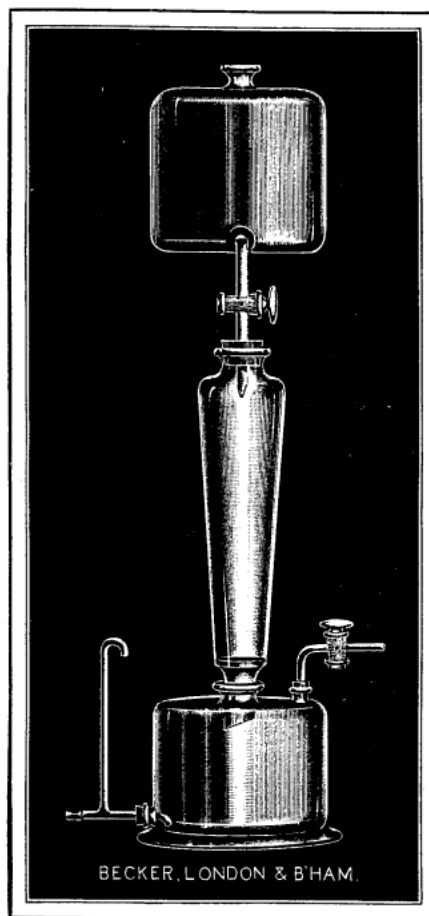
The gas outlet from the spent-liquor receiver serves a twofold purpose—first, by creating a downward pressure in the tower, it prevents fouling by assisting in the removal of spent-liquor; secondly, being below the generating zone, it eliminates all risk of spray being carried forward, thus dispensing with the necessity of washing the gas on this account.

*As generation practically ceases with the closing of the acid supply, the apparatus can safely be used in the open laboratory.*

The acid feed once adjusted, the generation of gas will continue without attention and with great regularity, for a very considerable period.

The top acid reservoir should be supported on a shelf or suitable stand and connected to the acid feed tube by means of a piece of rubber pressure tubing.

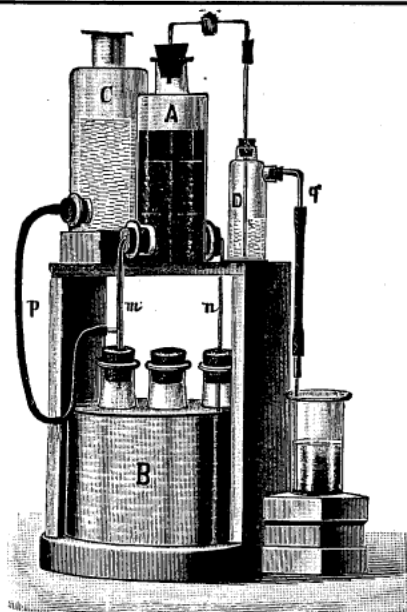
*The “Hirsch” gas generator will do a great deal more work than a 2000 c.c. apparatus of the Kipp type without recharging.*



1144

Price, complete as illustrated .. .. . £3 3 0

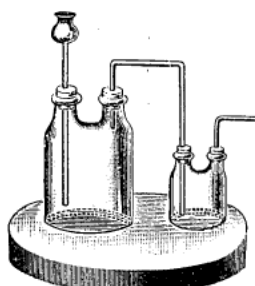
**1145.**  
**De Kon-**  
**inck's**  
**Sulphur-**  
**etted Hy-**  
**drogen**  
**Appar-**  
**atus.**



1145

Complete on stand as figured.

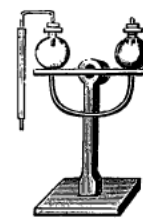
£3 5 0



1146

**1146.**—Gas Generator, on wooden stand. Complete with wash bottle as figured.

Each .. .. 7/6



1147

**1147.**—Babo's Sulphuretted Hydrogen Apparatus. Complete on stand.

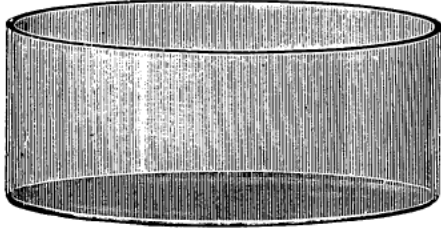
7/-

**1148.**—Ditto, without stand.

Each .. .. 3/-

Our stock of pure Chemicals and Acids is very considerable; hence all orders are executed with the utmost despatch. See comprehensive list at end of Catalogue.

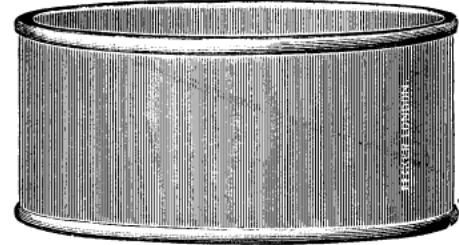
## GAS COLLECTING APPARATUS PNEUMATIC TROUGHS.



1149

**1149.—Pneumatic Troughs,** round, thick strong glass.

Diameter	..	6	8	10	12	14 in.
Height	..	4	4	5	5	6 in.
Each	..	2/-	3/-	4/3	7/6	15/-



1154

**1154.—Stoneware Pneumatic Troughs,** glazed inside and out, and guaranteed acid proof.

Diameter	..	..	..	26	30	42 cm.
Height	..	..	..	10	13	18 "
Price, net	..	..	..	5/6	6/9	13/6 each.



1150

**1150.—Japanned Tin,** with movable shelf.

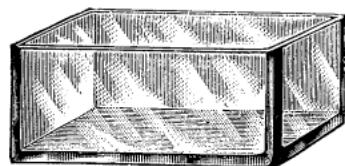
Capacity.	Length.	Width.	Height.	Each.
A. 1 gall.	.. 10 in.	.. 6½ in.	.. 6 in.	.. 4/6
B. 2. "	.. 11½ "	.. 8¾ "	.. 6½ "	.. 6/6
C. 4. "	.. 13 "	.. 9¾ "	.. 9¾ "	.. 8/-
D. 6 "	.. 15½ "	.. 12 "	.. 12 "	.. 10/6

**1151.—Japanned Zinc,** with side shelves and movable shelf.



1151

	Length	Width	Each.
A.	10 in.	6½ in.	6/6
B.	14 "	8 "	9/6
C.	17 "	12 "	13/6
D.	21 "	12 "	15/6



1152

**1152.—Pneumatic Troughs,** stout white crystal glass, rectangular.

Height in cm.	5	6	12	15	16	15	16
Width	..	10	15	20	25	30	35
Length	..	5	10	12	15	16	20
Each	..	2/-	3/4	7/6	9/6	12/-	15/- 18/6

**1153.—Brass Sliding Shelves,** to fit above from 4/- to 10/- each.

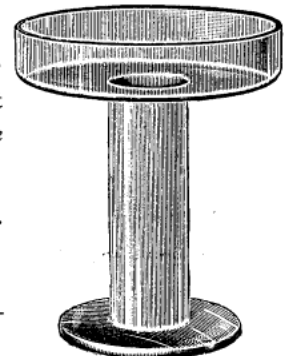
**1155.—Vertical Pneumatic Trough,** tall glass jar on broad foot with expanded mouth; best white glass.



1155

Height	..	..	10	16	18 in.
Width	..	..	2	2½	2½ "
Width of mouth	..	..	2½	3½	4½ "
Price	..	..	2/-	2/9	3/3

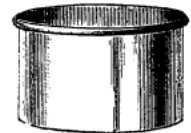
**1156.—Vertical Pneumatic Trough,** best white glass with extra-wide mouth.



1156

Diameter of mouth	14 cm.
" " body	4 "
Height	.. 18 "
Each	.. 5/-

**1157.—Basins,** pale green glass, cheap kind, with rough bottoms, suitable for pneumatic troughs, etc.



1157

A.	Diameter about 11 in., depth 8 in.	each	5/-
B.	" " 14½ in., " 10 in.	"	6/6
C.	" " 16½ in., " 12½ in.	"	9/6

Every requisite for Chemical, Physical, and Bacteriological work supplied, from a test tube to the complete furnishing of the largest laboratory.

## GAS JARS, BEEHIVE SHELVES, Etc.



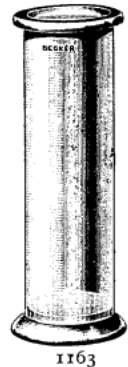
**1158.—Graduated Gas Jars**, with well-ground flange.

Capacity	100	200	300	400	500 cm.
Divided into	100	100	150	100	100 parts.
Each	2/-	2/3	2/9	3/3	3/6
Per doz.	22/-	24/-	29/6	34/-	37/6

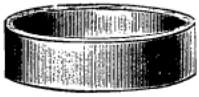
1158

**1163.—Gas Jars**, with glass foot and well-ground flange.

Height	6	8	8	10	12 in.
Inside dia.	1½	1½	2	2	2 in.
Each	10d.	11d.	1/3	1/5	1/6
Per doz.	8/6	9/6	12/6	14/6	16/-
Height	12	16	20	24 in.	
Inside dia.	3	3	3	4 in.	
Each	1/9	2/9	5/-	7/6	



1163



**1159.—Gas Trays**, glazed stoneware.

Diameter	2	2½	3	4 in.
Each	6d.	6d.	7d.	9d.

Diameter	5	6	7	8	9	10 in.
Each	11d.	1/2	1/4	1/9	2/-	2/3

1159

**1164.—Glass Covers**, ground on one side, for use with gas jars.

Diameter	5	6½	7½	9 cm.
Per doz.	8d.	10d.	1/2	1/9

Diameter	10	11	12½	15	17½	20	23 cm.
Per doz.	2/-	2/6	3/-	4/-	7/6	10/-	13/-



1164



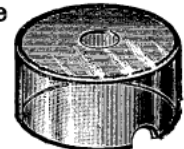
**1160.—Stoneware Beehive Shelves**, glazed inside and out, for use with pneumatic troughs.

Diameter	7½	10	12½	15 cm.
Each	10d.	1/2	1/6	2/-

1160

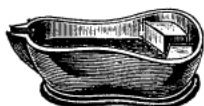
**1165.—White Glass Beehive Shelves**, finest quality.

Diameter	7½	10	12½	15 cm.
Each	2/3	2/6	3/-	3/6



1165

**1161.—Porcelain Mercury Troughs**, wide shape.



Capacity	8	16 lb.
Length	18	20 cm.
Width	6	7½ "
Each	6/6	12/6

1161

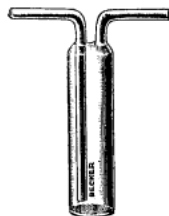
**1166.—Porcelain Mercury Troughs**, 22½ × 4½ cm., to contain 4 lbs.

Each	4/6
------	-----



1166

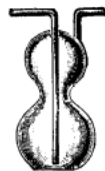
## GAS WASH BOTTLES



**1162.—Small Cylindrical Gas Wash Bottles**, all glass, about 4 in. × 1 in.

Each	1/6
Per doz.	17/-

1162



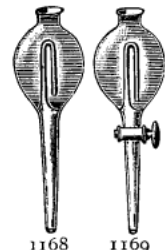
**1167.—Gas Wash Bottles**, capacity about 100 c.c.

Each	1/6
Per doz.	17/-

1167

**1168.—Schiebler's Gas Wash Bottles**, plain.

Each	2/9
------	-----



1168

1169

**1169.—Schiebler's Gas Wash Bottles**, with stopcock.

Each	4/9
------	-----

Our Balances and Weights have achieved World-wide Reputation: *vide* Opinions of the Leading Scientific Press.

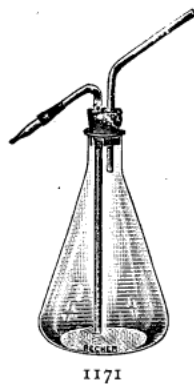
## GAS WASH BOTTLES, Etc.



1170

**1170.—Washing Bottles,** flat bottom flask, fitted with bent tubes and india-rubber stoppers.

Capacity.	Each.
250 c.c. .. ..	<b>1/9</b>
500 c.c. .. ..	<b>2/-</b>
750 c.c. .. ..	<b>2/3</b>
1000 c.c. .. ..	<b>3/-</b>



1171

**1171.—Washing Bottles,** conical flask, fitted with bent tubes and india-rubber stoppers.

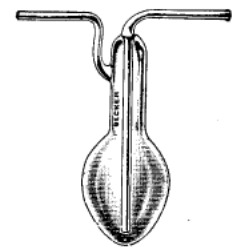
Capacity.	Each.
250 c.c. .. ..	<b>1/9</b>
500 c.c. .. ..	<b>2/-</b>
750 c.c. .. ..	<b>2/3</b>
1000 c.c. .. ..	<b>3/-</b>



1172

**1172.—Gas Washing Bottles,** Dreschel's form, tall pattern, with inlet and outlet tube, in well-ground stopper.

Capacity	125	175	250 c.c.
Each..	<b>4/3</b>	<b>4/6</b>	<b>6/-</b>
Capacity	500	750	1000 c.c.
Each..	<b>7/6</b>	<b>9/-</b>	<b>11/6</b>



1173

**1173.—Gas Washing Bottles,** Cloez' form, capacity about 100 c.c.  
 Each .. .. **3/-**



1174.

**Dr. Muencke's Wash-bottle.**

Capacity.	Each.
100 c.c. .. ..	<b>7/6</b>
250 c.c. .. ..	<b>10/-</b>

## WOULFFE'S BOTTLES



1175

**1175.—Woulffe's Bottles,** best white glass with two necks, ground inside.

Capacity	125	250	500	1000 c.c.
Each ..	<b>2/6</b>	<b>3/3</b>	<b>4/-</b>	<b>5/6</b>

**1177.—Woulffe's Bottles,** with two necks and with tubulure at bottom.

Capacity	500	750	1000 c.c.
Each ..	<b>5/-</b>	<b>6/6</b>	<b>7/6</b>
Capacity	1 1/2	2 litres.	
Each ..	<b>8/6</b>	<b>10/6</b>	



1177

**1176.—Woulffe's Bottles,** finest white crystal glass, three-necked.

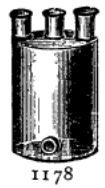


1176

Capacity .. ..	125	250 c.c.
Each .. ..	<b>3/-</b>	<b>4/3</b>
Capacity .. ..	500	750 1000 c.c.
Each .. ..	<b>5/-</b>	<b>6/- 7/-</b>
Capacity .. ..	1500	2000 c.c.
Each .. ..	<b>8/-</b>	<b>10/-</b>

**1178.—Woulffe's Bottles,** with three necks, and with tubulure at bottom.

Capacity	500	750	1000 c.c.
Each ..	<b>5/6</b>	<b>7/-</b>	<b>8/-</b>
Capacity	2	4	7 12 litres.
Each ..	<b>11/-</b>	<b>18/6</b>	<b>27/- 51/-</b>



1178



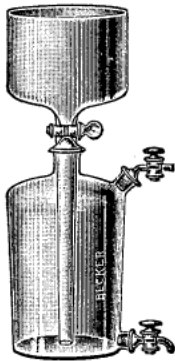
1179

**1179.—Woulffe's Bottles,** finest white crystal glass, with leading tubes ground in.

Capacity .. ..	250	500	750	1000	1500	2000 c.c.
Each .. ..	<b>8/-</b>	<b>9/6</b>	<b>11/-</b>	<b>12/-</b>	<b>15/-</b>	<b>21/-</b>

Our stock of pure Chemicals and Acids is very considerable; hence all orders are executed with the utmost despatch. See comprehensive list at end of Catalogue.

## GAS HOLDERS, ASPIRATORS, Etc.

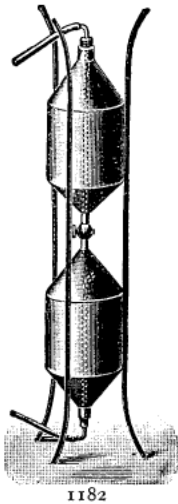


1180

**1180.—Strong White Crystal Glass Gas Holder,** with well ground-in stopcocks and tall funnel.

Capacity.	Each.
A. 2 litres ..	35/-
B. 4 „ ..	42/6
C. 8 „ ..	65/-
D. 10 „ ..	82/6

**FOR OTHER GLASS AND STONWARE ASPIRATORS, SEE PAGE 111.**

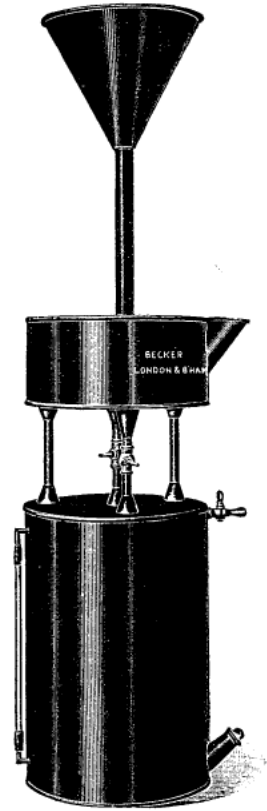


**1182.—Double Japped Zinc Aspirator,** complete on iron stand, with glass tubes and india-rubber corks.

Capacity.	Price.
A. ½ gallon .. ..	30/-
B. 1 „ .. ..	35/-
C. 2 „ .. ..	45/-

**1183.—Single Japped Zinc Aspirator,** with two stopcocks.

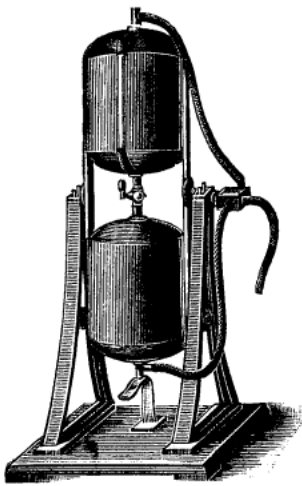
Capacity.	Price.
A. 5 litres .. ..	27/6
B. 10 „ .. ..	37/6



1187

**1187.—Pepy's Gas Holder,** made of stout japped zinc, complete with funnel, water gauge and stopcocks.

Capacity.	Each.
2 gallons .. ..	65/-
4 „ .. ..	79/6
6 „ .. ..	92/6
8 „ .. ..	105/-



1181

**1181.—Muencke's Double Aspirator,** made of strong japped zinc and mounted on iron stand.

Capacity of aspirators 5 litres.  
 Each .. .. **£4 5 0**

**1184.—Bunsen's Gas Holder,** for mercury, graduated in millimetres.

- A. With rubber tubing connection at top, capacity 500 c.c.  
 Each .. .. **10/6**
- B. With glass stopcock at top, capacity 500 c.c.  
 Each .. .. **16/-**



1184

**1185.—Cooper's Plain Receivers.**

Each .. .. **1/-**

**1186.—Cooper's Stoppered Receivers**

Each .. .. **1/9**



1185



1186

**1188.—Pepy's Gas Holder,** made of strong copper, best quality, fitted with funnel, water gauge and stopcocks.

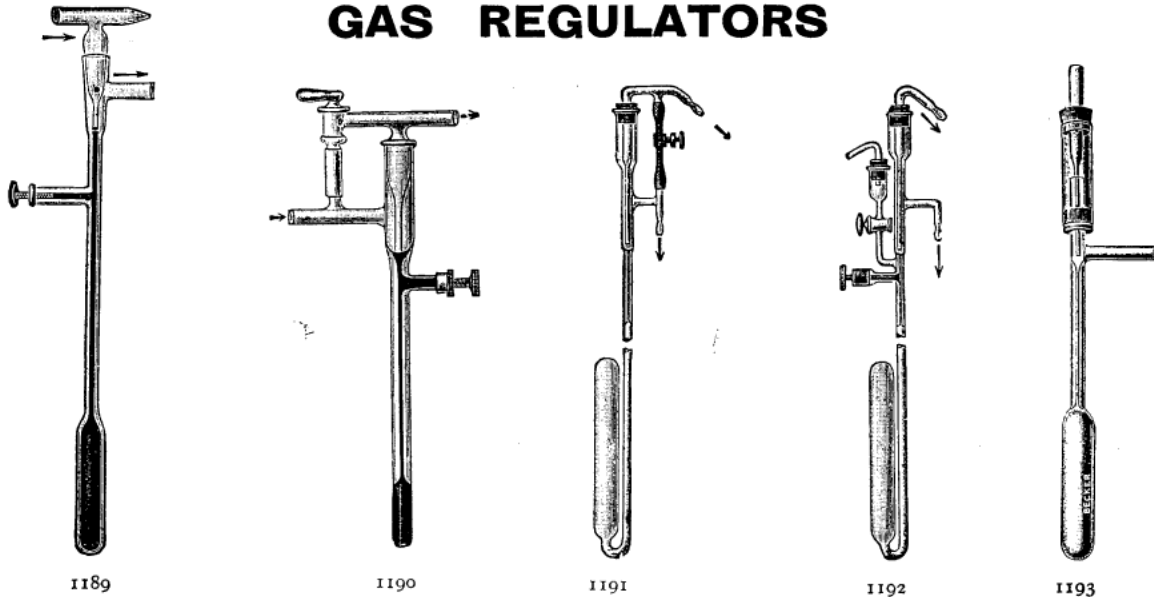
Capacity.	Each.
2 gallons .. ..	90/-
4 „ .. ..	105/-
6 „ .. ..	115/-
8 „ .. ..	127/6

Every requisite for Chemical, Physical, and Bacteriological work supplied, from a test tube to the complete furnishing of the largest laboratory.

N



## GAS REGULATORS



**1189.—Reichert's Gas Regulator.** This regulator consists of three parts—a hollow T-piece, a stem and a bulb. The T-piece fits like a stopper in the upper widened portion of the stem. One arm of the T is open and connected with the gas supply; the vertical portion terminates in a small orifice, and is also provided with a minute lateral opening. The stem is provided with a lateral arm, and this arm, the stem and the bulb contain mercury. The regulator is fixed in the oven by means of a rubber cork, so that the bulb projects into the interior of the oven.

When the oven reaches the required temperature, the mercury is forced up by means of the screw in the lateral arm, until it closes the orifice at the extremity of the vertical portion of the T.

The gas which passes through the lateral orifice is sufficient to maintain the apparatus at the required temperature. If the temperature of the oven falls, the mercury contracts, and gas passing through the terminal orifice of the T increases the flame of the burner, and the temperature is restored.

Price, filled with mercury, ready for use .. .. 9/6

**1190.—Reichert's Gas Regulator,** with glass stopcock .. .. each 15/-

**1191.—Ostwald's Toluene Gas Regulator,** empty, with clip .. .. each 5/-

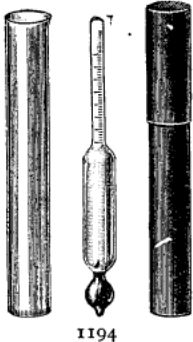
**1192.—Ostwald's Toluene Gas Regulator,** empty, with stopcock .. .. each 13/6

**1193.—Page's Gas Regulator.** This regulator works on the same principle as Reichert's (No. 1189), but instead of the T-piece there are two pieces of glass tubing. The outer tube surrounding the upper part of the stem can be raised or lowered.

The upper end of this tube is closed by a cork which carries a narrow glass tube which represents the vertical arm of the T, passing within the stem of the regulator. This has a terminal and a lateral opening, and is the means of entrance for the gas. The regulator is adjusted by observing when the thermometer indicates the required temperature, and then pushing down the short outer tube until the terminal opening of the inner tube, which is carried down with it, is obstructed by the mercury.

Price .. .. each 3/6

## HYDROMETERS, LACTOMETERS, Etc.



**1194.—Lactometer,** paper scale, small size, with test tube, complete with directions for use. Each .. .. 1/6

**1195.—Lactometer,** with ivory scale, in tin case, with directions for use. Each .. .. 3/6

**1196.—Oleometer,** for linseed, rape, sperm, etc., etc., the standard qualities of which are indicated on the scale. Each .. .. 3/-

**1197.—Urinometers,** for medical use, 0° to 60°, in leather case .. .. each 3/6

**1198.—Ditto,** with graduated immersion tube, in case. each 5/-

**1199.—Ditto,** paper scale, in cardboard case .. .. each 2/-

**1200.—Graduated Immersion Tubes** each 2/9

**1201.—Accumulator Hydrometer,** with flat bulb and very open scale, divided into unit degrees, to enable the specific gravity of the electrolyte in cells to be accurately taken .. .. each 3/3

Our Balances and Weights have achieved World-wide Reputation: *vide* Opinions of the Leading Scientific Press.

## HYDROMETERS

(See also next page.)

### 1202.—Specific Gravity Hydrometers. Direct reading.

Range .. ..	0.700° to 0.800°	0.800° to 0.900°	0.900° to 1.000°	1.000° to 1.200°
Divided into ..	$\frac{1}{10}^{\circ}$	$\frac{1}{10}^{\circ}$	$\frac{1}{10}^{\circ}$	$\frac{2}{10}^{\circ}$
Each .. ..	2/6	2/6	2/6	2/6
<hr/>				
Range .. ..	1.200° to 1.400°	1.400° to 1.600°	1.600° to 1.800°	1.800° to 2.000°
Divided into ..	$\frac{2}{10}^{\circ}$	$\frac{1}{10}^{\circ}$	$\frac{2}{10}^{\circ}$	$\frac{2}{10}^{\circ}$
Each .. ..	2/6	3/-	3/3	3/3

### 1203.—Specific Gravity Hydrometers. Direct reading.

Range .. ..	0.700° to 1.000°	1.000° to 2.000°
Divided into ..	$\frac{1}{10}^{\circ}$	$\frac{1}{10}^{\circ}$
Each .. ..	4/6	4/6

### 1204.—Twaddell's Hydrometers. Improved form for liquids heavier than water. Each degree is equal to 5° Specific Gravity. Mercury poise.

Table of Specific Gravities indicated by Twaddell's Scale.

Twaddell's No.	Specific Gravity	Each.
1. 0° to 24°	1.000 to 1.120	2/6
2. 24° to 48°	1.120 to 1.240	2/6
3. 48° to 74°	1.240 to 1.370	2/6
4. 74° to 102°	1.370 to 1.510	2/9
5. 102° to 138°	1.510 to 1.690	3/3
6. 138° to 170°	1.690 to 1.850	3/6

### 1205.—Beaume's Hydrometers, for HEAVY liquids. Scale 0° to 70°. Each 2/9

### 1206.—Beaume's Hydrometers, for LIGHT liquids. Scale 10° to 70°. Each 2/9

Scale of Beaume's Hydrometers for HEAVY liquids, No. 1205.

Reading degrees on Beaume Scale ..	0	5	10	15	20	25	30	35
Equals degrees Specific Gravity ..	1.000	1.035	1.074	1.116	1.161	1.210	1.263	1.321
<hr/>								
Reading degrees on Beaume Scale ..	40	45	50	55	60	65	70	
Equals degrees Specific Gravity ..	1.384	1.454	1.531	1.617	1.714	1.822	1.945	

Scale of Beaume's Hydrometers for LIGHT liquids, No. 1206.

Reading on Beaume Scale	10	12	14	16	18	20	22	24	26	28
Equals Specific Gravity	1.000	0.986	0.973	0.960	0.947	0.935	0.916	0.911	0.900	0.888
<hr/>										
Reading on Beaume Scale	30	32	34	36	38	40	50	60	70	
Equals Specific Gravity	0.878	0.867	0.857	0.847	0.837	0.827	0.782	0.742	0.705	

Our stock of pure Chemicals and Acids is very considerable ; hence all orders are executed with the utmost despatch. See comprehensive list at end of Catalogue.

## HYDROMETERS



1211

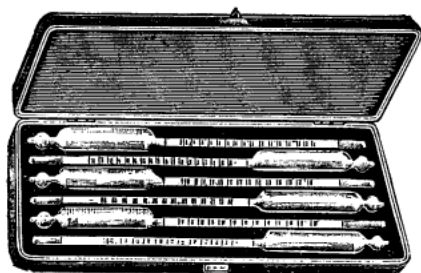
**1207.—Set of 2 Small Hydrometers**, for use with *small quantities* of liquids, .700 to 1.000, and 1.000 to 2.000, with glass solution tube and cases .. .. per pair 5/-

**1208.—Universal Hydrometer**, for specific gravities .700 to 2.000 each 5/-

**1209.—Set of 3 Standard Hydrometers**, .700 to 2.000, divided in fives, in case, with thermometer and trial jar.  
 Per set .. .. . £2 5 0

**1210.—Set of 4 Standard Hydrometers**, .700 to 1.000, 1.000 to 1.300, 1.300 to 1.600, 1.600 to 2.000, divided in single degrees, in mahogany case, with thermometer and trial jar.  
 Per set .. .. . £2 10 0

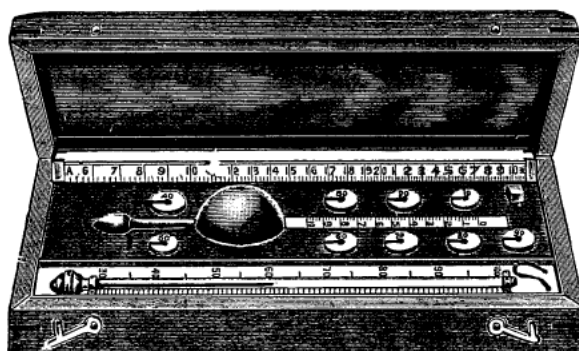
**1211.—Set of 7 Standard Hydrometers**, for accurate determinations, divided in single degrees, .700 to .850, .850 to 1.000, 1.000 to 1.200, 1.200 to 1.400, 1.400 to 1.600, 1.600 to 1.800, 1.800 to 2.000, in mahogany case, with thermometer and trial jar, as illustrated.  
 Per set .. .. . £4 10 0



1212

**1212.—Standard Twaddell's Hydrometers** set of six, in well-finished case, lined with velvet, each hydrometer fitted in a separate compartment.

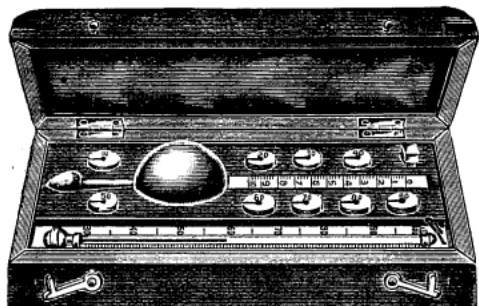
Per set .. .. . £3 0 0



1213

**1213.—Sikes Hydrometer**, well gilt, solid turned ball 9 in. ivory scale thermometer, boxwood comparative rule, fitted in polished mahogany case. Complete with book of strengths and assay jar.

Price .. .. . £3 10 0



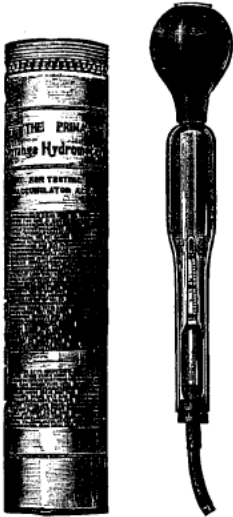
1214

**1214.—Sikes Hydrometer**, well gilt, solid turned ball 7 in. ivory scale thermometer, fitted in polished mahogany case, complete with book of strengths and assay jar.

Price .. .. . £3 5 0

Every requisite for Chemical, Physical, and Bacteriological work supplied, from a test tube to the complete furnishing of the largest laboratory.

## HYDROMETERS, TRIAL JARS, Etc.



**1215.—Syringe Hydrometer for testing the Acid in Accumulators.** To take a reading squeeze the bulb and insert the rubber tube into the acid through the filter cap of the battery. On gradually releasing the bulb, sufficient acid will be drawn into the glass tube to float the hydrometer. Remove from the cell and the actual sp. gr. will be shown on the scale at the point of flotation.

The required density is usually stated on the battery, but for ordinary purposes it may be taken as 1,200.

Each .. .. . 4/9

**1216.—Trial Jars, for hydrometers.**

	Each.	Per dozen.
6 in. high, 1½ in. diameter	9d.	7/6
8 " " 1½ " "	11d.	9/6
10 " " 1½ " "	1/-	10/6
12 " " 1½ " "	1/2	12/-
14 " " 1½ " "	1/4	14/-
16 " " 1½ " "	2/6	28/-
18 " " 1½ " "	2/9	31/-

Other sizes to order.



**1217.—Trial Jars, widened at top.**

Height	10	11	16	12	16	24 in.
Diam. at top	2½	1½	2½	3	3	3,,
Each ..	2/-	2/6	2/9	3/-	3/6	4/6



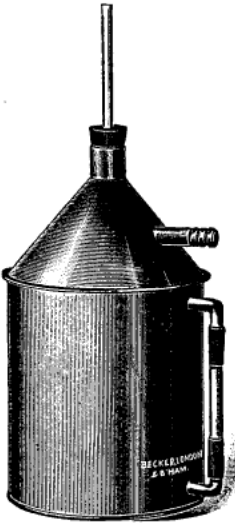
## STEAM HEATERS

**1218 — Copper Vessels, for use as Steam Boilers,** best make, with inlet and outlet tubes and water gauge as figured.

	Each.
A. 1 litre capacity	12/-
B. 2 " "	15/6
C. 3 " "	18/6

**1219.—Vessels for use as Steam Boilers:**

	Each.
A. Made of stout tin, 1 litre capacity .. .. .	1/-
B. Made of stout tin, 2 litre capacity .. .. .	1/3
C. Made of stout copper, ½ litre capacity .. .. .	7/6
D. Made of stout copper, 1 litre capacity .. .. .	10/6
E. Made of stout copper, 2 litre capacity .. .. .	13/6



1218



1219

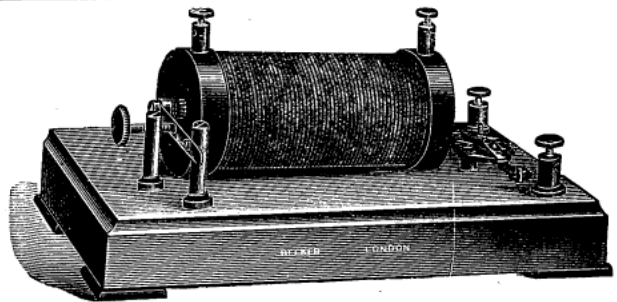
FOR ALL OTHER STEAM HEATERS AND INDUCTION COILS See PHYSICAL APPARATUS CATALOGUE.

## INDUCTION COILS

(For Batteries, see page 116.)

**1220.—Ruhmkorff's Induction Coils, cheap make,** wound with silk-covered copper wire, with paraffin-wax insulation; mounted on polished mahogany bases.

Length of Spark .. .. .	3/16	1/4	5/16	7/16	9/16	11/16	1 3/16	1 1/2 in.	2 in.
A. Price, with ordinary Commutator	12/6	15/-	19/6	28/6	42/-	55/-	80/-	—	—
B. " " Ruhmkorff's " "	—	—	—	32/6	48/-	62/6	87/6	95/-	135/-

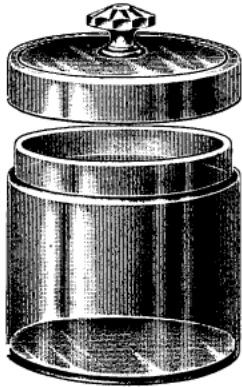


1220

Our Balances and Weights have achieved World-wide Reputation: vide Opinions of the Leading Scientific Press.



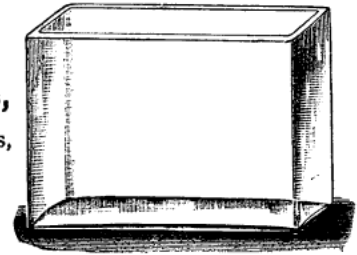
## JARS (VARIOUS)



1229

**1229.—Museum Jars,** cylindrical pattern, made of strong white crystal glass, with drop-on loose cover with cut knob.

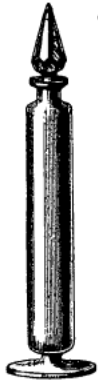
Height	10	12	15 cm.
Diam.	10	12	15 "
Each	3/-	3/8	5/9
Per doz.	35/-	43/-	68/-
Height	20½	31	26 cm.
Diam.	20½	21	26 "
Each	10/6	15/-	15/-
Per doz.	124/-	175/-	175/-



1230

**1230.—Glass Jars,** oblong, polished sides, best white glass.

Height	..	11½	16	16½	19	21	25½ cm.
Length	..	10	10½	14	12	20	21 "
Width	..	4	4	7½	9	10	12½ "
Each	..	9/6	10/6	11/-	12/6	14/-	15/-



1231

**1231.—Exhibition or Show Bottles,** best quality white crystal glass, cylindrical, on foot, with hand-cut stoppers finely polished.

Size No. oo	Height to top of stopper.	Height without stopper.	Diameter of body of bottle.	Price, each.
	6	4½	1 in.	5/-
" 0	8	6½	1¾ "	6/-
" 1	12	10	1¾ "	6/9
" 2	14	12	2 "	9/-
" 3	16	14	2½ "	10/6
" 4	18	15	2¾ "	13/-
" 5	20	16½	2½ "	15/-
" 6	24	20	3 "	25/-



1232

**1232.—Exhibition or Show Bottles,** best quality white crystal glass, cylindrical, on foot, with hand-cut stoppers finely polished.

Height without stopper.	Height with stopper.	Diameter of body of bottle.	Each.
11½ in.	16 in.	2½ in.	11/6
13½ "	18 "	2½ "	14/-

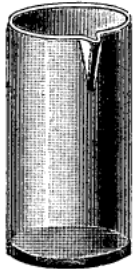
**1233.—Exhibition or Show Bottles,** best quality white crystal glass, cylindrical, on foot, with hand-cut stoppers finely polished.

Height including stopper	..	13½ in.
Diameter	..	2¾ "
Price, each	..	9/6



1233

## GLASS JARS FOR COLD SOLUTIONS.



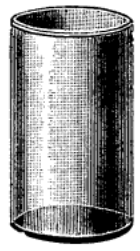
1234

**1234.—Glass Jars,** straight sides, lipped, white glass, for cold solutions.

Capacity	..	250	500	750	1000 c.c.
Each	..	1/3	1/10	2/3	2/6
Capacity	..	1½	2	3	4 litres.
Each	..	3/3	3/9	4/6	5/6

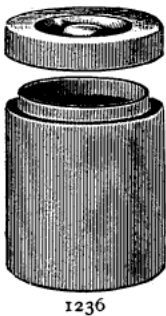
**1235.—Glass Jars,** cylindrical form, without feet, flange or spout, made of fine white crystal glass.

Height	..	10½	12	13	13	15½ cm.
Diameter	..	7½	8½	9	10	9 "
Per dozen	..	7/-	8/-	9/-	10/-	10/-
Height	..	15½	15½	16	18	18 cm.
Diameter	..	10	13	11½	12	15 "
Per dozen	..	11/-	13/-	13/-	14/-	19/-
Height	..	21	21	21	26	26 cm.
Diameter	..	11	13	15	13	15 "
Per dozen	..	16/-	18/-	23/-	23/-	30/-



1235

## STONEWARE JARS FOR STORING DRY CHEMICALS.



1236

**1236.—Stoneware Jars,** with Shut-over Lids, for storing Dry Chemicals.

Capacity.				Price, each.
20 oz.	..	..	..	1/9
40 "	..	..	..	2/2
60 "	..	..	..	2/8
80 "	..	..	..	3/3
120 "	..	..	..	3/10
160 "	..	..	..	4/6

**1237.—Stoneware Jars,** with Airtight Covers, for storing Dry Chemicals.

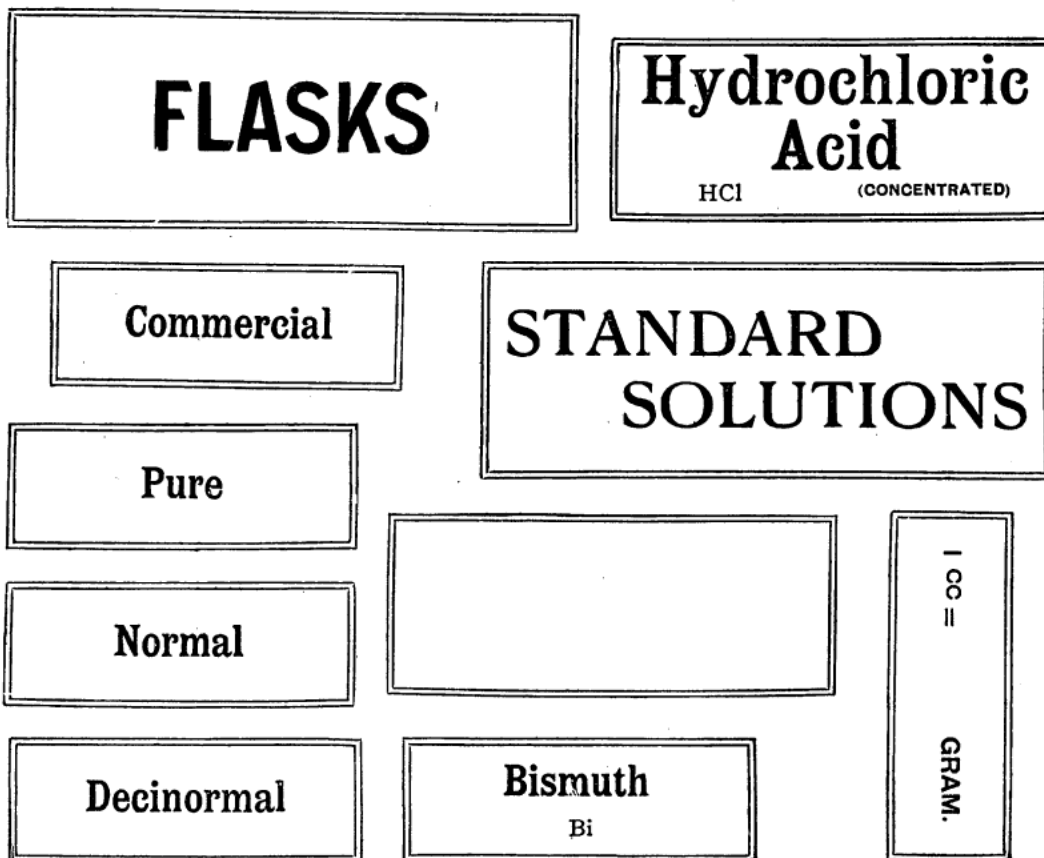
Capacity	..	10	20	40	60 oz.
Price, each	..	2/2	2/3	3/-	4/-
Capacity	..	80	120	160	240 oz.
Price, each	..	4/6	5/6	6/-	8/-



1237

Every requisite for Chemical, Physical, and Bacteriological work supplied, from a test tube to the complete furnishing of the largest laboratory.

**BOOKS OF LABELS, Etc.**



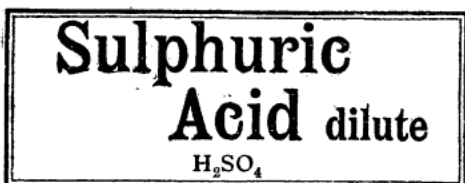
Actual size Specimen Labels in Books of Labels Nos. 1238 and 1239.

**1238.—Becker's New Book of Gummed and Varnished Labels,** for reagent bottles, standard solution bottles, cupboards, and drawers. Contains over 400 labels, a few specimens of which are illustrated above.

Per book .. .. . 2/-

**1239.—Becker's New Book of Gummed and Varnished Labels,** as No. 1238, but smaller book. Contains 200 assorted labels.

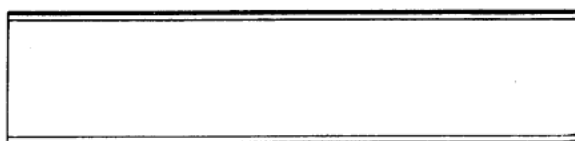
Per book .. .. . 1/-



**1240.—Gummed and Varnished Reagent Labels,** in packets. Each packet contains 100 labels of one kind.

We keep in stock labels for practically all reagents in general laboratory use.

Price, per packet .. .. . 10d.



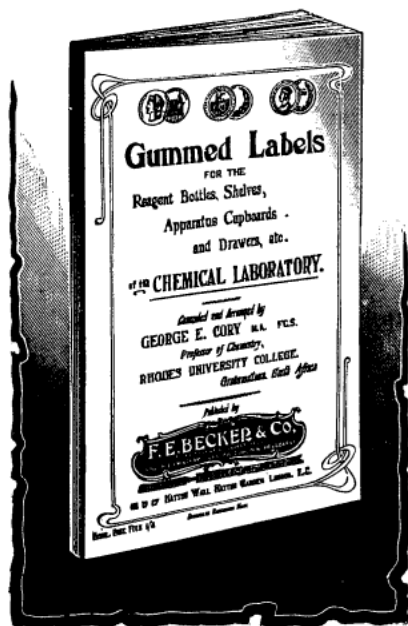
**1241.—Plain Gummed Labels,** with border in packets of 100.

Size.. ..	2 × 3/8	2 × 1/2	2 × 3/4	2 × 7/8 in.
Per 100 .. ..	5d.	5d.	6d.	8d.
Per 1,000 .. ..	3/9	3/9	4/9	6/6
Size.. ..	2 1/2 × 3/4	2 1/2 × 7/8	3 × 3/4	3 1/4 × 7/8 in.
Per 100 .. ..	8d.	8d.	8d.	8d.
Per 1,000 .. ..	6/6	6/6	6/6	6/6
Size.. ..	3 × 1	3 × 1 1/2	3 × 2	in.
Per 100 .. ..	8d.	10d.	1/-	
Per 1,000 .. ..	6/6	8/-	9/6	

Our Balances and Weights have achieved World-wide Reputation : *vide* Opinions of the Leading Scientific Press.



## LABELS

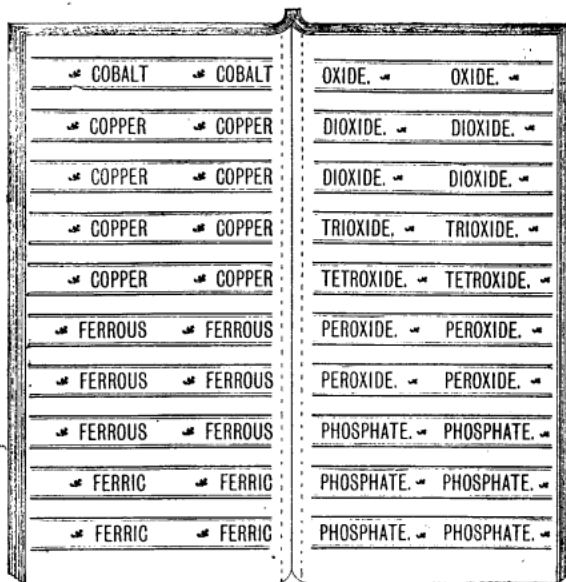


1242.—Book shut.

**1242.—“Halfo” Book of Chemical Labels**, compiled and arranged by Professor Sir GEORGE CORY, of the Rhodes University College, Grahamstown, South Africa.

The labels in this book are so arranged that any possible combination of names of metal and acid-radical substances can be formed. Also contains several large labels printed in bold type, suitable for cupboards, drawers, shelves, etc.

Per book 2/-



1242.—Book opened.

**1243.—Sheets of Gummed Labels**, of a suitable size for ordinary reagent bottles, containing following labels:—

Sodium Hypochlorite.	Nitric Acid (concentrated).
Potassium Ferricyanide.	Hydrochloric Acid (concentrated).
“ Chromate.	Sulphurous Acid Solution.
“ Iodide.	Barium Hydrate.
“ Sulpho-cyanide.	Alcohol.
Ammonium Acetate.	Ether.
“ Molybdate.	Hydric. Potassic Sulphate.
“ Sulphate.	Potassium Cyanide.
Mercuric Chloride.	“ Chlorate.
Platinic “	Starch.
Magnesium Sulphate.	Microcosmic Salt.
Stannous Chloride.	Methylated Spirit.
Calcium “	Charcoal.
Cobalt Nitrate.	Copper Oxide.
Ferric Chloride.	Soda Lime.
Acetic Acid.	
Tartaric Acid.	

Price, per sheet .. .. . 1/-  
 „ per dozen sheets.. .. . 8/-

**1244.—Sheets of Gummed Labels**, of a suitable size, for ordinary reagent bottles, containing following labels:—

Sodium Hydrate.	Sulphuric Acid (conc.).
“ Phosphate.	“ “ (dilute).
“ Carbonate.	Nitric Acid (dilute).
Potassium Ferrocyanide.	Hydrochloric Acid (dilute).
Ammonium Oxalate.	Sulphuretted Hydrogen Solution.
“ Chloride.	Lime Water.
“ Carbonate.	Borax.
“ Sulphide.	Fusion Mixture.
“ Hydrate.	Ferrous Sulphate (crystals).
Barium Chloride.	Manganese Dioxide.
Calcium Sulphate.	Potassium Nitrate.
Silver Nitrate.	Lime (powder).
Lead Acetate.	

Price, per sheet .. .. . 10d.  
 „ per dozen sheets .. .. . 7/-

**1245.— Sheets of Labels**, containing 600 assorted chemical labels, gummed ready for use.  
 Per sheet.. .. . 1/-



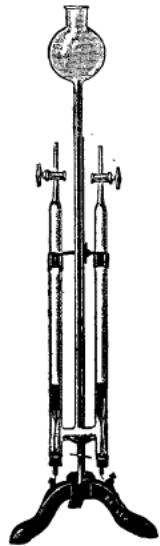
**1246.—Plain Gummed Labels**, with border,  $\frac{7}{8}$  in.  $\times$   $\frac{7}{8}$  in., for microscope slides.  
 Per 100 .. .. . 5d.



**1247.—Sets of Bench Figures**, for numbering benches, bottles, apparatus, etc. From 1 to 500 in consecutive numbers. Gummed and perforated as dotted lines. Ready for immediate use .. .. . 1/- per book.  
 We are also prepared to quote for figures of larger sizes. Prices on application.

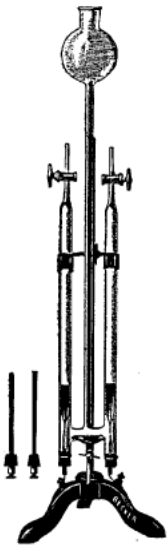
Our stock of pure Chemicals and Acids is very considerable; hence all orders are executed with the utmost despatch. See comprehensive list at end of Catalogue.

## LECTURE DEMONSTRATION APPARATUS



**1248.** — Becker's Improved Apparatus for Decomposing Water into One Part of Oxygen and Two of Hydrogen, with two stopcocks, bulb reservoir and platinum electrodes. *We specially recommend this form of apparatus, as the platinum electrodes are fitted through india-rubber corks.* This arrangement is a great improvement on the earlier patterns which have the platinum wires fused through the glass, and consequently are a continual source of trouble owing to the platinum loops breaking off.

- A. Price, with plain limbs .. 19/6
- B. Ditto, with the limbs graduated in ccms. .. 22/6
- C. Special stand for above, with adjustable clamp and support and with two terminals on base .. 10/6



**1249.** — Becker's Improved Apparatus for Electrolysis of H<sub>2</sub>O and HCl, complete with 1 pair carbon electrodes with terminals, and 1 pair platinum electrodes.

- A. Price with plain limbs .. 22/6
- B. Price with carbon electrodes only .. 17/6
- C. Ditto, with the limbs graduated and with 1 pair carbon electrodes, and 1 pair platinum electrodes .. 24/6
- D. Special stand for above with adjustable clamp and support and with two terminals on base .. 10/6

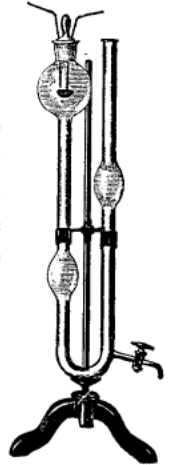


**1250.** — Tube, graduated, with one stopcock on open limb and platinum electrodes at the top of closed limb.

- Each .. 14/-

**1251.**—Apparatus for Synthetically Demonstrating the Composition of CO<sub>2</sub> and SO<sub>2</sub>. The volume of carbon dioxide or of sulphur dioxide produced by igniting carbon or sulphur in oxygen remains the same as that of the volume of oxygen at the commencement of the experiment.

- Price .. 24/-



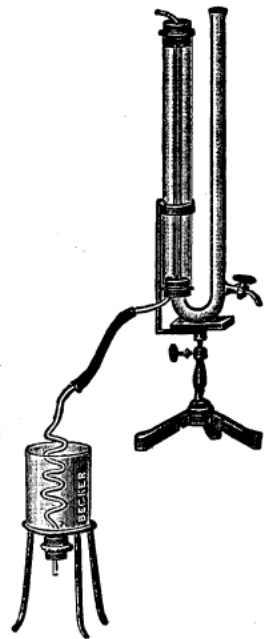
**1252.**—Stand for same with adjustable clamp and support .. 10/6

**1253.**—Apparatus to Demonstrate that when Two Volumes of Hydrogen and One Volume of Oxygen combine to form Water Vapour, there is a Contraction in Volume.

Glass U tube with stopcock, platinum electrodes and jacket through which Amyll alcohol vapour passes .. 16/-

**1254.**—Stand for above, with terminals .. 10/6

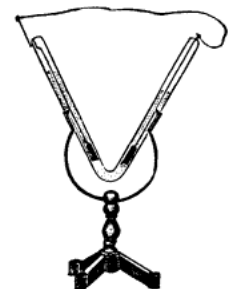
**1255.**—Glass Worm Condenser for Condensing the Amyll Alcohol Vapour, with tripod .. 6/-



**1256.** — Electrolysis Apparatus, V form.

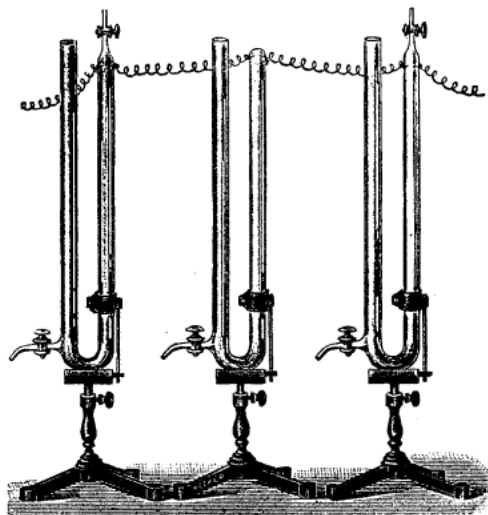
- Each .. 12/-

**1257.**—Complete, with stand .. 18/6



Every requisite for Chemical, Physical, and Bacteriological work supplied, from a test tube to the complete furnishing of the largest laboratory.

## LECTURE DEMONSTRATION APPARATUS



**1258.**—Lecture Apparatus, consisting of three tubes, with stopcocks and platinum electrodes for demonstrating that hydrogen combines only with oxygen in the same proportion as generated from water. Price, not including metal stands .. .. **47/6**

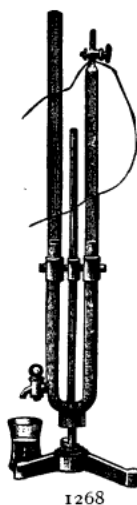
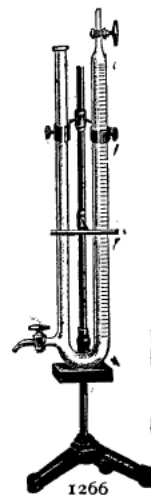
**1259.**—Ditto, complete with three stands .. .. **78/-**

**1260.**—**Stoppered U Tubes** may be ordered separately. Price, with one stopcock .. .. **14/-**

**1261.**—Ditto, with two stopcocks .. .. **17/-**

**1266.**—Lecture Eudiometer, graduated, with two stopcocks and platinum electrodes. Price, not including metal stand .. .. **17/6**

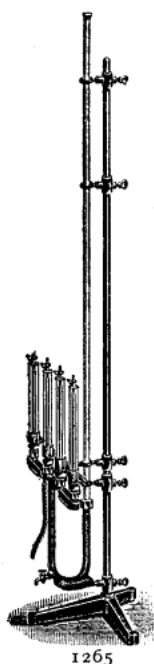
**1267.**—Ditto, complete on metal stand, with adjustable clamp and two terminals on base. **28/6**



**1268.**—Apparatus, with two stopcocks and platinum electrodes to demonstrate that three volumes of hydrogen combine with one volume of nitrogen to form two volumes of ammonia gas.

Price, not including metal stand **17/-**

**1269.**—Price, complete on metal stand. **27/6**



**1264.**—Apparatus, to show the effects of temperature and pressure on compound or simple gases. Complete with metal stand **£3 15 0**

**1265.**—Ditto, glass parts only **1 19 6**

**1265A.**—Ditto, simpler form, with two tubes and one water jacket **18/6**



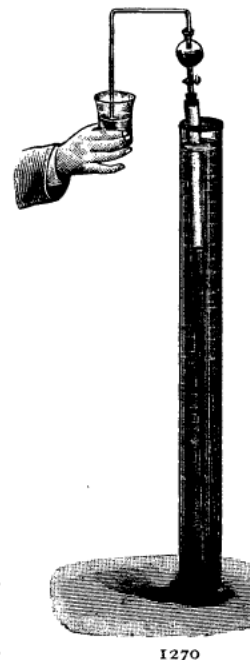
**1262.**—**Straight Tube**, stoppered at each end, and with a stopcock at one-third its length, to demonstrate that when H and Cl combine (to form HCl), their volumes are constant .. .. each **11/6**



**1263.**—**Straight Tube with two Stopcocks and Platinum Electrodes** to demonstrate that one volume of Chlorine and one volume of Hydrogen combine without alteration of volume .. each **15/-**  
 (Price varies according to market price of platinum.)

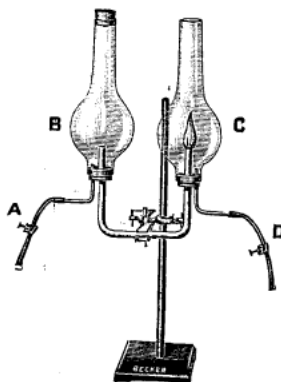
**1270.**—**Long Straight Tube**, with glass stopcock, to demonstrate the volumetric analysis of ammonia by the aid of chlorine .. each **15/-**

**1270A.**—**Tall Glass Cylinder**, for use with above **16/-**



Our Balances and Weights have achieved World-wide Reputation : *vide* Opinions of the Leading Scientific Press.

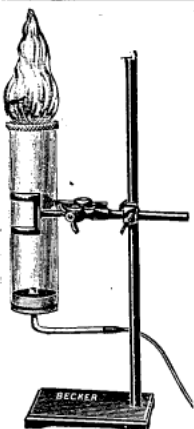
## LECTURE DEMONSTRATION APPARATUS



**1271.—Two Glass Chimneys**, with corks, india-rubber stopper, and tubes as figured, for burning oxygen in hydrogen or illuminating gas.

Price, complete .. 13/6

**1272.** — Ditto, without stand, clamp, and pinch-taps .. 5/-



**1273.—Glass Chimney**, with wire gauze cap, cork and delivery tube, to prove that only the external part of a flame is hot.

Price complete, with iron stand and clamp .. 13/6

**1274.**—Ditto, without stand and clamp .. 5/-

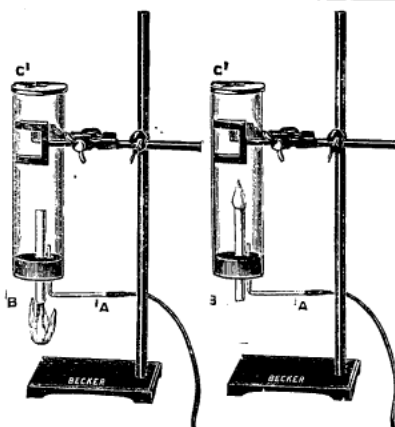


Fig. 1.

Fig. 2.

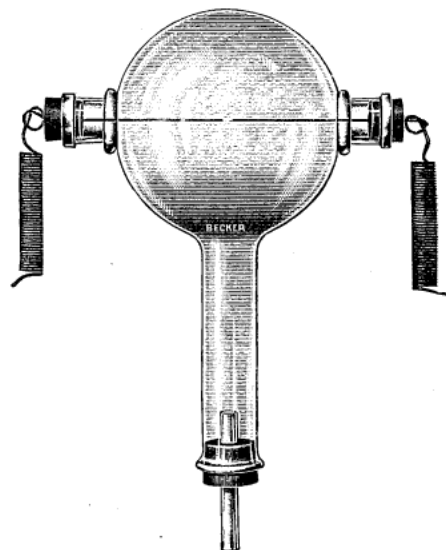
**1275. — Glass Chimney**, with brass cap (fitted with slide valve), corks, and tubes; for burning air in illuminating gas, and to show the principle of the Bunsen burner.

Price complete, as figured .. 13/6

**1276.** — Ditto, but without stand and clamp. Price .. 5/-

*Instructions for use.*—To show the burning of Gas in Air, remove slide valve C, introduce coal gas into bent tube A until all air has been expelled from the glass chimney. Place slide-valve over hole at B, when gas will burn at bottom, as shown in Fig. 1. Now open slide valve, when the flame will be drawn up and burn as Air in Gas (see Fig. 2).

The excess of coal gas (mixed with the products of the combustion of the inner jet) will burn feebly with a nearly colourless flame at top of chimney. Inside the chimney the oxygen of the air burns in the coal gas; outside the top of the chimney the coal gas burns in the oxygen of the air.

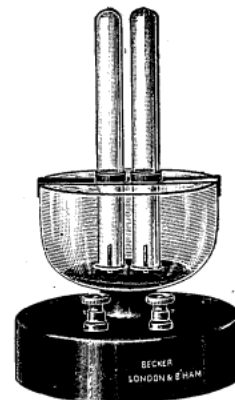


**1277.—Apparatus to show the Combustion of Oxygen and Nitrogen** by means of the electric spark, consisting of globe with three necks and electrodes with rubber corks and glass tube .. each 5/6



**1278. — Apparatus for the decomposition of Steam** by means of the electric spark, consisting of globe with platinum electrodes, fitted into flat bottom boiling flask.

A. Complete as figured .. 7/6  
B. Globe only with Platinum Electrodes .. 5/-  
(Price varies according to market price of platinum.)



**1279. — Apparatus for Decomposition of Water**, mahogany base with terminals and metal bridge for supporting the collecting tubes.

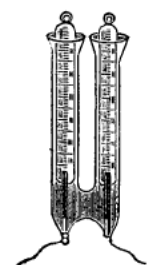
Each.. .. 15/-

**1280.—Ditto**, but with graduated glass tubes.

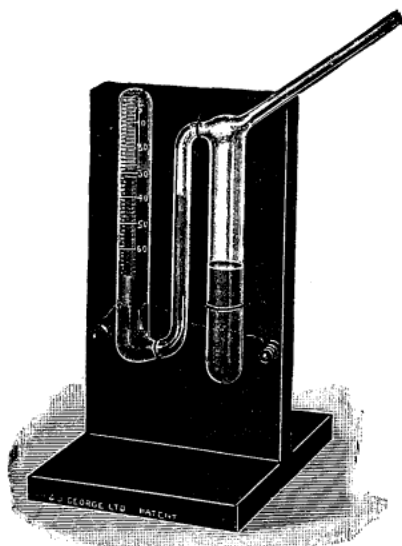
Each.. .. 17/6

Our stock of pure Chemicals and Acids is very considerable; hence all orders are executed with the utmost despatch. See comprehensive list at end of Catalogue.

## LECTURE DEMONSTRATION APPARATUS



**1282.** — Apparatus for Decomposition of Water, with graduated collecting tube. Each .. 10/6  
 (Price varies according to market price of platinum.)



1283

**1283.** — Voltameter for Mixed Gases, Schuster & Lees' pattern. The graduated tube is easily filled by slightly tilting apparatus on one side; any excess liquid overflows into the side reservoir. Pressure always remains constant. We are sole makers of this apparatus. Price 18/6

**1287.** — Voltameter for Mixed Gases, "Nivoc" pattern, consisting of an accurately graduated tube open at one end, and well ground-in stopcock at the other. Price, including insmolten platinum electrodes .. .. each 9/6



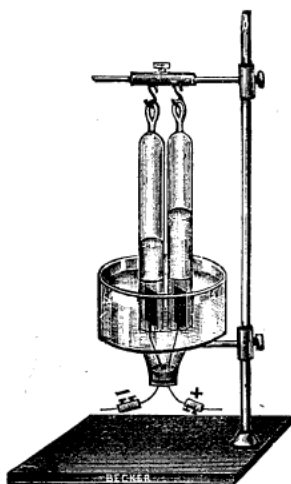
1287

**1288.** — Neumann's Voltmeter, complete with platinum electrodes, levelling tube and india-rubber tubing. Each .. .. 25/-



1288

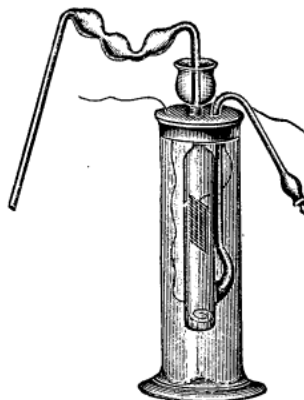
**1289.** — Metal Stand for above, with clamp and terminals. Each .. .. 10/6



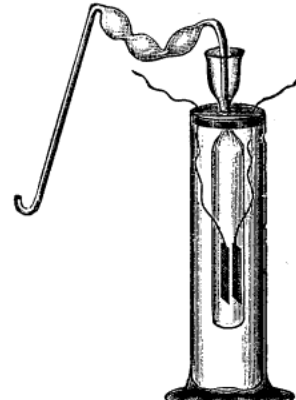
1284

**1284.** — Apparatus for the Decomposition of Water, "Lecture Table" pattern, consisting of a funnel-shaped glass basin having two platinum electrodes, each ending in a barrel-shaped terminal for connecting to wires of battery; two glass limbs suspended from hooks of sliding carrier, mounted on nicely-finished metal stand with hooks and adjustable ring. Price, complete as figured .. .. 30/-

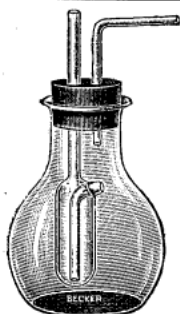
**1285.** — Ditto, but limbs graduated .. .. 35/-



**1290.** — Bunsen's Apparatus, to show generation of hydrogen. Complete as figured with platinum electrodes 25/-



**1291.** — Bunsen's Apparatus, to show generation of explosive gas. Complete as figured, with platinum electrodes, 25/-



1286

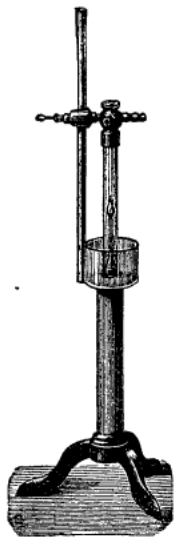
**1286.** Reynold's Apparatus, for determining the weight of hydrogen displaced from acidulated water by magnesium. Each .. .. 3/-

See Fig. 7, Reynold's "Experimental Chemistry," Part I.

**1292.** — Lecture Apparatus, for determining the specific gravity of gases by diffusion. Each .. .. 25/-



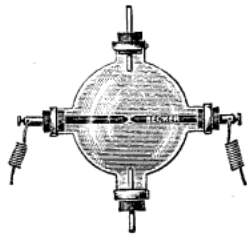
## LECTURE DEMONSTRATION APPARATUS



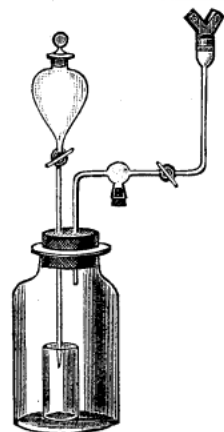
1293

**1293.—Lecture Apparatus,**  
 for determining the specific gravity  
 of gases by effusion.  
 Complete .. .. . £3 10 0

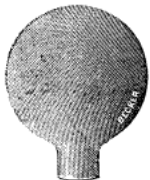
**1294.—Apparatus to syn-  
 thetically demonstrate  
 the composition of Acety-  
 lene,** by fusing carbon in hydro-  
 gen. Complete, with carbon elec-  
 trodes and terminals .. 9/6



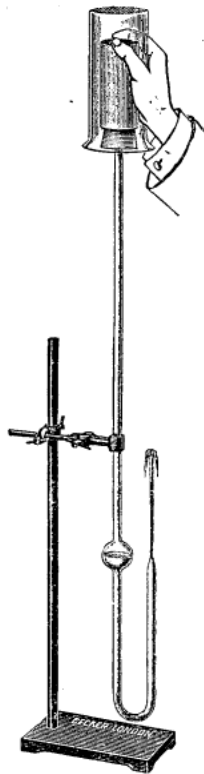
1294



**1295. — Lecture  
 Apparatus,** for  
 demonstrating the  
 manufacture of acety-  
 lene gas A. Price,  
 complete as figured,  
 with acetylene burner  
 for lighting 25/-  
 B, but without stop-  
 per, funnel, bottle,  
 and cork .. 15/-



**1296.—Globular  
 Porous Clay  
 Diffusion  
 Bulbs** each 1/6



**1297. — Apparatus  
 for demonstrating  
 the phenomena of  
 diffusion,** consisting  
 of porous cylinder, with  
 well-fitting india-rubber  
 cork and bent glass tube  
 with bulb each 3/6  
 (Fig. II, Roscoe & Schor-  
 lemmer, Vol. I.)

**1298. — Apparatus  
 for verifying the  
 Law relating to  
 Diffusion of  
 Gases.** Designed by  
 LL. T. JONES, B.Sc.,  
 F.C.S., Llanelly.

The apparatus serves to  
 show in a convincing man-  
 ner that:—

1. The lighter the gas is, the  
 greater is its rate of  
 diffusion.
2. The rates of diffusion  
 of different gases vary  
 inversely as the square  
 root of their densities.

The apparatus consists  
 essentially of a U tube with  
 one long arm *A* and a short  
 arm *B* (Fig. 1). The top of  
*B* is closed with a piece of  
 clay pipe-stem *F* sealed at  
 the top and attached to *B* by  
 india-rubber tubing. Near  
 the end of *B* is a side tube *C*,  
 to which is attached another  
 side tube *E*, which passes to  
 the back of the apparatus as  
 shown in Fig. 2. This acts  
 as a safety valve and leads  
 into tube *Y*, which contains  
 water. A drying tube *X* is  
 attached to *E* to prevent any  
 moisture in *Y* from entering  
 the tube *C* and thus mixing  
 with the gas under exami-  
 nation. In the case of a nox-  
 ious gas being used, an ab-  
 sorbent liquid is put into  
*Y* to absorb the excess and  
 thus prevent its escaping  
 into the air.

At the top of *A*, which  
 is provided with a stopcock  
*K*, is a small funnel *G*, which  
 also is provided with a stop-  
 cock *S*. Before experiment-  
 ing, the gas is passed through  
 U tube *W* to be purified.  
 To perform the experiment,  
 connect *W* with the generat-  
 ing apparatus, and allow the  
 gas to pass through tubes *C*  
 and *E*. Close *K* and open *D*.  
 Pour mercury through *G*  
 till it reaches the same level,  
 say *M*, in both arms. Now  
 close *D*. Pour in more mer-  
 cury until *A* and *G* are filled,  
 then close the stopcock *S*. The  
 gas in *B*, in the meantime,  
 will have forced through the  
 porous pipe *F* so that *B* will  
 be now full of mercury. Open  
 the stopcock *K* and *D* and  
 let the mercury run out from  
*B* till the graduation *O* is  
 reached, the gas taking its  
 place. Close *K* and *D*, and  
 open *S*. The gas in *B* will  
 thus be subjected to a pressure  
 of two atmospheres, and, con-  
 sequently, its volume will be  
 suddenly diminished. Finally,  
 the time taken for the mer-  
 cury to rise in *B*, say  
 through eight or more divi-  
 sions, is noted.

Price .. .. . £2 5 0

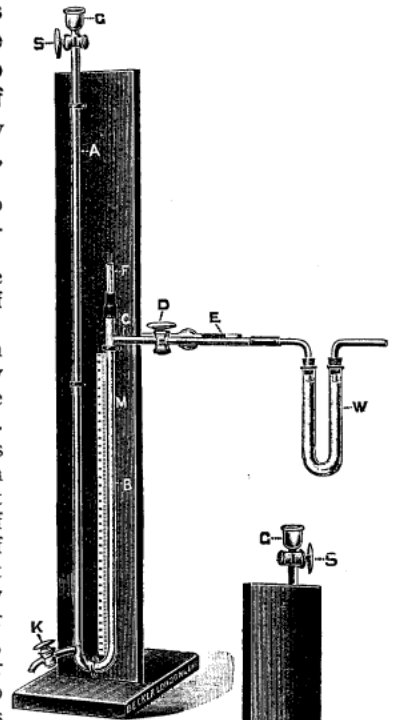


Fig. 1.

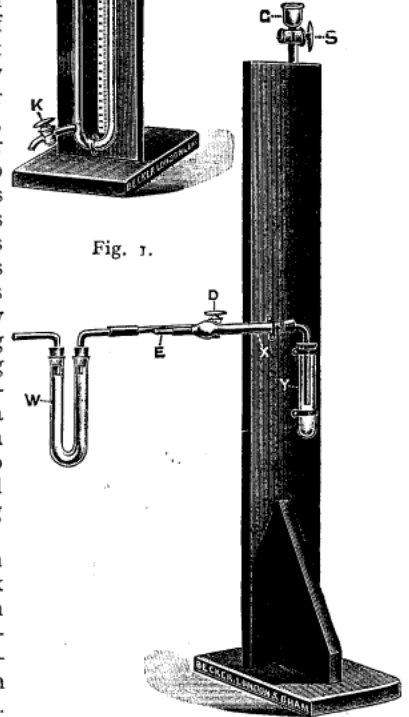
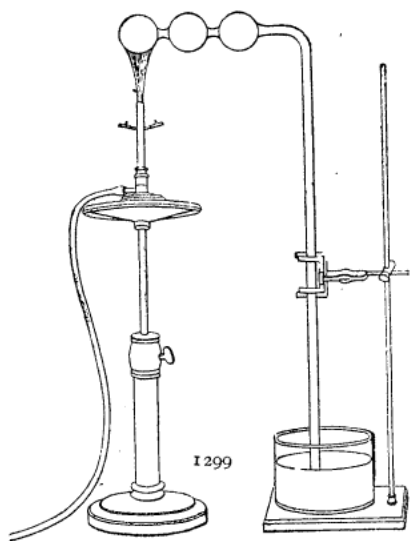


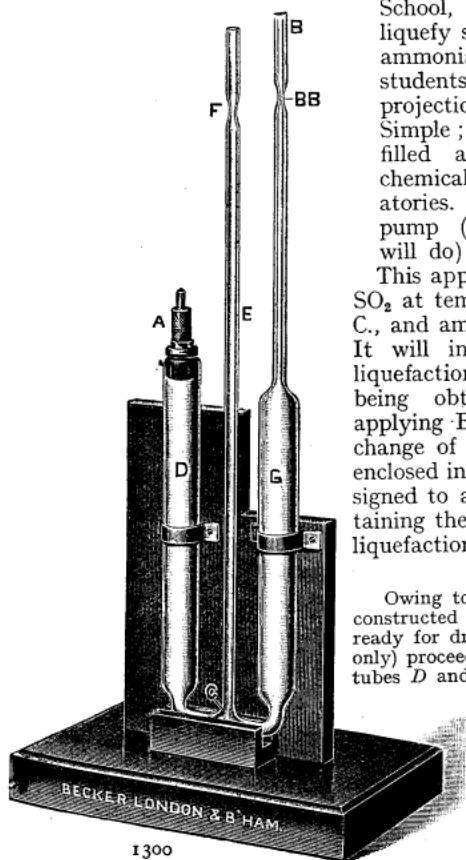
Fig. 2.

## LECTURE DEMONSTRATION APPARATUS



**1299.—Apparatus for preparing Amorphous Phosphorus**, bent tube with three bulbs of hard glass. (Roscoe & Schorlemmer).  
 Price of tube only .. .. . 4/6

**1300.—Becker's Registered Liquefaction Apparatus.** (Invented by Paul Wertheim, B.Sc., Hons. Lond., L. C.P., Senior Physics Master, Tiffin's Boys' School, Kingston.) Will liquefy sulphur dioxide and ammonia. Useful for students, demonstration, and projection on lantern screen. Simple; effective. Once filled always ready. For chemical and physical laboratories. Price, without pump (any bicycle pump will do) .. .. . 10/6



1300

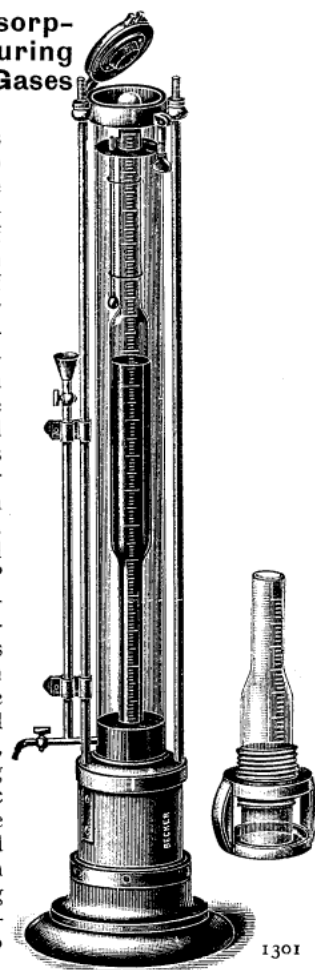
This apparatus will liquefy  $\text{SO}_2$  at temperature up to  $50^\circ\text{C}$ ., and ammonia up to  $20^\circ\text{C}$ .. It will indicate pressure of liquefaction, the measurement being obtained by simply applying Boyle's Law to the change of volume of the air enclosed in tube E. It is designed to allow the liquid containing the gas to be surrounded with water at different temperatures, so that the pressure of liquefaction over a range of temperatures may be obtained.

### INSTRUCTIONS FOR FILLING TUBE WITH GAS.

Owing to the difficulty of ensuring the safe arrival—if sent out already filled—the apparatus has been constructed so that it can be filled in the simplest possible manner on arrival—the tubes being constricted ready for drawing off. Having unscrewed the rough board from back (this board is used for safe transit only) proceed as follows: (1) Take out valve A and pour in mercury until it fills about  $\frac{3}{4}$  in. of the wide tubes D and G. (2) Connect H to gas generator, holding the apparatus in a slanting position so that the mercury just covers the elbow C. Pass the dry gas through until all the air is driven out (make sure that the gas is dry, and that all the air is completely driven out). (3) Hold the apparatus in an upright position and seal off at BB. (4) Pour in more mercury until it stands half-way up tube D. Replace the valve and pump carefully until a little mercury comes out of the middle tube E, and in this way drive the gas out of this limb. (5) Take out valve again; this releases the pressure so that the mercury descends in middle tube E and air enters. (6) Seal off at F. (7) Fill tube D to within  $\frac{1}{4}$  in. of the top with mercury and replace valve A. (8) Screw ordinary bicycle pump on to valve A and pump until gas is shown in liquid form in tube B.

### 1301.—Bunsen's Absorptiometer for measuring the Solubility of Gases in Liquids.

This apparatus consists of a graduated tube E, into which known volumes of the gas and liquid are introduced. The lower end of this tube is furnished with an iron screw, by means of which it can be securely screwed down upon an india-rubber pad, in order to completely close the tube (seen in the side figure). The tube containing the gas and liquid under examination is lowered into a tall cylinder GG, in the bottom of which is a quantity of mercury. The cylinder is then filled with water, and the cap P screwed down. Thermometer K registers the temperature. The apparatus is then briskly shaken, in order that the liquid in the eudiometer may exert its full solvent action upon the gas, and on slightly unscrewing the tube from the caoutchouc pad, mercury enters to take the place of the dissolved gas. The tube is again closed and the shaking repeated, and these operations are continued until no further absorption results.



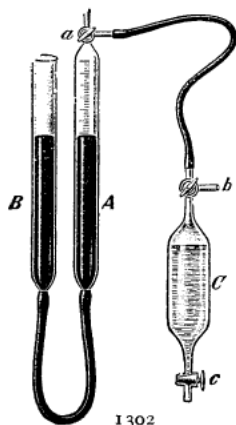
1301

Finally, the volume of gas is measured, the temperature noted, and the pressure ascertained by reading the position of the mercury within the tube, and deducting the height of the column from B to the surface of the mercury A, from the barometric pressure at the time of making the experiment. The temperature of the water in the cylinder may be varied, and the coefficient of absorption at different temperatures can thus be determined. Price, complete as figured .. .. . £14 10 0

(See Newth's "Text-Book of Inorganic Chemistry," Longmans, Green & Co.)



## LECTURE DEMONSTRATION APPARATUS



### 1302.—Heidenhain and Meyer's Absorptiometer (Modified Form).

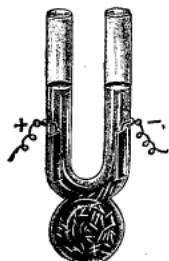
In this instrument the measuring tube and the absorption vessel are separate, and it admits of the use of much larger volumes of liquid. By means of the three-way cock *a*, the gas to be experimented upon is introduced into *A* by first raising and then lowering *B*; and the volume is measured when the levels of the mercury in *A* and *B* are coincident. By means of the three-way cock *b*, the vessel *C*, of known capacity, and which is connected with *A* by means of a flexible metal capillary tube, is filled with the desired liquid. The vessels *A* and *C* are then put into communication, and by raising *B*, and opening the tap *c*, a definite volume of the liquid is run out into a measuring vessel, which represents the volume of gas that enters. The gas and liquid are then thoroughly agitated, after which the gas is passed back into *A* by lowering *B*, and, when *A* and *C* are in communication, opening the tap *c* beneath mercury. By measuring the diminution in volume suffered by the gas, the volume absorbed by the known volume of liquid is obtained. The measuring tube and absorption vessel are kept constant at any desired temperature by surrounding them by water, or with vapours at known temperatures.

A. Price as figured .. .. . 17/6

(See Newth's "Text-Book of Inorganic Chemistry.")

## LÜPKE'S APPARATUS FOR ELECTRO-CHEMICAL EXPERIMENTS.

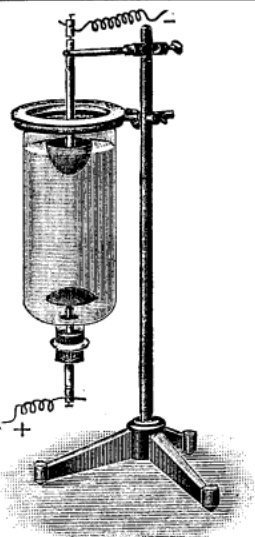
(Fully described in Dr. Lüpke's *Elements of Electro-Chemistry*.)



**1303.—Electrolytic Cell** for the decomposition by electrolysis of a solution of zinc chloride, etc., with platinum electrodes.

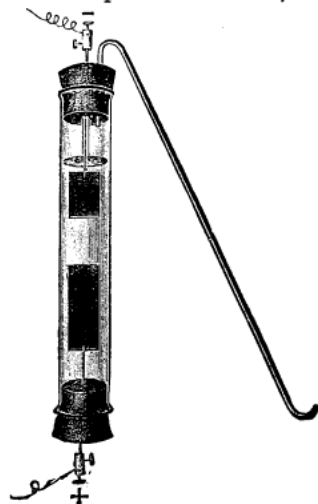
Each .. .. 10/6

(Price varies according to market price of platinum.)

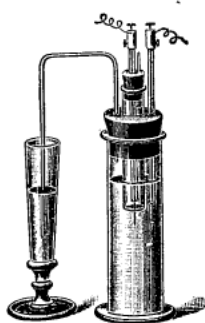


**1304.—Apparatus for the Decomposition of Stannous Chloride.** This apparatus is fitted with one pure tin and one pure copper electrode.

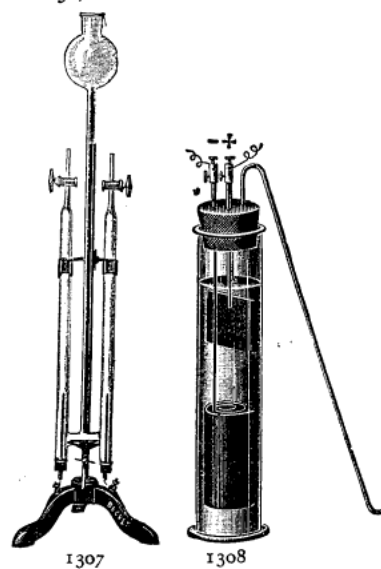
Complete on stand .. .. 25/-



**1305.— Electrolytic Cell,** for demonstrating that the copper (of a copper anode) is dissolved, when brought into contact with anions .. .. 18/6



**1306. Electrolytic Cell,** for demonstrating the formation of hydrogen peroxide and ozone when sulphuric acid is decomposed by electrolysis. Each .. 25/-



**1307.—Apparatus for the Electrolysis of Hydrochloric Acid,** complete with carbon electrodes and terminals.

Each .. .. 17/6

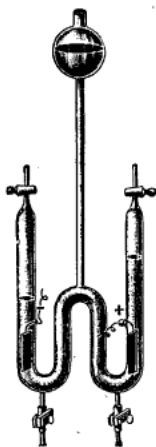
**1308.—Electrolytic Cell with Insoluble Anode,** for the electrolysis of a solution of oxygen salts. Complete with platinum anode and copper cathode.

Each .. .. 18/6

(Prices vary according to the market price of platinum.)

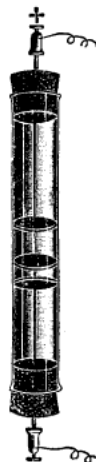
Every requisite for Chemical, Physical, and Bacteriological work supplied, from a test tube to the complete furnishing of the largest laboratory

**LÜPKE'S APPARATUS FOR ELECTRO-CHEMICAL EXPERIMENTS**



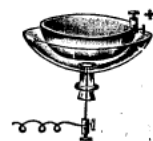
**1309. — Voltameter for the Electrolysis of Solutions,** arranged so that the electrolyte formed at the cathode can be drawn off separately from the electrolyte formed at the anode.

With Platinum Electrodes each 27/6  
 (Price varies according to the market price of platinum.)



**1316. Hittorf's Electrolytic Cell,** complete with terminals and electrodes.

Each .. 10/6



**1317. — Apparatus for the Electrolysis of Lead and Manganese Salts,** glass part with binding screws .. .. 6/-

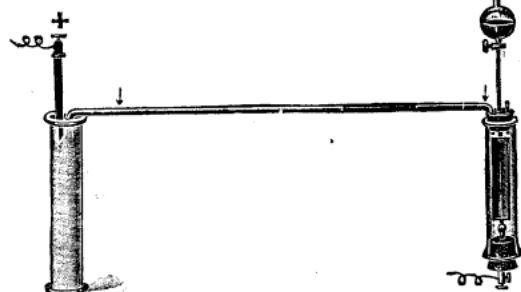
(Platinum basin extra, at lowest market price.)



**1310. — Apparatus for Demonstrating the Principle of Pole Reversal..** .. each 25/-

**1311. — Apparatus for Demonstrating Pole Reaction.**

A. Glass parts only .. 9/-  
 B. Special Stand for same 7/6



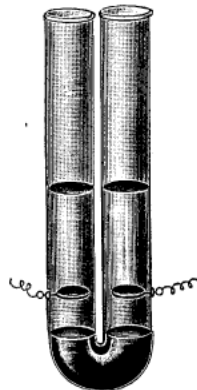
**1318.—Apparatus for Demonstrating the Migration-Velocity of the Ions.**

Complete as figured .. .. each £2 2/6

**1312.—Nernst Apparatus,** for separating metallic potassium at the cathode.  
 Each .. .. 15/-

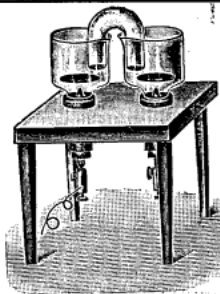


**1313.—Castner-Kellner Electrolytic Cell,** for electrolytically decomposing the alkaline chlorides.  
 Each .. .. 14/6



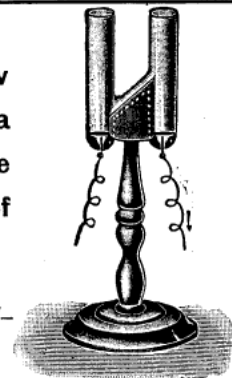
**1319.—Apparatus to show the Formation of a Current by Reduction and Oxidation.**

A. Glass parts only .. 35/-  
 B. Complete with table .. 42/6



**1320.—Apparatus to show the Formation of a Current by a Difference in the Concentration of the Solution.**

Complete on wooden stand 15/-



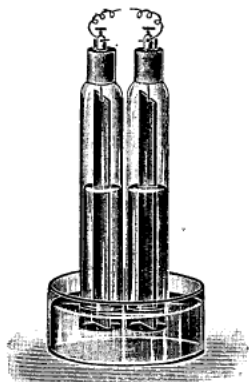
**1314. — Nernst Apparatus,** for demonstrating the migration-velocity of the  $MnO_4$  ions .. .. each 15/-

**1315.—Stand, with Clamp,** for above 10/6

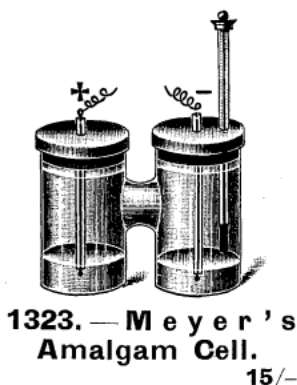


Our Balances and Weights have achieved World-wide Reputation: *vide* Opinions of the Leading Scientific Press.

**LÜPKE'S APPARATUS FOR ELECTRO-CHEMICAL EXPERIMENTS**



**1321.—Grove-Ostwald Cell**, for hydrogen and oxygen. Complete with glass dish, as figured.  
£3 15 0



**1323.—Meyer's Amalgam Cell.**  
15/-



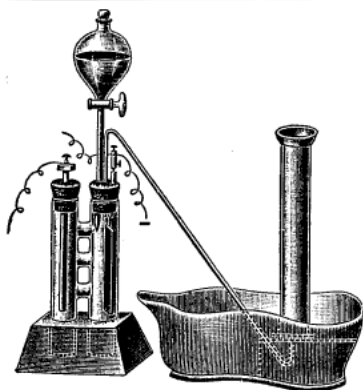
**1324.—Cell for Demonstrating the Solution-Pressure of Non-Metals.**  
Each.. .. 25/-



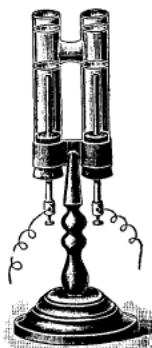
**1322.—Paschen's Apparatus** for the estimation of the difference of potential between a metal and an electrolyte, on wooden stand, without galvanoscope.  
Each .. 30/-



**1325.—Decomposition Cell**, for proving that the tension of decomposition increases with the progress of dilution, with platinum electrodes.  
Each.. .. 15/-  
(Price varies according to the market price of platinum.)

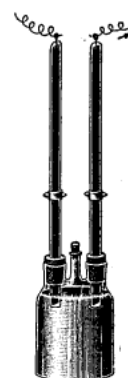


**1326.—Irreversible Cell**, with liquid (Chromic acid) depolarisation, without gas jar and pneumatic trough.  
25/-



**1327.—Apparatus to show that the Electro-Motive Force is Constant**, provided the concentration of the solution is constant.  
Complete .. .. 16/-

1327

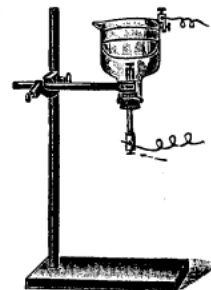


**1328.—Grove-Ostwald Cell**, for hydrogen and chlorine, with platinum electrodes.  
Complete .. £2 12 6  
(Price varies according to the market price of platinum.)

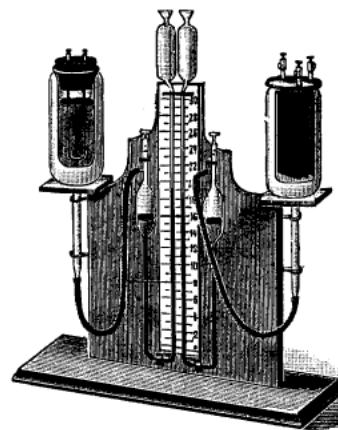
1328

**1329.—Apparatus for Electrolysis of mixed Electrolytes.**

- A. Glass vessel with platinum anode, rubber cork and binding screw .. 13/6  
(Price varies according to market price of platinum.)
- B. Metal Stand .. .. 7/6
- C. Platinum cathode at lowest market rate.



**1330.—Apparatus with Looser's Thermoscope**, for comparing the amount of heat generated in the cell with that generated in the external circuit.  
Complete on wooden stand .. £4 5 0



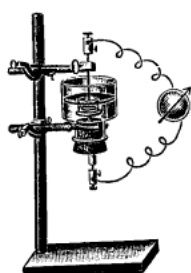
**1331.—Cell, with Copper Electrodes**, for demonstrating the decomposition between soluble electrodes.  
9/6

**1332.—Ditto**, fitted with one iron and one zinc electrode.  
9/6



Our stock of pure Chemicals and Acids is very considerable ; hence all orders are executed with the utmost despatch. See comprehensive list at end of Catalogue.

**LÜPKE'S APPARATUS FOR ELECTRO-CHEMICAL EXPERIMENTS**



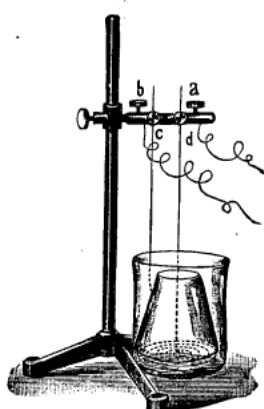
**1333.—Irreversible Cell**, with solid depolarisers.  
 Price without galvanometer .. . . . 37/6



**1334.—Apparatus for proving that Hydrogen is always liberated at the Cathode and not at the Anode** .. 18/6

1333

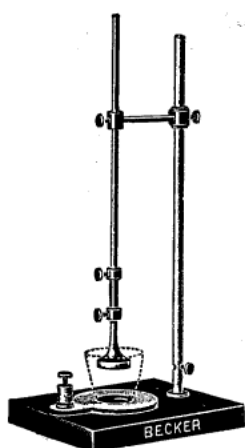
1334



**1335.—Dr. Classen's Apparatus** for the electrolytical estimation of copper, consisting of platinum cone and spiral, and stand with adjustable clamp with binding screws.  
 (Price varies according to the market price of platinum. (Lowest price on application.)

**1336.—Silver Voltmeter**, consisting of silver cone and spiral, and stand with adjustable clamp with binding screws.

The silver is deposited on a platinum cup from a solution of pure nitrate of silver in water. Greater accuracy is obtained than with the copper voltmeter.  
 Price complete, as figured .. . . . £1 18 6



**1337.—Silver Voltmeter**, comprising adjustable silver anode clamped to a double terminal of special design which can be raised or lowered and clamped at desired height; strong brass ring with terminal at side, with brass upright mounted on nicely finished slate base. This apparatus will take a platinum vessel measuring about 30 mm. high x 35 mm. diameter, and weighing approximately 3/4ths of an ounce. This voltmeter is fully described in Watson's "Text-Book of Practical Physics."

Price complete, as figured .. . . . £1 15 0

**1338.—Platinum Vessel** for use with above.  
 Price varies according to the market price of platinum.

**1339.—Decomposition Cell**, fitted with one platinum and one aluminium electrode.

Each .. . . . 19/6  
 (Price varies according to the market price of platinum.)



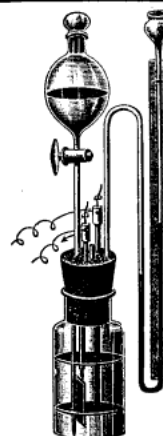
**1340.—Apparatus for Estimating the Position of Hydrogen in the Tension Series.** Complete with one lead and one copper electrode .. . . . 16/6

**1341.—Apparatus to Demonstrate that the Intensity of Adhesion of Hydrogen Ions under Ordinary Pressure is less than that of Potassium Ions.**

Complete as figured £2 5 0



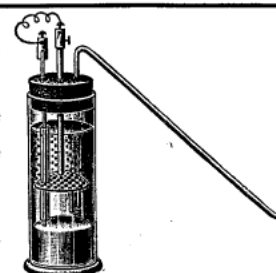
1340



1341

**1342.—Apparatus for Demonstrating the Phenomena of Polarisation of Galvanic Elements.**

Each .. . . . 15/-



**NEWTN'S APPARATUS**

**1343.—Apparatus for showing the Lightness of Hydrogen on the Lantern Screen**, as described in Newth's "Chemical Lecture Experiments" (Fig. 9) .. . . . each 4/6

**1344.—Apparatus to Show the Colour of Incandescent Hydrogen**, as described in Newth's "Chemical Lecture Experiments" (Fig. 12) .. . . . each 5/-

**1345.—Apparatus for showing the Decomposition of Water on the Lantern Screen**, as described in Newth's "Chemical Lecture Experiments" (Fig. 41) .. . . . each 6/-

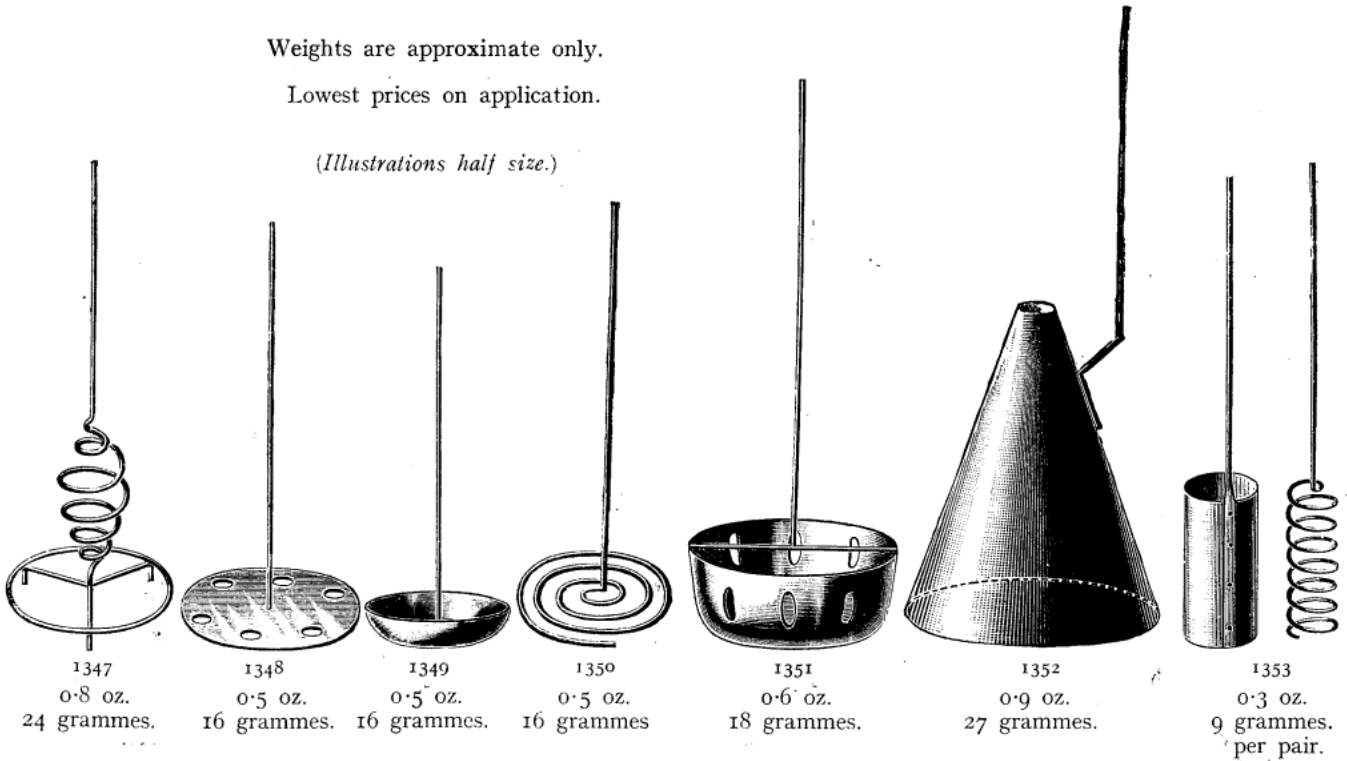
**1346.—Apparatus to Show the Formation of Hydrochloric Acid by Synthesis**, as described in Newth's "Chemical Lecture Experiments" (Fig. 65). Price, without stand and clamp .. 5/-

Every requisite for Chemical, Physical, and Bacteriological work supplied, from a test tube to the complete furnishing of the largest laboratory.

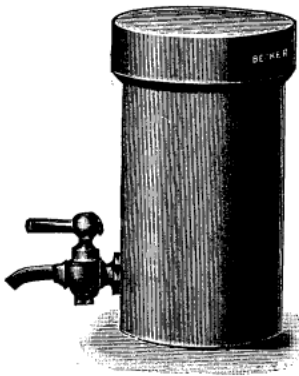
## PLATINUM APPARATUS FOR ELECTROLYSIS

Weights are approximate only.  
 Lowest prices on application.

(Illustrations half size.)



## MERCURY VESSELS, Etc.



1354

**1354.—Mercury Vessel**, made of iron, to hold 25 lb. of mercury.  
 Price, including lid and metal tap as figured **8/6**

**1355.—Ditto**, to hold 76 lb. of mercury .. **12/6**

**1357.—Japanese Fibre Mercury Trays.**

Each.  
 A. 12 in. square **3/-**  
 B. 15 " " **4/6**



**1358.—Mercury Trays**, made of wood, dead-blackened.

12 in. long, 8 in. wide, 1 in. deep .. .. each **2/-**

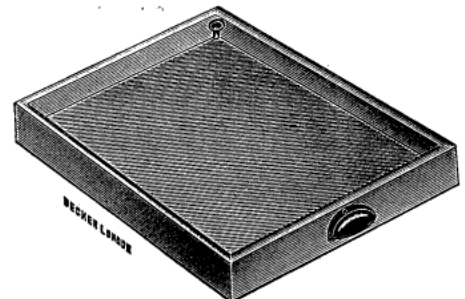


**1356.—Glass Reservoirs for Mercury**, strongly made.

Capacity .. 125 250 500 700 1000 c.c.  
 Each .. **1/8 1/11 2/6 3/6 4/6**

**FOR PORCELAIN MERCURY TROUGHS, SEE INDEX.**

**1359.—Canary Wood Mercury Tray**, with plug in corner, and two handles.

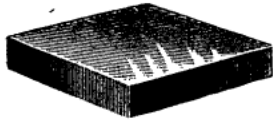


1359

Size about 23 in. x 16 in. x 2 in. .. .. each **15/-**

Our Balances and Weights have achieved World-wide Reputation: *vide* Opinions of the Leading Scientific Press.

## METALLURGICAL AND ASSAY APPARATUS



**1360. — Square Steel Anvil Blocks**, polished on one face.

Size ..  $1\frac{1}{2} \times 1\frac{1}{2} \times \frac{1}{2}$     $2 \times 2 \times \frac{1}{2}$     $4 \times 4 \times 1$     $4 \times 4 \times 1\frac{1}{2}$  in.  
 Price each     **2/6**     **3/3**     **12/-**     **21/-**



**1361. — Anvils**, square-faced, with fang, for Chemists, Geologists, etc.

Size of Face      $1\frac{1}{2}$      2      $2\frac{1}{4}$       $2\frac{1}{2}$  in.  
 Weight between 2—3   3—4   4—5   5—6 lb.  
 Each ..     ..     **7/-**     **10/6**     **12/-**     **15/-**



**1362. — Horn Assay Scoops.**  
 Each 8d. ; per dozen 7/-

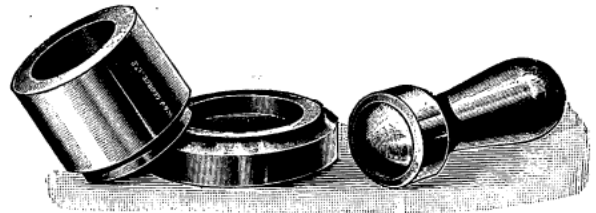


**1363. — Horn Scoops.**  
 Length ..     12     14     16 cm.  
 Price, each ..     **1/-**     **1/4**     **1/6**



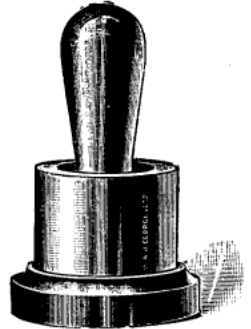
**1364. — Ingot or Bar Moulds.**

A.	$2 \times 1 \times \frac{1}{2}$ in.	..	..	..	..	each	<b>1/3</b>
B.	$3 \times 1 \times \frac{3}{4}$ ..	..	..	..	..	..	<b>1/6</b>
C.	$3 \times 1\frac{1}{4} \times \frac{1}{2}$ ..	..	..	..	..	..	<b>1/6</b>
D.	$4 \times 1 \times 1$ ..	..	..	..	..	..	<b>2/3</b>
E.	$4\frac{1}{4} \times 1\frac{1}{2} \times \frac{1}{2}$ ..	..	..	..	..	..	<b>2/3</b>
F.	$6 \times 1\frac{7}{8} \times 2$ ..	..	..	..	..	..	<b>6/-</b>
G.	$7\frac{3}{4} \times 1\frac{7}{8} \times 2$ ..	..	..	..	..	..	<b>7/-</b>
H.	$9\frac{3}{8} \times 2\frac{1}{2} \times 2$ ..	..	..	..	..	..	<b>8/6</b>



**1365. — Gun Metal Cupel Mould**, of substantial make, as used in the Metallurgical Department of the Birmingham Municipal Technical School.

- A. To make Cupels  $\frac{7}{8}$  in. diam.     **25/-**  
 B. To make Cupels  $1\frac{1}{4}$  in. diam.     **27/6**



**1366. — Crucible Mould** for making small

metallurgical fine clay crucibles or cupels of 1 inch inside diameter as used in most of the large Metallurgical Laboratories.

Each ..     **27/6**



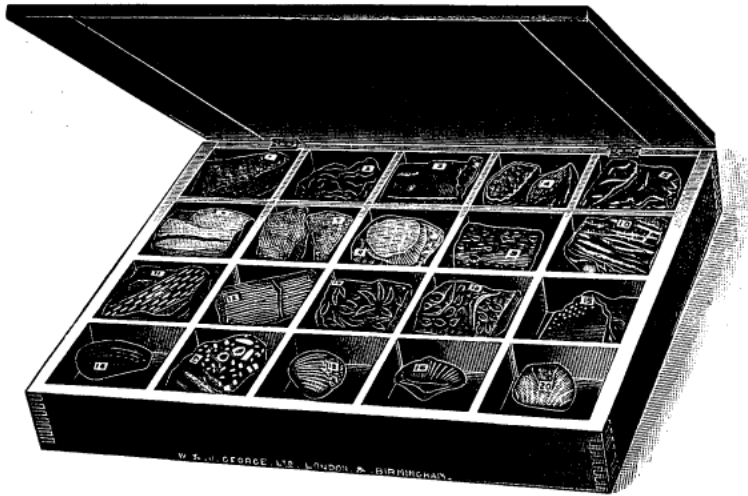
**1367. — Ingot or Bar Mould**, with two divisions.  
 Each division  $4 \times 2\frac{3}{8} \times 2\frac{1}{2}$  in. .. .. each **7/6**

**1368. — Ingot or Bar Mould**, with three divisions, measuring respectively  $1 \times 1$  in.,  $2 \times 1$  in. and  $3 \times 1 \times \frac{3}{8}$  in. .. .. each **7/6**

FOR FULL DETAILS OF LATEST IMPROVED PATTERNS OF  
**ELECTRIC MUFFLE FURNACES, ELECTRIC TUBE FURNACES,**  
**ELECTRIC CRUCIBLE FURNACES,**  
 with RENEWALS, RESISTANCES, and PYROMETER EQUIPMENT,  
 SEE PAGES 187 TO 191.

Our stock of pure Chemicals and Acids is very considerable ; hence all orders are executed with the utmost despatch. See comprehensive list at end of Catalogue.

## COLLECTIONS OF MINERALS, FOSSILS & ROCKS



### 1371.—Elementary Collections of Minerals, Fossils, and Rocks.

- 50 small specimens, all with name, locality, etc., in cabinet .. .. . **£1 5 0**
- 100 small specimens, all with name, locality, etc., in cabinet .. .. . **£2 2 0**
- 200 small specimens, all with name, locality, etc., in cabinet .. .. . **£3 15 0**
- 200 large specimens, all with name, locality, etc., in cabinet with 6 drawers **£6 10 0**
- 200 large and specially selected specimens, all with name, locality, etc., in cabinet **£8 10 0**

### 1369.—Small Collections for Boys.

- A. 20 specimens of Earthy Minerals, all named, in box .. .. . **3/6**
- B. 20 specimens of Metallic Minerals and Ores, all named .. .. . **3/6**
- C. 20 specimens of Sedimentary Rocks, all named.. **3/6**
- D. 20 specimens of Igneous, Metamorphic, and Volcanic Rocks, all named .. .. . **3/6**
- E. 20 specimens of Precious Stones, Gems, and Ornamental Stones, all named, in box .. .. . **6/6**
- F. 20 specimens of Fossils from different formations **3/6**

### 1370.—Elementary Collections (in Cabinets). Arranged to illustrate Dana's "Mineralogy."

- 50 specimens, small, but all characteristic, with name and locality, in cabinet .. .. . **25/-**
- 100 specimens, small, but all characteristic, with name and locality, in cabinet .. .. . **£2 2 0**
- 200 specimens, small, but all characteristic, with name and locality, in cabinet .. .. . **£3 15 0**

### 1372.—Collections of Metallic Ores.

- Collection of 100 ores of metals,  $1\frac{1}{2} \times 1$  in. **£3 15 6**
- " " " " 2 x 2 in. **£5 17 6**

## MINERALS FOR BLOWPIPE WORK.

- 1373.—Set of 25 Fragments of Minerals, for blowpipe work .. .. . **5/-**
- 1374.—Set of 50 Fragments of Minerals, for blowpipe work .. .. . **10/-**
- 1375.—Set of 104 Larger Fragments of Minerals, for blowpipe work .. .. . **36/-**
- 1376.—Set of 40 Larger Fragments, for use with "Ross's Pyrology" .. .. . **12/-**
- 1377.—Set of 80 Larger Fragments, for use with "Ross's Pyrology" .. .. . **25/-**

## MORTARS AND PESTLES



### 1378.—Mortars and Pestles, heavy glass.

Diameter	2½	3	4	6 in.
Each ..	1/5	1/6	2/3	4/3
Per dozen	14/6	15/9	24/-	48/6

FOR  
**PORCELAIN**  
 MORTARS AND PESTLES,  
 SEE PAGE 14.

### 1379.—Horn Mortar Scrapers.

Length .. .. .	10 cm.
Each .. .. .	10d.

### 1380.—Wedgwood Ware Mortars and Pestles, biscuit inside and out. Prices include pestle with wooden handle,



Outside diameter ..	3	3½	4 in.
Price, each ..	2/3	2/9	3/-
Outside diam.	4½	5½	6 6½ in.
Price, each ..	3/3	4/-	5/3 6/6
Outside dia.	7	8	9 10 12 in.
Price, each	8/6	9/-	11/- 14/- 27/6

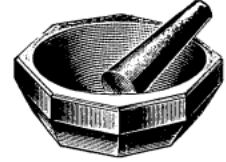
Every requisite for Chemical, Physical, and Bacteriological work supplied, from a test tube to the complete furnishing of the largest laboratory.



## MORTARS AND PESTLES

**1381.—Agate Mortars and Pestles**, best selected, highly polished, for analytical use and the pulverisation of hard substances.

Diameter	..	..	..	30	35	40	45	50	65	70 mm.
Price	..	..	..	3/6	4/6	5/3	6/-	6/6	10/-	13/-
Diameter	..	..	..	75	80	85	90	100	120	120 mm.
Price	..	..	..	14/-	18/-	20/-	22/-	28/-	50/-	



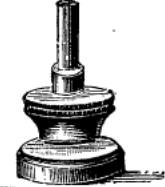
**1382.—Mortars and Pestles.**

Iron, bell-shaped, turned inside, with iron pestle. Best quality.

Diameter	4	5½	6	8	10 in.
Price, each	3/9	7/6	11/3	16/6	25/6

**1385.—Mortar and Pestle** of hardened polished steel, in three pieces, mounted in gun-metal base.

Diameter of Pestle	..	..	17 mm.
Price, each	..	..	17/-



**1383.—Mortars and Pestles.**

Iron, bowl-shaped, turned inside, with iron pestle. Best quality.

Diameter	..	4	5	6	7	8	9 in.
Price each	..	5/6	10/-	14/-	18/-	21/-	25/-

**1386.—Mortars and Pestles**, heavy iron, turned inside. Complete with pestle with wooden handle, 4 feet long.

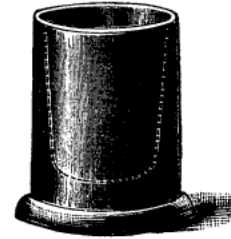
Diameter	..	..	4	5	6 in.
Height	..	..	5½	6½	8 "
Price, complete	..	..	16/6	19/6	48/6
Diameter	..	..	7	8	10 in.
Height	..	..	10½	11½	13½ "
Price, complete	..	..	66/-	87/-	150/-



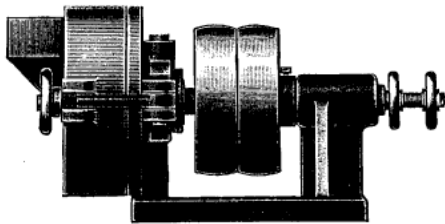
**1384.—Mortar and Pestle** of hardened polished steel, in three pieces for crushing minerals.

Diameter of Pestle	..	..	15	17 mm.
Price, each	..	..	12/-	17/-

Side bow handles to mortar can be supplied at 2/- each extra.



## ORE SAMPLE CRUSHERS AND GRINDERS



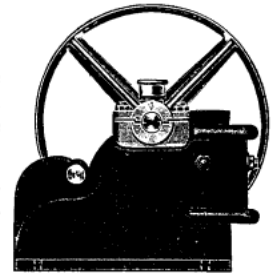
**1387.—Ore Sample Grinder**, of the well-known disc type, adapted for grinding all kinds of ores and similar materials to any desired degree of fineness. All wearing parts of steel and having extra large bearings. Very simple in operation and quickly and effectively cleaned out.

Each	..	..	..	..	..	..	..	..	..	£21 0 0
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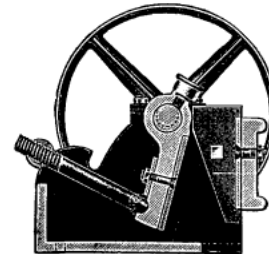
**1388.—Ore Sample Crusher.**

Specially designed with the object of quickly cleaning out when changing from one sample to another.

All kinds of Ore Samples and similar materials quickly reduced to about ¼ in. and smaller.



Ready for Work.



Open for brushing out.

Adapted for either hand or power, all wearing parts of steel.

**Price.**

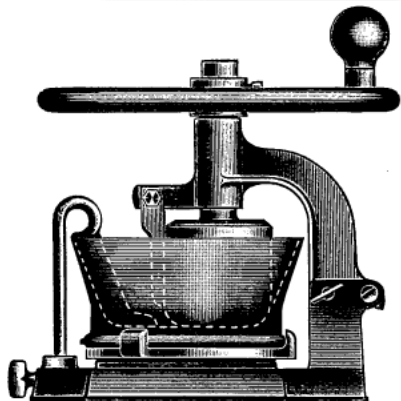
Size No. 1, having jaw opening 3 in. x 2 in.	..	£18 0 0
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Our Balances and Weights have achieved World-wide Reputation: *vide* Opinions of the Leading Scientific Press.

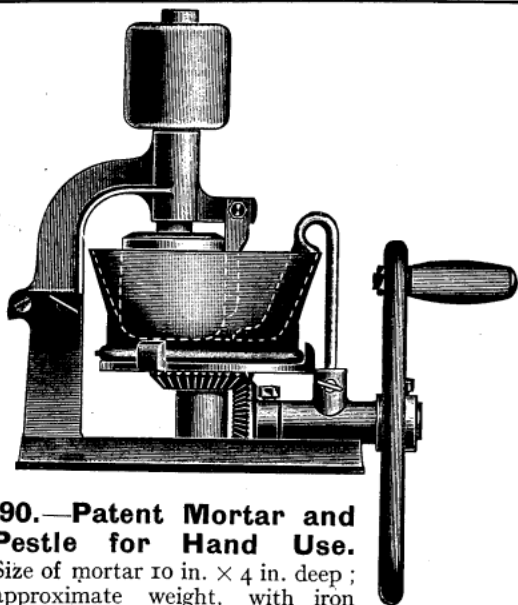
## PATENT MORTARS AND PESTLES

For use by Chemists, Assayers, Colour Grinders, Cement Manufacturers, etc. **For grinding and mixing most substances, either in wet, dry, or plastic state.** The special features of the machines are: Extremely easy to work, easy to clean, clean in working. Will grind and mix all kinds of substances usually ground and mixed by hand with the ordinary mortar and pestle. The hardest gold and other ores may be quickly reduced to a fine powder by their use.

*The Mills illustrated are with Cast Iron Mortars and Pestles, but can be supplied with Granite, Marble, Stone, Porcelain, Wood or Steel Mortars and Pestles to suit various materials at extra cost.*



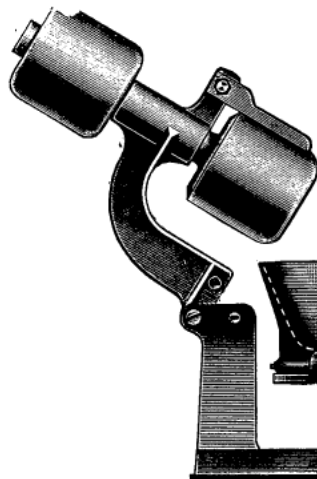
**1389.—Patent Mortar and Pestle for Hand Power.** The illustration shows the machine in position for operating, fitted with iron mortar and runner, and runs on ball bearings. Size of mortar, 10 in. diam.  $\times$  4 in. deep; approximate weight, 3 qrs.  
 Price .. .. . £9 0 0



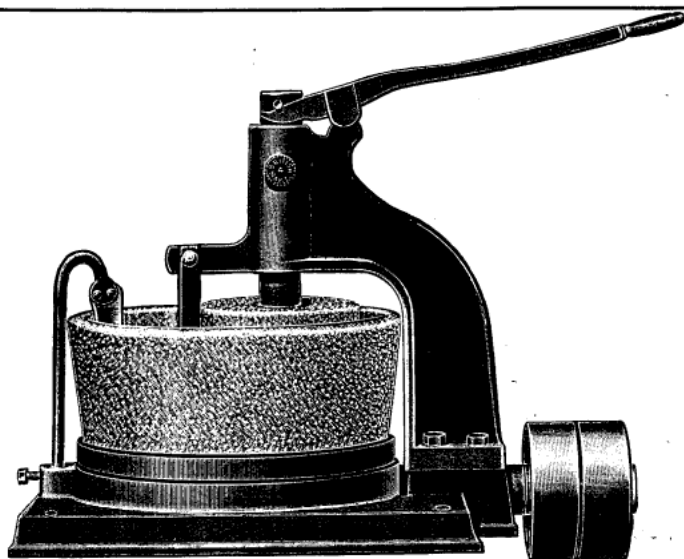
**1390.—Patent Mortar and Pestle for Hand Use.** Size of mortar 10 in.  $\times$  4 in. deep; approximate weight, with iron mortar and runner, 1 cwt.; size of base, 15½ in.  $\times$  9 in. Price .. £10 10 0

**1391.—Ditto, but with mortar measuring 15  $\times$  5 in.**  
 Price .. .. . £21 0 0

**1392.—Patent Mortar and Pestle, adapted for Power.** The illustration shows the machine in position for cleaning. The runner being raised, rests directly over the mortar, and may be cleaned with brush or palette knife.



All that is cleaned off the runner falls directly into the mortar. Size of mortar, 10 in.  $\times$  4 in. deep; size of base, 15½ in.  $\times$  9 in.  
 Price .. .. £10 10 0  
**1393.—Ditto, but mortar measuring 15 in.  $\times$  5 in.**  
 Price .. .. £21 0 0



**1394. — Large Power-Driven Mortar and Pestle.** Much larger and more powerful than No. 1391. The illustration shows mill fitted with granite mortar and runner (see note above). An emptying slide may be fitted in bottom of mortar if required to allow material to pass through while running.

PRICE WITH IRON MORTAR.  
 Size of mortar, 20  $\times$  6 in. .. .. £57 10 0  
*Prices of larger sizes on application.*

Our stock of pure Chemicals and Acids is very considerable; hence all orders are executed with the utmost despatch. See comprehensive list at end of Catalogue.

## " NIVOC " GRINDING MORTAR

**1395. — Grinding Mortar for Crushing and Pulverizing Ores, Coal and Coke, Rocks of all kinds, Phosphate, Clays, and for Amalgamating Gold Ores.**

A hand machine which will crush and pulverise coarse material at one operation, and discharge the finished product as soon as pulverised.

This machine will pulverise all kinds of ores, coal, rocks, pig iron, phosphate, clay, etc., and for amalgamating gold ores it is unequalled.

It does the work of two other machines—a rock breaker and a buckboard or mortar.

It pulverises faster than other hand mortars.

It is easy to clean, as there are no joints or corners in which the pulverised material can collect. It revolves more easily when working than when empty.

It discharges the material as soon as pulverised.

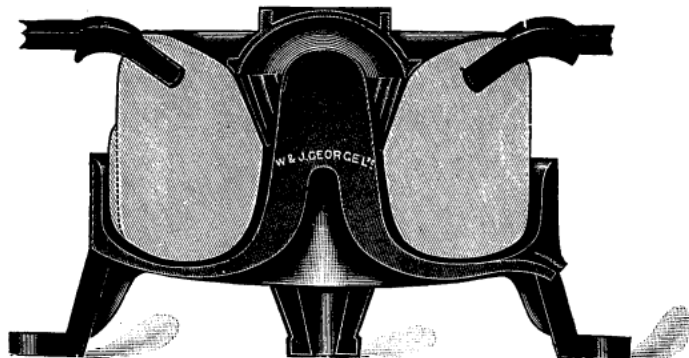
No sieves be used with this machine; by passing the material through the second time, it will be reduced fine enough for all laboratory purposes.

The working-surfaces are tempered as hard as steel can be tempered, thereby minimising the wear.

The cover is made so that it can be used as a small hand mortar, the ends of the handles being rounded to form pestles.

The machine has been in constant use for over ten years, so that it has been thoroughly tested out.

The following tables show the time required to grind one pound each of common window glass and pig iron; also the fineness of each after passing once through the pulveriser. The pulverised products were passed through a series of six sieves. The per cent. remaining on each sieve is shown in the tables:—



Sectional View.

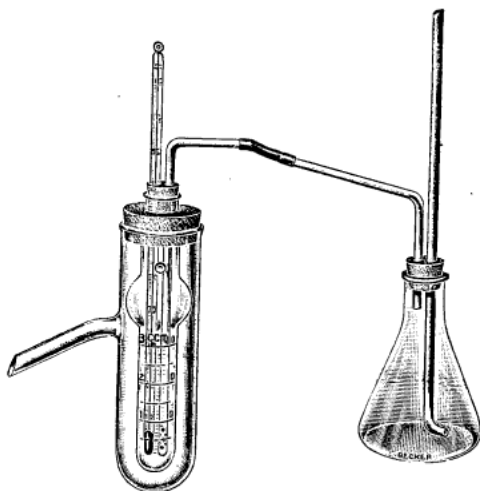
GLASS.				PIG IRON.			
40-mesh sieve	..	..	..	40-mesh sieve	..	..	..
60	..	..	..	60	..	..	..
80	..	..	..	80	..	..	..
100	..	..	..	100	..	..	..
120	..	..	..	120	..	..	..
140	..	..	..	140	..	..	..
Amount passed through 140..	..	..	59	Amount passed through 140..	..	..	67
Total	..	..	100	Total	..	..	100
Time of pulverising..	..	..	7½ min.	Time of pulverising..	..	..	12 min.

The substances were selected on account of their commonness. The difficulty of pulverising them is well known.

Price £5 7 6

## MOLECULAR WEIGHTS APPARATUS

(For Beckmann's Apparatus, see page 117.)



**1396.**—Landsberger's Apparatus for the determination of Molecular Weights. (Modified by Walker & Lumsden.)

For full instructions see "Introduction to Physical Chemistry," 1910 edition, by James Walker, LL.D., F.R.S. (Macmillan & Co., Ltd.), also *Journal of Chemical Society*, 1898, Vol. LXXIII., Part II, page 5.

- A. Price complete, including thermometer, 70° C. to 105° C., graduated in tenths and caoutchouc stoppers .. .. . **25/-**  
B. Price, without thermometer .. .. . **16/6**

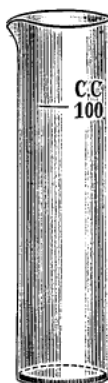
## NESSLER GLASSES.



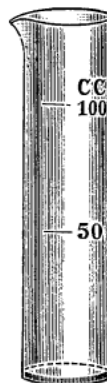
**1397.**—Nessler Glasses, for water analysis.. Colourless glass and polished bottoms, plain, not graduated.  
Height .. 5 6 1/2 in.  
Per doz. **10/9 12/6**



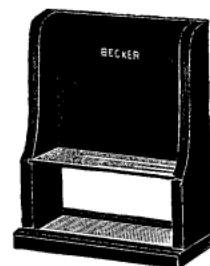
**1398.**—Nessler Glasses, with one mark at 50 c.c.  
Each .. .. **1/3**  
Per doz. .. **13/6**



**1399.**—Nessler Glasses, with one mark at 100 c.c.  
Each .. .. **1/4**  
Per doz. .. **14/-**

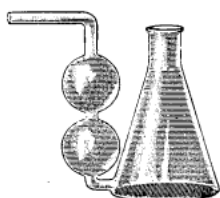


**1400.**—Nessler Glasses, with two marks at 50 c.c. and 100 c.c.  
Each .. .. **1/7**  
Per doz. .. **16/6**



**1401.**—Nessler Tube Stand, black wood, with glass shelf, and white opaque bottom.  
Each .. .. **5/-**

## NITROGEN BULBS



**1402.**—Nitrogen Bulbs.  
Each .. .. **2/3**  
Per dozen.. **26/-**



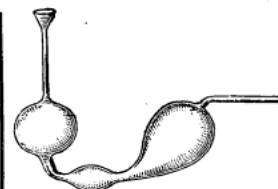
**1403.**—Nitrogen Bulb, V o l l h a r d ' s modification.  
Each .. .. **2/6**  
Per dozen.. **29/-**



**1404.**—Nitrogen Bulbs (Will & Varrentrap's).  
Each .. .. **1/8**  
Per dozen .. **18/-**



**1405.**—Nitrogen Bulbs, with cork (Will & Varrentrap's).  
Each .. .. **1/10**  
Per dozen .. **20/-**



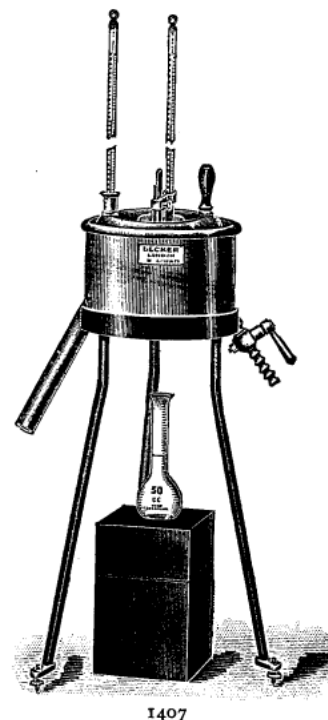
**1406.**—Nitrogen Bulbs, with funnel.  
Each .. .. **1/10**  
Per dozen .. **20/-**

Our Balances and Weights have achieved World-wide Reputation : *vide* Opinions of the Leading Scientific Press.

## OIL TESTING APPARATUS

**1407.—Sir Boverton Redwood's Standard Viscometer,** as adopted by the Mineral Oil Association as the standard instrument for determining the viscosity of lubricating oils. Fully described in Sir Boverton Redwood's paper (see *Journal of the Society of Chemical Industry*, Vol. V., p. 126). Consisting of a silvered copper oil cylinder about  $1\frac{7}{8}$  inches diameter and about  $3\frac{1}{2}$  inches deep, and provided with an agate jet suitably mounted so that no leakage can take place even when the apparatus is used at high temperatures. The oil cylinder is surrounded by a copper bath, and the whole is supported on a tripod stand with levelling screws. The apparatus is complete with ball valve, two thermometers and 50 c.c. flask as illustrated.

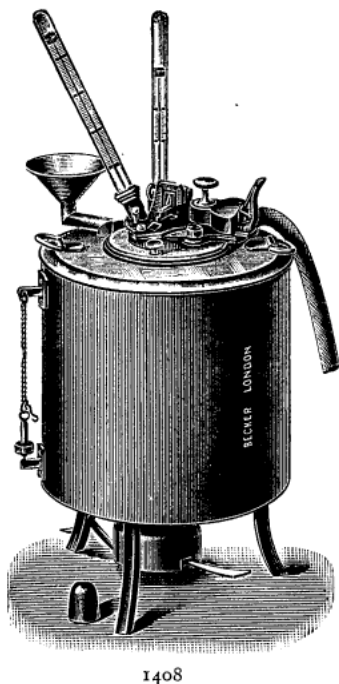
- A. Complete, with thermometers and certificate of accuracy .. .. £8 0 0  
 B. Polished mahogany case (if required), extra .. .. £1 10 0



### 1408.—Abel's Petroleum Test Apparatus.

*Board of Trade Standard Pattern with latest modifications.*

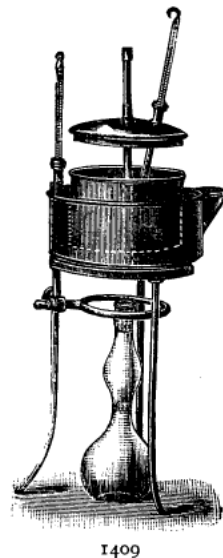
Complete in polished mahogany case, with two thermometers and Board of Trade Certificate .. .. £11 0 0



### 1409. — Engler's Standard Viscometer,

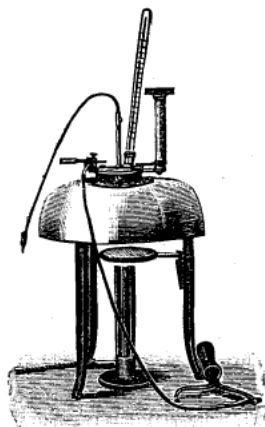
consisting of two flat brass pans forming an inner oil pot, gilt inside, and having a platinum outlet, with cover carrying a thermometer and an outer water-bath on metal tripod, with gas burner and a measuring flask with mark on neck. Each instrument is accompanied by a certificate.

Price complete on tripod stand with gas burner, thermometer and measuring flask .. .. £6 0 0



Our stock of pure Chemicals and Acids is very considerable ; hence all orders are executed with the utmost despatch. See comprehensive list at end of Catalogue.

## OIL TESTING APPARATUS



1410

**1410. — Pensky-Martens's Flash-Test Apparatus,** complete with stirrer and thermometer, 80° to 250° C., packed in polished wood cabinet, with burner.

Price .. .. £7 0 0

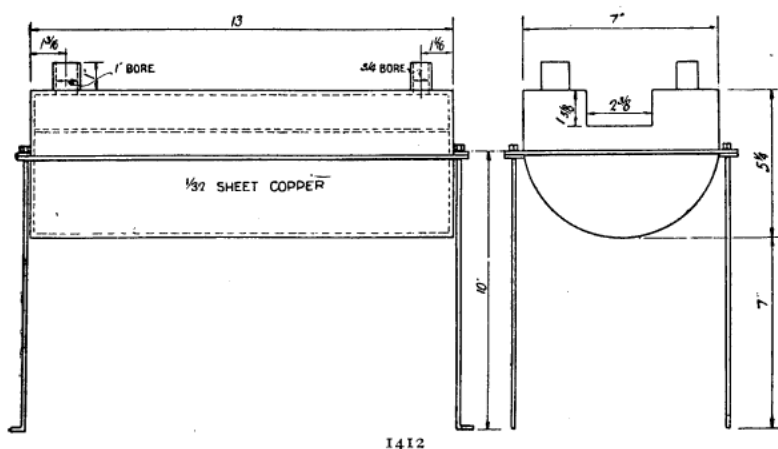
**1411.—Gray's Flash-Point Apparatus,** latest pattern, for determining the flash-point of heavy mineral oils.

- A. Price, with thermometer registering up to 550° Fah., complete in polished mahogany case **£7 5 0**
- B. Ditto, but with nitrogen-filled thermometer registering up to 700° Fah. .. .. **£7 15 0**

(See *Journal of the Society of Chemical Industry*, April, 1891.)

### 1412.—Toluene Vapour Bath for estimating loss due to Evaporation of Oil.

See pp. 47 and 48 "*Lubricating and Allied Oils*," by E. A. Evans, F.C.S., A.M.I.P.T.  
 (Published by Messrs. Chapman & Hall.)



1412

This method is described in J.I.E.E., Vol. LIV, No. 258, 1916, by the Research Committee on Insulating Oils. The apparatus consists of a copper bath fitted with a reflux condenser. The upper portion of the bath contains a trough, the ends of which can be closed by push-in doors. The oils to be tested (5 c.c.) are weighed into crucibles with flat bottoms and vertical sides 1½ in. in internal diameter. The crucibles are placed in the trough and surrounded to their upper edge with lead shot or small glass beads. A thermometer is inserted into the shot. By boiling the toluene a uniform temperature of oil at 100° C. is maintained. The heating is conducted for eight hours, at the end of which time the oil is re-weighed and the loss per cent. calculated.

Price of Copper Bath on Stand, as diagram .. .. **£3 5 0**

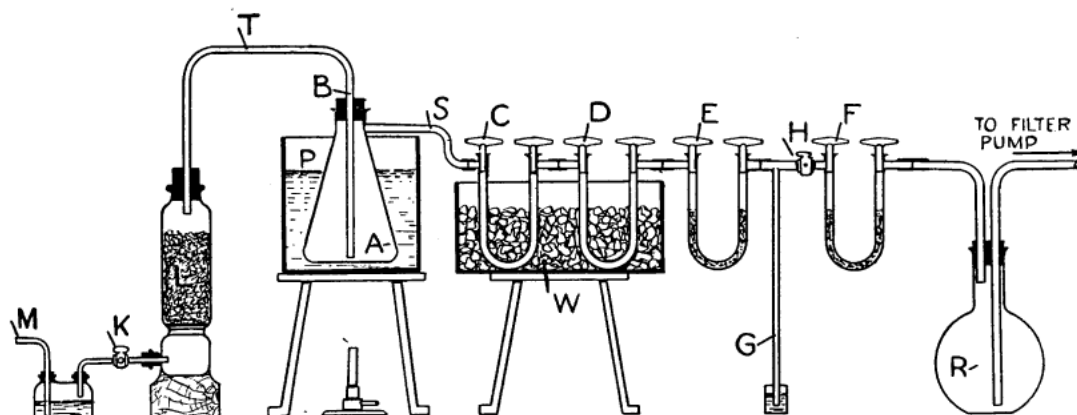
**1413.—Flask for estimating the Saponification Value of an Oil,** consisting of a flask about 200 c.c. capacity, into which is ground a condenser tube about 3 ft. long.

Price .. .. **8/6**

For method employed see "*Lubricating and Allied Oils*," by E. A. Evans, F.C.S., A.M.I.P.T.  
 (Published by Messrs. Chapman & Hall.)

Every requisite for Chemical, Physical, and Bacteriological work supplied, from a test tube to the complete furnishing of the largest laboratory.

## OIL TESTING APPARATUS



1414

### 1414.—Apparatus for Estimating the Amount of Water in Oil.

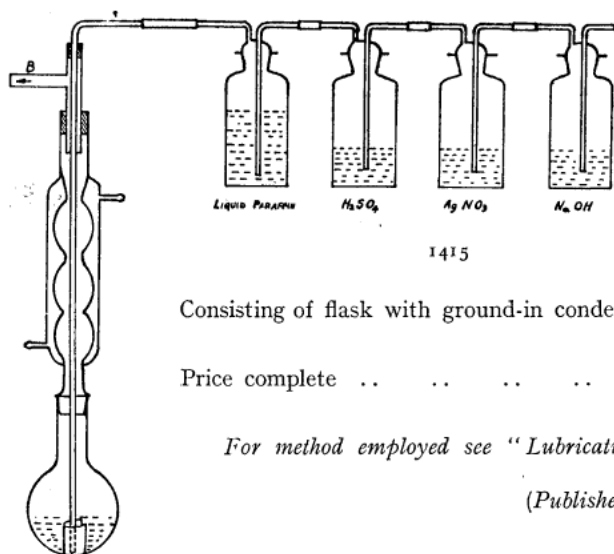
See p. 79, "Lubricating and Allied Oils," by E. A. Evans, F.C.S., A.M.I.P.T. (Published by Messrs. Chapman & Hall.)

Two hundred grams of oil is weighed into a conical copper flask A, which has a capacity of about 800 c.c. The flask is fitted with side tubes and is closed by an india-rubber bung B, through which a glass leading-in tube  $\tau$  passes to the bottom of the flask, its lower end being constricted to a fine orifice. The flask is immersed in a water-bath P. The side tube of the flask is connected to an absorption train, which consists of the following: two small stoppered U-tubes C and D, surrounded by a freezing mixture W; two calcium chloride tubes E and F, and a guard flask R, which is connected to a pump. Between E and F a mercury pressure tube G is connected. The tube  $\tau$  is connected to a calcium chloride tower L, and this to a tell-tale bottle M. A tap K is interposed between M and L, and another H between E and F.

The tap K is closed and the pump started. When the mercury in G reaches a constant level, H is closed. If the apparatus is air-tight, which it must be, the mercury will remain at the same level. Then air is drawn through at the rate of three bubbles per second, and the bath P raised to 212° F. The water from the oil is collected in C, D and E, and can be weighed in them. If any oil should pass over into C and D it can be separated and a correction made after weighing by absorbing the water with anhydrous copper sulphate and extracting the oil with dry petroleum spirit.

To avoid frothing of the oil dry pumice or anthracite should be placed in the flask with the oil, and a careful regulation of the reduced pressure may assist. In fact, the addition of pumice is always used as a precaution. The copper flask is used owing to the risk of fracture when removing the pumice.

Price of complete Apparatus, as illustrated .. .. . £4 5 0



1415

### 1415.—STANDARD APPARATUS FOR TESTING THE SLUDGING PROPERTIES OF OIL.

Consisting of flask with ground-in condenser connected to four wash bottles each with ground-in tops.

Price complete .. .. . £1 17 6

For method employed see "Lubricating and Allied Oils," by E. A. Evans, F.C.S., A.M.I.P.T.

(Published by Messrs. Chapman & Hall.)

Our Balances and Weights have achieved World-wide Reputation: *vide* Opinions of the Leading Scientific Press.



## LIQUID OXYGEN AND LIQUID AIR

**Liquid Air** consists mainly of oxygen and nitrogen, and when freshly prepared is a nearly colourless liquid, boiling at  $-190^{\circ}\text{C}$ . As the more volatile nitrogen evaporates, the temperature rises and the liquid assumes a bluish tinge—the colour of liquid oxygen.

In the liquid state, air occupies  $\frac{1}{800}$ th part of its ordinary volume, or, in other words, if liquid air be vaporised and restored to normal temperature it will expand 800 times.

### Vacuum Vessels.

Vacuum vessels are necessary for the storage of liquid air and those gases which only liquefy at low temperatures.

Vacuum vessels are either cylindrical or globular in shape, and consist of one glass vessel enclosed within another. The space between these vessels is thoroughly exhausted and sealed under a high permanent vacuum. Heat radiates across the vacuous space very slowly, consequently liquid stored in a vacuum vessel is admirably insulated from the action of external heat and only vaporises slowly away.

The efficiency of the vacuum vessel is increased by silvering, as radiation from outside is thus partially reflected.

Liquid air evaporates from vacuum vessels at the rate of from 5 per cent. to 15 per cent. per twenty-four hours, according to the size of the vessel, the evaporation from small vessels being more rapid than from large.

(For further information on liquefaction of gases, see "The Experimental Study of Gases," by Prof. Morris W. Travers. Macmillan & Co.)

We are prepared to supply **Liquid Air** at the following rates, in quantities of not less than 1 litre at a time, delivered *ex works*—

**1416.—Liquid Air** . . . . . per litre **15/-** and **10/-** net for every additional litre supplied at the same time.

**1417.—Liquid Oxygen** is supplied at an increase of **5/-** per litre on the above net prices.

**1418.—Vacuum Vessels** may be hired at a rental of **3/-** per week, but customers are strongly recommended to purchase their own vessels.

NOTE.—We supply the liquid in our own glass vacuum vessels, which are lent free of charge for a period not exceeding seven days.

The vacuum vessels are packed in specially constructed wooden boxes, and every effort is made to guard against breakage, but the conditions of sale are that all breakages which occur after the vessels leave the works are debited to the customers. *On no account can we hold ourselves responsible for any evaporation which may take place during transit.*

The railway companies carry liquid air at parcel rates per passenger train at owner's risk.

FOR THE CONVENIENCE OF CUSTOMERS LIVING IN THE COUNTRY WE WILL DELIVER LIQUID AIR OR LIQUID OXYGEN BY SPECIAL MESSENGER TO ANY LONDON, BIRMINGHAM, MANCHESTER, OR NEWCASTLE RAILWAY STATION, TO BE FORWARDED BY ANY SPECIFIED TRAIN, AND IT IS ADVISABLE THAT THE CUSTOMER SHOULD MEET THE TRAIN ON ARRIVAL.

## VACUUM VESSELS

**1419.—Dewar's Cylindrical Demonstration Vacuum Vessels**, for holding liquid air, oxygen, hydrogen, etc.



1419

Internal Dia.	Length.	Cap.	A		B	
			Clear Glass. Each.	Silvered Glass. Each.	Clear Glass. Each.	Silvered Glass. Each.
4 cm.	20 cm.	260 c.c.	7/6	9/6		
4 "	30 "	400 "	9/-	11/6		
4 "	40 "	500 "	10/6	13/6		
5 "	20 "	430 "	9/-	12/6		
5 "	30 "	620 "	12/-	15/-		
5 "	40 "	850 "	15/-	18/-		

NOTE.—For demonstration purposes the Clear Glass Vessels are recommended.

Any of the above vessels may be hired at a rent charge of **3/-** per week (at Customer's risk). Customers are, however, strongly recommended to purchase their own demonstration vessels. For ordinary lecture purposes the vessel of 400 c.c. capacity is recommended.

**1420.—Dewar's Globular Demonstration Vacuum Vessels.**

Capacity. Litres.	A		B	
	Clear Glass.	each	Silvered Glass.	each.
$\frac{1}{4}$ .. ..	6/-	each	8/-	each.
$\frac{1}{2}$ .. ..	8/-	"	10/6	"
$\frac{3}{4}$ .. ..	10/6	"	13/6	"
1 .. ..	12/6	"	15/6	"
2 .. ..	22/6	"	26/-	"
5 .. ..	42/-	"	48/-	"

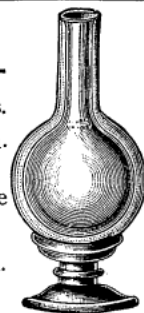


**1421.—Polished Wooden Supports**, for use with Vacuum Vessels.

No. 1420 .. .. **3/-** to **5/-** each.

**1422.—Ditto**, but made for use with the cylindrical pattern, No. 1419.

**3/-** to **5/-** each.



Our stock of pure Chemicals and Acids is very considerable; hence all orders are executed with the utmost despatch. See comprehensive list at end of Catalogue.

## OXYGEN

**1423.—Special Low Temperature Thermometer**, filled with pentane, for liquid air experiments.

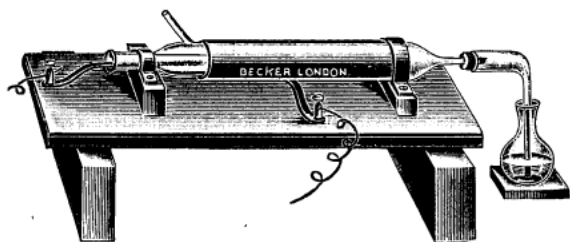
- A. + 30° to -80° C. in single degrees, milk glass scale, each **17/6**  
 B. + 30° to -200° C. in single degrees „ **30/-**

**1424.—Double - Walled Vacuum Vessels**, wine glass shape.

- A. 70 mm. diam., clear glass .. **5/6**  
 B. „ „ „ silvered glass .. **7/6**



## OZONE APPARATUS



**1425.—Siemen's Ozone Tube**, superior finish, mounted on polished teak stand, as figure each **18/6**

**1426.—Siemen's Ozone Tube**, covered with tin-foil .. .. . each **12/-**

### 1427.—COMPRESSED GASES.

WE CAN SUPPLY OXYGEN, COAL GAS AND HYDROGEN AT USUAL TRADE PRICES.

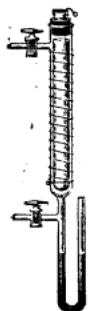
WHEN ORDERING, PLEASE STATE WHETHER IT IS DESIRED TO BUY THE CYLINDER OR WHETHER IT IS REQUIRED ONLY ON LOAN. SIZE OF CYLINDER SHOULD ALSO BE GIVEN, AND WHETHER NIPPLE UNION AND KEY ARE REQUIRED.



**1428.—Apparatus to demonstrate that Contraction takes place when Oxygen is converted into Ozone.**

(See Newth's "Chemical Lecture Experiments," Fig. 28, p. 34, 1899 edition.)

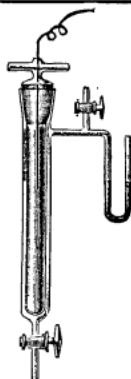
Price, without platinum wire. **15/-**



**1429.—Apparatus to demonstrate the Absorption of Ozone by Turpentine.**

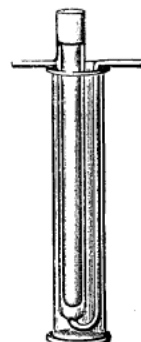
(See Newth's "Chemical Lecture Experiments," Fig. 29A, p. 35, 1899 edition.)

Price, without the platinum wire. **22/6**



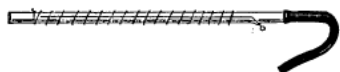
**1430.—Ozone Induction Tube** (all glass), complete with outer vessel for dilute sulphuric acid.

Price .. **9/6**



**1431.—Ozone Tube**, simple form. (See Newth's "Chemical Lecture Experiments," Fig. 25, p. 31, 1899 edition.)

With platinum wire .. .. . Each **15/-**

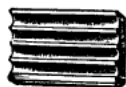


**1432.—Ozone Tube**, with outer jacket containing dilute sulphuric acid. (See Newth's "Chemical Lecture Experiments," Fig. 27, p. 32, 1899 edition.)

Each .. .. . **17/6**



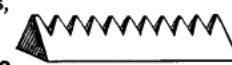
## PIPETTE RESTS AND STANDS



**1433.—Porcelain Fluted Rest**, for pipettes, with four flutes .. each **3/-**

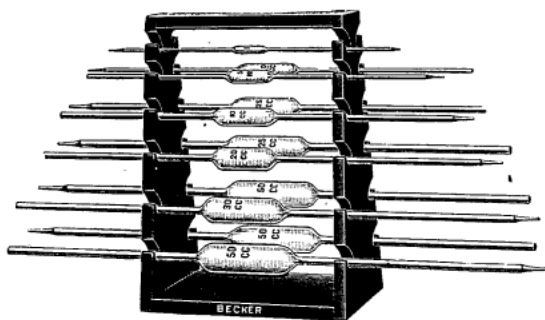
**1434.—Porcelain Fluted Rest**, for pipettes, glass tubes, platinum needles, etc.

Each .. .. . **1/6**



Every requisite for Chemical, Physical, and Bacteriological work supplied, from a test tube to the complete furnishing of the largest laboratory.

## PIPETTE STANDS (Continued)



**1435.—Pipette Stand**, made of hard teak wood, to hold 12 pipettes horizontally, six on each side.  
 Each .. .. . 5/9

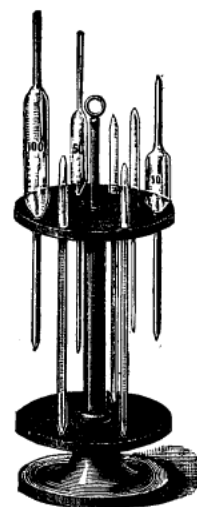
**FOR PIPETTES, SEE  
 PAGES 8, 9, and 11.**

**1436.—Revolving Stand for Pipettes**, polished black wood.

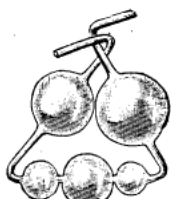
Each .. .. . 10/-

**1437.—Ditto**, superior quality, mahogany with porcelain foot.

Each .. .. . 19/6



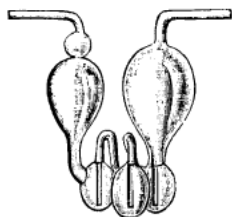
## POTASH BULBS



1438

**1438.—Liebig's Potash Bulbs.**

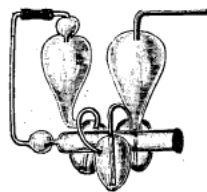
Each .. .. . 1/8



1439

**1439.—Geissler's or Mohr's Potash Bulbs.**

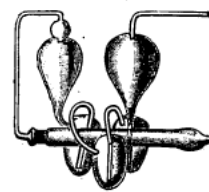
Each .. .. . 3/-



1440

**1440.—Geissler's or Mohr's Potash Bulbs**, with calcium chloride tube attached.

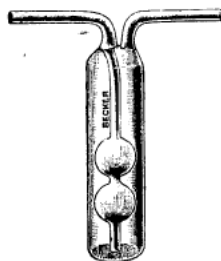
Each .. .. . 4/-



1441

**1441.—Geissler's Potash Bulbs**, with well ground-on calcium chloride tube.

Each .. .. . 4/3



1442

**1442.—Arnold's Potash Bulbs**, as described in "Steel Works Analysis," Fig. 10.

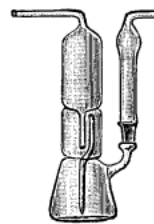
Each .. .. . 2/6



1443

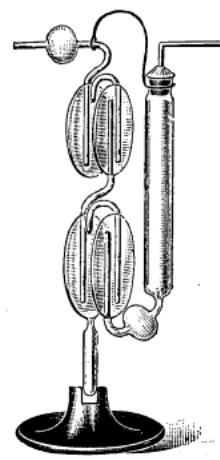
**1443.—Bender's Potash Bulbs**, with ground-on calcium chloride tube, as made by us for Woolwich Arsenal.

Each .. .. . 6/6



1444

**1444.—Potash Bulbs (Gomberg's)**, new and improved form .. .. . each 6/-



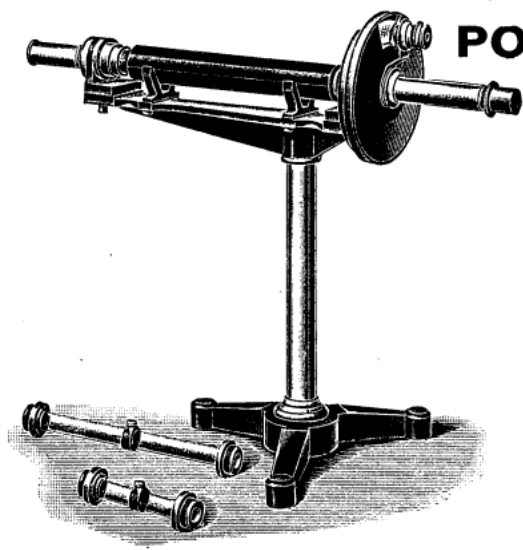
1445

**1445.—Potash Bulbs**, improved form, giving double the absorption power of ordinary potash bulbs; weight when filled about 34 grammes.

Each .. .. . 8/6

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## POLARISCOPES

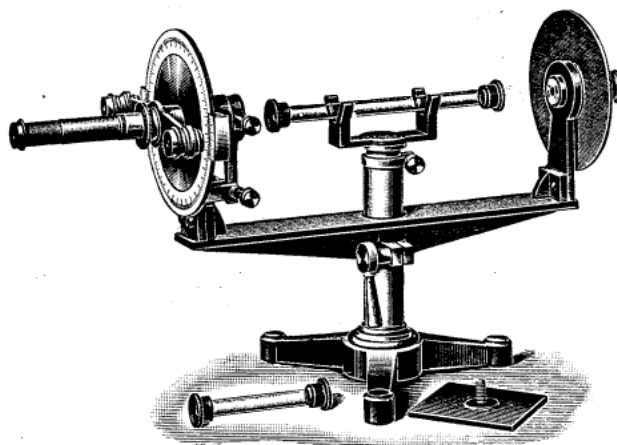


1446

SEE ALSO PHYSICAL APPARATUS CATALOGUE.  
 POLARISCOPES OF ALL OTHER MAKES  
 SUPPLIED AT CURRENT LIST PRICES.

**1446.**—Polariscope, best quality and finish, constructed on Laurent's half-shadow principle. The polariser consists of a rotatable Nicol prism, the position of which can be read to one degree by divided arc and index, and a Laurent half-shadow plate. In front of the polariser is placed a small chamber for the reception of a liquid colour filter, usually bichromate of potassium. The analyser consists of a Nicol prism, carried by a protected divided circle read by vernier to  $\cdot 1$  degree, and an observing telescope. Two solution tubes, 10 and 20 cm. long, are supplied—these are placed in a piece of tube which lies concentrically with the axis of the instrument.  
 Price, complete in case . . . . . **£12 0 0**

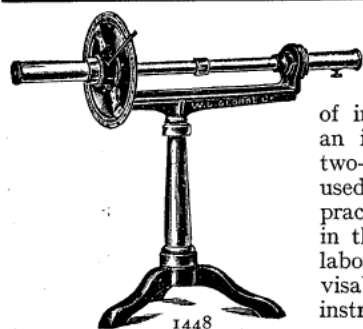
**1447.**—Polariscope, "College" pattern, guaranteed highest quality and finish. All parts are of the most solid construction and will withstand a great deal of wear and tear. This instrument is so constructed that the various methods of measuring the rotation of the plane of polarisation can be carried out in the same instrument. It is thus possible to compare the different methods and to show the student any advantage one method may have over another for any specific purpose. The transforming of the instrument from one type to another is rapidly and easily made. Starting with the plain instrument, the accessories listed below can be added, so as to obtain any type of polariscope or saccharimeter in current use, and this without sacrifice of accuracy. The polariser and analyser are mounted at the ends of a strong iron bar, which slides up or down, and can be clamped to a stout vertical pillar, supported by a heavy iron tripod. A stout draw-tube slides within the vertical pillar, and can be clamped thereto—it carries the supports for solution tubes, troughs, etc. At one end of the iron bar are fixed the Nicol-prism polariser and collimating lens; at the other end are fixed the Nicol-prism analyser and observing telescope. The analyser is mounted in a vertical circle read by two opposite verniers to  $\cdot 01$  degree; provided with clamp and fine adjustment and two small reading microscopes. Two solution tubes are supplied with the instrument.



1447

PRICES:

- A. Price, in case . . . . . **£19 5 0**
- B. Biquartz, fitted to the above . . . . . **£1 4 0**
- C. Laurent half-shadow quartz plate, with index and graduated arc, fitted to the above . . . . . **£2 0 0**
- D. Poynting's quartz plate, fitted to the above **£1 12 0**
- E. Lippich two-prism polariser, fitted to the above **£5 12 0**
- F. Soleil quartz wedges and compensation plate, with scale and vernier and rack-motion adjustment, fitted to the above . . . . . **£8 0 0**
- G. Solution tube 10, 15, 20, 25, 30 cm. each **£0 12 0**
- H. Glass troughs, price according to size.
- J. Apparatus to convert the instrument into a Wild's polaristrobometer . . . . . **£4 16 0**
- K. Light filter, to fit over collimating lens **£0 12 0**



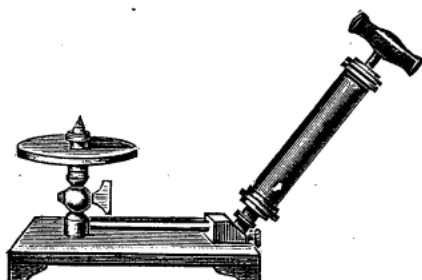
1448

**1448.—School Polariscope.**

This is a simple form of instrument mounted on an iron stand, in which a two-decimetre tube can be used, and by means of which practical work can be done in the elementary chemical laboratory, where it is inadvisable to use an expensive instrument. Price **£6 5 0**

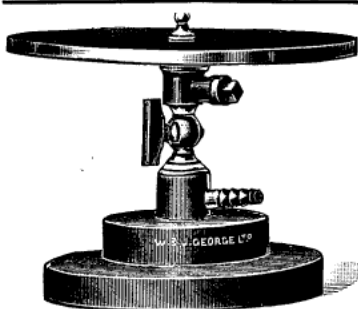
Our stock of pure Chemicals and Acids is very considerable; hence all orders are executed with the utmost despatch. See comprehensive list at end of Catalogue.

## AIR PUMPS



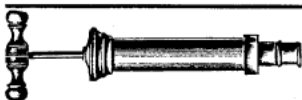
**Air Pump,**  
single barrel, on  
polished ma-  
hogany base,  
with stopcock.

	Each.
1489.—Diameter of plate, 4¼ in. ..	£2 2 6
1490. " " 5 " ..	2 7 6
1491. " " 5¾ " ..	2 12 6
1492. " " 7 " ..	2 17 6



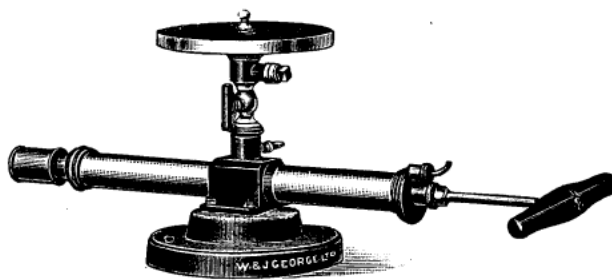
**1493.**  
**Air Pump Plate,**  
on stand, diameter  
of plate 10 in.  
Each .. £2 17 6

**1493A.—Pres-  
sure Tubing** to  
fit ditto.  
1/6 per foot.



**1494. — Exhausting  
Syringe,** length of  
barrel, 5 in. .. 12/-

1494A.—Ditto, length of barrel, 8 in. ..	22/6
1495.—Condensing Syringe, 5 in. barrel	12/-
1496.—Ditto, 8 in barrel ..	22/6



**1497.—Tate's Air Pump,** fitted on heavy iron  
base for screwing to table. Length of barrel, 16 in.,  
diameter of plate, 7 in. .. each £5 10 0

**1498.—Ditto,** but fitted with plate, 8 in. diameter.  
£5 15 0

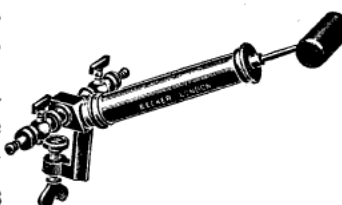
**1499.—Tate's Air Pump,** plate 7 in. diameter,  
as No. 1497, but fitted with strong clamp to fix to table.  
£5 5 0

**1500.—Ditto,** but fitted with 8-in. plate.. £5 10 0

**1501. — Exhaust-  
ing and Con-  
densing Syringe,**

with strong clamps for  
fixing to bench. The  
barrel is 8 in. long, and  
1¼ in. diam.

£1 18 6

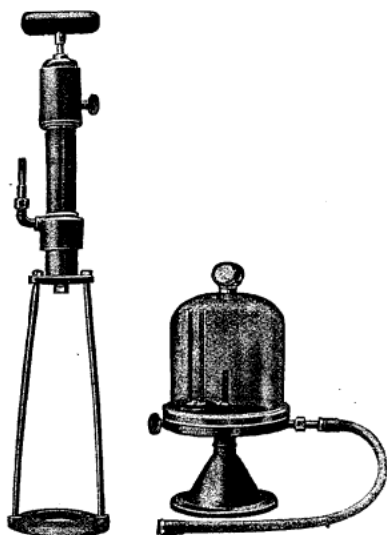


**1502.—Exhausting and  
Condensing Syringe,**  
length of barrel, 6 in. 16/6

**1503.—Ditto,** length of barrel, 8 in. .. 27/-



## GERYK VACUUM PUMPS (Fleuss' Patents)



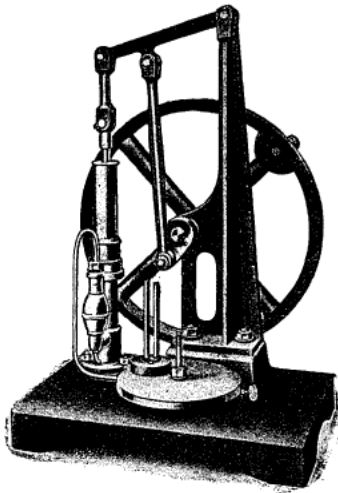
THE "GERYK" PUMP.

**1504.—Small Portable Geryk Pump,** designed to meet the demand among  
Schools, Laboratories, etc., for a cheap efficient vacuum pump. The pump is precisely  
the same as that of the well-known No. 0 "Geryk" Patent Vacuum Pump, and is  
capable of giving the same vacuum, i.e., one fiftieth of a millimetre off perfect.  
Owing to the vertical pull, these pumps are quite easy to work. They are extremely  
light and portable, these advantages being effected by dispensing with the more  
elaborate rotary motion of the original "Geryk."

A. No. 5 size with 1½ in. diameter cylinder by 4 in. stroke, including spare charge of oil ..	£7 0 0
B. No. 6 size with longer stroke to make the pump double size, including spare charge of oil ..	£8 0 0
C. 7 in. brass vacuum plate fitted with screw plug for regulating the admission of air, length of india-rubber tube for connection to pump, and removable brass tube for connection to apparatus other than a bell jar. All mounted on cast iron stand ..	£2 17 0
D. 8 in. ditto ditto ..	£3 2 0
E. 9 in. ditto ditto ..	£4 5 0
F. Oil sealed stopcock fitted to inlet of either of the above-mentioned vacuum plates ..	£1 7 6
G. Glass bell jar with ground flanged rim and knob at top, suitable for 7 in. vacuum plate ..	£0 9 6
H. For 8 in. ditto ..	0 10 6
J. For 9 in. ditto ..	0 12 6
K. "U" mercury gauge mounted on wooden stand ..	0 5 6

Every requisite for Chemical, Physical, and Bacteriological work supplied, from a test tube to the complete furnishing of the largest laboratory.

## GERYK PATENT VACUUM PUMPS



**1505.—Geryk Patent Air Pump**, No. 0 size with 7 in. plate and vacuum gauge, suitable for schools, elementary classes, etc., with new patented improvements. Fast running type.

Diameter of cylinder  $1\frac{1}{2}$  in.  
 Stroke .. .. . 4 in.  
 A. Price, without plate and gauge .. .. . **£7 5 6**  
 B. Price, with plate and gauge .. .. . **£9 12 6**

With this pump, all the ordinary phenomena can be produced, such as freezing water by evaporation, etc. Vacuum obtained within  $\frac{3}{4}$  of 1 millimetre less than perfect vacuum, as registered by the McLeod gauge.

**1506.—Geryk Patent Air Pump**, No. 0 size as above, but *motor driven*. Complete with Electric Motor (continuous current)

reduced to 250 volts) and suitable Reduction Gear, mounted on same baseplate, including Single Acting Starting Switch. Also fitted with 7 in. Plate and Vacuum Gauge.

(When ordering please state voltage.)

Price .. .. . **£28 0 0**

**1507.—Geryk Patent Air Pump**, No. 1 size as illustrated, with new patented improvements. Fast running type.

Diameter of cylinder 2 in.  
 Stroke .. .. . 4 in.  
 Price .. .. . **£9 12 6**

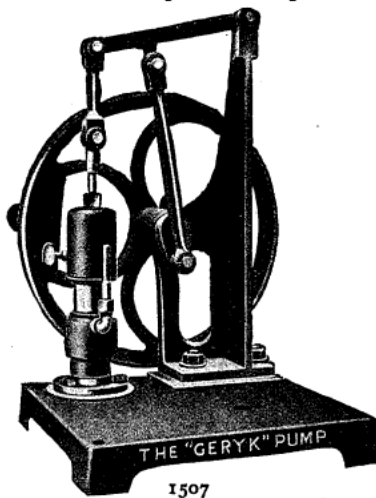
This pump is specially designed for hard work in laboratories. It is of larger diameter than the No. 0, and consequently exhausts more rapidly. It is so frictionless that a boy can readily work it; it is always ready for use, even if put away for any length of time.

**1508.—Ditto**, but motor driven as No. 1506 .. .. . **£29 15 0**

**1509.—Geryk Air Pump**, as above, but larger. No. 2 size.

Diameter of cylinder 2 in.  
 Stroke .. .. . 10 in.  
 Price .. .. . **£14 0 0**

**1510.—Ditto**, but motor driven as No. 1506 .. .. . **£36 15 0**



1507

### ACCESSORIES FOR GERYK PUMPS.

**1511.—Air Pump Plate**, on stand, diameter of plate 10 in.

Each .. .. . **£2 17 6**

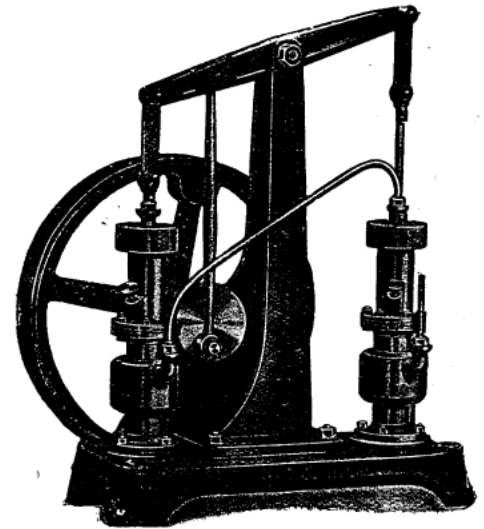
**1512.—Pressure Tubing**, to fit ditto .. .. . per foot  $\frac{1}{6}$

**1513.—Special Oil**, eminently suitable for high vacua for use with Geryk pumps .. per pint  $\frac{2}{6}$

**1518.—Geryk Patent Air Pump, Duplex No. 1**, extra powerful, for the rapid production of very high vacua, with new patented improvements. Fast running type.

This pump has been used and tested by well-known scientists who have found it invaluable. The vacuum obtained is comparable with that given by a Sprengel Pump and the exhaustion of air is, of course, infinitely more rapid.

Diameter of cylinders 2 in.  
 Stroke .. .. . 5 in.  
 Price .. .. . **£27 2 6**



**1514.—Geryk Patent Air Pump, Duplex A** .. .. . **£35 0 0**

This pump has 2 in. cylinders by 5 in. stroke.

Special vacuum stopcock, fitted with screw plug for regulating admission of air  $\frac{26}{6}$   
 This pump can be worked by hand if required.

**1515.—Geryk Patent Air Pump, Duplex B**, with  $2\frac{1}{2}$  in. cylinders by

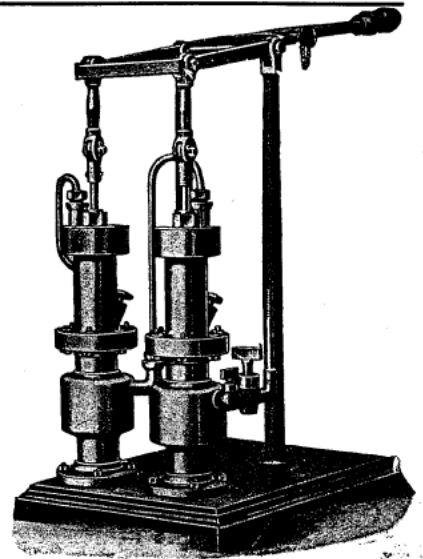
5 in. stroke .. .. . **£43 15 0**  
 Stopcock .. .. . extra **£1 15 0**

**1516.—Geryk Patent Air Pump, Duplex C**, with 3 in. cylinders by

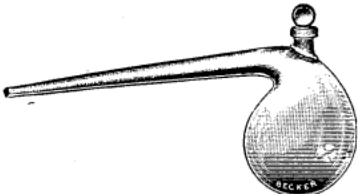
7 in. stroke .. .. . **£70 0 0**  
 Stopcock .. .. . extra **£2 12 6**

**1517.—Geryk Patent Air Pump, Duplex D**, with  $3\frac{1}{2}$  in. cylinders by

7 in. stroke .. .. . **£87 10 0**  
 Stopcock .. .. . extra **£3 1 3**



## RETORTS



**1519.—Retorts, Stoppered.**

Capacity	150	250	400 c.c.
Each ..	1/5	1/10	2/4
Dozen ..	15/2	19/4	25/-

1519

Capacity	500	750	1000	1500	2000	3000 c.c.
Each ..	2/5	2/9	3/-	3/8	3/11	5/1
Dozen ..	25/6	30/-	32/-	40/-	42/3	—



1520

**1520.—Retorts, plain, unstoppered.**

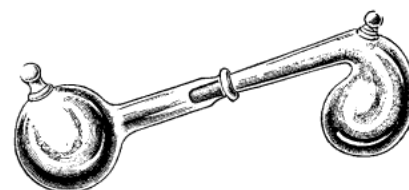
Capacity	50	125	250	500	750	1000 c.c.
Each	1/-	1/3	1/6	2/-	2/6	2/6
Dozen	11/6	13/6	16/9	21/6	26/6	27/-



1521

**1521.—Clark's Retort and Receiver.**

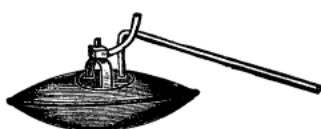
Each ..	1/2
Per dozen ..	12/-



1523

**1523.—Stoppered Retort and Receiver, the receiver ground into the stem of the retort.**

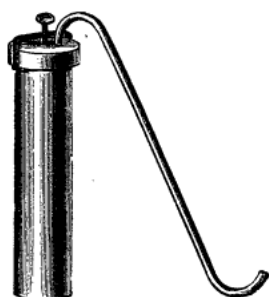
Capacity	125	250	500 c.c.
Each	5/9	6/6	8/6



1522

**1522.—Sheet Iron Retort with delivery tube.**

Each ..	10/-
---------	------

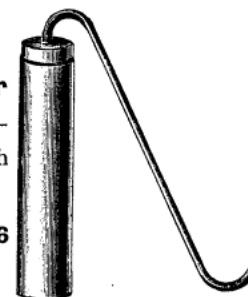


**1524.—Retort for Oxygen, consisting of copper tube 10 in. × 2 in., with brass cap and leading tube to clamp on top.**

Each ..	16/6
---------	------

**1525.—Retort for Oxygen, consisting of copper tube 10 in. × 2 in., with cork and delivery tube.**

Each ..	7/6
---------	-----



**1526.—New Improved Oxygen Retort, made of strong iron. As will be seen from the illustration this retort has an extra wide mouth so that the inside is "get-at-able." The retort can be easily taken to pieces, and is provided with safety valve and asbestos washer.**

Price complete, with long leading tube ..	15/6
---	------



Our stock of pure Chemicals and Acids is very considerable; hence all orders are executed with the utmost despatch. See comprehensive list at end of Catalogue.



## RECEIVERS



**1527.—Receivers, tubulated.**

Capacity ..	2	4	8 oz.
Each..	1/2	1/4	1/7
Capacity ..	16	32	48 oz.
Each..	2/-	2/6	3/-

**1528.—Receivers, tubulated and stoppered.**



Capacity ..	2	4	8 oz.
Each..	1/6	1/10	2/4
Capacity ..	16	32	48 oz.
Each..	3/-	3/9	5/-



**1529.—Receivers, three-necked.**

Capacity ..	2	4	8 oz.
Each..	1/9	2/3	3/-
Capacity ..	16	32	48 oz.
Each..	4/-	5/6	7/6



**1530.—Receivers, four-necked.**

Capacity ..	8	16	20	32	48 oz.
Each ..	4/3	5/6	6/6	7/-	8/6

**1531.—Receivers, plain.**

Capacity ..	4	8	16 oz.
Each ..	1/3	1/6	2/-
Capacity ..	—	32	48 oz.
Each ..	—	2/3	2/9



**1532.—Receivers, two-necks.**

Capacity ..	4	8	16 oz.
Each ..	1/9	2/-	2/6
Capacity ..	—	32	48 oz.
Each ..	—	3/-	4/-



**1533.—Receivers, three-necks.**

Capacity ..	4	8	16 oz.
Each ..	2/-	2/3	3/3
Capacity ..	—	32	48 oz.
Each ..	—	3/9	4/9

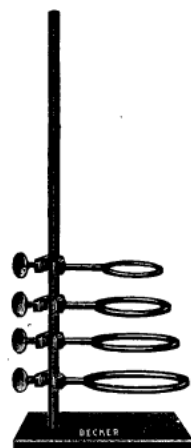


**1534.—Receiver, with bent tube thoroughly ground into neck.**

Capacity	1/2	1	2	3	4 litres.
Each ..	3/9	6/-	8/6	10/-	12/6



## RETORT STANDS



**1535.—Iron Retort Stand,** total height about 15 in., base 4 1/2 in. x 3 in.; fitted with three malleable iron rings, the largest being 3 1/4 in. in diameter. Price, complete 4/6

**1536.—Iron Retort Stand,** total height about 17 1/2 in., base 6 1/4 in. x 4 1/2 in.; fitted with three malleable iron rings, the largest being 3 1/4 in. in diameter. Price, complete 5/3

**1537.—Iron Retort Stand,** total height about 22 in., base 8 in. x 5 in.; fitted with three malleable iron rings, the largest being 4 1/4 in. in diameter. Price, complete 6/6

**1538.—Iron Retort Stand,** total height about 24 in., base 9 in. x 5 1/2 in.; fitted with four malleable iron rings, the largest being 5 in. in diameter. Price, complete 8/-

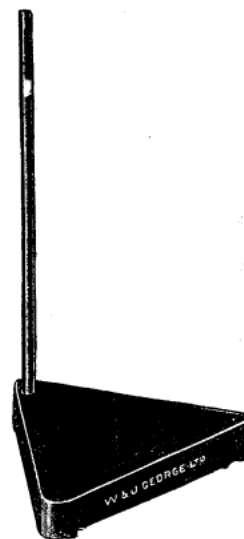
**1539.—Iron Retort Stand,** total height about 30 in., base 12 in. x 6 in.; fitted with four malleable iron rings, the largest being 6 in. in diameter. Price, complete 9/6

**1540.—Laboratory Stands,** superior quality

and finish, for lecture table work. The base, which is extra heavy and has a perfectly even surface, carries a polished steel rod, which is screwed into it. We stock the following sizes:—

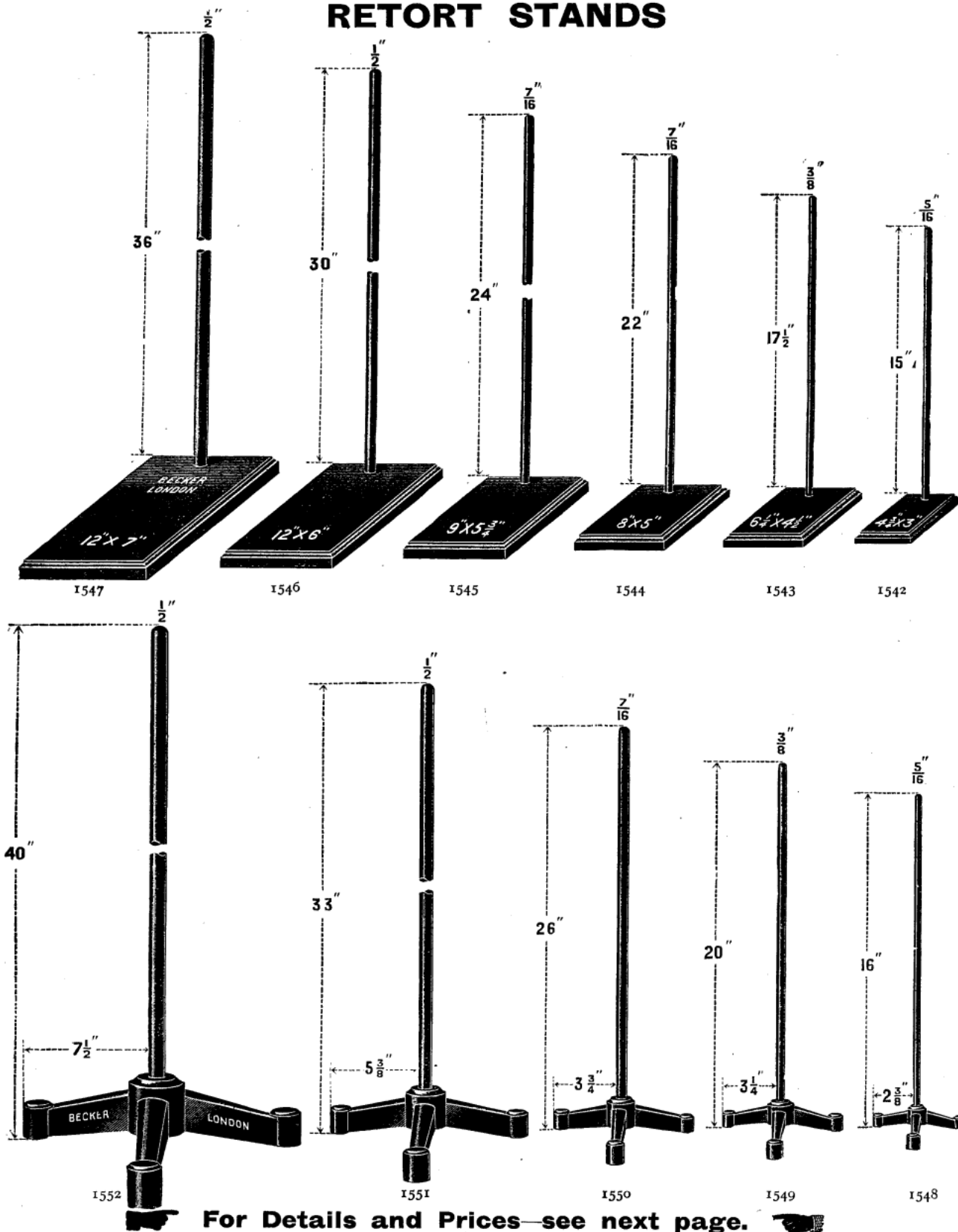
Diameter of Base ..	18	23	30 cm.
Height of Rod ..	35	75	100 "
Diameter of Rod ..	12	16	25 mm.
Price, each ..	5/-	7/9	11/6

**1541.—Special large size boss-heads and clamps for above stands ..** .. .. . 8/6



Every requisite for Chemical, Physical, and Bacteriological work supplied, from a test tube to the complete furnishing of the largest laboratory.

## RETORT STANDS



## RETORT STANDS

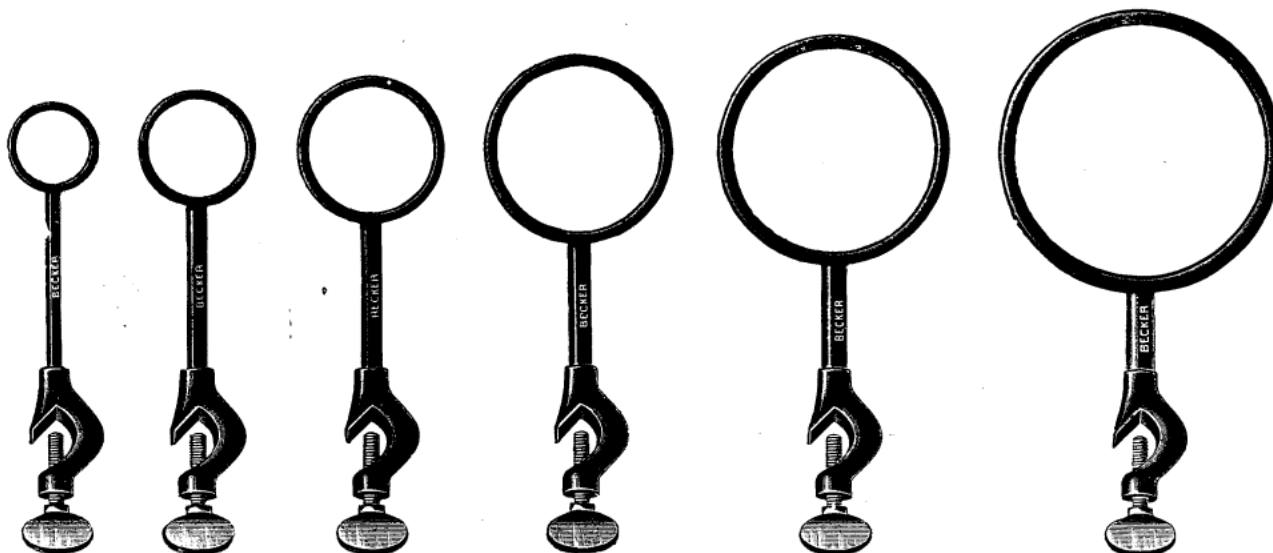
**Iron Retort Stands, without Rings,** with upright rods screwed into bases. For illustrations, see page 246.

Catalogue Reference .. .. .	1542	1543	1544	1545	1546	1547
Height of Rod .. .. .	15	17½	22	24	30	36 in.
Diameter of Rod .. .. .	$\frac{5}{16}$	$\frac{3}{8}$	$\frac{7}{16}$	$\frac{7}{16}$	$\frac{1}{2}$	$\frac{1}{2}$ "
Length of Base .. .. .	4¼	6¼	8	9	12	12 "
Width of Base .. .. .	3	4½	5	5¾	6	7 "
Price, each .. .. .	1/6	2/3	3/-	3/6	4/9	6/-
„ per dozen .. .. .	17/-	26/-	35/-	41/-	56/-	71/-

**Metal Stands, with Heavy Tripod Feet,** having smooth rods screwed into them, as illustrated on page 246.

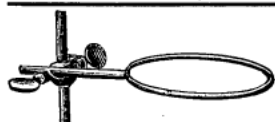
Catalogue Reference .. .. .	1548	1549	1550	1551	1552
Total Height .. .. .	16	20	26	33	40 in.
Diameter of Rod .. .. .	$\frac{5}{16}$	$\frac{3}{8}$	$\frac{7}{16}$	$\frac{1}{2}$	$\frac{1}{2}$ "
Spread of Foot .. .. .	2¾	3¼	3¾	5¾	7½ "
Price, each .. .. .	1/9	2/3	3/3	4/6	6/9
„ per dozen .. .. .	20/-	26/-	38/-	53/-	80/-

## RETORT RINGS



**Malleable Iron Rings,** with bosses and screws for clamping to retort stands as figured. Bosses will fit rods up to ½ inch in diameter.

Catalogue Reference .. .. .	1553	1554	1555	1556	1557	1558	1559
Diameter of Ring .. .. .	2	2½	3¼	3¾	4¼	5	6 in.
Price, each .. .. .	11d.	1/-	1/1	1/2	1/3	1/4	1/5
„ per dozen .. .. .	10/-	11/-	12/-	13/-	14/-	15/-	16/-



**1560.—Malleable Iron Rings,** plain, to fit into open bosses.

Diameter ..	2	2½	3	4	4¼	5	6 in.
Each ..	7d.	8d.	9d.	10d.	11d.	1/-	1/3



**1561.—Table Support,** iron plate with boss-head and clamping screw for fitting on to retort stands to support Bunsen burners, etc.

Each .. .. . 1/9

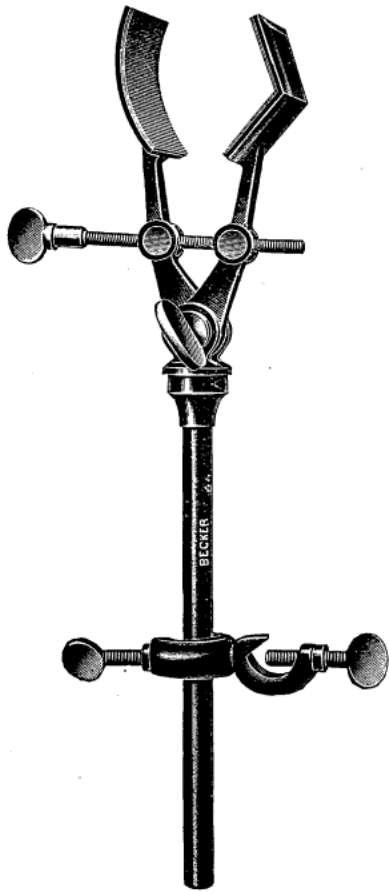
**1562.—Double Boss Heads,** heavy iron with thumbscrews.

Each 1/2; per dozen 13/-



Our stock of pure Chemicals and Acids is very considerable; hence all orders are executed with the utmost despatch. See comprehensive list at end of Catalogue.

## RETORT STAND CLAMPS



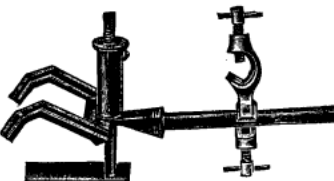
1563/5.

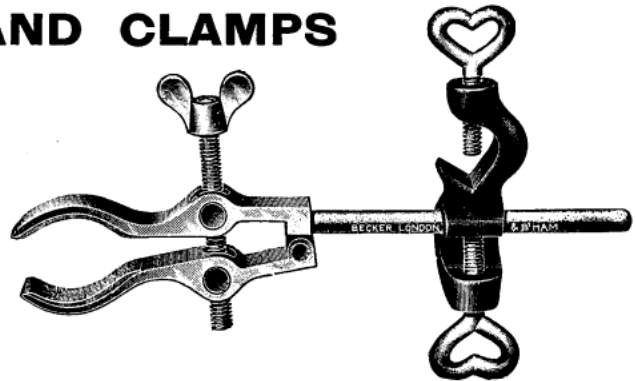
**The "Moveable Joint" Clamp.**—As will be seen by the illustration the jaws of this clamp can be moved either to the right or to the left, thus enabling the operator to make slight adjustments to his apparatus without having to remove the boss-head from its original position.

The clamp is strongly made of gun-metal and is fitted with an iron rod.

Prices include double boss-head.

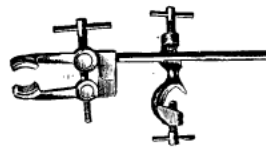
- |   |       |
|---|-------|
|   | Each. |
| <b>1563.</b> —For tubes up to 1½ in. in diameter  | 5/-   |
| <b>1564.</b> —For tubes up to 3 in. in diameter.. | 6/6   |
| <b>1565.</b> —For tubes up to 4 in. in diameter.. | 8/6   |

- 1566.**—**Special Condenser Clamp**, oxidized brass, for condensers of all sizes, and to fit any size retort stand rod. Each .. 6/6
- 

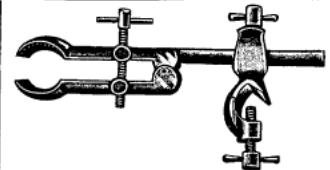


**1567.**—**Nivoc Laboratory Clamp.** Brass with iron boss-head. We recommend this particular pattern as an engineering product and an example of high-class British manufacture. It has been specially designed and manufactured by us to obviate those little annoyances which are familiar to the user. The elliptical opening of the jaws ensure a *perfect grip*, and the arrangement of the opening screw is such that it is impossible for the threads to bind or stick.

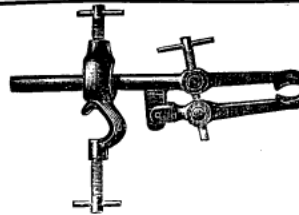
To take tubes up to 2½ in. diameter. Price, including double boss-head .. .. . each 4/6



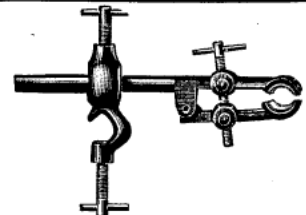
**1568.**—The "**Students**" Brass Clamp. Small size, to take tubes up to 1½ in. diam. Price, including double boss-head .. .. each 3/9



**1569.**—The "**Students**" Brass Clamp. Large size, to take tubes up to 3½ in. diam. Price, including double boss-head each 5/6

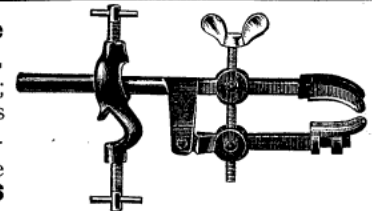


**1570.**—The "**Science School**" Clamp. Strongly made of iron; small size, to take tubes up to 1½ in. diam., etc. Price, including double boss-head..each 3/9



**1571.**—The "**Science School**" Clamp. Strongly made of iron; medium size, to take tubes up to 2¼ in. diam. Price, including double boss-head each 4/6

**1572.**—The "**Science School**" Clamp. Strongly made of iron; large size, to take tubes up to 3¼ in. diameter. Price, including double boss-head .. .. 5/6



Every requisite for Chemical, Physical, and Bacteriological work supplied, from a test tube to the complete furnishing of the largest laboratory.

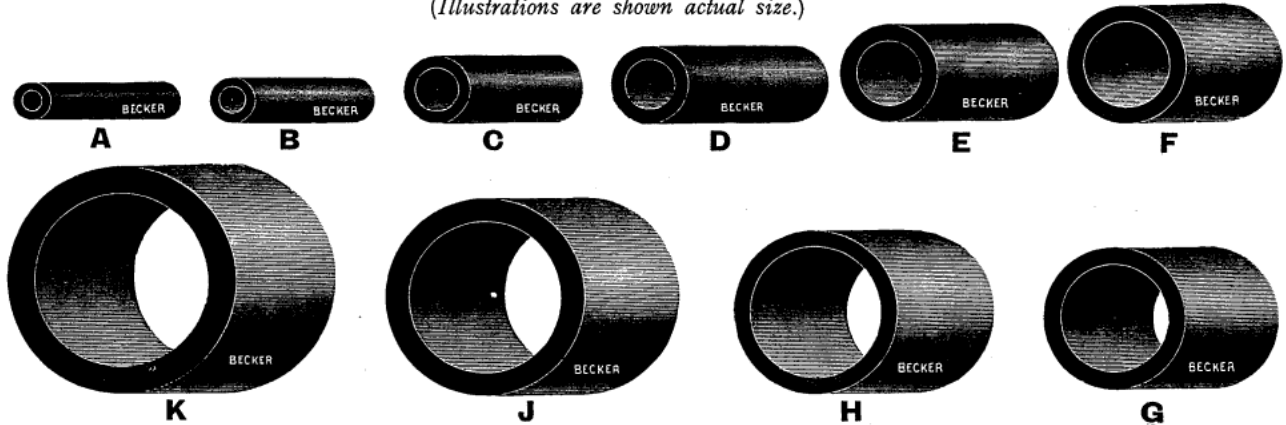
## RUBBER TUBING

Guaranteed Finest London Make.

(Prices are subject to fluctuations of the market.)

If desired we can supply rubber tubing of cheaper quality, but we would point out that the tubing listed below is the best quality and is the only kind we can conscientiously recommend for Chemical work.

(Illustrations are shown actual size.)



**1573.—Black Cut Sheet Rubber Tubing**, guaranteed made of best selected rubber, for chemical work.

Illustrations are shown actual size. Size D is the most suitable for Bunsen burners.

Size	A	B	C	D	E	F	G	H	J	K
Inside diameter	$\frac{1}{8}$	$\frac{3}{16}$	$\frac{1}{4}$	$\frac{5}{16}$	$\frac{3}{8}$	$\frac{1}{2}$	$\frac{5}{8}$	$\frac{3}{4}$	$\frac{7}{8}$	1 inch.
Price, per foot	2d.	3½d.	5d.	6½d.	9d.	1/2	1/9	2/10	4/-	4/6

**1574.—Red Rubber Tubing**, guaranteed made of best selected rubber, for chemical work. Illustrations are shown actual size.

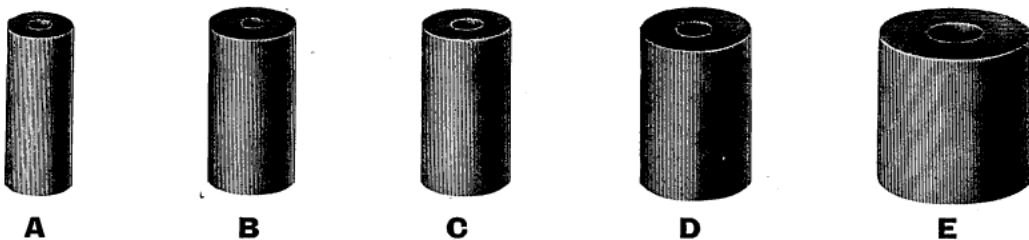
Size	A	B	C	D	E	F	G	H	J	K
Inside diameter	$\frac{1}{8}$	$\frac{3}{16}$	$\frac{1}{4}$	$\frac{5}{16}$	$\frac{3}{8}$	$\frac{1}{2}$	$\frac{5}{8}$	$\frac{3}{4}$	$\frac{7}{8}$	1 inch.
Price, per foot	2d.	3½d.	5d.	8d.	9d.	1/5	1/9	2/10	4/-	4/6

**1575.—Bunsen Burner Tubing**, special quality and thicker walled.

Price, per foot	7d.
In coils of 60 ft., per foot	6d.

We have been supplying this quality for some time to many Educational Institutions and now list it by special request.

For Flexible Metallic Tubing with rubber ends see Index.



**1576.—Extra Thick-walled Rubber Tubing for Pressure**, best quality.

Size	A	B	C	D	E
Outside diameter	$\frac{3}{8}$	$\frac{1}{2}$	$\frac{1}{2}$	$\frac{5}{8}$	$\frac{7}{8}$ in.
Inside diameter	$\frac{1}{8}$	$\frac{1}{8}$	$\frac{3}{16}$	$\frac{3}{16}$	$\frac{5}{16}$ "
Price, per foot	8d.	1/-	1/2	1/6	2/6

**1577.—Canvas Lined Rubber Pressure Tubing**. Guaranteed best quality. This tubing, although not so flexible as ordinary pressure tubing, will withstand a much higher pressure.

Outside diameter	$\frac{1}{2}$	$\frac{1}{2}$	$\frac{3}{4}$ in.
Inside diameter	$\frac{3}{16}$	$\frac{1}{4}$	$\frac{5}{16}$ "
Price, per foot	1/6	1/2	2/9

Our Balances and Weights have achieved World-wide Reputation : vide Opinions of the Leading Scientific Press.

FOR PRICES  
SEE PAGE 253

## SQUAT PATTERN RUBBER CORKS

FOR PRICES  
SEE PAGE 253

Guaranteed Finest London Make.

Illustrations are shown full size. For prices, see page 253, No. 1578.



## TALL PATTERN RUBBER CORKS.

Guaranteed Finest London Make.

Illustrations are shown full size. For prices, see page 253, No. 1579.



Our stock of pure Chemicals and Acids is very considerable ; hence all orders are executed with the utmost despatch. See comprehensive list at end of Catalogue.

FOR PRICES  
SEE PAGE 253

## SQUAT PATTERN RUBBER BUNGS

FOR PRICES  
SEE PAGE 253

Illustrations are shown full size. For prices, see page 253, No. 1580.



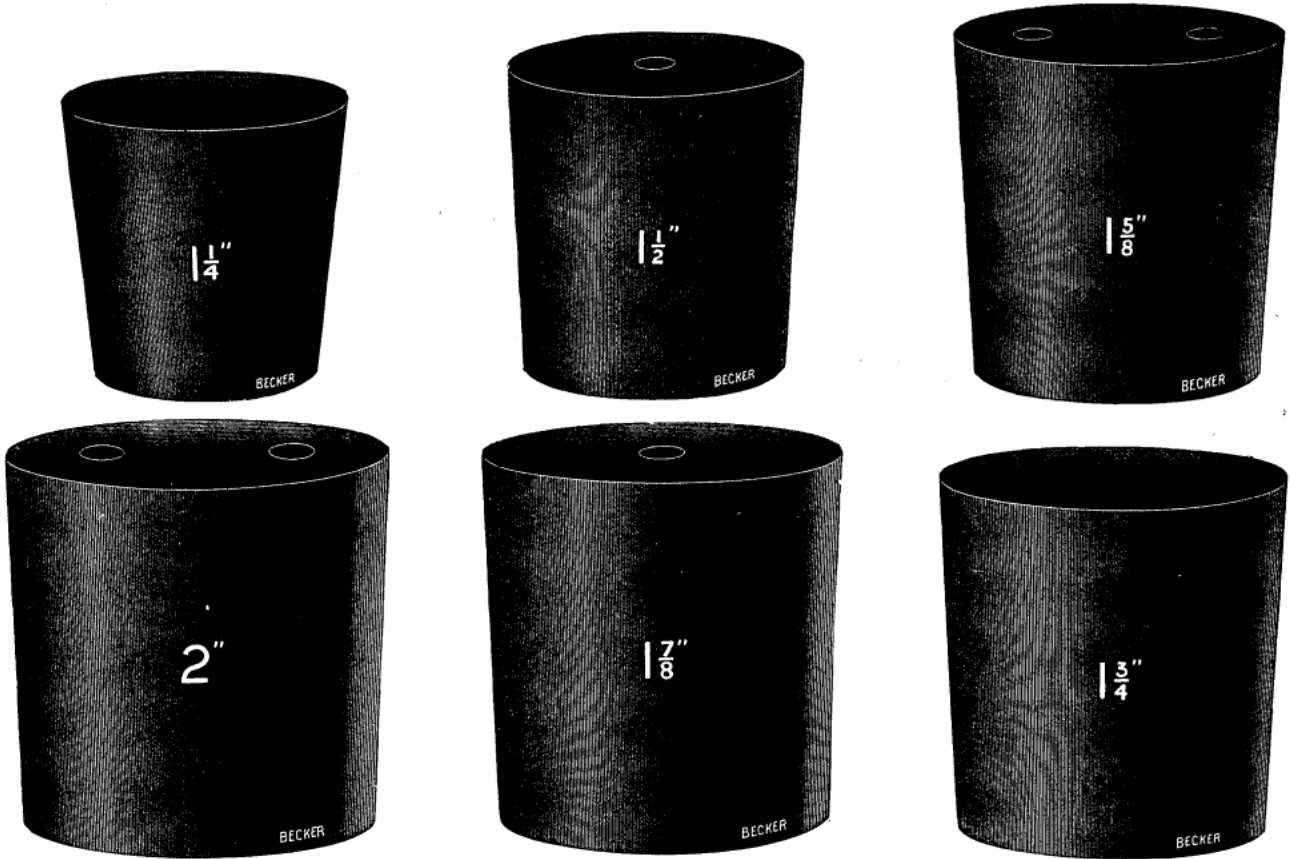


FOR PRICES  
SEE PAGE 253

## TALL PATTERN RUBBER BUNGS

FOR PRICES  
SEE PAGE 253

Illustrations are shown full size. For prices, see page 253, No. 1581.



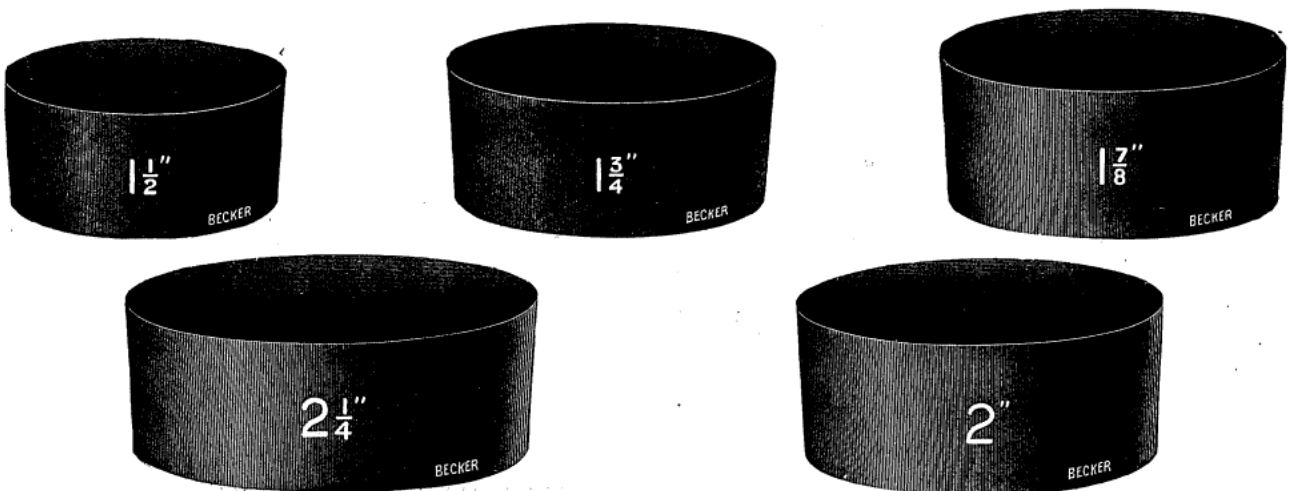
FOR PRICES  
SEE PAGE 253

## SHALLOW RUBBER BUNGS

FOR PRICES  
SEE PAGE 253

For Steam Jackets, etc.

Illustrations are shown full size. For prices, see page 253, No. 1582.



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 Leading Scientific Press.

## RUBBER CORKS

For full-size illustrations, see pages 249, 250 and 251.

**1578.—Squat Pattern Rubber Corks**, best quality, solid, one or two holes. Finest London make. (For full-size illustrations, see page 250.)

Diameter of narrow end	..	..	..	$\frac{7}{16}$	$\frac{1}{2}$	$\frac{9}{16}$	$\frac{5}{8}$	$\frac{11}{16}$	$\frac{3}{4}$	$\frac{13}{16}$	$\frac{7}{8}$	$\frac{15}{16}$	1 in.
Each	..	..	..	3d.	3d.	3d.	3d.	4d.	4d.	5d.	5d.	7d.	7d.
Per dozen	..	..	..	2/-	2/-	2/6	2/6	3/6	3/6	4/6	4/6	6/-	6/-
Diameter of narrow end	..	..	..	..	..	..	$1\frac{1}{8}$	$1\frac{1}{4}$	$1\frac{3}{8}$	$1\frac{1}{2}$	$1\frac{5}{8}$	$1\frac{3}{4}$	$1\frac{7}{8}$ in.
Each	..	..	..	..	..	..	8d.	11d.	1/1	1/4	1/6	1/6	1/6
Per dozen	..	..	..	..	..	..	7/-	10/-	12/-	15/-	15/6	15/6	15/6

**1579.—Tall Pattern Rubber Corks**, best quality, solid, one or two holes. Finest London make. (For full-size illustrations, see page 250.)

Diameter of narrow end	..	..	..	$\frac{3}{16}$	$\frac{1}{4}$	$\frac{5}{16}$	$\frac{3}{8}$	$\frac{7}{16}$	$\frac{1}{2}$	$\frac{9}{16}$	$\frac{5}{8}$	$\frac{11}{16}$ in.
Each	..	..	..	1½d.	1½d.	2d.	2d.	2½d.	3d.	4d.	5d.	6d.
Per dozen	..	..	..	1/-	1/3	1/6	1/9	2/-	2/9	3/6	4/3	5/3
Diameter of narrow end	..	..	..	..	..	..	$\frac{3}{4}$	$\frac{13}{16}$	$\frac{7}{8}$	1	$1\frac{1}{8}$ in.	
Each	..	..	..	..	..	..	7d.	9d.	10d.	11d.	1/2	1/2
Per dozen	..	..	..	..	..	..	6/6	7/6	9/-	10/-	13/6	13/6

**1580.—Squat Pattern Rubber Bungs**, best quality, solid, one or two holes. Finest London make. (For full-size illustrations, see page 251.)

Diameter of narrow end	..	..	..	$1\frac{3}{4}$	$1\frac{7}{8}$	2	$2\frac{1}{4}$	$2\frac{1}{2}$	$2\frac{5}{8}$	$2\frac{3}{4}$	$2\frac{7}{8}$	3 in.
Each	..	..	..	1/9	2/6	2/8	3/4	4/-	6/-	6/6	7/-	8/-
Per dozen	..	..	..	20/-	29/-	30/-	38/-	46/-	71/-	77/-	83/-	93/-

**1581.—Tall Pattern Rubber Bungs**, best quality, solid, one or two holes. Finest London make. (For full-size illustrations, see page 252.)

Diameter of narrow end	..	..	..	..	..	..	$1\frac{1}{4}$	$1\frac{1}{2}$	$1\frac{5}{8}$	$1\frac{3}{4}$	$1\frac{7}{8}$	2 in.
Each	..	..	..	..	..	..	1/11	2/5	3/5	4/-	4/3	6/8
Per dozen	..	..	..	..	..	..	22/-	28/-	40/-	46/-	48/-	77/-

**1582.—Shallow Rubber Bungs**, for steam jackets, etc., best quality, solid. Finest London make. (For full-size illustrations, see page 252.)

Diameter of narrow end	..	..	..	..	..	..	$1\frac{1}{2}$	$1\frac{3}{4}$	$1\frac{7}{8}$	2	$2\frac{1}{4}$ in.
Each	..	..	..	..	..	..	2/3	2/6	3/-	3/6	4/6
Per dozen	..	..	..	..	..	..	26/-	29/-	35/-	40/-	53/-

**The prices of all rubber goods are subject to the fluctuations of the rubber market**

FOR PRICES OF ORDINARY BARK CORKS SEE PAGE 147

Our stock of pure Chemicals and Acids is very considerable; hence all orders are executed with the utmost despatch. See comprehensive list at end of Catalogue.

## INDIA-RUBBER SUNDRIES



**1583.—India-rubber Caps with Tubulures,** for bottles and glass jars, with 1, 2, or 3 necks. When ordering please state which.

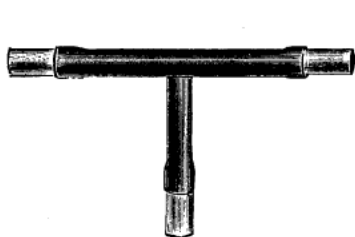
Diameter of Cap	..	$\frac{3}{4}$	1	$1\frac{1}{4}$	$1\frac{3}{8}$	in.
Price	..	9d.	9d.	9d.	10d.	each.
Diameter of Cap	..	$1\frac{1}{2}$	$1\frac{3}{4}$	2		in.
Price	..	1/-	1/3	1/6		each.

**1584.—Rubber Caps** for covering flasks, test tubes, etc.

	Diameter	..	$\frac{1}{2}$	$\frac{5}{8}$	$\frac{3}{4}$	$\frac{7}{8}$	in.
	Per dozen	..	4d.	4d.	4d.	4d.	
	Diameter	..	1	$1\frac{1}{4}$	$1\frac{1}{2}$	$1\frac{3}{4}$	2 in.
	Per dozen	..	4d.	4d.	4d.	5d.	5d.

**1585.—Rubber End-Pieces** for stirring rods.

					Per doz.
A.	For small-sized rods	..	..	1/6	
B.	For medium-sized rods	..	..	1/9	
C.	For large-sized rods	..	..	1/10	



**1586.—India-rubber T Tubes** for connecting glass tubes, etc.

	Each.
Small	.. 8d.
Medium	.. 10d.
Large	.. 1/3

**1587.—Rubber Circles for Foot Bellows,** best quality, 10 in. diameter.

Each	..	2/6
------	----	-----

**1588.—Ditto, ditto, 12 in. diameter** each 3/-

**1589.—String Net,** with wire for foot bellows .. 2/- and 2/6

**1590.—India-rubber Teats,** for use with pipettes, drop bottles, etc.

			Small.
A.	Per dozen	..	1/9
	Per gross.	..	18/6
			Medium.
B.	Per dozen	..	1/10
	Per gross.	..	19/6
			Large.
C.	Per dozen	..	2/-
	Per gross.	..	21/-



**1591.—India-rubber Blowing Balls,** black, with silk nets.

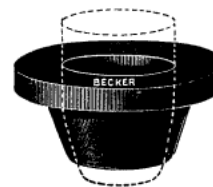
A.	Small	3/3	B.	Medium	3/9	C.	Large	5/-
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**1592.—India-rubber Blowing Balls,** single form, with valve .. each 2/-



**1593.—India-rubber Cones,** to take Gooch Crucibles, as figured.

A.	For Gooch Crucible, Size 1	7d.
B.	" " " 2	8d.
C.	" " " 3	9d.
D.	" " " 4	10d.



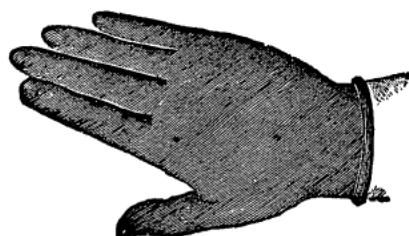
**1594.—Rubber Gloves,** thick sheet.

Per pair	..	9/6
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**1595.—Rubber Gloves,** thin sheet, best.

Per pair	..	10/-
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Every requisite for Chemical, Physical, and Bacteriological work supplied, from a test tube to the complete furnishing of the largest laboratory.

## SAND BATHS



### 1596.—Tinned Iron Sand Baths, shallow pattern.

Diameter	..	..	13	15	20	25 cm.
Each	..	..	2d.	2d.	3d.	6d.
Per dozen	..	..	1/-	1/9	2/3	5/6



### 1597.—Sheet Iron Sand Baths, strongly made, shallow pattern.

Diameter	..	..	13	15	20	25 cm.
Each	..	..	7d.	8d.	10d.	1/2
Per dozen	..	..	6/-	6/9	9/-	12/-

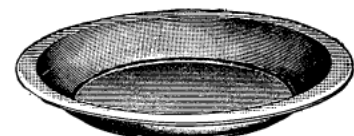


### 1598.—Sheet Iron Sand Baths, strongly made, deep pattern.

Diameter	..	..	13	15	20	25 cm.
Each	..	..	1/3	1/6	1/9	2/2
Per dozen	..	..	13/6	15/6	18/9	23/3

### 1599.—Copper Sand Baths, shallow, as Fig. 1597.

Diameter	..	..	8	10	13	15 cm.
Each	..	..	1/-	1/3	1/6	2/4



### 1600.—Asbestos Baths, shallow.

Diameter	..	10	12	15	18	20	25 cm.
Each	..	10d.	1/2	1/8	2/-	2/6	2/9
Per dozen	..	9/-	13/-	19/-	23/-	29/-	32/-

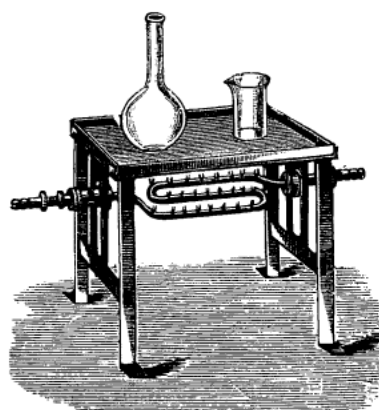
### 1601.—Iron Sand Bath, with Legs,

as supplied to the Birmingham Municipal Technical School.



Dimensions of Bath, 13 × 7½ × 7 in. high.

Each .. .. 13/6



### 1602.—Portable Sand Baths, on wrought-iron stand, with arrangement for raising or lowering the gas burner.

Inside dimensions of Bath.

A.	25 × 15 cm.	..	..	..	..	..	27/-
B.	40 × 20 "	..	..	..	..	..	33/-
C.	50 × 25 "	..	..	..	..	..	39/6
D.	60 × 45 "	..	..	..	..	..	52/6

### 1603.—Babo's Safety Baths, for flasks varying in size from 1 to 5 litres. These baths are made of sheet iron and furnished with asbestos strips to prevent the flask from coming into contact with the hot metal part.

No. ..	..	..	..	1	2	3	4	5	6
Diameter	..	..	..	11	13	15	18	22	27 cm.
Each	..	..	..	1/9	2/-	2/6	2/10	3/3	4/3



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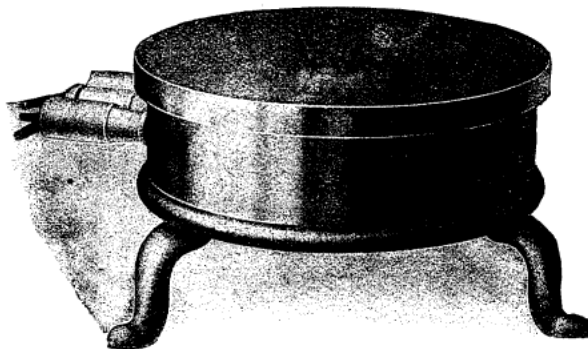
## ELECTRIC HOT PLATES

The Laboratory Hot Plates described below are obtainable in two types, each of which possesses special virtues for particular purposes.

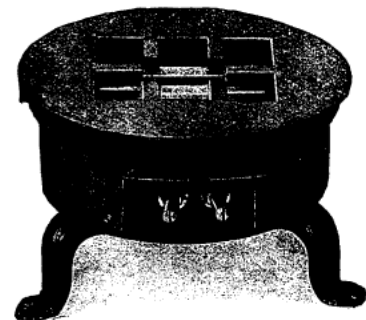
The enclosed type is fitted with a machined cast iron top and is very robust. For laboratory or factory use this pattern cannot be improved upon; its efficiency is high, although there is of necessity a certain time lag in the first boiling.

The open luminous type is particularly useful for ordinary laboratory utensils. The heating in this instance is effected more by radiation than conduction, and thus its efficiency does not depend upon good contact between the surface of the utensil and the hot-plate.

All the large hot-plates are provided with heat regulation, the connections giving low, medium and full heat.



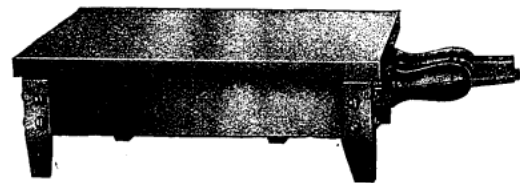
1604/5/6  
Enclosed Type.



1607  
Open Luminous Type.



1608  
Open Luminous Type.



1609/10/11  
Cast iron hot plates for laboratory and manufacturing purposes.

Cat. No.	Dimensions in inches.	Consumption in watts.	Weight in lb.	PRICE Black finish.			No. of Heats.	No. of Elements fitted.	Price of each spare Element.
				£	s.	d.			
*1604	5½ diam.	400	4¾	0	19	6	1	2	3/-
1605	6¾ "	750	9	1	5	0	3	3	3/-
1606	9¾ "	1,000	11¼	1	12	0	3	4	3/-
*1607	6 "	650	5¾	1	1	0	1	1	6/-
1608	11 "	1,500	16	2	0	0	3	2	8/6
1609	16 × 18	1,000	24	2	12	6	—	4	3/-
1610	18 × 12	2,000	46	5	5	0	—	8	3/-
1611	24 × 12	2,500	56	6	5	0	—	10	3/-

\* Price includes 3 yards flexible cord and lampholder adaptor.

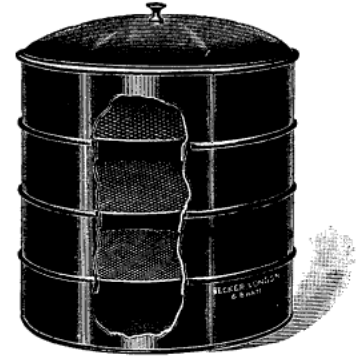
*Please state catalogue numbers and voltage when ordering.*

**Our stock of pure Chemicals and Acids is very considerable; hence all orders are executed with the utmost despatch. See comprehensive list at end of Catalogue.**

## SIEVES

**1612.—Brass Wire-Gauze Sieves in Sets of Three**, a set consisting of one each sieve (30, 60 and 90 mesh) mounted in Japanned tin frames, complete with cover and bottom as illustrated.

Diameter .. .. .	4	6	9 in.
Price, per set .. .. .	8/-	10/-	16/6



1612

The above Sieves are also supplied in parts, prices as below.

Catalogue Reference .. .. .	<b>1614</b>	<b>1615</b>	<b>1616</b>	<b>1617</b>	<b>1618.—Japanned Tin Covers, with Knob</b> , to fit above sieves.
Diameter .. .. .	4	6	8	9 in.	Diam. .. 4 6 8 9 in.
A. 10 Mesh .. .. .	1/8	2/6	3/3	4/- each.	Each .. 1/3 1/6 2/- 2/6
B. 20 „ .. .. .	1/8	2/6	3/3	4/- „	
C. 30 „ .. .. .	1/8	2/6	3/3	4/- „	
D. 40 „ .. .. .	2/-	3/-	3/9	4/9 „	
E. 60 „ .. .. .	2/-	3/-	3/9	4/9 „	
F. 80 „ .. .. .	2/6	3/6	4/3	5/6 „	
G. 90 „ .. .. .	2/6	3/6	4/3	5/6 „	
H. 100 „ .. .. .	3/6	4/6	5/6	7/- „	
J. 120 „ .. .. .	3/6	4/6	5/6	7/- „	
					<b>1619.—Japanned Tin Bottoms</b> , to fit above sieves.
					Diam. .. 4 6 8 9 in.
					Each .. 10d. 1/3 1/4 1/8

**1620.—Standard Sieves**, as recommended by the Institution of Mining and Metallurgy. Japanned Tin Frames, diameter 8 inches.

Wire Weaving Mesh.								£	s.	d.	
5	8	10	12	16	20	30	40	Each .. .. .	1	0	0
	50	60	70	80	90			Each .. .. .	1	3	0
	100	120	150	200				Each .. .. .	1	6	0

**1621.—Japanned Tin Receiver and Cover**, for above .. .. . per set 9/-

**1622.—Standard Sieves**, as recommended by the Institution of Mining and Metallurgy. Polished brass frames, diameter 8 inches.

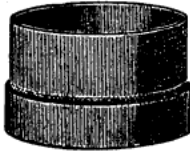
Wire Weaving Mesh.								£	s.	d.	
5	8	10	12	16	20	30	40	Each .. .. .	1	19	6
	50	60	70	80	90			Each .. .. .	2	3	6
	100	120	150	200				Each .. .. .	2	6	6

**1623.—Polished Brass Receiver and Cover**, for above .. .. . per set 15/9

Every requisite for Chemical, Physical, and Bacteriological work supplied, from a test tube to the complete furnishing of the largest laboratory.

## SIEVES

**1624.—Brass Wire-Gauze Sieves with Wooden Rims, best quality.**



Diameter	..	..	..	..	6	8	10	12 in.
20 Mesh	..	..	..	..	2/2	2/6	3/10	4/6 each.
30 "	..	..	..	..	2/2	2/6	3/10	4/6 "
60 "	..	..	..	..	2/9	3/3	4/6	5/- "
80 "	..	..	..	..	4/-	5/6	7/6	9/9 "
90 "	..	..	..	..	4/4	6/-	8/-	10/6 "
100 "	..	..	..	..	4/6	6/6	8/9	11/6 "

**1625.—Hair Sieves, 9 in. diameter, each 5/-; 12 in. diameter, each 7/-**

## SPATULAS AND STIRRING RODS

FOR NICKEL SPATULAS, SEE PAGE 32.



1626

**1626.—Horn Spatulas, palette-knife form.**

Length ..	..	..	10	12	15	20 cm.
Each ..	..	..	4d.	5d.	7d.	1/3
Per dozen ..	..	..	3/6	4/6	6/6	12/9



1627

**1627.—Horn Spatulas, double pattern**

Length ..	..	..	10	13	15	20 cm.
Each ..	..	..	5d.	6d.	8d.	1/3
Per dozen ..	..	..	4/6	5/3	6/9	12/9



**1628.—Ebonite Stirring Rods, with india-rubber cone at the end .. .. each 10d.**

**1629.—Ditto, plain, 9 to 12 in. long, without rubber cone, rounded ends—**

Each 4d. ; per doz. 3/6



1630

**1630.—Glass Stirring Rods, with rounded ends.**

Length ..	..	..	6	9	12	18 in.
Per dozen ..	..	..	7d.	9d.	1/10	2/9
Per gross ..	..	..	6/-	8/-	20/-	30/-

**Rubber End Pieces for Stirring Rods.**

See page 254.



1631

**1631.—Steel Spatulas, in wood balance handle.**

Length of blade..	3	4	5	6	7 in.
Each ..	..	1/2	1/3	1/4	1/7 2/6



1632

**1632.—Steel Spatulas, tapering blade, best make and very flexible. Length of blade, 4 inches.**

Each 1/4; per doz. 15/-



1633

**1633.—Horn Spatulas, very thin and flexible, suitable for microscopic work, etc. .. .. each 6d.**



1634

**1634.—Vulcanite Spatulas.**

Total length ..	..	..	13	15 1/2	18	20 cm.
Each ..	..	..	6d.	8d.	9d.	10d.
Per dozen ..	..	..	5/6	7/-	7/6	9/6



1635

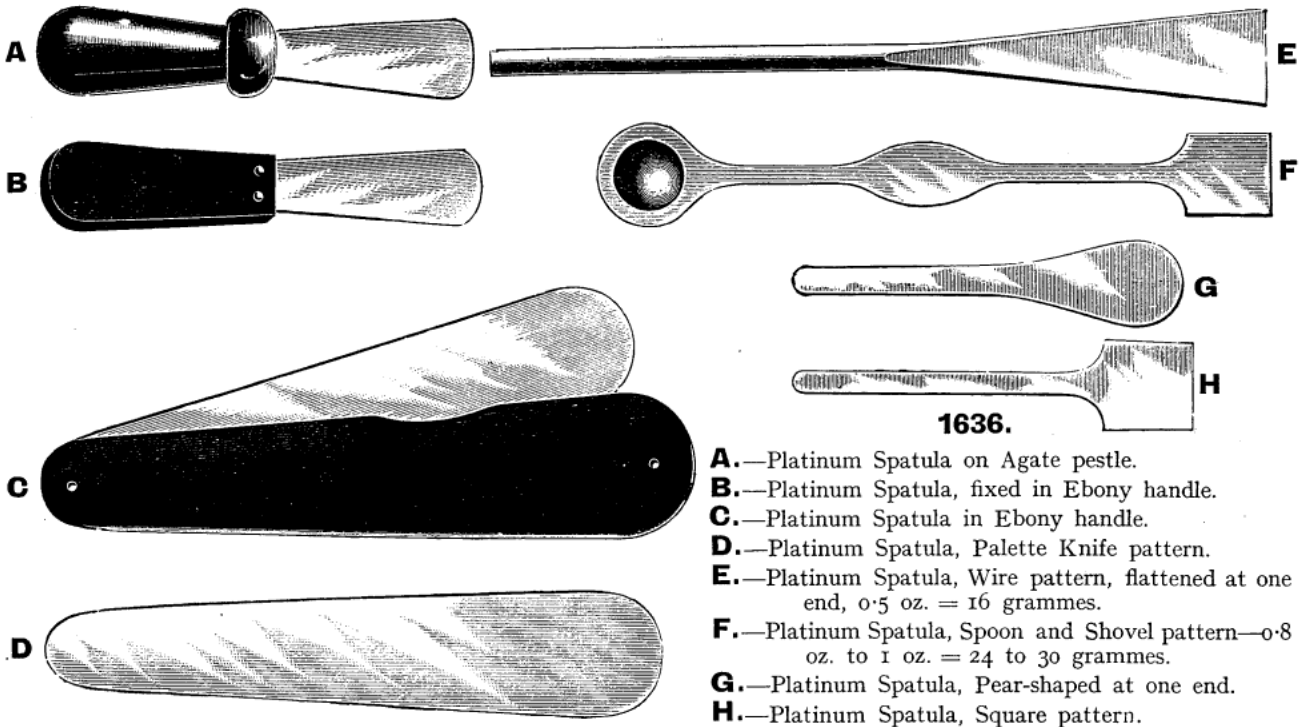
**1635.—Horn Leaves or Mortar Scrapers.**

Length ..	..	..	3	4	5	6	8 in.
Each ..	..	..	7d.	10d.	1/1	1/5	1/9

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## PLATINUM SPATULAS



1636.

- A.—Platinum Spatula on Agate pestle.  
 B.—Platinum Spatula, fixed in Ebony handle.  
 C.—Platinum Spatula in Ebony handle.  
 D.—Platinum Spatula, Palette Knife pattern.  
 E.—Platinum Spatula, Wire pattern, flattened at one end, 0.5 oz. = 16 grammes.  
 F.—Platinum Spatula, Spoon and Shovel pattern—0.8 oz. to 1 oz. = 24 to 30 grammes.  
 G.—Platinum Spatula, Pear-shaped at one end.  
 H.—Platinum Spatula, Square pattern.

The above Spatulas can be made to any required size and weight ; unless otherwise specified a weight of about 0.5=16 grammes will be sent, representing a Spatula of the size illustrated, No. 1636D. *Lowest prices quoted on application.*

## SPOONS



1637

**1637.—Horn Spoons, best quality, with spatula handle.**

Length .. .. .	4	5	6	8 in.
Each .. .. .	6d.	7d.	9d.	1/3
Per dozen .. .	4/10	6/3	7/6	13/6

**1638.—Horn Spoons, with ordinary handle.**

A. 3 in. .. .. .	each	5d.
B. Teaspoon size .. .	..	10d.
C. Dessert-spoon size .. .	..	1/-
D. Tablespoon size .. .	..	1/3



1639

**1639.—Platinum Spoons, at market rate.**  
*(Lowest prices on application.)*



1640

**1640.—Glass Spoons, best crystal glass.**

Size .. .. .	Tea-	Dessert-	Table-spoon.
Each .. .. .	9d.	1/3	1/6



1641

**1641.—Porcelain Spoons, glazed round bowl, pierced with holes for lifting crystals out of a solution .. .. . each 2/6**

Our stock of pure Chemicals and Acids is very considerable ; hence all orders are executed with the utmost despatch. See comprehensive list at end of Catalogue.

## SPOONS



**1642.—Wire-Gauze Spoons**, for sodium or potassium .. .. each **1/5**; per doz. **18/-**

**1643.—Ditto**, with cover each **2/2**; per doz. **24/-**



**1644.—Sodium Tongs**, with long arm and spoon ends .. .. each **5/-**

**1645.—Porcelain Spatulas**, with spoon end.

4 in. long	..	..	..	each	<b>10d.</b>
5 "	..	..	..	"	<b>1/1</b>
6 "	..	..	..	"	<b>1/2</b>
7 "	..	..	..	"	<b>2/-</b>
9 "	..	..	..	"	<b>2/9</b>
12 "	..	..	..	"	<b>4/6</b>
15 "	..	..	..	"	<b>6/6</b>
18 "	..	..	..	"	<b>8/-</b>



**1646.—Tinned Iron Spoons**, for fusions, etc. each **6d.**; per doz. **5/-**

## SPECIFIC GRAVITY BOTTLES, Etc.

**1647.—Specific Gravity Bottles**, unadjusted, with perforated stopper.



1647

Approx. Capacity	25	50 c.c.
Each .. ..	<b>1/-</b>	<b>1/2</b>
Per dozen .. ..	<b>11/6</b>	<b>13/6</b>



1648

**1648.—Specific Gravity Bottle**, unadjusted, Harrow School pattern.

Each .. ..	<b>9d.</b>
Per dozen .. ..	<b>8/-</b>

**1649.—Specific Gravity Bottle**, with perforated stopper, grammes. Carefully adjusted.



A. 10 grammes	..	..	each	<b>3/9</b>
B. 25 "	..	..	"	<b>4/6</b>
C. 50 "	..	..	"	<b>5/6</b>
D. 100 "	..	..	"	<b>6/6</b>

**1650.—Ditto**, as above, but in grains.

250 grains	..	..	each	<b>3/9</b>
500 "	..	..	"	<b>5/6</b>
1,000 "	..	..	Special Government Laboratory Pattern..	each <b>12/-</b>

**1651.—Specific Gravity Bottle**, in tin case with brass counterpoise.



10 grammes	..	..	each	<b>7/6</b>
25 "	..	..	"	<b>9/-</b>
50 "	..	..	"	<b>11/-</b>
100 "	..	..	"	<b>12/6</b>

**1652.—Ditto**, as above, but in grains.

250 grains	..	..	each	<b>9/-</b>
500 "	..	..	"	<b>11/-</b>
1,000 "	..	..	"	<b>12/6</b>

**1653.—Specific Gravity Bottle**, with well ground-in thermometer stopper. Thermometer outside.

Capacity ..	25	50	100 grammes.
Each .. ..	<b>10/6</b>	<b>12/6</b>	<b>15/-</b>



**1654.—Ditto**, marked in grains.

Capacity ..	250	500	1,000 grains.
Each .. ..	<b>10/6</b>	<b>12/6</b>	<b>15/-</b>

**1655.—Specific Gravity Bottle**, Regnault's, with ground-in stopper and mark on neck.

Capacity ..	..	25	50 grammes.
Each .. ..	..	<b>2/9</b>	<b>3/3</b> "



**1656.—Ditto**, in grains.

Capacity ..	..	250	500 grains.
Each .. ..	..	<b>2/9</b>	<b>3/3</b>

**1657.—Lunge and Rey's Bulb Pipette** with 2 stopcocks for taking the specific gravity of acids.

Each .. ..	..	..	..	..	<b>9/6</b>
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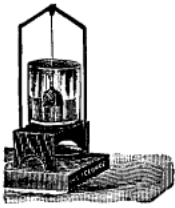
**1658.—Glass Bulbs**, with two stopcocks and glass hook, for taking the specific gravity of gases.

A. 1,000 c.c. capacity	..	each	<b>14/-</b>
B. 2,000 c.c. "	..	"	<b>16/-</b>



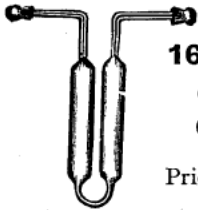
Every requisite for Chemical, Physical, and Bacteriological work supplied, from a test tube to the complete furnishing of the largest laboratory.

## SPECIFIC GRAVITY TUBES, Etc.



**1659.—Glass Vessels for Specific Gravity.**

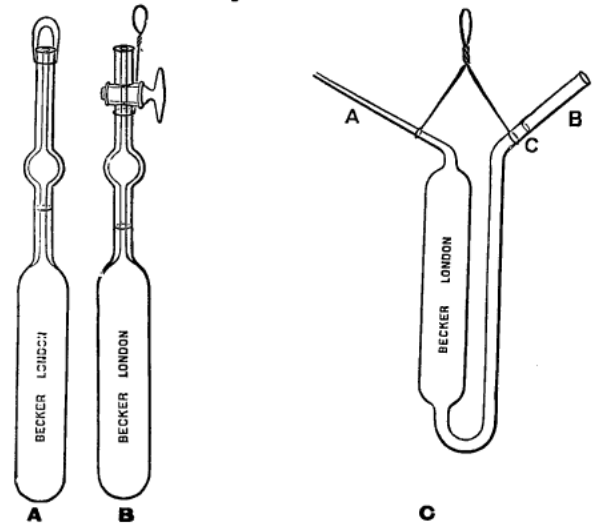
Each .. .. 1/-  
 Per dozen .. 11/-



**1660. — Sprengel's Specific Gravity Tubes.**

Price .. .. 4/-

FOR  
 SPECIFIC  
 GRAVITY  
 HYDROMETERS  
 See page  
**211**



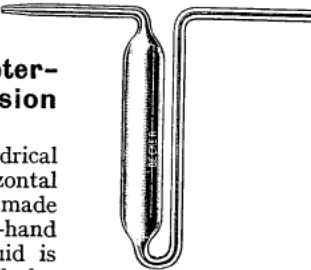
**1662.—Specific Gravity Tubes** for measuring the specific gravity of volatile liquids as described in Watson's "Text-book of Practical Physics," page 89, 1906 Edition.

Fig. A .. .. . each **3/3**  
 Fig. B. .. .. . ,, **4/-**  
 Fig. C. .. .. . ,, **2/3**

*CAUTION.—As no grease must be used on the stopper or tap, care must be taken not to force these in too tightly or they will stick, and great difficulty may be experienced in removing them.*

**1661.—Nicol's Specific Gravity Tube or Pyknometer, for Determining the Expansion of a Liquid.**

This consists of a cylindrical glass bulb, having two horizontal tubes of fine bore. A mark is made round the centre of the right-hand horizontal tube, and the liquid is drawn in as far as this mark by means of a piece of india-rubber tube. On heating the Pyknometer, the liquid will flow out in both directions, and it is again adjusted to the mark.



A. 5 c.c. .. .. . each **1/6**; per dozen **17/-**  
 B. 10 ,, .. .. . ,, **1/6**; ,, **17/-**

## SPECTRUM ANALYSIS APPARATUS

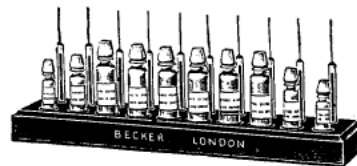


**1665.—Magic Lantern Slide**, showing diagram of the Solar Spectrum .. .. . each **15/-**

**1666.—Plates of Crystal**, for showing absorption phenomena .. .. . each, from **10/6** to **25/-**

**1663.—Flask**, with parallel walls, for examining absorption band in liquids. Capacity about 2 c.c.

Each .. .. . .. . **2/-**



**1667.—Set of Reagents**, for Spectrum Analysis, consisting of 10 bottles containing salts of the following metals: Ba, Ca, Na, K, Sr, Sn, Tl, Cs, Li, and Rb. Price, including 10 platinum wires with glass rods and polished stand .. .. . **£2 2 0**



**1664.—Rectangular Tubes**, for examining absorption band in liquids.

Length ..	2	5	10	15	20 cm.
Price ..	<b>3/6</b>	<b>5/6</b>	<b>7/6</b>	<b>9/6</b>	<b>10/6</b> each.

**1668.—Ditto**, consisting of 6 reagents only. Price, complete .. .. . **27/6**

Our Balances and Weights have achieved World-wide Reputation: *vide* Opinions of the Leading Scientific Press.

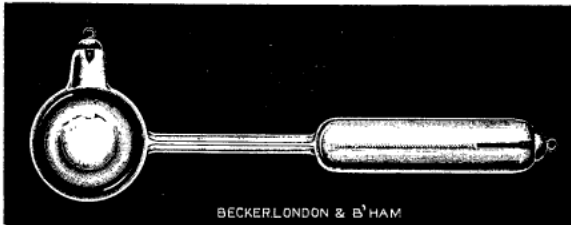
## VACUUM TUBES FOR SPECTRUM ANALYSIS



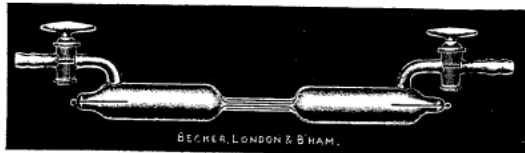
### 1669.—Vacuum Tubes, for Spectrum Analysis, guaranteed best quality, containing—

	Each.
A. Oxygen .. .. .	7/6
B. Hydrogen .. .. .	7/6
C. Nitrogen .. .. .	7/6
D. Chlorine .. .. .	7/6
E. Carbonic Acid .. .. .	7/6
F. Iodine .. .. .	7/6
G. Bromine .. .. .	7/6
H. Hydrochloric Acid .. .. .	7/6
J. Argon .. .. .	27/6
K. Helium .. .. .	27/6
L. Neon .. .. .	£3 15 0
M. Krypton .. .. .	7 10 0
N. Xenon .. .. .	11 10 0

Tubes filled with other Gases can be supplied to order at reasonable prices.



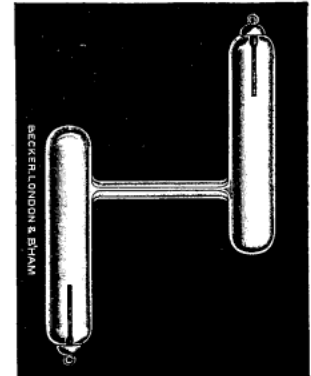
### 1670.—Vacuum Tubes, for Spectrum Analysis, Bulb pattern. Prices, etc., as No. 1669, plus 20 per cent.



### 1671.—Spectrum Analysis Tube, for filling with various gases. Price, complete, with two well ground-in stopcocks, as figured .. each 10/6

### 1672.—Vacuum Tubes, for Spectrum Analysis, "End-on" pattern, guaranteed best quality, containing—

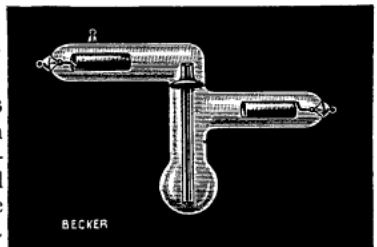
A. Oxygen .. .. .	11/6
B. Hydrogen .. .. .	11/6
C. Nitrogen .. .. .	11/6
D. Chlorine .. .. .	11/6
E. Carbonic Acid .. .. .	11/6
F. Iodine .. .. .	11/6
G. Bromine .. .. .	11/6
H. Hydrochloric Acid .. .. .	11/6
K. Argon .. .. .	37/6
L. Helium .. .. .	37/6
M. Neon .. .. .	£3 15 0
N. Krypton .. .. .	7 10 0



O. Xenon each	£11 10 0
P. Mercury ..	1 2 6
Q. Cadmium ..	1 2 6

### 1673. — Goetze's Vacuum Tubes for Spectrum Analysis.

This tube gives a spectrum of remarkable definition, and was awarded the Gold Medal at the St. Louis Exhibition.



A well-known professor detected a minute quantity of argon in one of these tubes filled with helium, and also, when using a Michelson's Echelon Spectroscope, obtained the double helium line. (Further details will be sent post free on application.)

A. Price, filled with Hydrogen or other common gases .. .. .	Each.
B. " " Argon .. .. .	£1 2 6
C. " " Helium .. .. .	2 15 0
D. " " Neon .. .. .	2 15 0
E. " " Krypton .. .. .	4 5 0
F. " " Xenon .. .. .	4 5 0
G. " " mixture of Helium and Argon in equal parts..	12 15 0
	2 15 0

### 1674.—Goetze's Vacuum Tubes for Spectrum Analysis, with windows made from Uviol glass.

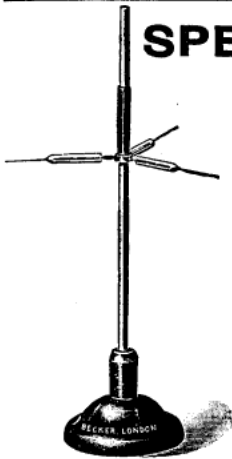
A. Price, filled with Hydrogen or other common gases .. .. .	Each.
B. " " Argon .. .. .	£1 10 0
C. " " Helium .. .. .	3 0 0
D. " " Neon .. .. .	3 0 0
E. " " Krypton .. .. .	4 15 0
F. " " Xenon .. .. .	4 15 0
	13 5 0

### 1675.—Goetze's Vacuum Tubes for Spectrum Analysis, with windows made from quartz.

A. Price, filled with Hydrogen or other common gases .. .. .	Each.
B. " " Argon .. .. .	£2 15 0
C. " " Helium .. .. .	3 15 0
D. " " Neon .. .. .	3 15 0
E. " " Krypton .. .. .	5 10 0
F. " " Xenon .. .. .	5 10 0
	13 10 0

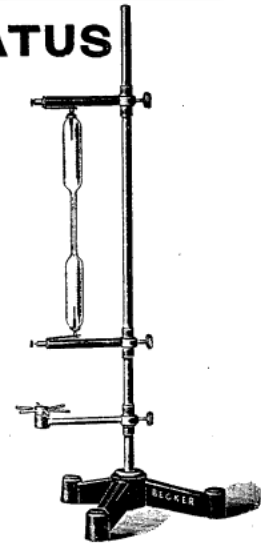
Our stock of pure Chemicals and Acids is very considerable ; hence all orders are executed with the utmost despatch. See comprehensive list at end of Catalogue.

## SPECTRUM ANALYSIS APPARATUS



**1676.—Brass Spectroscope Stand**, on heavy iron foot and provided with adjustable slider for holding three platinum wires fused into glass tubes.

- A. Without platinum wires .. .. each **3/9**
- B. Platinum wires fused into glass tubes, for use with above, extra .. .. each **2/-**

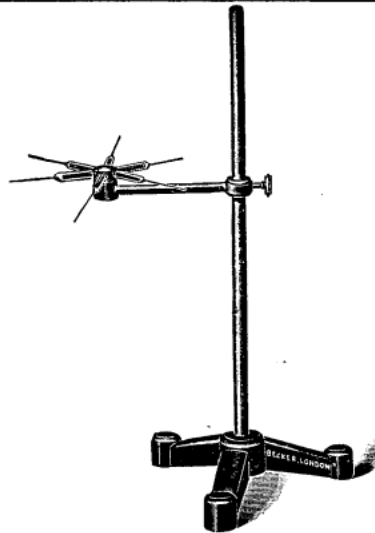


**1678.—Brass Spectroscope Stand**, mounted on heavy iron foot, fitted with spring clips for making electrical contact with spectrum tubes, otherwise same specification as No. 1677.

- A. Price, complete, as figured **£1 7 6**
- B. Platinum wires fused into glass tubes, extra.  
Each **2/-**

**1677.—Brass Spectroscope Stand**, with adjustable slider, carrying a rotatable six-way platinum wire holder.

- A. Price, mounted on heavy iron foot, as figured .. .. **15/-**
- B. Platinum wires fused into glass tubes, extra .. .. each **2/-**



### DIRECT VISION SPECTROSCOPES

**1679.—Pocket Direct Vision Spectroscope**, small size, with fixed slit  
 Each **£1 1 0**



**1680.—Pocket Direct Vision Spectroscope**, with fixed slit, achromatic object glass and 3 element prism, in case .. .. **£1 10 0**

**1681.—Pocket Direct Vision Spectroscope**, with adjustable slit, achromatic object glass and 3 element prism, in case .. .. **£2 5 0**

**1682.—Pocket Direct Vision Spectroscope**, with adjustable slit, comparison prism, achromatic object glass and 3 element prism, in case **£2 12 6**

**1683.—Pocket Direct Vision Spectroscope**, with adjustable slit, comparison prism, mirror, achromatic object glass and 3 element prism, in case **£3 15 0**

**1684.—Pocket Direct Vision Spectroscope**, large size, with adjustable slit, comparison prism, mirror, micrometer scale, achromatic object glass and 3 element prism, in case .. .. **£5 15 0**

**1685.—Spectroscope**, best quality, with adjustable slit, photographed micrometer scale, right-angled prism for showing two spectra in the field of view at the same time, achromatic lens, etc. Price, complete in nicely finished morocco case, velvet-lined **£6 15 0**



This instrument will show Fraunhofer's lines, bright lines of the metals and gases, and the absorption bands in coloured gases, crystals, or liquids, and may be used for many experiments in spectrum analysis.

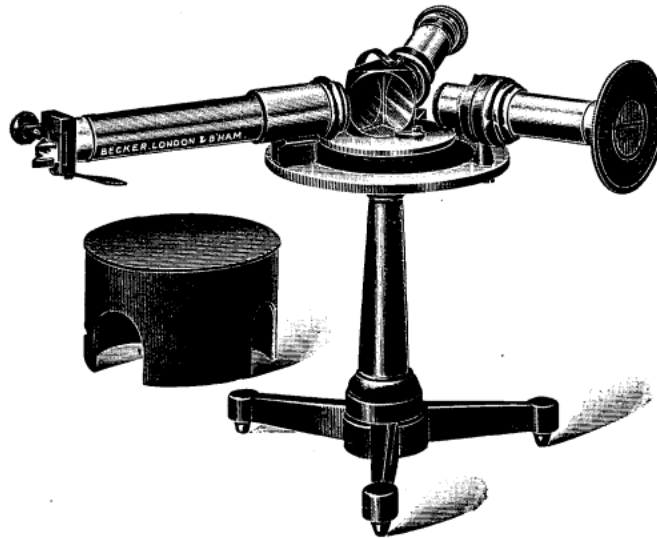
**1686.—Direct Vision Spectroscope**, extra large size, on stand, with adjustable collimator and telescope, adjustable slit, with micrometer screw and divided drum to .01 mm., comparison prism, mirror, micrometer scale, 5 element prism, in case **£12 0 0**

**1687.—Stand**, simple pattern, for use with Spectroscopes Nos. 1680 to 1684 .. .. **£1 10 0**

**1688.—Stand**, superior quality, for use with Spectroscopes Nos. 1680 to 1684. Price complete, with adjustable holder, stage for absorption boxes and tubes, and mirror .. .. **£3 5 0**

Every requisite for Chemical, Physical, and Bacteriological work supplied, from a test tube to the complete furnishing of the largest laboratory.

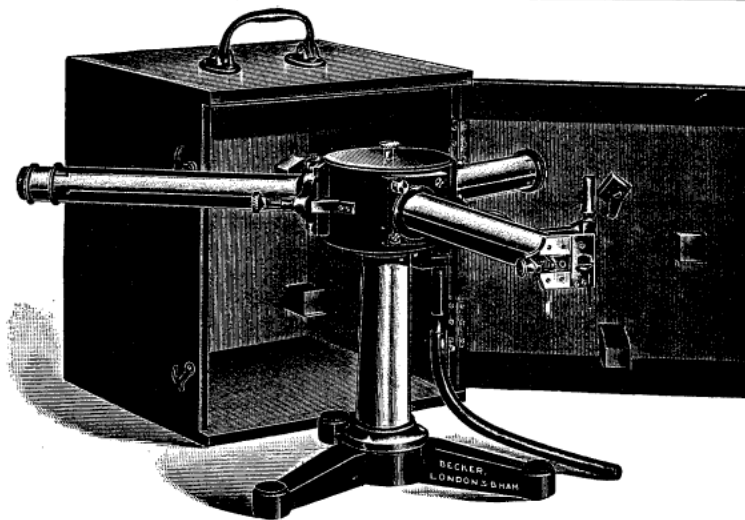
## SPECTROSCOPES



**1689.—Table Spectroscope**, for use in schools, comprising prism  $60^\circ$  of dense flint glass; collimator and telescopes of 18 mm. aperture and 180 mm. focal length; collimator provided with an adjustable slit and a reflecting prism for showing two spectra in the field at the same time; scale tube provided with a photographic fine scale. Price, mounted on heavy metal foot, as figured .. .. . **£7 10 0**

**1690.—Mahogany Case**, with lock and key. Extra **£1 7 6**

**1691.—Table Spectroscope**, as No. 1689, but without comparison prism and photographic scale. Price, complete .. .. . **£6 10 0**



**1692.—Table Spectroscope**, "Science School" pattern. In this instrument the prism is enclosed in a brass drum to which the telescope, collimator and scale tube are attached. A gas burner is fixed to the scale tube. The dense glass prism is  $1\frac{1}{2}$  in. high, and is permanently fixed to the metal box. Telescope and collimator are provided with object glasses having an aperture of 25 mm., and a focal length of 250 mm. The collimator is provided with an adjustable slit and a reflecting prism for showing two

spectra in the field at the same time. The scale tube is provided with a photographic fine scale and achromatic lens. Price .. .. . **£7 10 0**

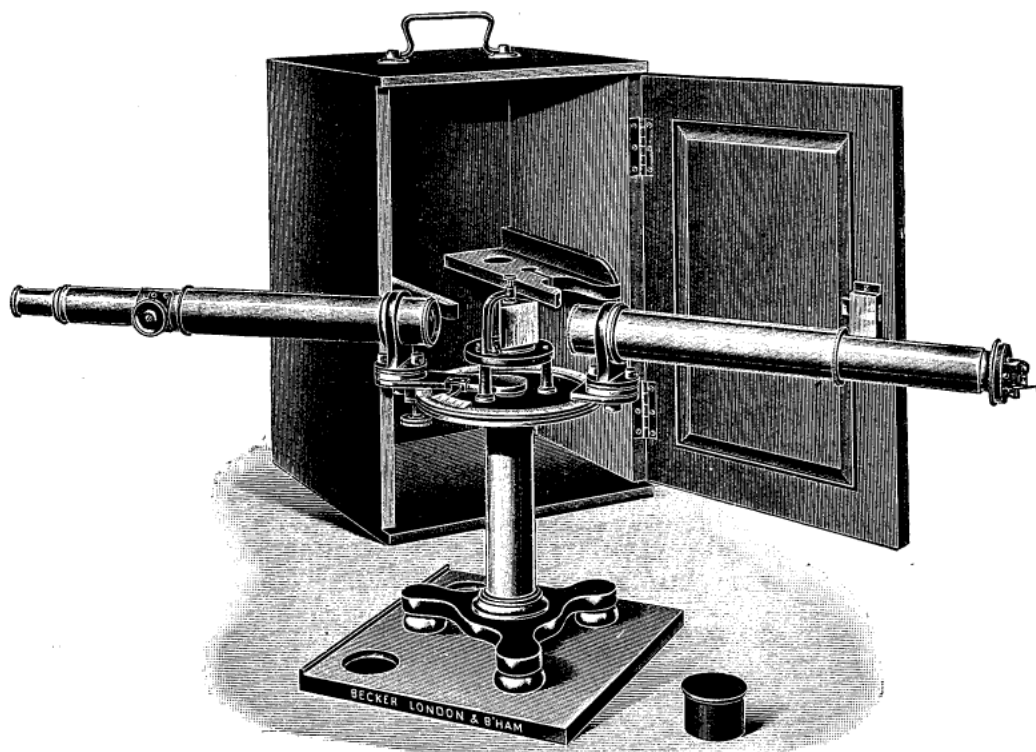
**1693.—Box**, with handle, etc., as figured, extra **16/-**

**1694.—Telescope**, made adjustable either to right or left by means of screws .. .. . extra **16/-**

**1695.—Rack and Pinion Motion** fitted to either telescope or collimator .. .. . extra **16/-**

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## SPECTROSCOPES

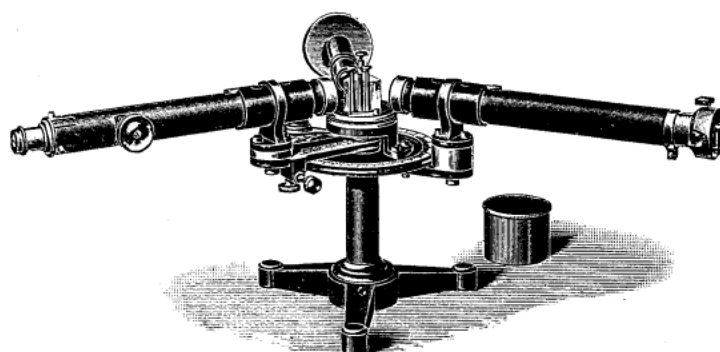


**1696.**—Table Spectroscope, best quality and finish. This instrument is provided with a dense glass prism,  $1\frac{1}{4}$  in. high, telescope and collimator. It has achromatic object-glasses  $1\frac{1}{4}$  in. diameter, adjustable slit fitted with a reflecting prism, by means of which two spectra can be shown in the field of view at the same time, sliding adjustment to eye end of telescope, and Huyghenian eye-piece. The circle is divided to  $\frac{1}{2}$  degrees, and reads by a vernier to 1 minute, enabling angular measurements to be taken.

Price, in polished case .. .. . £15 10 0

**1697.**—Ditto, with rackwork adjustment to eye end of telescope .. .. . 16 5 0

**1698.**—Table Spectroscope, "College" pattern, with circle 6 in. in diameter, divided to read by vernier to 1 minute of arc. The telescope and collimator are provided with achromatic object-glass, 12 in. focus,  $1\frac{1}{4}$  in. aperture. The telescope is provided with cross-wires, rack-motion clamp and fine adjustment. The collimator is provided with adjustable slit, comparison prism, and wedge for varying the length of slit. The prism is adjustable by means of three levelling screws and is rotatable. Complete adjustments are provided for both telescope and collimator. The scale tube has complete adjustments and is detachable from the instrument. Two eye-pieces and one dense flint or crown glass prism, of suitable size, are supplied with the instrument.



- |   |       |         |
|---|-------|---------|
| A. With case .. .. .                                | price | £15 0 0 |
| B. Hollow prism $\frac{3}{4}$ -in. hole .. .. .     | "     | 1 17 6  |
| C. Rack-motion to collimator .. .. .                | "     | 0 16 0  |
| D. Micrometer symmetrical slit to 0.001 mm. .. .. . | "     | 5 12 6  |

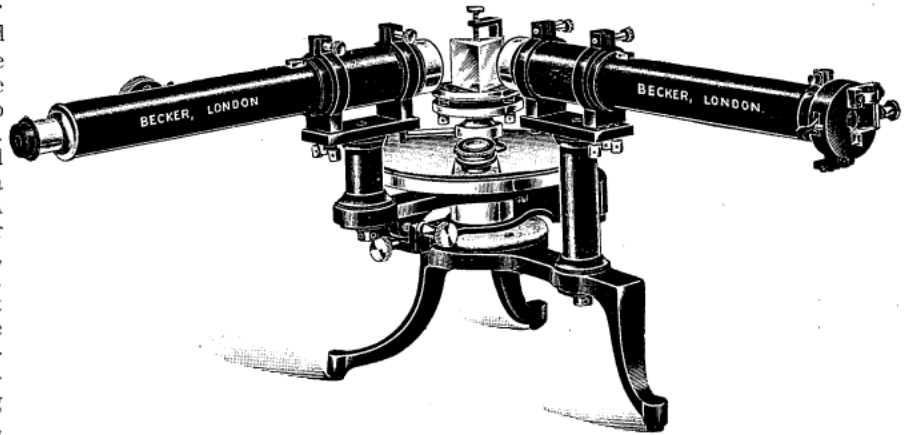
Our stock of pure Chemicals and Acids is very considerable ; hence all orders are executed with the utmost despatch. See comprehensive list at end of Catalogue.



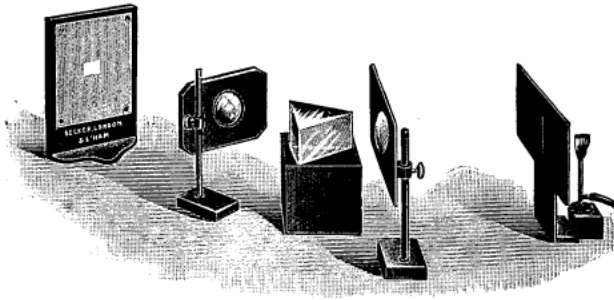
## SPECTROSCOPES

### 1699.—Table Spectro-

**scope**, superior quality, "Board of Education" type. May also be used as a Goniometer. The circle is 6 in. in diameter, and divided to read by vernier to 1 minute of arc. The rotating prism table is fitted with a clamp for the prism, and a division for setting the prism. A movable reader is supplied for reading the vernier. The prism, which is  $1\frac{5}{16}$  in. high with  $1\frac{1}{2}$  in. long face, can be of either light or dense flint as desired. The collimator is provided with a well-made adjustable slit having non-corrosive jaws, wedge for reducing the aperture, comparison prism, and protective cap. A screw adjustment is provided for correcting the parallelism of the jaws should this at any time require correction. The telescope has rack and pinion focussing, high and low-power eye-pieces with spider webs for measurement, and tangent screw for slow motion. The objectives of both telescope and collimator are good achromatics of 12 in. focal length and  $1\frac{1}{4}$  in. clear aperture. Price mounted on a heavy iron tripod stand as figured, in case .. .. . **£15 15 0**

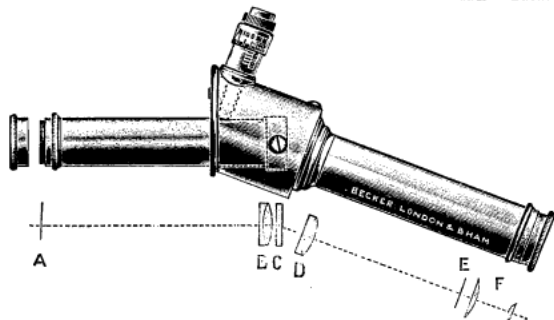


- 1700.—Photographic Fine Scale**, adapted on a third tube uniform in design with telescope and collimator. extra **3 15 0**
- 1701.—Rack Motion to Collimator** .. .. . **0 15 0**
- 1702.—Hollow Prism**, with 1-in. hole .. .. . **2 5 0**



**1703.—Model Spectroscope**, for showing deviation and dispersion of light. This apparatus consists of 1 glass prism; 2 convex lenses of 10 and 15 in. focus; stands for same; metal screen with a slit in it; screen to receive the spectrum; gas flame and 2 blocks. Price, complete as figured .. .. . **£1 12 6**

(For further details, see Clay's "Practical Exercises in Light.")



### 1704. — The Rafferty Wave Length Spectroscope.

This instrument is made with the well-known Thorp replica of the Rowland Grating, and is so constructed that the positions of the lines in the spectrum are read direct on a revolving drum in wave lengths (Angstrom Units).

It is inexpensive and yet gives remarkably accurate results; with the ordinary eye-piece it gives an apparent dispersion of about 30°, the whole of the spectrum being included in the field of view at once. By the addition of a high-power eye-piece the dispersion is increased to 90°,

and about one-third of the spectrum is included in the field at one time.

The Spectroscope consists of a Collimator, with an adjustable slit (A) at one end, an Object Glass (B) at the other, and a Thorp Diffraction Grating (14,500 lines) (C) fitted into the same tube. Hinged on to this tube is a telescope, with an object glass (D) at one end and cross-wires (E) and eye-piece (F) at the other. The centres on which this telescope is hinged are on the level of the grating, and the telescope is moved by a micrometer screw divided into 100 parts. This screw moves the telescope on a true sine motion so that the positions of the lines in the spectrum as they travel across the cross-wires are read in wave-length measurements, each division being equal to 10 Angstrom units. An index gives the number of turns of the screw.

The instrument is supplied for use in the hand, as a portable Spectroscope, or on a fully adjustable table stand.

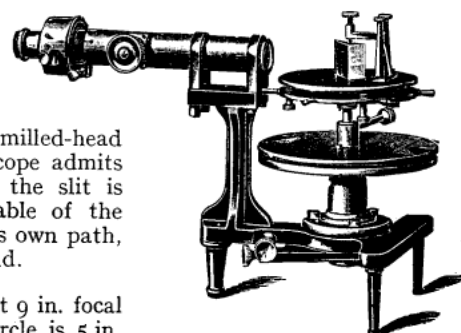
#### PRICES.

- A. Rafferty Wave Length Spectroscope for use in hand, with low-power eye-piece, in case .. **£8 10 0**
- B. Ditto, on tripod table stand .. .. **9 5 0**
- C. High-power eye-piece, extra .. .. **0 17 6**

## SPECTROMETERS

### 1705.—Students' Auto-collimating Spectrometer.

The essential feature of this class of Spectrometer is, that the telescope performs the functions of both telescope and collimator. This is effected by placing the slit in the field of the telescope, covering the lower half of it. The slit is adjustable from the outside by means of a milled-head screw on the right of the telescope. A hole on the left of the telescope admits light, which is reflected by a prism on to the slit. An image of the slit is thrown by the object-glass on to the 30° prism placed on the prism table of the instrument, and reflected by the posterior face of this prism back upon its own path, the object-glass forming an image of the slit in the upper half of the field.



The telescope has an object-glass of 1 in. clear aperture and of about 9 in. focal length, and is provided with rack-motion focussing arrangement. The circle is 5 in. in diameter and is read by two opposite verniers to 1 minute, and is provided with clamp and fine adjustment. The prism table is adjustable by means of three levelling screws, and can be raised or lowered to any convenient position. The whole instrument is strongly constructed, and is packed in a neat case.

Price, complete with prism .. .. . £9 0 0



### 1706. — Students' Spectrometer, S.X.

Pattern. This instrument was designed to meet the demands of those requiring a cheap, yet reliable Spectrometer. It has a protected 5-in. circle, read by vernier to 1 minute. The circle and telescope are attached to the outer centre and move together. The telescope is counterpoised and provided with cross-wires, rack-motion focussing arrangement, clamp and fine adjustment. The collimator has a protected adjustable slit and clamping ring, so that it can be set for verticality and focal distance once for all. The prism table is adjustable by means of three levelling screws, and can be raised or lowered to any convenient height; it can be clamped to the inner centre, which carries the vernier, and which is provided with clamp and fine adjustment. The object glasses of both telescope and collimator are about 7 in. in focal length, and have a clear aperture of 7/8 in. Adjustments are provided for setting the optical axes of telescope and collimator at right angles to the vertical axis of the instrument. One eye-piece, grating-holder, prism clamp and reader are supplied with the instrument.

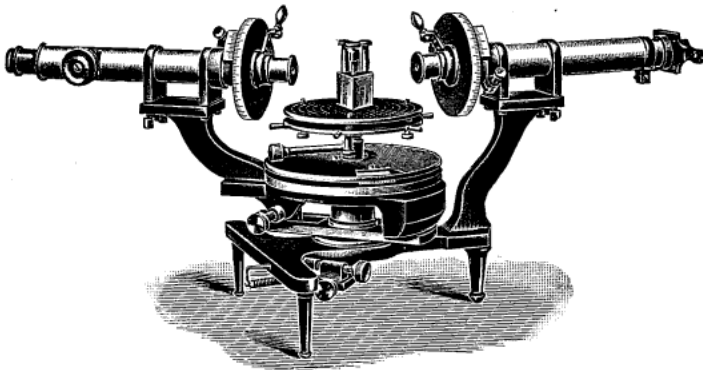
#### PRICES OF STUDENTS' SPECTROMETER, NO. 1706.

A.	With case .. .. .	£9 0 0
B.	Without rack-motion and fine adjustments .. .. .	7 10 0
C.	With two verniers, extra .. .. .	11/6
D.	Rack-motion to collimator .. .. .	15/-
E.	With 9-in. telescope and collimator, extra .. .. .	8/6
F.	Comparison prism attached to slit .. .. .	11/6
G.	Extra dense flint glass prism .. .. .	15/-
H.	Ordinary dense flint glass prism .. .. .	13/6
K.	Crown glass prism .. .. .	13/6
L.	Hollow prism, with 5/8-in. hole .. .. .	16/-
M.	Copy of Rowland's grating .. .. .	22/6
N.	Illuminating attachment to eye-piece .. .. .	11/6
O.	Plane parallel mirror, silvered both sides .. .. .	15/-
P.	Large ordinary dense flint glass prism, suitable for the 9-in. telescopes .. .. .	24/-
Q.	Ditto, crown glass .. .. .	24/-
R.	„ extra dense flint glass .. .. .	25/6

**SPECTROSCOPES AND SPECTROMETERS OF ALL OTHER  
 MAKES SUPPLIED AT CURRENT LIST PRICES.**

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## SPECTROMETERS



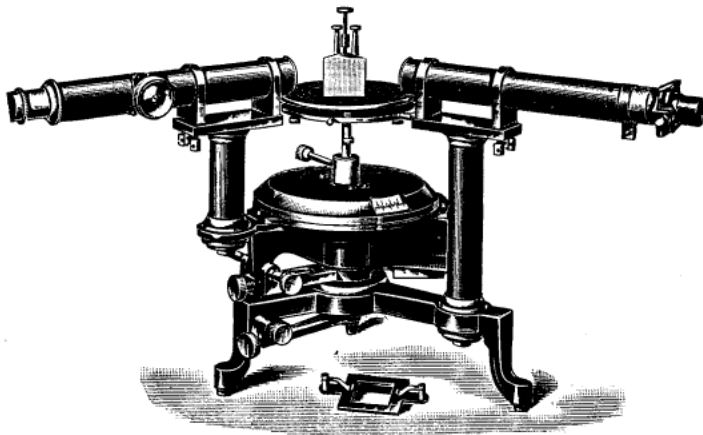
### 1707. — Students' Spectrometer, S.N.

pattern. The circle of this instrument is about 5 in. diameter, and read by two opposite verniers to 1 minute. The circle and verniers are well protected. The telescope is counterpoised and provided with cross-wires, rack-motion focussing arrangement, clamp and fine adjustment. The collimator has a protected adjustable slit and clamping ring by which the slit can be set for verticality and focal distance once for all. The object glasses are about 7 in. in focal length with a clear aperture of  $\frac{3}{8}$  in. Adjustments are provided for setting the optic axes at right angles to the vertical axis of the instrument. The prism table is adjustable by means of three levelling screws, and can be raised or lowered to any convenient height; it can be clamped to the inner centre, which carries the verniers and which is provided with

clamp and fine adjustment. One eye-piece, grating holder, prism clamp, and reader are supplied with the instrument. The uprights which support the telescope and collimator are thrown out sufficiently to give ample room for the attachment of polarising apparatus. These consist of (1) a Nicol prism polariser and analyser, each mounted in a rotating circle read by vernier to 5 minutes, and fitting the object ends of telescope and collimator (an adapter is supplied by which the analyser may be attached to the eye end of telescope); (2) a rotating circle, reading to 5 minutes, and fitting the object end of telescope or collimator, to which may be fitted a  $\frac{1}{2}$  wave plate, Babinet compensator, etc.; and (3) an extra Nicol and mount for the Babinet compensator, when used at the eye end of telescope. The Babinet compensator is fitted with micrometer screw and scale reading to .01 mm.

#### PRICES.

A. With case .. .. .	£10 10 0	L. Illuminating attachment to eye-piece ..	£0 11 6
B. Rack-motion to collimator, extra ..	0 15 0	M. Plane-parallel mirror, silvered both sides	0 15 0
C. 9-in. telescope and collimator, extra ..	0 8 6	N. Nicol prism polariser and analyser (the pair) .. .. .	6 0 0
D. Comparison prism to slit, extra ..	0 11 6	O. Divided circle to 5 minutes .. .. .	2 5 0
E. Extra dense flint-glass prism .. .. .	0 15 0	P. $\frac{1}{2}$ -wave plate and stage .. .. .	0 12 0
F. Ordinary dense flint-glass prism .. .. .	0 13 6	Q. Babinet compensator with extra Nicol and mount .. .. .	6 15 0
G. Crown glass prism .. .. .	0 13 6	R. Eye-pieces, each .. .. .	0 11 6
H. Hollow prism, $\frac{3}{8}$ -in. hole .. .. .	0 16 0		
K. Copy of Rowland's grating .. .. .	1 2 6		



### 1708.—College Spectrometer, T.N. pattern.

This instrument is constructed on similar lines to those of the Students' Spectrometer, No. 1707, with the exception of the centre work. In this, the inner axis carries a 5-in. circle and the prism table, while the outer socket carries the telescope and verniers. The circle is well protected and read by two opposite verniers to 1 minute. The prism table and telescope are both provided with clamp and fine adjustment. The prism table can be raised or lowered, is adjustable by means of three levelling screws and can be detached from the instrument, and other apparatus used in its place. The object lenses of telescope and collimator are achromatic, and have a focal length of 9 in. and a clear aperture of nearly 1 in. The telescope is provided with rack-motion focusing arrangement and cross-wires; and the optic axis can be set radially and at right angles to the

vertical axis of the instrument. The collimator is provided with a protected adjustable slit, comparison prism and wedge for reducing the length of the slit; and it can also be set radially and at right angles to the vertical axis of the instrument. One eye-piece, grating holder, prism clamp and reader are supplied with the instrument.

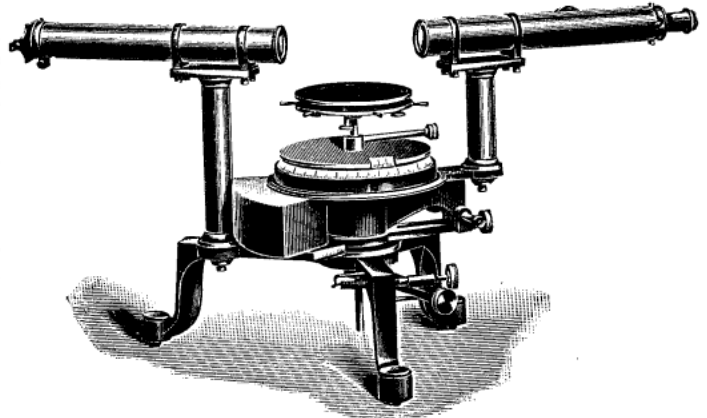
#### PRICES.

A. With case .. .. .	£15 0 0	G. Hollow prism, $\frac{3}{8}$ -in. hole .. .. .	£1 7 0
B. Divided on silver, extra .. .. .	1 10 0	H. Copy of Rowland's grating, about 14,500 lines .. .. .	1 2 6
C. Rack-motion to collimator .. .. .	0 16 0	K. Illuminating attachment to eye-piece ..	0 11 6
D. Dense flint-glass prism .. .. .	1 2 6	L. Mirror, silvered both sides .. .. .	0 15 0
E. Crown glass prism .. .. .	1 2 6	M. Eye-pieces, each .. .. .	0 11 6
F. Extra dense flint-glass prism .. .. .	1 6 6		

## SPECTROMETERS

### 1709.—College Spectrometer, T.E. pattern.

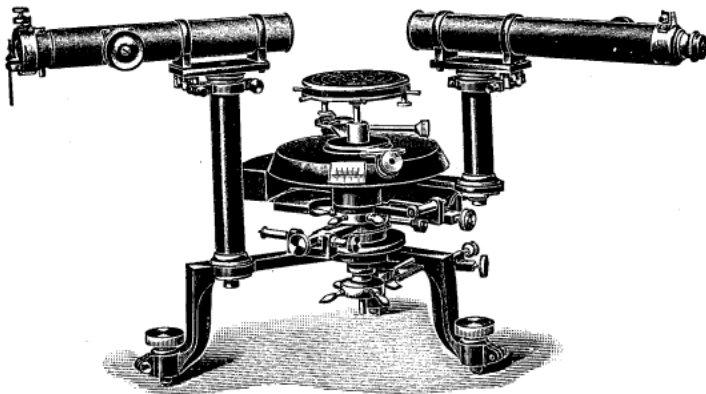
The circle of this instrument is fixed. The movement of the telescope is read by two opposite verniers on the lower edge of the circle; and the movement of the prism table is read by two opposite verniers on the upper edge of the circle. Two small microscopes (not shown on an arm which moves concentrically with the circle, and can be set to read either edge. Both edges of the circle are protected. The telescope is counterpoised, and provided with cross-wires, rack-motion focussing arrangement, clamp and fine adjustment. The collimator is provided with a protected adjustable slit, comparison prism and fixing ring, by means of which the slit can be set for verticality and focal distance once for all. The slit has means for setting the jaws parallel and an arrangement for varying its length. The prism table is adjustable by three levelling screws, and can be raised or lowered to any convenient height, and is provided with clamp and fine adjustment. The lenses of telescope and collimator have a focal length of about 10 in. and a clear aperture of 1 in. Adjustments are provided for setting the optical axes of the telescope and collimator at right angles to the vertical



axis of the instrument, and also for setting the axes radial, or otherwise, to the circle. The prism table can be detached from the instrument, and crystal holder and other apparatus used in its place. One eye-piece, grating holder and prism clamp are supplied with the instrument. The whole is packed in a neat case.

#### PRICES.

A.	With 5-in. circle, reading to 1 minute..	£18 0 0	S.	The above, with divided circle to 1 minute, clamp and fine adjustment to both polariser and analyser ..	£10 2 6
B.	" 6 " " " " 30 " ..	18 15 0	T.	Divided circle to 5 minutes, to carry ¼-wave plates, etc. ..	2 5 0
C.	" 6 " " " " 10 " ..	19 10 0	U.	¼-wave plate and stage ..	0 12 0
D.	" 7½ " " " " 10 " ..	21 15 0	V.	Babinet compensator, with Nicol and eye-lens ..	6 15 0
E.	If divided on silver, extra ..	1 10 0	W.	Micrometer symmetrical slit, reading to .001 mm. ..	5 5 0
F.	Rack-motion to collimator, extra ..	0 16 0	X.	One right-handed and one left-handed 30° quartz prism, and one right-handed and one left-handed quartz lens to fit in telescope and collimator ..	5 5 0
G.	Dense flint glass prism, 1½ × 1½ face ..	1 8 0	Y.	Crystal holder, consisting of 2 curved and 2 plane slides with screw adjustment ..	5 12 6
H.	Crown glass prism, same size ..	1 8 0	Z.	Crystal holder, simple construction ..	1 2 6
K.	Extra dense flint glass prism do. ..	1 17 6	Z1.	Liebisch total reflectometer, adapted to take the place of the prism table ..	7 10 0
L.	Hollow prism, with ¾-in. hole ..	1 17 6	Z2.	Kohlrausch total reflectometer, adapted to take the place of the prism table ..	7 10 0
M.	" " " brass case ..	2 12 6			
N.	Copy of Rowland's grating, 14,514 lines to the inch ..	1 2 6			
O.	Illuminating Attachment to eye-piece (a modified form of Gauss' eye-piece) ..	0 11 6			
P.	Plane parallel mirror, silvered both sides ..	0 15 0			
Q.	Extra eye-pieces, each ..	0 11 6			
R.	Nicol prism polariser and analyser to fit over the object end of collimator and telescope—the analyser fitted with divided circle, reading to 1 minute, with clamp and fine adjustment ..	7 5 0			



### 1710.—Repeating Spectrometer, "University" pattern.

The construction of this instrument is such that the telescope can be rotated and accurately set independently of either circle or verniers, and it can also be clamped to the circle in such a manner that the telescope and circle move together; so that in measuring the angular movement of the telescope, the angle can be read step by step all round the circle, thus eliminating any error due to eccentricity. The circle is divided on silver and read by two opposite verniers to 10 seconds. There are four concentric axes—the inner one carries the verniers and the prism table, etc.; the second one is attached to the base of the instrument; the third carries the circle, and the fourth the telescope. Each axis is provided with clamp and fine adjustment. The focal length of telescope and collimator is about 10 in. and an adjustment is provided for setting the cross-wires. The telescope and collimator radial or otherwise.

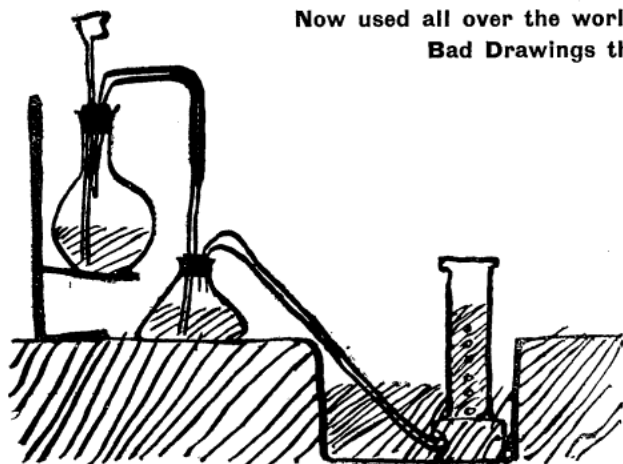
10 in. The telescope is provided with rack-motion and cross-wires, collimator is also provided with rack-motion and a symmetrical slit. An adjustment is provided for setting the telescope and collimator radial or otherwise.

Price, with case .. .. . £37 10 0

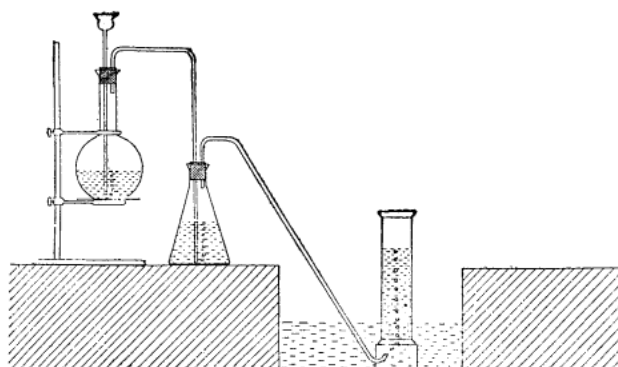
(Accessories, the same as for Spectrometer, S.N. pattern, see page 268, No. 1707.)

## “NIVOC” PATENT STENCILS

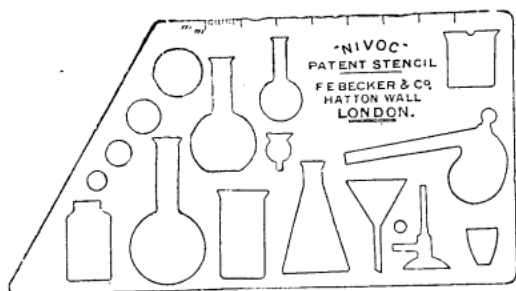
Now used all over the world where Chemistry is taught.  
 Bad Drawings things of the past.



Student's sketch, drawn by hand in the usual way.

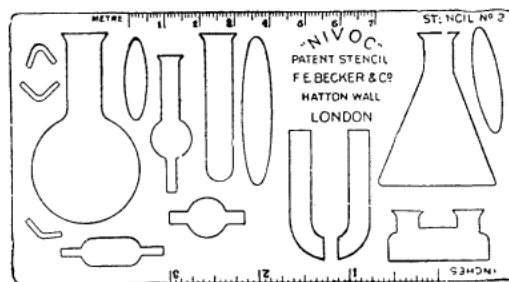


Drawn by the same student, but with use of “Nivoc” Patent Stencil.



**Stencil No. 1** ( $\frac{1}{2}$  Actual Size).

It has been found that Students when supplied with these Stencils take a greater interest in their work, and produce perfectly symmetrical drawings in a remarkably short space of time.



**Stencil No. 2** ( $\frac{1}{2}$  Actual Size).

Stencil No. 2 will be found useful for producing drawings on a larger scale than is possible with No. 1, but most Science Masters order an equal quantity of each.

### EXAMINATIONS.

Extracted from the Matriculation and Science Programme of the University of London:—

**“Candidates taking Chemistry will be permitted, if they desire it, to use a stencil for making drawings of apparatus.”**

**USE “NIVOC” PATENT STENCIL.**

👉 The Indian Educational Authorities have sanctioned the use of these Stencils. 👈

PRICES.

1711.—“Nivoc” Stencil No. 1 .. .. .	.. .. .	each 1/-
1712.—“Nivoc” Stencil No. 2 .. .. .	.. .. .	” 1/-

Our Balances and Weights have achieved World-wide Reputation : *vide* Opinions of the Leading Scientific Press.

## “NIVOC” PATENT STENCILS

### DIRECTIONS AND SUGGESTIONS FOR USE.

The “Nivoc” Stencil consists of a flexible plate having “cut-outs” of various articles such as Flasks, Beakers, Bunsen Burner, Funnel, etc., so that by placing the point of a pencil inside these “cut-outs,” and following the directions of the curves and lines, all the articles illustrated may be neatly drawn.

With a little thought and care a great many other articles similar to those illustrated on this page can be drawn, and of course much more quickly and accurately than by hand alone. It will be noticed that the edges of the Stencil itself form different angles, and these are of the greatest assistance when drawing bent delivery tubes (see Figs. 5 and 6). The DOTTED line shown in Fig. A should always be drawn by hand alone—thus to avoid the ugly corner shown in Fig. B.

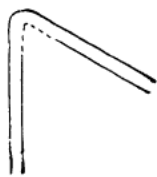


FIG. A.

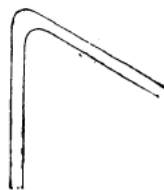


FIG. B.

The edges will also be found useful for drawing Pneumatic Troughs, Retort Stands, Tripod Stands, Tubes, etc.

**FIG. 1.** For straight lines use edge of Stencil, for capsule—bottom part of crucible, for top part of stopper—one of the circles.

**FIG. 2.** Use bulb of flat-bottomed flask, edge of Stencil—and one of the circles.

**FIG. 3.** Use edge of Stencil, or if smaller sketch will do—wide-necked bottle.]

**FIG. 4.** Use edge of Stencil and two of the circles.

**FIG. 5.** Use Thistle Funnel, edges of Stencil, flat-bottomed flask.

**FIG. 6.** For large Woulff's Bottle use wide-lipped Beaker, edges of Stencil, Thistle Funnel, and for the small Woulff's Bottle use wide-mouthed bottle and edge of Stencil.

**FIG. 7.** Use edge of Stencil for straight lines, circles for the bulbs and curves.

These and many other ways of using the Stencil will suggest themselves to the user.

The m/m scale may be used for finding the centre of any article drawn with the edge of the Stencil and also for determining the length to which a line shall be taken.

The Stencil is transparent, therefore no difficulty should be experienced in drawing one piece of apparatus in the desired relative position to another.



FIG. C.

**IMPORTANT.**—When using “Nivoc” Stencils see that your pencil has a fairly sharp point as shown in Fig. C; also keep pencil in a vertical position, otherwise you will not make symmetrical drawings.

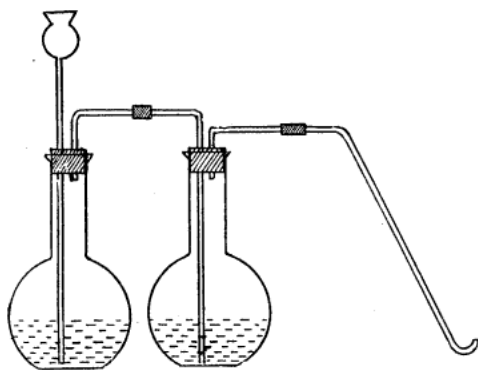


FIG. 5.

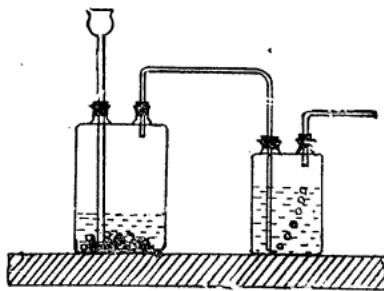


FIG. 6.

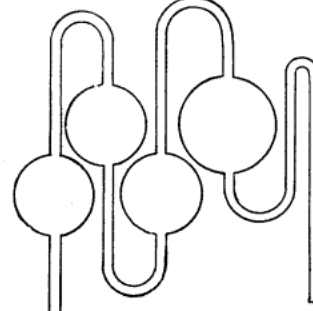


FIG. 7.



FIG. 1.

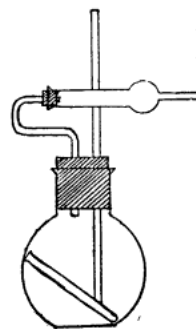


FIG. 2.

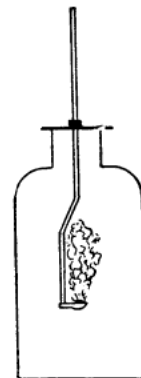


FIG. 3.

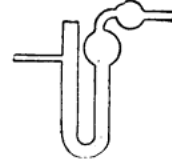
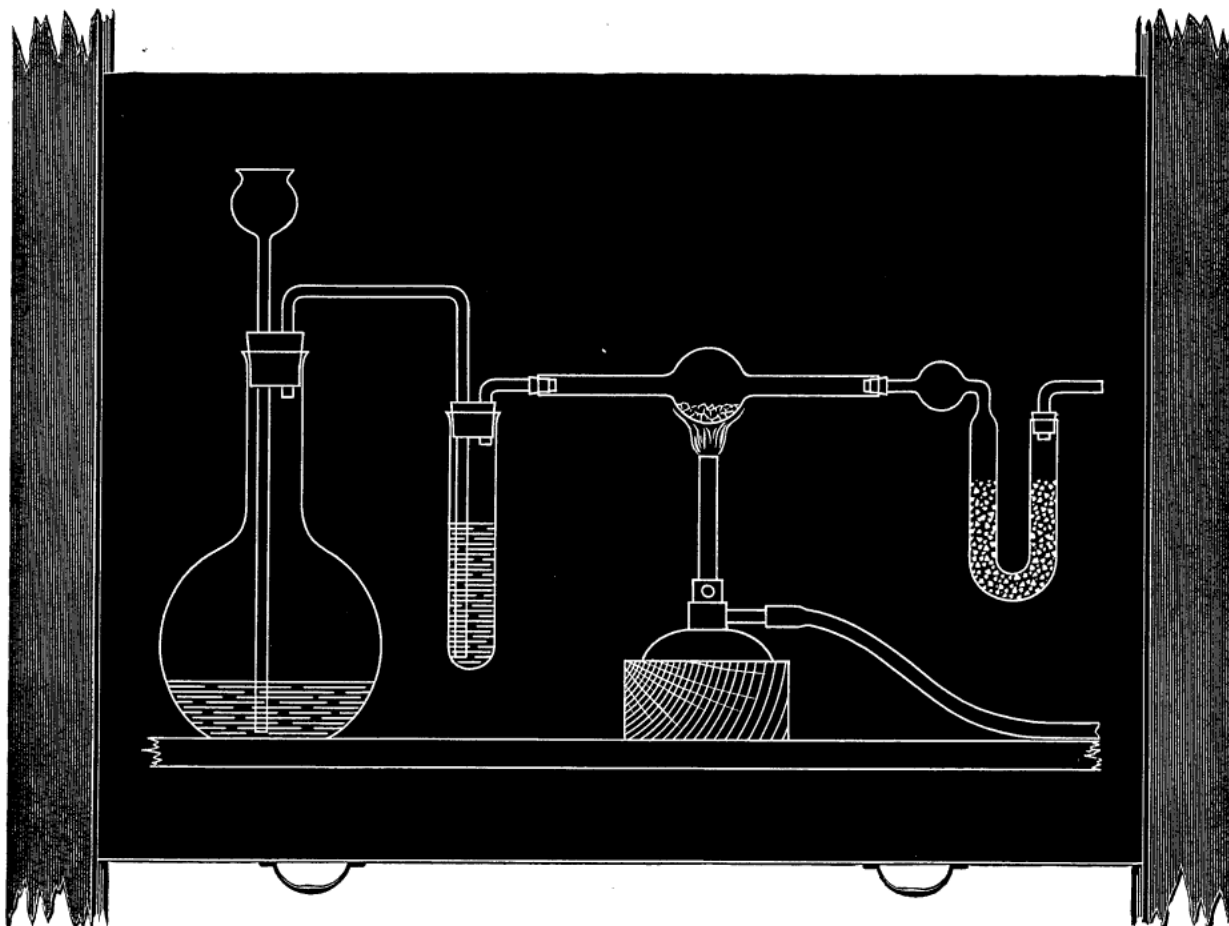


FIG. 4.

# "NIVOC" BLACKBOARD STENCILS



This diagrammatic sketch was made **within a few minutes** by an inexperienced draughtsman with the aid of "Nivoc" Blackboard Stencils. Other sketches can be made just as quickly by selecting suitable stencils from the set.

**1713.—The "Nivoc" Set of Blackboard Stencils for Demonstrators' Use.** These stencils are similar in design to our patent "Nivoc" Stencils for notebooks, fully described on pages 270 and 271, but made on a much larger scale for blackboard use. In addition to a chalk holder and a clamp (both registered patterns), the set comprises eighteen separate wooden stencils, as follows:—

- |                              |                          |                              |
|------------------------------|--------------------------|------------------------------|
| 1 Flask, large size.         | 1 Retort with tubulure.  | 1 Pipette.                   |
| 1 " small "                  | 1 Funnel.                | 1 U tube.                    |
| 1 Beaker, large size.        | 1 Bunsen burner.         | 1 Thistle funnel (top part). |
| 1 " medium size.             | 1 Calcium chloride tube. | 1 Set of circles and angles. |
| 1 " small "                  | 1 Reduction tube.        | Supply of chalks.            |
| 1 Conical flask, large size. | 1 Test tube.             |                              |
| 1 Woulff's bottle.           | 1 Crucible.              |                              |

The chalk holder enables the lecturer to draw connecting and delivery tubes (either straight or curved) in one operation, thus ensuring perfectly parallel lines. The clamp is a simple device for holding a chalk so that when being sharpened, a writing edge of uniform and correct thickness is always produced.

**PRICE, complete in wooden box** .. .. . **£1 1 0**

Every requisite for **Chemical, Physical, and Bacteriological** work supplied, from a test tube to the complete furnishing of the largest laboratory.



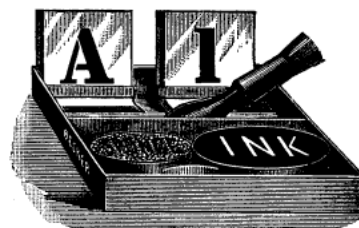
## STENCILS

**1714.—Zincplate Stencils**, complete in box, consisting of Set of Letters and figures with sponge, ink and brush.

	A	B	C
Size of letters and figures.. .. .	1	1½	2 in.
Price, per set .. .. .	7/6	11/6	14/-

**1715.—Stencil Inks**, in various colours.

	Black	Blue	Red
Each .. .. .	1/-	1/3	1/3



1714

## VARIOUS STANDS AND SUPPORTS

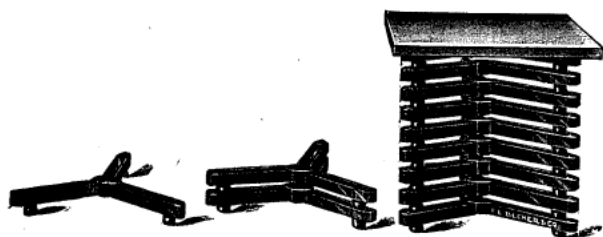


FIG. A

FIG. B

FIG. C

Will not Warp.



FIG. D

Absolutely Rigid.



FIG. E

**Geometric Tripod Stands.**—The geometric forms were designed in the first instance by Professor C. V. Boys. Their use will be readily understood from the illustrations, the three rounded feet of the upper tripod fitting rigidly in the V grooves in the tripod below, and so on until the desired height is attained.

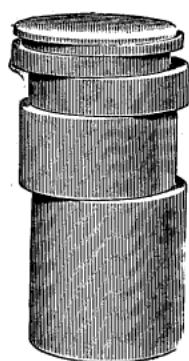
Made in two heights, viz.:—"Shallow" pattern, Fig. A, height 1 in. "Tall" pattern, Fig. D, height 2½ in.

Fig. B shows two sections of the "Shallow" pattern—making a total height of 2 in.; Fig. C shows nine sections, making a total height (without table-top) of 9 in.

Fig. E shows a table fitted with three levelling screws for placing on top of either of the two patterns above mentioned.

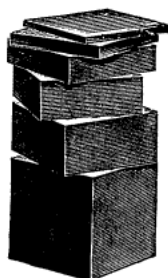
### PRICES.

<b>1716.</b> —"Shallow" Pattern, total height 1 in., made of iron (see Fig. A) .. .. .	per doz.	14/-
<b>1717.</b> —"Tall" Pattern, total height 2½ in., made of iron (see Fig. D) .. .. .	"	15/-
<b>1718.</b> —Iron Table Tops, very accurately planed and fitted with three levelling screws (see Fig. E) .. .. .	each	16/-
<b>1719.</b> —Plain Ground Glass Table Tops, may be used instead of Fig. E .. .. .	"	3/6
<b>1720.</b> —Table Top, consisting of one iron geometric tripod (Fig. A) to which is permanently fixed a wooden table top .. .. .	"	4/6
<b>1721.</b> —Ditto, but larger size tripod (Fig. D) .. .. .	"	6/-



1722

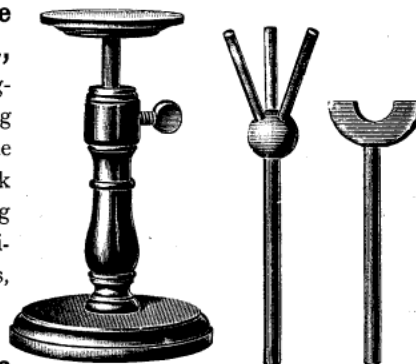
**1722.—Blocks of Wood**, round, stained black, consisting of six pieces of different sizes.  
 Per set .. 4/6



1723

**1723.—Blocks of Wood**, square shape, stained black, consisting of six pieces of different sizes.  
 Per set .. 4/6

**1724.—Berzelius Table Support**, polished mahogany. Consisting of sliding table support, crook for supporting tubes and a tripod for globes, basins, etc.  
 Each, complete 8/6



Our Balances and Weights have achieved World-wide Reputation: *vide* Opinions of the Leading Scientific Press.

R

## TRIPOD STANDS

**1725.—Tripods**, stout iron, triangular.  
Length of side 5 in., height 7 in., each 1/-



1725/8

**1726.—Tripods.** Length of side 6 in., height 7 in. .. .. each 1/3

**1727.—Tripods.** Length of side 7½ in., height 8 in. .. .. each 1/6

**1728.—Tripods.** Length of side 10 in., height 9½ in. .. .. each 2/-

**1729.—Tripods**, stout iron, round.  
Diameter of top 4 in., height 7 in., each 1/-



1729/31

**1730.—Tripods.** Diameter of top 6 in., height 8 in. .. .. each 1/3

**1731.—Tripods.** Diameter of top 8 in., height 10 in. .. .. each 1/9

## LABORATORY STANDS

**1732.—Rising Table Supports**, polished mahogany, loaded foot; for raising apparatus to different heights.

Diameter of table.. 3 4 6 in.  
Price, each .. 4/9 5/3 7/-



1732

For **Retort Stands**, see pages 245, 246 and 247.

„ **Burette Stands**, see pages 134 and 135.

„ **Funnel Stands**, see page 182.

„ **Bunsen's Universal Supports**, see page 135.

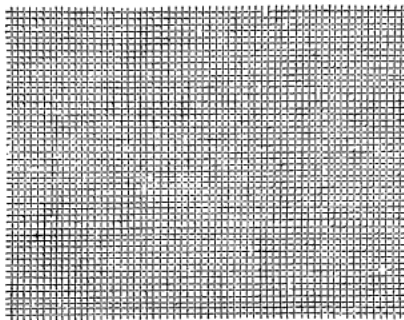
„ **Hinged Wooden Clamps**, see page 136.



1733

**1733.—Block of Wood with Sliding Rod**, rising from 4 to 6 in.  
Each .. .. 2/-

## WIRE GAUZE



1734/1737

**1734.—Iron Wire Gauze**, in squares, 10 holes to the inch.

A. 3×3 in. per doz. 10d. C. 5×5 in. per doz. 1/9  
B. 4×4 in. „ 1/- D. 6×6 in. „ 2/3

**1735.—Iron Wire Gauze**, in squares, 20 holes to the inch.

A. 3×3 in. per doz. 1/3 C. 5×5 in. per doz. 2/3  
B. 4×4 in. „ 1/4 D. 6×6 in. „ 3/-

**1736.—Iron Wire Gauze**, in squares, 30 holes to the inch.

A. 3×3 in. per doz. 1/6 C. 5×5 in. per doz. 3/-  
B. 4×4 in. „ 1/8 D. 6×6 in. „ 3/10

**1737.—Iron Wire Gauze**, as above, but not cut up.

A. Holes to the lineal inch, 10 .. price per sq. ft. 9d.  
B. „ „ „ 20 .. „ „ 1/2  
C. „ „ „ 30 .. „ „ 1/4  
D. „ „ „ 40 .. „ „ 2/6

**1738.—Copper Wire Gauze.**

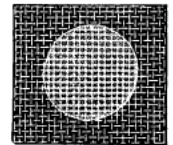
A. Holes to the lineal inch, 10 .. price per sq. ft. 1/6  
B. „ „ „ 20 .. „ „ 1/7  
C. „ „ „ 30 .. „ „ 1/9  
D. „ „ „ 40 .. „ „ 2/-  
E. „ „ „ 60 .. „ „ 2/6  
F. „ „ „ 90 .. „ „ 5/3

**1739.—Brass Wire Gauze.**

A. Holes to the lineal inch, 10 .. price per sq. ft. 1/6  
B. „ „ „ 20 .. „ „ 1/7  
C. „ „ „ 30 .. „ „ 1/9  
D. „ „ „ 40 .. „ „ 2/-  
E. „ „ „ 60 .. „ „ 2/6  
F. „ „ „ 90 .. „ „ 5/3

**1740.—Iron Wire Gauze, combined with Asbestos**, lasts much longer than the ordinary wire gauze.

A. 4×4 in. .. .. per doz. 3/9  
B. 5×5 in. .. .. „ 4/6  
C. 6×6 in. .. .. „ 5/6



1740

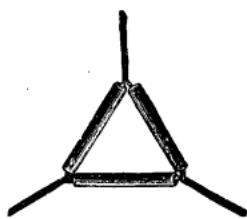
**1741.—Asbestos Millboard**, in lieu of wire gauze, distributes the heat very evenly; also very useful for placing hot beakers, flasks, etc., upon.

	Each.	Per doz.
A. 4 in. square × 1/8 in. thick ..	3d.	2/-
B. 5 „ „ × 1/8 „ „ ..	4d.	3/6
C. 6 „ „ × 1/8 „ „ ..	5d.	4/6
D. 9 „ „ × 1/8 „ „ ..	11d.	10/-
E. 12 „ „ × 1/8 „ „ ..	1/6	16/-
F. 12 „ „ × 3/16 „ „ ..	2/6	25/-

Our stock of pure Chemicals and Acids is very considerable; hence all orders are executed with the utmost despatch. See comprehensive list at end of Catalogue.

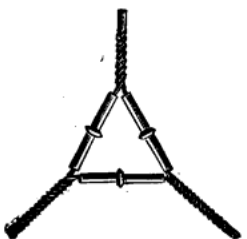
## TRIANGLES

(For SILICA TRIANGLES, see page 20.)



### 1742.—Pipeclay Triangles.

Size .. ..	1½	2 in.
Per dozen ..	1/9	1/10
Per gross ..	18/-	19/-
Size .. ..	2½	3 in.
Per dozen ..	1/10	2/-
Per gross ..	20/-	20/-



### 1743.—Triangles of Iron Wire with Pipeclay Tubes, the middle of each has a ridge so that the flame can reach the crucible on all sides.

Side of Triangle ..	50	60	80	100 mm.
Price, per dozen ..	3/4	3/6	3/9	4/-



### 1744. — Malleable Iron Triangles.

Side of Triangle ..	1½	2 in.
Price, each ..	2d.	3d.
Side of Triangle ..	2½	3 in.
Price, each ..	3d.	4d.

### 1745.—Nickel Wire Triangles.

Small. Medium. Large.  
 10d. 1/- 1/4 each.

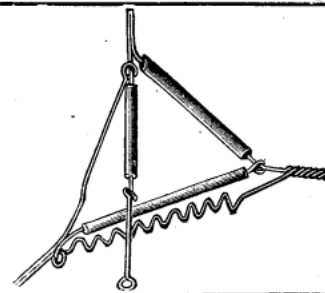


### 1746.—Ditto, of platinum.

Lowest prices on application.

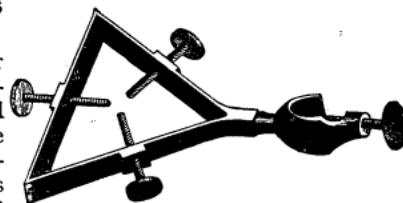
### 1747. — Universal Triangles, iron wire covered, with pipeclay, suitable for small and large crucibles.

Each .. ..	9d.
Per dozen ..	8/-

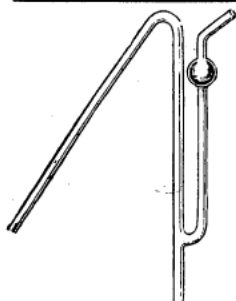


### 1748. — Brass Triangles,

with boss for fixing on to retort stand, and with adjustable screws for crucibles of various sizes each 4/6



## SYPHONS AND SYRINGES



### 1749.—Glass Syphons, with suction tube and bulb.

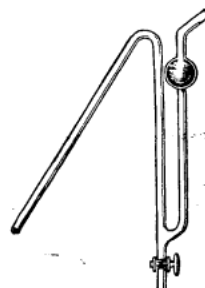
Length ..	8	10	15 in.
Each ..	2/3	2/6	3/3
Length ..	—	20	30 in.
Each ..	—	3/9	6/-

### 1750.—Ditto, plain, without suction tube.

Length .. ..	12	15	18	30 in.
Each .. ..	1/-	1/4	1/9	2/3

### 1752.—Glass Syphons, with suction tube and glass stopcock.

Length .. ..	12	15 in.
Each .. ..	5/6	6/-
Length .. ..	18	30 in.
Each .. ..	7/-	8/6

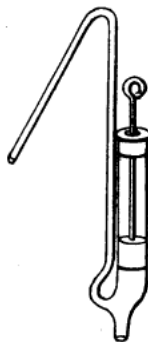


1752

### 1751.—Glass Syringes, with solid glass plunger.

Capacity .. ..	¼	½ oz.
Each .. ..	5d.	6d.
Dozen .. ..	3/6	4/-
Capacity .. ..	1	2 oz.
Each .. ..	7d.	9d.
Dozen .. ..	5/6	8/-

1751

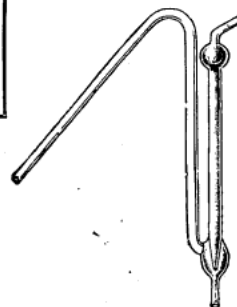


1753

### 1753.—Glass Syphons, with lift pump instead of suction tube .. each 8/6

### 1754.—Glass Syphons, improved safety pattern. The action of the syphon is started by blowing.

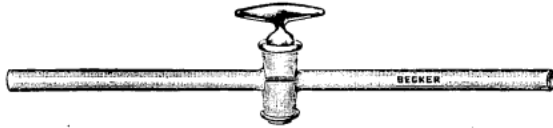
Length .. ..	12	24 in.
Price .. ..	4/6	5/6 each.



1754

Every requisite for Chemical, Physical, and Bacteriological work supplied, from a test tube to the complete furnishing of the largest laboratory.

## STOPCOCKS



**1755.—Stopcocks**, glass, best quality, very accurately ground. Total length about 9 inches.

Diam. of bore in plug	1	2	3	4	5 mm.
Each .. .. .	2/9	3/-	3/3	3/9	4/6



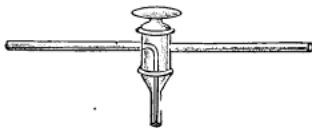
**1756.—Stopcocks**, glass, with oblique bore.

Diameter of bore in plug	2	3	4	5 mm.
Each .. .. .	4/3	5/3	6/-	7/6



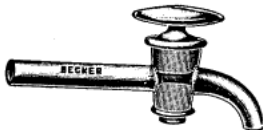
**1757.—Stopcocks**, glass, with oblique bore and mercury cup.

Diameter of bore in plug	2	3	4	5 mm.
Each .. .. .	6/9	7/6	8/-	9/6



**1758.—Stopcocks**, glass, three-way, solid plug.

Diameter of bore of plug	2	3	4 mm.
Each .. .. .	4/6	5/-	5/6

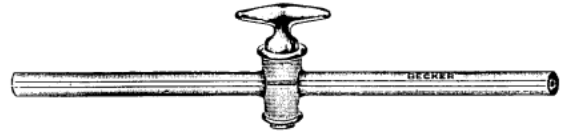


**1759.—Glass Taps**, bent for aspirators.

Diameter of bore ..	4	5	7	9 mm.
Each .. .. .	3/9	4/6	6/6	7/6

**1760.—Stopcocks**, small, for sealing to burettes, bore 1 to 2 mm., shape as in Burette No. 65, Fig. D, page 10 .. .. . each **2/9**

**1761.—Stopcocks**, small, for sealing to burettes, bore 1 to 2 mm., shape as in Burette No. 66, Fig. E, page 10 .. .. . each **2/9**



**1762.—Stopcocks**, glass, with side *capillary* tubes.

Diameter of bore in plug .. .. .	1 to 2 mm.
Each .. .. .	3/9

**1763.—Four-way Stopcocks**, glass, solid plug.

Diam. of bore of plug.	Each.
2 mm. .. .. .	5/6
3 " .. .. .	6/-
4 " .. .. .	7/6

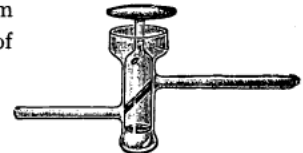


**1764.—Three-way Stopcocks**, glass, solid plug, as No. 1763 but with three tubes.

Diam. of bore of plug.	Each.
2 mm. .. .. .	4/-
3 " .. .. .	4/6
4 " .. .. .	6/-

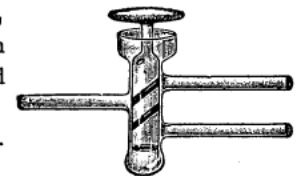
**1765.—Stopcocks**, glass, single way, with mercury joint at top and bottom to prevent entrance of air.

Bore about	2	4 mm.
Each .. .. .	6/9	8/-



**1766.—Stopcocks**, glass, three-way, with mercury joint at top and bottom.

Bore about	2	4 mm.
Each .. .. .	8/6	12/6



**1767.—Stopcocks**, small, three-way, for sealing to burettes, bore 1 to 2 mm., shape as in Burette No. 67, Fig. F, page 10 .. .. . each **4/-**

**1768.—Ground Glass Joints**, made out of soft soda glass tubing, ready for sealing on.

Diameter of tube	10	12	14	21	25 mm.
Each .. .. .	2/4	2/6	3/3	4/-	5/3

Our Balances and Weights have achieved World-wide Reputation : *vide* Opinions of the Leading Scientific Press.

## TEST TUBES

**1769. — Test Tubes.** Best thin hard white glass, packed in cardboard boxes.

Length in inches.	Diameter in inches.	Per single gross.	Per gross taking 10 gross of one size.
2 × ¼	.. ..	1/9	1/6
2 × ⅜	.. ..	2/9	2/4
3 × ¼	.. ..	3/-	2/6
3 × ⅜	.. ..	3/6	3/-
3 × ½	.. ..	4/-	3/6
4 × ½	.. ..	5/-	4/-
5 × ½	.. ..	6/6	5/6
5 × ⅝	.. ..	7/-	6/-
5 × ¾	.. ..	7/6	6/3
6 × ⅝	.. ..	8/-	6/6
6 × ¾	.. ..	10/-	9/-
6 × 1	.. ..	15/-	13/6
6 × 1¼	.. ..	24/-	22/-
7 × 1¼	.. ..	26/-	24/-
8 × 1½	.. ..	46/-	40/-



**1772. — Test Tubes, extra strong, and made out of thick hard glass Combustion Tubing.**

Length in inches.	Diameter in inches.	Price each.	Price per doz.	Price per gross.
3 × ½	.. ..	3d.	2/-	21/-
4 × ½	.. ..	3d.	2/3	24/-
5 × ⅝	.. ..	4d.	2/6	28/-
6 × ⅝	.. ..	4d.	3/-	32/-
5 × ¾	.. ..	4d.	3/3	35/-
6 × ¾	.. ..	5d.	3/6	40/-
6 × 1	.. ..	6d.	5/6	60/-



**1773. — Test Tube, with side tubes, 6 in. × ⅜ in.**  
 Each .. 6d.  
 Per dozen .. 5/-



**1774. — Test Tube, with bulb.**  
 A. 5 in. × ⅝ in.,  
 Per dozen 1/6  
 Per gross 16/-  
 B. 6 in. × ¾ in.,  
 Per dozen 2/-  
 Per gross 21/6



**1770. — Bacteriological Test Tubes, guaranteed finest quality and extra strong for Bacteriological work.**

Length	5	6	6	7 in.
Diameter	⅝	⅝	¾	¾ in.
Per dozen	1/2	1/3	1/8	1/10
Per gross	12/-	13/-	18/-	20/-



**1771. — Test Tubes on feet.**

Height	3	4	5	5	6	6	7 in.
Diam.	⅜	½	½	⅝	⅝	¾	1 1/8 in.
Each	3d.	3d.	3d.	4d.	5d.	5d.	7d. 11d.
Doz.	2/-	2/3	2/6	3/-	3/6	4/-	6/- 10/-

**1775. — Test Tubes for Government Heat Test, of uniform capacity and weight, with 3 marks to Government specification, fully described in the First Report of the Departmental Committee on the Heat Test as applied to Explosives.**

Each	1/5
Per dozen	15/-

**1776. — Ignition Test Tubes, made out of hard Combustion Tubing, without bulb.**

Length	2	4 in.
Diameter	¼	½ in.
Per gross	7/6	12/-



**1777. — Ignition Test Tubes, with bulb.**

Per doz.	1/8
Per gross	17/6

## TEST TUBE HOLDERS



**1778. — Test Tube Holders, wooden, with steel spring or rubber ring for closing jaws.**

Each	4d.
Per dozen	3/3



**1779. — Test Tube Holder, flat brass, with slider.**

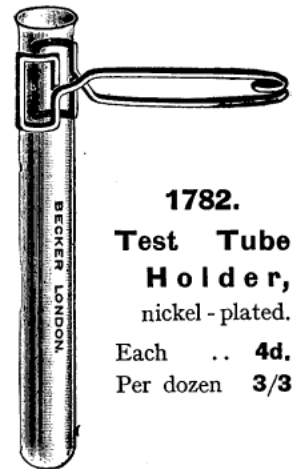
Each	7d.
Per dozen	6/-



**1780. — Test Tube Holder, wire pattern, in polished handle** .. .. each 8d.; per doz. 7/6



**1781. — Test Tube Holder, extra strong, mounted in polished handle** .. each 1/-; per doz. 11/-



**1782. Test Tube Holder, nickel-plated.**  
 Each .. 4d.  
 Per dozen 3/3

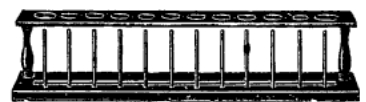
Our stock of pure Chemicals and Acids is very considerable; hence all orders are executed with the utmost despatch. See comprehensive list at end of Catalogue.

## TEST TUBE STANDS

- 1783.**—Test Tube Stand, made of hard teak wood, with 6 holes in one row.  
 each 1/6
- 1784.**—Test Tube Stand, made of hard teak wood, with 8 holes in one row.  
 each 1/9
- 1785.**—Test Tube Stand, made of hard teak wood, with 12 holes in one row.  
 each 2/3



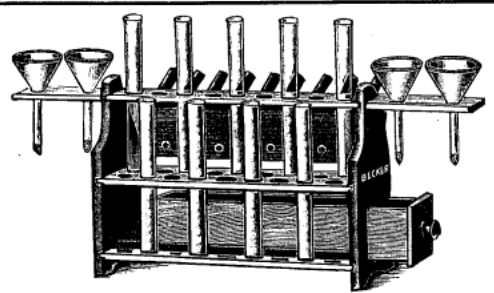
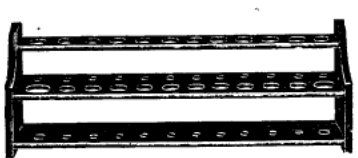
- 1786.**—Test Tube Stand, made of hard teak wood, furnished with 6 holes and pegs .. .. . each 2/3
- 1787.**—Test Tube Stand, made of hard teak wood, furnished with 8 holes and pegs .. .. . each 2/9
- 1788.**—Test Tube Stand, made of hard teak wood, furnished with 12 holes and pegs .. .. . each 3/10



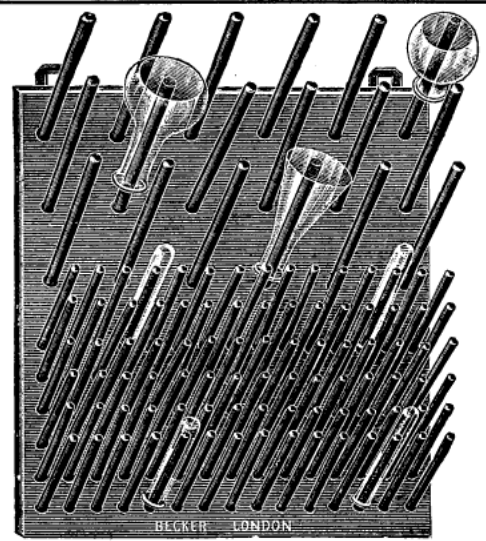
- 1789.**—Test Tube Stand, made of hard teak wood, provided with 22 holes for test tubes and 2 large holes for boiling tubes .. .. . each 4/9



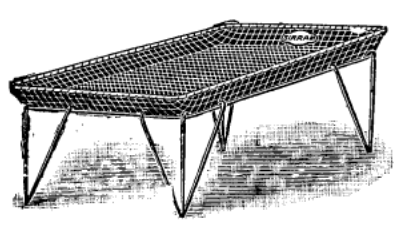
- 1790.**—Test Tube Stand, polished mahogany, with 12 holes in two rows.  
 each 3/-
- 1791.**—Test Tube Stand, polished mahogany, with 18 holes in two rows.  
 each 3/9
- 1792.**—Test Tube Stand, polished mahogany, with 24 holes in two rows.  
 each 5/-



- 1793.**—Test Tube Stand, "Lecture Table" pattern, 18 holes in two rows, 4 holes for small funnels, and one drawer .. .. . each 8/6



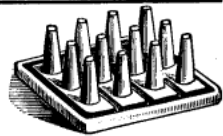
- 1796.**—Draining Rack, for hanging, furnished with 90 pegs for test tubes and 18 pegs for flasks, etc.  
 Each .. .. . 21/-



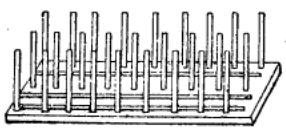
- 1794.**  
**Draining Tray,**  
 for glass and porcelain apparatus, wire frame absolutely indestructible, rust proof and very strong.

Size 18 in. x 12 in. 20 in. x 14 in. 22 in. x 16 in.  
 Each 8/6 10/6 12/9

- 1797.**—Solid Porcelain Support for test tubes.  
 Each .. .. . 3/9



- 1795.**  
**Wooden Draining Rack,** strongly made, with 33 pegs for test tubes, etc.  
 Each .. .. . 5/6



For **Test Tube Cleaners**, see page 137.  
 For **Test Tube Baskets**, see page 137.

Every requisite for Chemical, Physical, and Bacteriological work supplied, from a test tube to the complete furnishing of the largest laboratory.

## TEST GLASSES



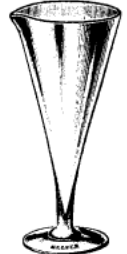
1798

**1798.—Test Glasses**, cylindrical on glass foot, with spout.

Capacity ..	50	75	125	c.c.
Each ..	9d.	10d.	1/1	
Per dozen ..	8/-	9/-	11/-	
-----				
Capacity ..	200	300	400	500 c.c.
Each ..	1/4	1/7	1/9	1/10
Per dozen ..	14/-	17/-	19/-	20/-

**1799.—Test Glasses**, conical, on glass foot, with spout.

Capacity ..	30	50	75	c.c.
Each ..	8d.	9d.	10d.	
Per dozen ..	7/-	8/-	9/-	
-----				
Capacity ..	125	200	500	c.c.
Each ..	1/1	1/4	1/10	
Per dozen ..	11/-	14/-	20/-	



1799

## TEST PAPERS



**1800.—Blue Litmus Books**, Bibulus. Per book 1½d., per dozen books 1/4, per gross books 13/6.

**1801.—Red Litmus Books**, Bibulus. Per book 1½d., per dozen books 1/4, per gross books 13/6.

**1802.—Extra Sensitive Litmus Papers.** Red or blue, each book in a separate wrapping. Per book 2d., per dozen books 1/9.

*N.B.—No. 1802 should always be kept in air-tight stoppered bottles.*

**1803.—Turmeric Books.** Per book 3d., per dozen books 2/-, per gross books 22/6.

**1804.—Lead Books.** Per book 2d., per doz. books 1/6, per gross books 13/6.

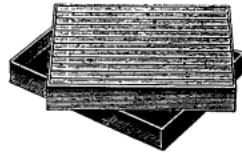
**1805.—Starch Books.** Per book 2d., per doz. books 1/2, per gross books 12/-.

**1806.—Congo-Red Books.** Per book 3d., per dozen books 2/3, per gross books 21/-.

**1807.—Oil Test Paper**, in tubes containing 120 strips. Per tube 10/6.

**1808.—Phenol-Phthaleine Paper.** Per book 3d., per dozen books 2/-.

**1809.—Brazil Wood Test Papers.** Per book 2d., per dozen books 1/6, per gross books 15/-.



**1810.—“Centitest” Perforated Ribbon Test Papers**, in tin boxes, containing sufficient paper for 100 tests.

A. “Centitest” Blue Litmus. Per box 5d., per dozen boxes 3/9, per gross boxes 43/-.

B. “Centitest” Red Litmus. Per box 5d., per dozen boxes 3/9, per gross boxes 43/-.

C. “Duplitest Paper,” perforated ribbon form as above, but with blue and red litmus side by side on one ribbon. Per box 7d., per dozen boxes 5/6, per gross boxes 63/-.

D. “Centitest” Turmeric. Per box 7d., per dozen boxes 5/6, per gross boxes 63/-.

### TEST PAPER IN SHEETS.

**1811.—Litmus Paper in Sheets.** Blue or red .. .. . per sheet 2d.

**1812.—Congo-Red Paper in Sheets.** per sheet 2d.

**1813.—Turmeric Paper in Sheets.** per sheet 2d.

**1814.—Turned Wooden Boxes**, for holding test papers, platinum foil, platinum wire, etc.

per doz. 2/-



**1815.—Litmus Pencil**, red one end, blue the other. Instructions for use sent out with each pencil.

Each .. .. . 2/-



Our Balances and Weights have achieved World-wide Reputation: *vide* Opinions of the Leading Scientific Press.

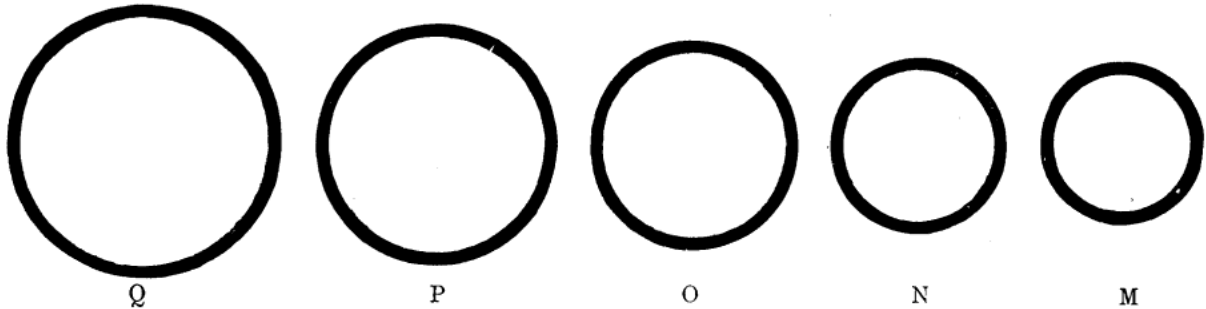
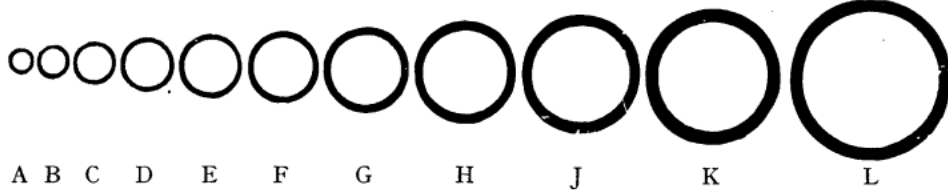


**For  
INDIA RUBBER  
TUBING,  
see page 249.**

**GLASS TUBING**

Soft Soda Glass, in 5-ft. Lengths.

Illustrations are shown full size.



**1816.—Glass Tubing**, best quality soft soda glass, for blowpipe work, etc. Guaranteed free from lead.

Size .. .. .	A	B	C	D	E	F	G	H	J	K	L
Outside diameter .. .. .	3 to 4	4 to 5	6	7	9	10	12	14	16	19	22 mm.
Per lb. .. .. .	2/6	2/6	1/8	1/8	1/8	1/8	1/8	1/8	1/9	1/9	1/9

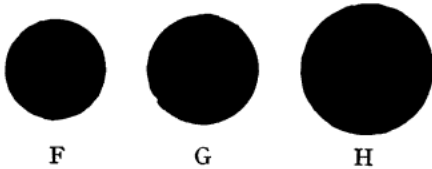
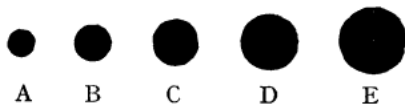
  

Size .. .. .	M	N	O	P	Q	R	S
Outside diameter .. .. .	23	25	30	35	40	45	50 mm.
Per lb. .. .. .	1/9	2/1	2/1	2/6	2/6	3/-	3/6

**We can draw glass tubing up to about 70 mm. outside diameter. Prices on application.**

**GLASS ROD**

Illustrations are shown full size.



**1817.—Glass Rod**, soft soda glass.

Sizes C, D and E.. .. .	per lb.	1/9
„ A and B .. .. .	„	2/-
„ F, G and H .. .. .	„	2/9

**THERMOMETER & BAROMETER TUBING, Etc.**



**1818.—Thermometer Tubing.**  
Soft soda glass, size A (as illustrated) .. .. . per lb. 2/9

**1819.—Thermometer Tubing.**  
Soft soda glass, size B (as illustrated) .. .. . 2/9

**1820.—Thermometer Tubing.**  
Soft soda glass, size C (as illustrated) .. .. . 2/9

**1821.—Barometer Tubing.**  
Soft soda glass, size D (as illustrated) .. .. . 2/3

**1822.—Barometer Tubing.**  
Soft soda glass, size E (as illustrated) .. .. . 2/3

**1823.—Glass Tubing, Thick Walled.**  
Soft soda glass, sizes F, G, H and J (as illustrated) .. .. . 2/9

**1824.—Glass Tubing, Thick Walled.**  
Soft soda glass, size K (as illustrated) .. .. . 2/9

Our stock of pure Chemicals and Acids is very considerable ; hence all orders are executed with the utmost despatch. See comprehensive list at end of Catalogue.

## COMBUSTION TUBES



1825

**1825.—Combustion Glass Tubing.** *Special quality to stand very high temperatures and frequent usings.*

External diameter 5 to 10 10½ to 25 26 to 32 mm.  
 Per lb. .. .. 5/6 5/- 6/-

The most convenient size for ordinary Laboratory Work has an *inside* diameter of 12 to 13 mm.



1826

**1826.—Combustion Glass Tubes,** made of stout hard glass Combustion Tubing as No. 1825, but cut into convenient lengths ready for use. Internal diam. 12-13 mm.

Length .. ..	8	10	12	14	18 in.
Each .. ..	7d.	8d.	10d.	1/1	1/3
Per dozen ..	6/-	7/6	9/6	12/-	14/6

**1827.—Iron Tube,** 9 in. long, ½ in. inside diameter, closed one end .. .. each 1/-



1828

**1828.—Combustion Glass Reduction Tubes,** with one bulb, made out of stout hard glass Combustion Tubing No. 1825.

Each .. .. 10d. Per dozen .. .. 9/-

**1829.—Ditto** with two bulbs.

Each .. .. 1/- Per dozen .. .. 11/-



1830

**1830.—Combustion Glass Tubes,** bent and drawn out ready for use. Made out of stout hard glass Combustion Tubing No. 1825.

Length .. ..	12	14	20	30 in.
Each .. ..	11d.	1/-	1/5	1/7
Per dozen ..	9/6	10/6	15/-	17/-



**1831.—Iron Tubes,** white enamelled inside, 26 in. × ¾ in. .. .. each 3/6



**1832.—Iron Tube,** 18 in. long, ¾ in. inside diameter, open both ends .. .. each 1/6



**1833.—Iron Tube,** 12 in. long, ¾ in. inside diameter, closed at one end .. .. each 1/3

## FLEXIBLE METALLIC TUBING

**1834.—Flexible Metallic Steel Tubing,** of great durability and strength, free from smell. Supplied in 2 ft., 3 ft., 4 ft., 5 ft., and 6 ft. lengths, with rubber ends complete—¾ in. for Bunsen burners.

- A. In lengths of 2 ft., with rubber push-on at each end. per 2 ft. length 1/8
- B. In lengths of 3 ft., with rubber push-on at each end. per 3 ft. length 2/-  
 (Other lengths supplied at 6d. per foot extra.)
- C. Rubber push-ons only .. .. per dozen 4/-

**1835.—Flexible Metallic Copper Tubing** (rubber ends, 4/- dozen extra.) Supplied in any length.

Size ¾ in. (for Bunsen burners) .. .. per foot 1/4



1834/5

For Rubber Tubing, see page 249.  
 „ Porcelain Combustion Tubes, see page 13.  
 „ Silica Tubes, see pages 22, 24 and 29.

Every requisite for Chemical, Physical, and Bacteriological work supplied, from a test tube to the complete furnishing of the largest laboratory.

# THERMOMETERS

Thermometers, of Jena normal glass, narrow, for passing through corks. Scale engraved on stems.

Each thermometer in cylindrical case, for general laboratory work.



Cat. No.	Range.	How Divided.	Price each.	Price per doz.	Cat. No.
1836	- 10° to 110° C.	single degrees	2/6	27/6	1836
1837	0° to 200° C.	single degrees	3/-	35/-	1837
1838	- 10° to 250° C.	single degrees	3/3	37/6	1838
1839	0° to 360° C.	single degrees	4/6	52/-	1839
1840	- 5° to 212° F.	single degrees	3/-	35/-	1840
1841	- 32° to 240° F.	single degrees	3/3	37/6	1841
1842	+ 10° to 400° F.	single degrees	3/6	40/-	1842
1843	0° to 600° F.	every 2 degrees	4/6	52/-	1843
1844	0° to 50° C.	half degree	3/-	35/-	1844
1845	- 10° to 110° C.	half degree	3/6	40/-	1845
1846	- 10° to 250° C.	half degree	4/6	50/-	1846
1847	0° to 50° C.	fifth degree	4/6	50/-	1847
1848	- 10° to 110° C.	fifth degree	6/-	70/-	1848
1849	+ 50° to 150° C.	fifth degree	6/-	70/-	1849
1850	- 10° to 50° C.	tenth degree	5/6	60/-	1850
1851	- 5° to 110° C.	tenth degree	6/6	72/-	1851

## BEST BRITISH STANDARD THERMOMETERS FOR RESEARCH WORK

### HIGHEST QUALITY:

Scale engraved on stem for experiments requiring great accuracy.

#### THE NATIONAL PHYSICAL LABORATORY,

KEW OBSERVATORY, RICHMOND, SURREY

#### CERTIFICATE OF EXAMINATION.

CENTIGRADE THERMOMETER—No. 32474 112  
by Becker, London

(VERIFIED UNMOUNTED AND IN A VERTICAL POSITION.)

Corrections (to the nearest 0.1) to be applied to the Scale Readings, determined by comparison with the STANDARD INSTRUMENTS at the National Physical Laboratory, Richmond.

At 0 ..... -0.1	35 ..... +0.1	70 ..... -0.0
5 ..... -0.1	40 ..... +0.1	75 ..... -0.0
10 ..... -0.1	45 ..... +0.1	80 ..... -0.0
15 ..... -0.1	50 ..... -0.0	85 ..... -0.0
20 ..... +0.1	55 ..... -0.0	90 ..... -0.0
25 ..... +0.1	60 ..... -0.1	95 ..... +0.1
30 ..... +0.1	65 ..... -0.1	100 ..... +0.2

Note.—I.—When the sign of the Correction is + the quantity noted is to be added to the observed scale reading, and when — to be subtracted from it.

II.—It is desirable that this instrument should be tested again after some time has elapsed, as Mercurial Thermometers are liable to read too high through age.

III.—The Correction attached to any temperature in the certificate applies only when the whole of the glass and the contained mercury possesses that temperature.

NATIONAL PHYSICAL LABORATORY,

July 1912.

R. J. Pagebrook  
DIRECTOR.



Cat. No.	Range.	Divided to	Each.	Natl. Phys. Laboratory Certificate.	
				Points Tested.	Extra.
1852	- 30 + 30° C.	1°	14/-	11	5/-
1853	- 5 + 55° C.	1°	14/-	11	4/6
1854	- 5 + 55° C.	2°	12/-	11	4/6
1855	+ 10 + 50° C.	1°	14/-	9	4/-
1856	- 10 + 110° C.	2°	16/-	21	12/-
1857	+ 20 + 100° C.	2°	15/-	15	10/-
1858	+ 50 + 105° C.	1°	16/-	11	8/-
1859	+ 50 + 105° C.	2°	14/-	11	8/-
1860	+ 70 + 130° C.	1°	16/-	7	14/-
1861	+ 80 + 150° C.	2°	17/6	7	14/-
1862	+ 100 + 210° C.	2°	22/-	6	15/-
1863	+ 140 + 210° C.	2°	22/-	7	15/-
1864	+ 200 + 300° C.	2°	25/-	6	22/-
1865	- 5 + 155° C.	5°	20/-	8	14/-
1866	- 5 + 205° C.	5°	21/-	9	15/-
1867	0 + 250° C.	5°	21/-	6	18/-
1868	0 + 300° C.	5°	25/-	7	22/-
1869	0 + 360° C.	5°	27/6	8	22/6
1870	+ 100 + 400° C.	5°	35/-	7	30/-
1871	+ 100 + 500° C.	1°	40/-	9	40/-
1872	0 + 120° F.	2°	14/-	13	6/-
1873	+ 20 + 120° F.	5°	10/-	7	3/-
1874	+ 20 + 220° F.	5°	16/-	19	10/-
1875	+ 120 + 220° F.	2°	16/-	10	8/-
1876	+ 30 + 300° F.	5°	20/-	8	14/-
1877	+ 30 + 400° F.	1°	20/-	10	21/-
1878	+ 30 + 600° F.	1°	25/-	7	20/-
1879	+ 100 + 800° F.	1°	40/-	8	27/6

## THERMOMETERS

**Thermometers** of Jena normal glass, with paper scale enclosed in outer tube, outside diameter of the thermometer from  $\frac{1}{4}$  in. to  $\frac{3}{8}$  in., each thermometer in cylindrical case.

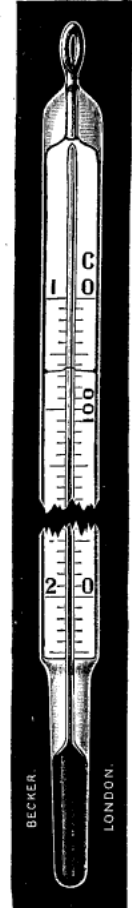
Cat. No.	Range.	How Divided.	Price each.	Price per doz.	Cat. No.
1880	-10° to +110° C.	single degrees	2/3	26/-	1880
1881	0° to 200° C.	single degrees	2/9	30/-	1881
1882	-10° to +250° C.	single degrees	3/-	34/-	1882
1883	0° to 360° C.	single degrees	3/6	40/-	1883
1884	0° to 150° F.	single degrees	2/-	22/-	1884
1885	-5° to +212° F.	single degrees	2/3	26/-	1885
1886	-32° to +240° F.	single degrees	2/6	27/6	1886
1887	+10° to +400° F.	every 2 degrees	2/9	30/-	1887
1888	0° to 600° F.	every 2 degrees	3/6	40/-	1888
1889	-10° to +110° C.	half degree	3/-	34/-	1889
1890	-10° to +250° C.	half degree	3/6	40/-	1890
1891	0° to 250° C.	fifth degree	5/-	55/-	1891
1892	-10° to +110° C.	fifth degree	4/6	50/-	1892
1893	+50° to +110° C.	fifth degree	4/-	45/-	1893

**Thermometers**, of Jena normal glass, with milk-glass scale enclosed in outer tube, outside diameter of tube about  $\frac{3}{8}$  in., each thermometer in cylindrical case.

1894	-10° to +110° C.	single degrees	2/9	30/-	1894
1895	0° to 250° C.	single degrees	3/9	40/-	1895
1896	0° to 360° C.	single degrees	4/-	46/-	1896
1897	-5° to +212° F.	single degrees	2/6	27/6	1897
1898	-32° to +240° F.	single degrees	3/-	34/-	1898
1899	+10° to +400° F.	single degrees	3/6	40/-	1899
1900	0° to 600° F.	every 2 degrees	4/-	46/-	1900



1880-1893  
Paper Scale.



1894-1900  
Milk Glass Scale.

**1901.—Thermometers**, of Jena normal glass, with both Fahrenheit and Centigrade scales, on strip of milk glass enclosed in outer tube, diameter  $\frac{3}{8}$  in.

A.	212° F. and 100° C.	.. .. .	each	3/6
B.	400° F. and 200° C.	.. .. .	..	4/-
C.	600° F. and 360° C.	.. .. .	..	5/6



**1902.—Special High Temperature Thermometers**, of Jena normal glass, filled with nitrogen, graduated on stem, enamelled backs, diameter about 6 mm.

A.	0° C. to 360° C., in single degrees ..	each	5/6	E.	100° C. to 360° C., in half degrees ..	each	11/6
B.	" " 400° C., " " " " " " " "	"	8/-	F.	+100° C. " 400° C., " single " " "	"	9/-
C.	" " " " " half " " " " " "	"	9/6	G.	0° C. " 460° C., " " " " " "	"	12/6
D.	+100° C. to 360° C., " single " " " "	"	8/6				

**1903.—Special Low Temperature Thermometers**, of Jena normal glass, for liquid air experiments; calibrated with the greatest precision, graduated on stem, enamelled backs.

Range .. .. .	+30° down to -120°	.. .. .	+30° down to -200° C.
Divided into .. .. .	single	.. .. .	single degrees
Filled with .. .. .	Toluol	.. .. .	Pentane
Price .. .. .	15/-	.. .. .	28/6 each.

## BECKMANN'S THERMOMETERS

*Directions for handling Beckmann Thermometers when the upper mercury reservoir has become full.*—First turn the Thermometer upside down, and then by lightly knocking the mercury bulb, let the mercury thread run forward so that it unites with the mercury in the reservoir. The Thermometer must now be very carefully placed in a slightly inclined position so that the mercury thread does not break but draws the mercury in the reservoir down with it; this treatment may probably have to be repeated several times. If, however, in spite of this, the mercury cannot be brought back out of the reservoir in this way, the latter must be slightly warmed and then treated as above stated.

**1904.**—Beckmann's Thermometers, of Jena normal glass, for the determination of molecular weights, milk-glass scale closed by metal cap at the top.

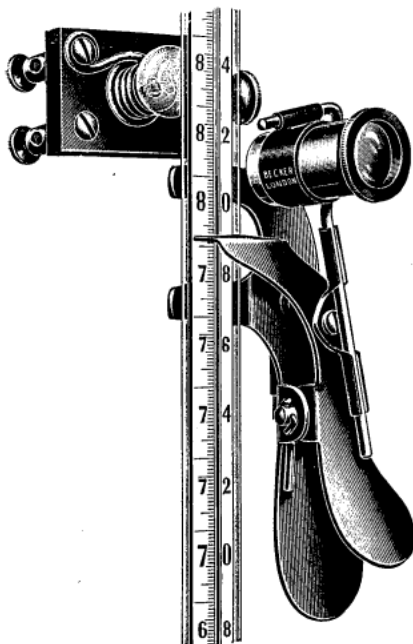
A.	Range of scale, 5° to 6° in $\frac{1}{100}$ ths .. .. .	each	£1 5 0
B.	" " " 1° in $\frac{1}{500}$ ths .. .. .	"	1 5 0
C.	" " " 10° to 12° in $\frac{1}{50}$ ths .. .. .	"	1 1 0
D.	" " " 25° to 30° in $\frac{1}{20}$ ths .. .. .	"	0 16 0
E.	" " " 50° to 60° in $\frac{1}{10}$ ths .. .. .	"	0 15 0

**1905.**—Beckmann's Thermometers, of Jena normal glass, with auxiliary scale.

A.	Ordinary pattern, range of scale 5° to 6°, divided into $\frac{1}{100}$ ths; extent of auxiliary scale-division, - 10° to + 120° C. in $\frac{1}{10}$ ° .. .. .	each	£1 8 0
B.	Ditto, new form, shorter in length, and with smaller mercury bulb .. .. .	"	1 8 0
C.	Ordinary pattern, range of scale 5° to 6°, divided into $\frac{1}{50}$ ths; extent of auxiliary scale, - 10° to + 120° C. in $\frac{1}{10}$ ° .. .. .	"	£1 5 0
D.	Ditto, new form, shorter in length, and with smaller mercury bulb .. .. .	"	1 5 0

**1906.**—Beckmann's Differential Thermometer, latest pattern, with fused-in absolute thermometer.

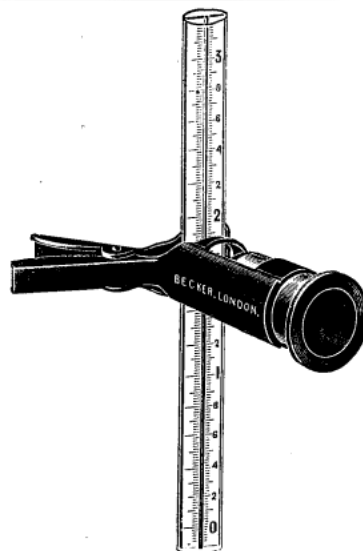
Range of scale of the differential thermometer, 5° to 6°, divided into  $\frac{1}{100}$ ths; extent of auxiliary scale, - 10° to + 120°, divided into  $\frac{1}{10}$ °; range of absolute thermometer, - 10° to + 120° in  $\frac{1}{10}$ ths .. .. . each **£3 3 0**



**1907.**—Powerful Magnifier, with electric lamp complete. Will fit any thermometer. All parts adjustable.

The electric lamp is fixed to the clamping arrangement and can be worked with a couple of dry cells.

Each .. .. . **21/-**



**1908.** Powerful Magnifier, for reading Beckmann thermometers.

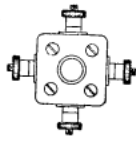
Each .. .. . **12/-**

Every requisite for Chemical, Physical, and Bacteriological work supplied, from a test tube to the complete furnishing of the largest laboratory.



## THERMOMETERS

**1937.—Platinum Resistance Thermometer**, for temperatures up to 500° C. Tube, porcelain throughout, 1 in. diameter, platinum bulb, copper leads throughout, hardwood heads, net price .. .. **£5 17 6**



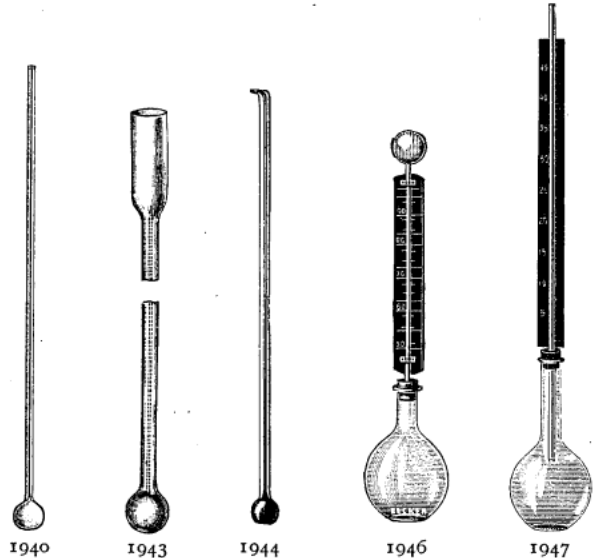
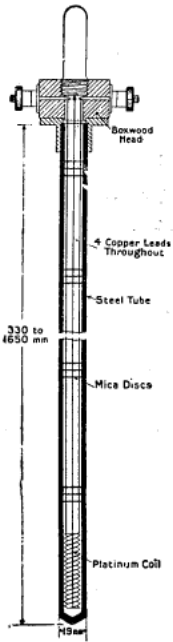
**1938.—Ditto**, for temperatures up to 1,200° C.  
 Price .. .. **£9 0 0**

**1939.—Thermo - Electric Thermometer**, suitable for research work, determination of recalescent points, etc. Especially useful when only a small quantity of the substance to be measured is available. For temperatures up to 1,400° C., or, with porcelain tube removed, to 1,600° C. Tube, porcelain throughout, 7 mm. diameter. Hardwood head, with simple device for holding the porcelain tube, in order that the tube may be readily replaced during an experiment. A table giving the constants of each thermo-couple is supplied.

Length of thermometer, 12 in. ; platinum-iridium.

Price .. .. **£6 15 0**  
 Length of thermometer, 12 in. ; platinum-rhodium.

Price .. .. **£7 0 0**  
 (The above thermometers vary in price according to the market price of platinum.)



**1940.—Empty Thermometer Tubes**, size of bulb, 1.5 cm., length of stem, 29 cm. per doz. **4/-**

**1941.—Ditto**, medium, size of bulb, 3.5 cm., length of stem, 45 cm. .. .. per doz. **5/-**

**1942.—Ditto**, large, size of bulb, 5.5 cm., length of stem, 70 cm. .. .. each **8d.** ; per doz. **6/6**

**1943.—Empty Thermometer Tubes**, enamelled back, with funnel end for filling, size of bulb, 1.5 cm., length of stem (including funnel), 33 cm. per doz. **5/-**

**1944.—Ungraduated Thermometers**, filled with mercury .. .. each **1/6**

**1945.—Ditto**, filled with spirit .. .. each **1/-**

**1946.—Air Thermometer**, with graduated scale, large size .. .. each **6/-**

**1947.—Model Thermometer**, to illustrate the expansion of liquids by heat, 40 oz. flask, with tube and scale .. .. each **5/6**

## CLINICAL THERMOMETERS

**1948.—4 in. Clinical thermometer**, hospital pattern, in metal case .. .. each **2/-**



**1949.—4 in. Clinical thermometer**, standard "Imperishable Index," in metal case .. .. each **3/-**



**1950.—4 in. Clinical thermometer**, improved oval or flat back, rendering the divisions and figures very distinct, whilst its shape prevents it from rolling, in oval plated case .. .. each **3/6**



**1951.—4 in. Clinical thermometer**, with magnifying index, hospital pattern, in metal case .. .. each **3/6**



**1952.—4 in. Clinical thermometer**, "Standard" lens front magnifying bore, very sensitive .. .. each **4/6**

**1953.—4 in. Clinical thermometer**, 30 sec. "Standard" ordinary pattern, in metal case .. .. each **4/6**

**1954.—4 in. Clinical thermometer**, 60 sec. "Standard" ordinary pattern, in metal case .. .. each **4/-**

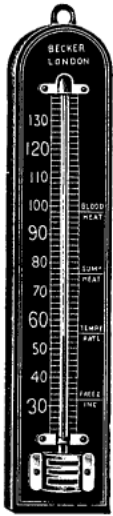
**1955.—4 in. Clinical thermometer**, rapid acin., 30 sec. magnifying lens front .. .. each **6/-**

**1956.—4 in. Clinical thermometer**, 60 sec. magnifying lens front .. .. each **6/-**

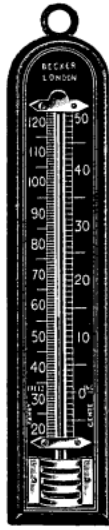
Our stock of pure Chemicals and Acids is very considerable ; hence all orders are executed with the utmost despatch. See comprehensive list at end of Catalogue.



## BOXWOOD SCALE THERMOMETERS



**1957.** — Thermometers, square-edged boxwood scale, for hanging on walls.  
 Each .. .. 1/6



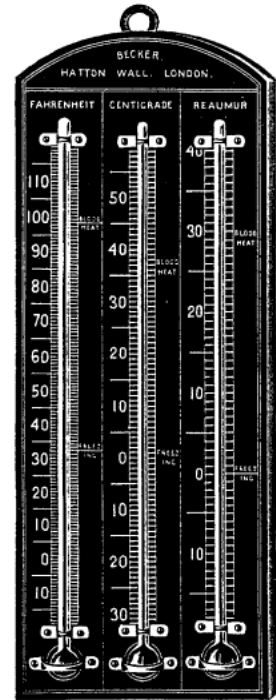
**1958.** — Double Scale Thermometers, highly finished, bevelled boxwood, with both Centigrade and Fahrenheit scales.  
 Each .. .. 3/6

**1959.** — Set of 3 Thermometers, Centigrade, Fahrenheit, and Réaumur scales respectively, mounted on polished boxwood back for hanging on wall.

Each .. .. 12/6

**1960.** — Set of 3 Thermometers, cheaper make, showing Centigrade, Fahrenheit and Réaumur scales, mounted.

Each .. .. 6/6

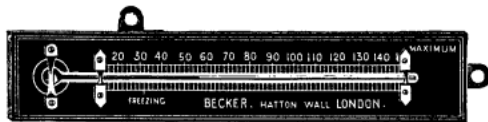


1959

## MAXIMUM THERMOMETERS

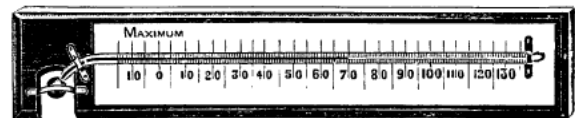
(For Minimum Thermometers, see next page.)

The self-registering maximum thermometer is used by observers to register the extreme heat during the day. It is usually placed in a Stevenson's screen, together with the minimum thermometer and the hygrometer. If a screen is not available, a board with a sloping top, to screen from sun and rain, will be found useful. The observation is usually taken at 9 a.m. every morning, when the thermometer is also reset. To reset, hold the top of the thermometer by the right hand and give it two or three gentle swings of the arm, which will cause the column of mercury to descend to its starting point.



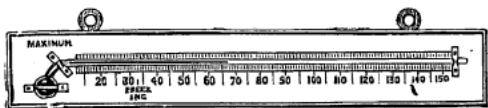
**1961.** — Thermometers, maximum, self-registering, boxwood scale, 8 in. .. .. each 3/-

**1962.** — Ditto, 10 in. .. .. ,, 3/9



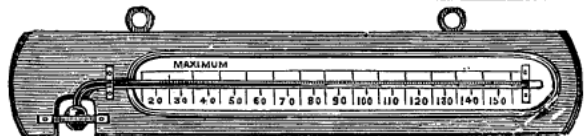
**1965.** — Standard Maximum Thermometer, self-registering, engine-divided on stem, and figured on opal scale, mounted polished mahogany or oak back.

£1 1 0



**1963.** — Maximum Thermometer, better quality, boxwood scale, 8 in. .. .. each 6/-

**1964.** — Ditto, 10 in. .. .. ,, 7/6



**1966.** — Maximum Thermometer, self-registering, engine-divided on stem, and figured on opal scale, mounted on polished mahogany frame, as No. 1965, but smaller size .. .. 15/-

Every requisite for Chemical, Physical, and Bacteriological work supplied, from a test tube to the complete furnishing of the largest laboratory.

## MINIMUM THERMOMETERS

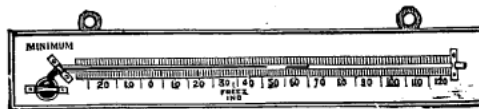
The self-registering minimum thermometer is used by observers to obtain the extreme of cold during the night. It is usually suspended with the bulb end, slightly inclined downwards, in the Stevenson's screen, with the maximum and the hygrometer. If a screen is not available it may be suspended on a board with sloping top to shelter from sun and rain.

The observation is usually taken at 9 a.m. every morning, and the index is reset at the same time. To reset the index, lift the bulb end of the thermometer and allow it to run to edge of the spirit in the tube; thus set, the instrument may be replaced in its horizontal position.



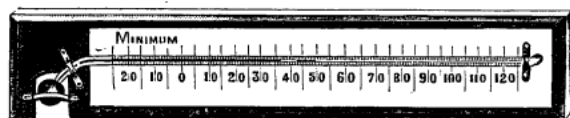
**1967.—Thermometer, minimum, self-registering,** boxwood scale, 8 in., as figured .. .. each **2/9**

**1968.—Ditto, 10 in. .. .. .. , 3/6**

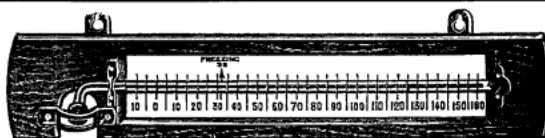


**1970.—Thermometer, minimum, better quality,** boxwood scale, 8 in. as figured .. .. each **4/6**

**1971.—Ditto, 10 in... .. . , 7/-**

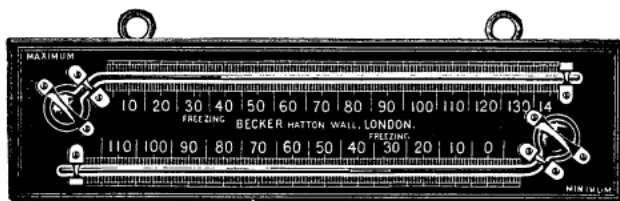


**1969. Standard Minimum Thermometers,** self-registering, engine-divided on stem, and figured on opal scale, mounted on polished mahogany or oak back .. .. . **£1 1 0**

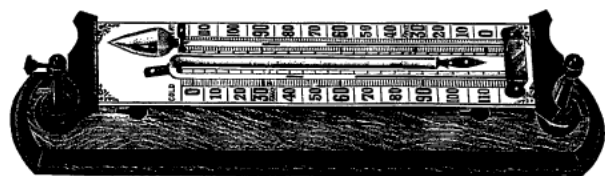


**1972.—Minimum Thermometer, standard pattern, self-registering, engine-divided on stem, and figured on opal scale, mounted on polished mahogany frame, as No. 1969, but cheaper make .. 15/-**

## COMBINED MAXIMUM AND MINIMUM THERMOMETERS

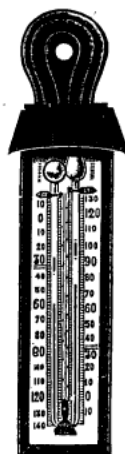


**1973.—Thermometer, combined maximum and minimum, 10 in. scales .. .. . each 17/6**



**1974.—10 in. Window or Bracket Six's Thermometer, mounted on oak or mahogany board, opal scale and plain figures, with magnet.**

Each .. .. . **£1 7 6**

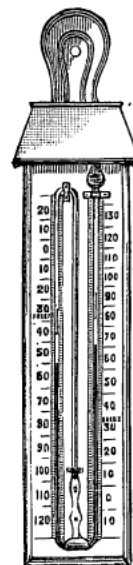


**1975.—Six's Self-Registering Maximum and Minimum,** boxwood, in well-finished japanned tin frame, complete with grooved magnet, 8 in.

Each .. .. **6/6**

**1976.—Ditto, 10 in.**

Each .. .. **9/6**



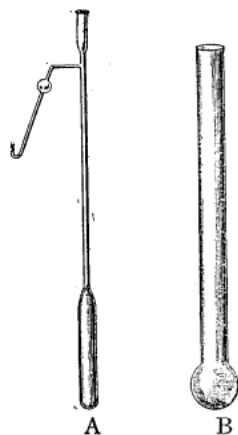
**1977. — Combined Standard Maximum and Minimum Thermometers, self-registering,**

Six's principle, engine-divided on stems, and clearly figured on opal scale, in white metal case with magnet, verified at Kew, 10 in., **£1 17s. 6d.**; 12 in., as illustration, **£2 17s. 6d.**

**For HYGROMETERS, DIFFERENTIAL AIR THERMOMETERS, Etc., see PHYSICAL APPARATUS CATALOGUE.**

Our Balances and Weights have achieved World-wide Reputation: *vide* Opinions of the Leading Scientific Press.

## VAPOUR DENSITY APPARATUS

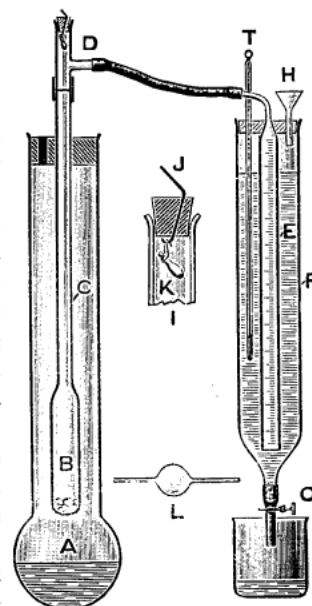


### 1978.—Victor Meyer's Apparatus for Determining the Density of an Unsaturated Vapour. Ordinary pattern.

- Each
- A. Price of inner vessel.. 4/-
  - B. Price of outer glass jacket for ditto .. 5/6
  - C. Price of outer jacket for ditto, made of brazed copper .. 37/6
  - D. Small stoppered bottles for use with above .. 6d. per dozen 5/6

### 1980.—Victor Meyer's Apparatus for Determining the Density of an Unsaturated Vapour. Improved pattern, as described in Poynting & Thomson's "Heat."

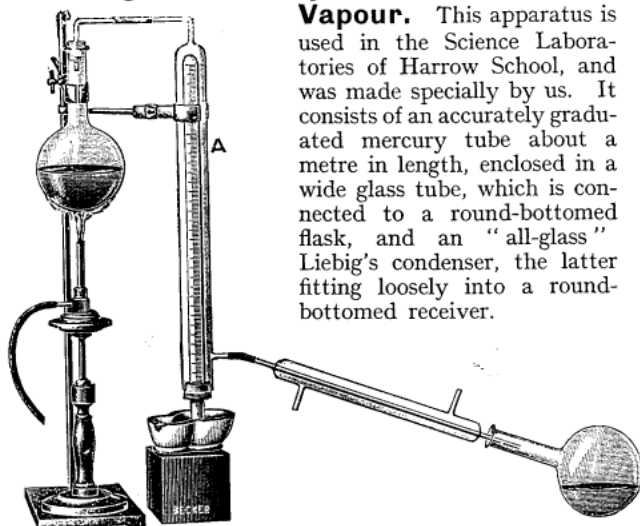
The wide tube *A* contains at the bottom a liquid which has a higher boiling point than the substance of which the vapour-pressure has to be measured. The substance is vaporised in the bulb *B*, and in doing so displaces its own volume of air, which is driven up the tube *C* through a length of thick-walled india-rubber tubing attached to the side tube *D* and into a graduated burette *E*. This burette is supported in the manner shown within a glass cylinder *F*, the bottom of the cylinder being closed, either by being drawn down as shown, or with a cork and a drainage tube attached, which can be closed by a pinch-cock *G*. The liquid to be experimented upon is contained either in a small bottle with a glass stopper, or in a thin-walled glass bulb, which at the commencement of the experiment is hung from a wire *J*, which passes through the cork which closes the top of the tube *C*. The form of this wire is shown on a large scale at *I*. In the position shown the bottle hangs from the lower end of the wire, a loop of wire being attached to the neck of the bottle for the purpose. On turning the wire through two right angles by means of the handle *J*, the wire loop slips off the hook, and the bottle falls down the tube *C*. A little asbestos placed in the bulb *B* serves to prevent the bottle breaking the tube in its fall.



Price 35/-

### 1979.—Hofmann's Apparatus for Determining the Density of an Unsaturated Vapour.

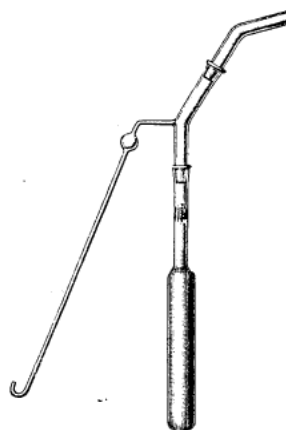
This apparatus is used in the Science Laboratories of Harrow School, and was made specially by us. It consists of an accurately graduated mercury tube about a metre in length, enclosed in a wide glass tube, which is connected to a round-bottomed flask, and an "all-glass" Liebig's condenser, the latter fitting loosely into a round-bottomed receiver.



- A. Price, complete, as figured .. .. £2 2 6
- B. ,, glass parts only .. .. 1 2 6
- C. ,, of graduated tube and jacket only 0 15 0

### 1981.—Victor Meyer's Apparatus for Determining the Density of an Unsaturated Vapour. "Stopped" Pattern.

This improved form of Victor Meyer's apparatus is fully described in Poynting & Thomson's Text-Book of Physics—"Heat."



- A. Price of apparatus, as figured .. .. 10/-
- B. ,, outer jacket for ditto .. .. 5/6
- C. ,, outer jacket for ditto, made of brazed copper .. .. 37/6
- D. Small stoppered bottles for use with above, each 6d.; per dozen 5/6

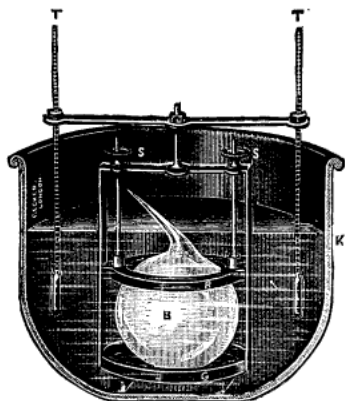
### 1982.—Small Stoppered Bottles, for use in vapour-density experiments.

each 6d.; per dozen 5/6

Our stock of pure Chemicals and Acids is very considerable; hence all orders are executed with the utmost despatch. See comprehensive list at end of Catalogue.

S

## VAPOUR DENSITY APPARATUS



1983

### 1983.—Dumas' Apparatus for Determining the Density of an Unsaturated Vapour.

A large glass flask, provided with a neck drawn out to a fine tube, was partially filled with the liquid the vapour-density of which was required, and then immersed in a bath of oil or molten metal which could be maintained at a temperature considerably above the boiling point of the liquid. In order to keep the flask immersed, it was held in a heavy metal frame, which also supported thermometers to indicate the temperature of the bath.

During the ebullition of the liquid in the flask, the vapour formed issued in a small jet from the drawn-out neck. This continued until the liquid was completely vaporised, at which instant the issue of the vapour abruptly ceased. The flask was then full of vapour at the atmospheric pressure and the temperature of the bath. The barometer was then read, and the mouth of the flask was sealed up with a blowpipe.

Price .. .. . £1 12 6

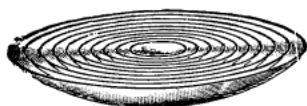
(See Edser's "Heat for Advanced Students.")



### 1984.—Dumas' Vapour-Density Bulbs, as used in apparatus No. 1983.

Each.. .. 8d.  
 Per dozen .. .. 7/6

## WATCH GLASSES



1985

### 1985.—Watch Glasses.

Diameter ..	4	5	6½	7½	9	10 cm.
Per dozen ..	1/6	1/8	1/10	2/6	3/6	4/3
Per gross ..	15/9	17/6	19/6	26/-	39/-	47/6

Diameter ..	11½	12½	15	17½	20 cm.
Per dozen ..	5/9	8/6	10/6	15/-	18/-
Per gross ..	64/-	91/-	114/-	167/-	210/-

### 1986.—Watch Glasses in pairs, ground edges, and carefully adjusted for use with balances.



Diameter, 2½ in. .. .. per pair 1/-

### 1987.—Flat-Bottomed Watch Glasses, best quality, ground edges.



A. Diameter, 2 in. .. .. per doz. 2/3  
 B. " 2½ in. .. .. " 3/-

### 1988.—Spring Wire Clips, for watch glasses.



A. Aluminium .. 4d. each.  
 B. Brass .. .. 5d. "

## WEIGHING SCOOPS, Etc.



### 1989.—Copper Assay Scoops, with wooden handles.

Length of scoop..	5	6	8	10 in.
Each .. ..	8/6	9/-	10/-	11/6



### 1990.—Horn Assay Scoops, Each 8d.; per dozen 7/-



### 1991.—Horn Scoops.

Length..	10	12	14	16 cm.
Each ..	10d.	1/-	1/6	2/-



### 1992.—Flat-Bottom Weighing Scoops, aluminium.

Length .. ..	65	85	90 mm.
Each .. ..	1/3	1/6	1/9
Per dozen ..	14/-	17/-	20/-

Every requisite for Chemical, Physical, and Bacteriological work supplied, from a test tube to the complete furnishing of the largest laboratory.

## WEIGHING BOTTLES AND TUBES



**1993.—Weighing Bottles**, with wide necks and well-ground-in stoppers, best make.

Height .. ..	50	50	70	mm.
Diameter .. ..	25	30	25	„
Price .. ..	1/2	1/6	1/6	each.
Height .. ..	70	80	90	mm.
Diameter .. ..	35	40	50	„
Price .. ..	2/3	2/9	4/-	each.



**1994.—Weighing Bottles**, with contracted necks and well-ground-in stoppers.

Height .. ..	50	60	75	100	mm.
Diameter .. ..	25	29	29	29	„
Price .. ..	1/6	2/-	2/3	2/6	each.

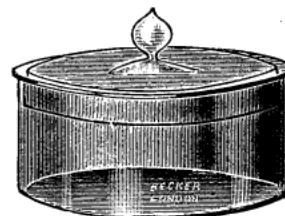


**1995.—Weighing Tubes**, with well-ground-in stoppers, best make, flat bottoms.

Height .. ..	50	50	75	mm.	
Diameter .. ..	13	19	13	„	
Price .. ..	8d.	9d.	10d.	each.	
Height .. ..	75	80	100	115	mm.
Diameter .. ..	25	16	25	30	„
Price .. ..	1/3	1/-	1/4	2/6	each.

**1996.—Weighing Bottles**, extra wide, with well-ground-in stoppers.

Height.	Diameter.	Price each.
20 mm.	30 mm.	2/-
20 „	35 „	2/3
30 „	38 „	2/8
30 „	50 „	3/6
30 „	60 „	5/6



**1997.—Weighing Tubes**, with well-ground-in stoppers, round bottoms.

Height ..	50	50	75	mm.	
Diameter ..	13	19	13	„	
Price ..	8d.	9d.	10d.	each.	
Height ..	75	80	100	115	mm.
Diameter ..	25	16	25	30	„
Price ..	1/3	1/-	1/4	2/6	each.



**1998.—Glazed Weighing Paper.**

A. Black .. ..	per quire	4/-	; per ream	75/-
B. White .. ..	„	4/-	; „	75/-
C. Red .. ..	„	4/-	; „	75/-

## MISCELLANEOUS LABORATORY APPARATUS

**1999.—Mansfield's Oil Gas Apparatus for Laboratories.**

The object of this apparatus is to place in the hands of scientists, whose laboratories are removed from the advantages of a supply of town's coal gas, a complete plant of great durability and simplicity, which will manufacture and maintain a constant supply of gas. The gas is made from any kind of oil (mineral, animal, or vegetable oil); it is permanent, will not condense, and has much greater calorific power than coal gas. All the appliances used for coal gas are readily adapted for use with Mansfield's Oil Gas Apparatus.

Mansfield's Oil Gas is distributed in exactly the same manner as coal gas. Pipes of various sizes, according to the distance and the quantity of gas to be carried, are laid to the various points where gas is required.

*We shall be pleased to quote for complete plants on receipt of full details as to requirements.*

### ASBESTOS GOODS.

(Asbestos Millboards, see page 274.)

				Per lb.
<b>2000.—Asbestos Cloth</b> , best quality.	..	..	..	5/6
<b>2001.—Asbestos Paper</b> , for covering flasks while exposed to heat	..	..	..	2/6
<b>2002.—Asbestos Yarn</b> , best quality	..	..	..	4/6
<b>2003.—Asbestos Tape</b> , 2 in. wide	..	..	..	6/9
<b>2004.—</b> „ „ 1 1/4 „	..	..	..	6/9
<b>2005.—Uralite</b> , made of asbestos fibre amalgamated with mineral glue. Being fireproof and unaffected by acids, it is very suitable for covering laboratory benches, etc. In sheets 6 x 3 ft.				

Thickness of sheets..	1/8	1/8	1/4	5/8	3/8	in.
Per foot super	1/3	2/-	2/6	3/3	3/9	

In squares .. ..	10	12 1/2	15 cm. x 1/8 in.
Dozen .. ..	2/-	3/-	4/-

**Our Balances and Weights have achieved World-wide Reputation: vide Opinions of the Leading Scientific Press.**

## MISCELLANEOUS LABORATORY APPARATUS



**2006.—Sponges**, students' size, as supplied by us to Harrow School.

Each .. .. . 8d.  
 Per doz. .. .. . 7/-

**2007.—Ditto**, larger size.

Each .. .. . 1/-  
 Per dozen .. .. . 10/6

**2008.—Laboratory Towels** .. each 1/6  
 per doz. 17/-

**2009.—Laboratory Dusters** .. each 10d.  
 per doz. 9/6

**2010.—Cloths**, for cleaning glass-ware, microscope slides, etc. .. .. . each 1/3  
 per doz. 14/-

**2011.—Chamois Leathers**, best quality, for instruments .. .. . each 2/-

**2012.—String Dusters** .. .. . per doz. 2/-

**2013.—Laboratory Coats**, made of white or khaki drill with pockets.

A. 33 inches long .. .. . 13/6  
 B. 40 " " .. .. . 15/-  
 C. 52 " " .. .. . 17/6



**2014.—Rupert's Drops.** These are small glass pear-shaped globules which have been allowed to cool suddenly. On breaking off the thin tail the whole globule breaks up into a powderish mass.

Price .. per doz. 1/9

**2015. Bologna Phials.** These are small thick-walled glass bottles which have been allowed to cool quickly. Drop one or two sharp-edged pieces of flint inside and then shake them about, when the bottom of the bottle will fall out.



Each 5d. .. Per doz. 4/6



**2018.—India-rubber Finger Stalls** .. .. . per doz. 2/-



**2019.—India-rubber Thumb Stalls** .. .. . per doz. 3/6

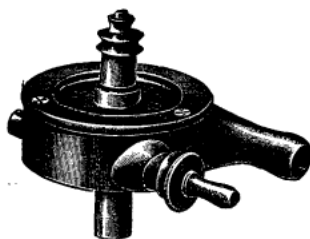


**2016.—Measures**, japanned tin, with handle, for lecture purposes.

$\frac{1}{4}$  litre.  $\frac{1}{2}$  litre. 1 litre.  
 1/8 2/- 2/6 each.

**2020.—India-rubber Aprons** with pockets.

Each .. .. . 17/6

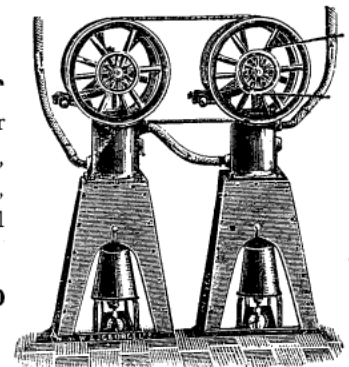


**2017.—Rabe's Turbines**, for steam or water power, 70 mm. diam.

Each .. .. . 17/6

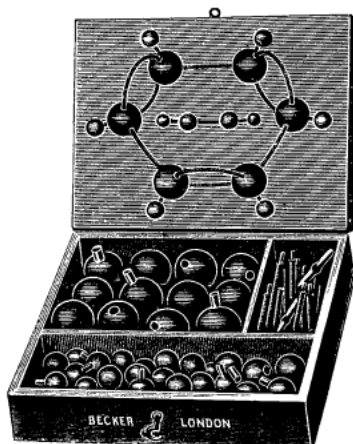
**2021.—Hot Air Motors.** Diameter of piston 54 mm., horse-power 1-40th, diameter of flywheel 20.2 cm.

Price .. £15 0 0



Our stock of pure Chemicals and Acids is very considerable ; hence all orders are executed with the utmost despatch. See comprehensive list at end of Catalogue.

## MISCELLANEOUS LABORATORY APPARATUS



**2022.—Engler's Set of Atomic Models**, in box complete, with full instructions.

Per set .. .. . 32/6

**2023. — Professor Collie's Set of Models** for illustrating principle of the atomic theory, each set consisting of 1 stand, 1 cube, 6 tetrahedra, 6 supports, 12 hooks, and 6 bands.

Price complete £3 15 0

**2024.—Dr. Eiloart's Atomic Models**, as used in organic chemistry lectures, consisting of 6 wooden models, 6 straight pins, 6 hinged pins, 40 japanned tin caps, with formulæ, etc.

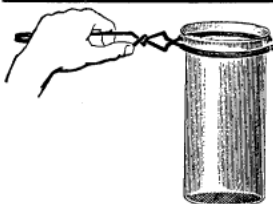
£4 4 0

(Full details are given in Dr. Eiloart's book, "Guide to Stereochemistry," price 4/-.)

**2025.—Supports** for the above, with arrangement for raising and lowering the models, with special joint for inclining in any position.

Each .. .. . 9/6

**2026.—Professors Perkins and Kippings' Models** for showing isomerism of sugars and tartaric acids. Complete set of 12 models, 48 coloured balls and rubber tube, with instructions .. .. . 13/6



**2027.—Strong Wire Clip**, with handle, for holding beakers, etc.

Each .. .. . 1/3

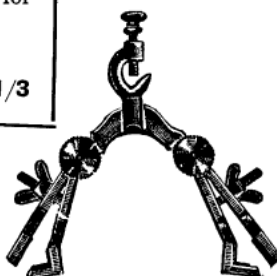


**2028.—Water Pump Valve**, to prevent water rushing back into the exhausted chamber if any alteration of pressure at the main takes place.

As supplied by us to the University of Liverpool (School of Physiology).

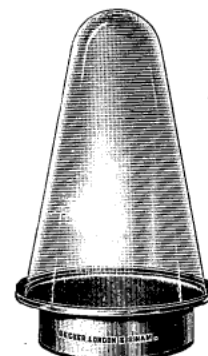
Price, each .. .. . 2/6

Per dozen .. .. . 24/-



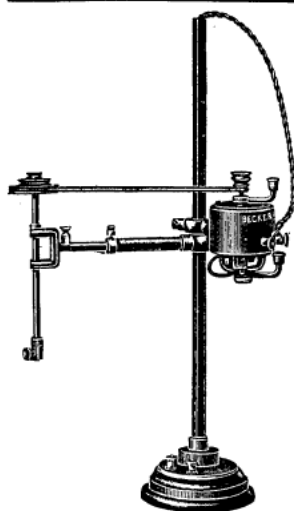
**2029.—Double Nitrometer Clamp**, with fixed boss-head and two clamps with swivel joints as figured.

Each .. .. . 12/-



**2030.—Glass Cordite Cones**, for determining quantity of volatile matter in gun-cotton. Made of thin, light glass .. .. . each 1/6

**2031.—Aluminium Trays** for use with above .. .. . each 2/6



**2032.—Stirring Apparatus**, with three speeds, can be fixed to any retort stand.

Price, as illustrated, but without stand or motor.

Each .. .. . 12/6

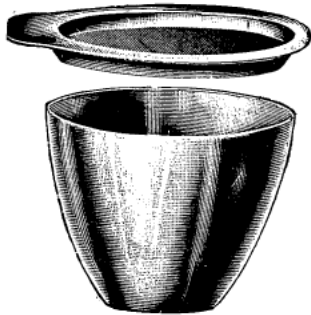


**2033.—Laboratory Scales**, Superior Quality and Finish. Suitable for weighing chemicals, etc.; double beam; mounted on nicely finished walnut box, with white marble top, and provided with two movable brass pans.

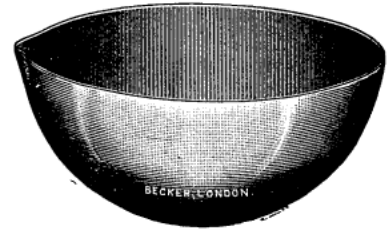
To weigh ..	1	2	5	10 kilos.
Diameter of pans..	16	18	20	22 cm.
Each .. .. .	42/6	50/-	75/-	92/6

Every requisite for Chemical, Physical, and Bacteriological work supplied, from a test tube to the complete furnishing of the largest laboratory.





## MONEL METAL LABORATORY UTENSILS



Monel Metal is a natural nickel-copper alloy consisting of approximately 67% Nickel, 28% Copper and 5% other metals. *It contains no tin, zinc or antimony.* Owing to its high resistance to corrosion, it has been found eminently suitable for laboratory use where a material is required which will withstand corroding agencies under varying conditions of temperature and concentration.

### 2034.—Monel Metal Crucibles.

No.	1	2	3	4	5
Diameter .. cm.	3	3.5	4	4.5	5
Capacity .. cc.	15	25	35	50	70
Each .. ..	1/3	1/6	1/10	2/3	2/9
Covers extra	7d.	8d.	10d.	1/-	1/3

### 2035.—Monel Metal Basins.

No.	1	2	3	4	5	6	7
Diameter cm.	5	6	7	8	10	12	15
Each .. ..	1/9	2/-	2/3	2/9	3/6	4/6	7/-

Monel Metal gives a complete resistance to corrosive action by salt water, atmospheric conditions, alkalis and some acids, and a high resistance to a large number of acids.

Melting Point, 1360° C.

Specific Gravity, 8.87.

Heat Conductivity 1/15th that of Copper.

Owing to the varying conditions under which metals are used in chemical operations, it is impossible to give definite guarantees as to suitability, but MONEL METAL IS GENERALLY RECOMMENDED FOR THE FOLLOWING, CHEMICALS :—

Acetic Acid  
Aluminium Sulphate  
Alkaline Soap  
Ammonia  
Benzoic Acid  
Boric Acid  
Butyric Acid  
Calcium Sulphate  
Calcium Chloride

Carbolic Acid  
Chlorine  
Hydrofluoric Acid  
Lactic Acid  
Lime  
Malic Acid  
Oleic Acid  
Oxygen  
Palmitic Acid

Phosphoric Acid (cold—  
weak)  
Picric Acid (cold)  
Potassium Hydroxide  
Citric Acid  
Crystallisation of Alum  
Formic Acid  
Hydrocyanic Acid  
Hydrogen

Tannic Acid  
Tartaric Acid  
Salicylic Acid  
Sodium Hydroxide  
Sodium Hyposulphite  
Stearic Acid  
Sulphur Dioxide  
Water, Fresh  
Water, Salt

*Not affected by Atmospheric Corrosion, Metallic Mercury, Heat (Oxidation) for temperatures not above 700° C. ; Steam wet or superheated, or Electrical Resistance.*

**We shall be pleased to quote for MONEL METAL SPAT-  
ULAS, BEAKERS, CAPSULES, WIRE GAUZE, or other  
forms of Apparatus to suit customers' special requirements.**

MONEL METAL is recommended for Laboratory and Chemical work, Sugar Plant, Glue and Gelatine Works, Dye Works, Soap Works, Mine equipment, and other similar directions where a material which will stand up to corrosive influence is called for.

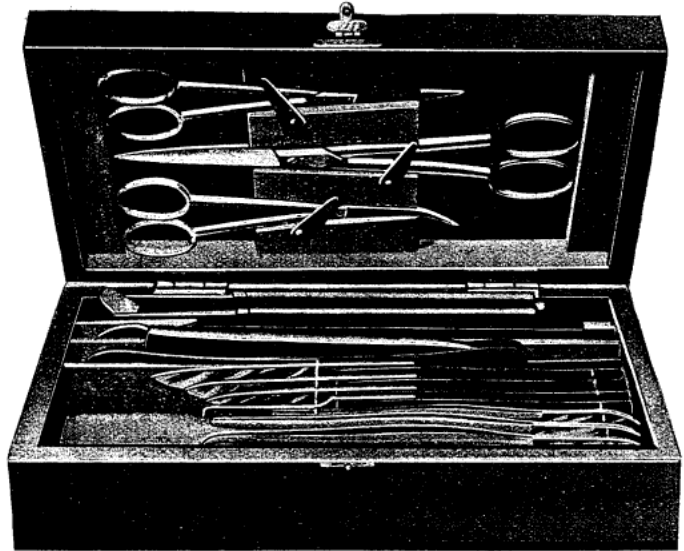
**Our Balances and Weights have achieved World-wide Reputation : *vide* Opinions of the  
Leading Scientific Press.**

# DISSECTING, BOTANICAL, ENTOMOLOGICAL APPARATUS, ETC. DISSECTING INSTRUMENTS

The sets of Dissecting Instruments listed below are all of the very best Sheffield make and finish, and can be relied on to fulfil all requirements. They can be supplied either in polished mahogany cases, or leather-covered cases as per illustrations.

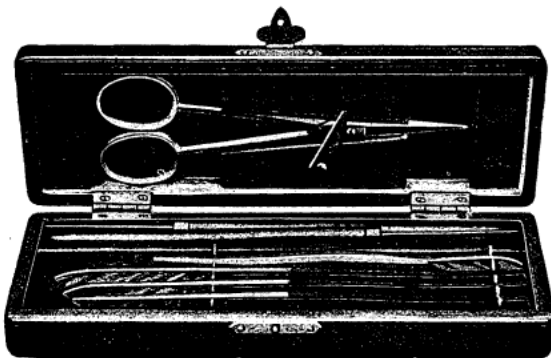
PRICES.

	2036	2037	2038	2039
A. Polished Mahogany Case, with snap catch ..	13/6	21/-	27/-	33/9 each.
B. Leather-covered case, with snap catch .. ..	15/-	22/-	30/-	37/6 „



## DISSECTING SETS

Contents of Set No. 2036.	Contents of Set No. 2037.	Contents of Set No. 2038.	Contents of Set No. 2039.
1 No. 1 Scalpel, E.H.	1 No. 1 Scalpel, E.H.	1 No. 1 Scalpel, E.H.	1 No. 1 Scalpel, E.H.
1 No. 8 " "	1 No. 8 " "	1 No. 3 " "	1 No. 12 " "
1 No. 12 " "	1 No. 12 " "	1 No. 8 " "	1 No. 14 " "
1 pair Forceps, 5 in. straight	1 No. 14 " "	1 No. 10 " "	1 pair Forceps, 4½ in. straight
1 pair Scissors, 4½ in. straight	1 pair Forceps, 5 in. straight	1 No. 12 " "	1 pair " 5 in. curved
2 Needles	1 pair Forceps, 5 in. curved	1 No. 14 " "	1 pair " 5 in. straight
	1 pair Scissors, 5 in. straight	1 pair Forceps, 5 in. straight	1 pair Scissors, 6 in. straight
	1 pair Scissors, 4½ in. straight	1 pair " 5 in. curved	1 pair " 4½ in. straight
	2 Needles	1 pair Scissors, 6 in. straight	1 pair " 4½ in. curved
		1 pair " 4½ in. curved	2 Needles
		1 Section Lifter	1 Hook, E.H., single
		2 Needles	1 Razor
			1 Strop
			1 Section Lifter



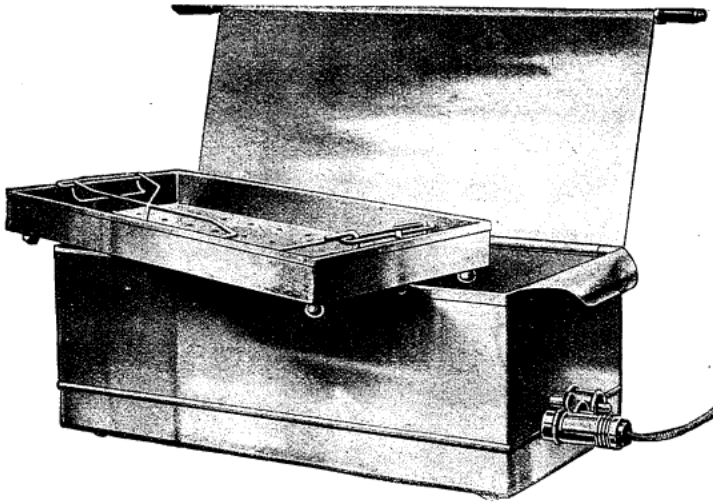
Special cases containing any other combination of instruments can be made to order.

**FOR SCALPELS, FORCEPS, SCISSORS, ETC.**  
 See pages 72 and 73.

**2040.—Special Dull Black Paper**, for placing under botanical sections or under animal dissections, to throw up the specimens. This paper, being very dull black, is much more efficient than a glossy black paper, which gives too much reflection. Per quire, 5/-

Our stock of pure Chemicals and Acids is very considerable ; hence all orders are executed with the utmost despatch. See comprehensive list at end of Catalogue.

## STERILIZERS FOR DISSECTING INSTRUMENTS



These Sterilizers are particularly well and strongly made from heavy gauge copper, are highly finished and used in a large number of Hospitals and Public Institutions. Their design greatly facilitates easy cleaning.

They are all arranged for 3-heat regulation and are supplied complete with lid, perforated tray and lifters.

These Sterilizers are supplied fitted with a patent protector device which is automatic and extremely simple and efficient. It so functions that as soon as the sterilizer ceases to contain water the current is cut off and any damage whatever is averted. Immediately the device has operated, it adjusts itself and the article is again ready for use.

Cat. No.	Consumption in watts.	Dimensions in inches.	Weight in lb.	PRICE.		No. of Elements fitted.	Price of each spare Element.
				A. Copper.	B. Nickel Plated.		
2041	500	8 × 4 × 3	5	£4 5 0	£4 12 6	3	3/-
2042	1000	13 × 6 × 3	10	£5 17 6	£6 10 0	4	3/-
2043	1500	20 × 8 × 4	19	£10 15 0	£11 15 0	8	3/-

Please state Catalogue No. and Voltage when ordering.

## BOTANICAL AND ENTOMOLOGICAL APPARATUS



**2044.—Collecting Cases**, or Vascula, japanned tin, flat shape.

7×4 in. 8×5 in. 11×5½ in. 13×6½ in. 15×7½ in.  
4/6 5/- 6/- 7/6 8/6 each.

**2045.—Leather Shoulder Straps**, for above.  
Extra 2/6

**2046.—Fern Trowel**, with long and curved blade, in leather sheath, superior quality .. .. 4/-

**2047.—Botanical Drying Paper**, thick-grey; size of sheet, 22 × 17 in.

Per ream .. .. 67/6  
Per quire .. .. 3/6

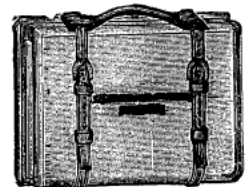
**2048.—Botanical Mounting Paper**, stout cartridge, 15 × 10 in.

Per ream .. .. 48/-  
Per quire .. .. 2/9

Other sizes cut to order.

**2049.—Woven Wire Botanical Press**, with springs and chains for adjusting pressure, 18½ × 12½ in.  
19/6

**2050. — Field Book**, as figured, for collecting and preserving large specimens. A pair of strong, well-finished hardwood boards, 11¼ × 9½ in., containing one dozen four-fold leaves of thick botanical drying paper, and all held together with two leather straps and carrying handle .. .. 8/6



Every requisite for Chemical, Physical, and Bacteriological work supplied, from a test tube to the complete furnishing of the largest laboratory.

## BOTANICAL AND ENTOMOLOGICAL APPARATUS



**2051.—Killing Bottle** or collecting jar of special stout white glass, without neck,  $6 \times 2\frac{1}{2}$  in., with boxwood-top cork .. **1/9**

**2052.—Killing Bottles**, for chloroform, brass **3/9**

**2053.—Killing Bottle**, glass, with neck, large size, wide mouth, with boxwood-top cork (without killing material) .. .. . **1/6**

**2054.—Killing Boxes**, zinc .. .. each **1/6**

**2055.—Pressing Boards**, of stout hardwood. per pair **3/9**

**2056.—Rack Pin and Rope** for applying pressure .. .. . **1/6**

**2057.—Entomological Pins**, assorted sizes, K.B. & Co.'s .. .. . per oz. **2/6**

All sizes of Kirby Beard & Co.'s and Tayler & Co.'s pins supplied to order.

**2058.—Entomological Pin Forceps** .. **2/3**

**2059.—Larva Breeding Cages**, with two compartments .. .. . **8/6**

**2060.—Ditto**, ditto, with water tanks for preserving the food plant .. .. . **15/-**

**2061.—Setting Boards**, corked and papered, flat, or oval, all 14 in. long.

Breadth ..	$\frac{1}{2}$	$\frac{3}{4}$	1	$1\frac{1}{4}$	$1\frac{1}{2}$ in.
Each ..	<b>8d.</b>	<b>8d.</b>	<b>9d.</b>	<b>11d.</b>	<b>1/2</b>

Breadth ..	$1\frac{3}{4}$	2	$2\frac{1}{4}$	$2\frac{1}{2}$ in.
Each ..	<b>1/3</b>	<b>1/4</b>	<b>1/6</b>	<b>1/9</b>

Breadth ..	3	$3\frac{1}{2}$	4	$4\frac{1}{2}$	5 in.
Each ..	<b>2/-</b>	<b>2/3</b>	<b>2/6</b>	<b>2/9</b>	<b>3/-</b>

**2062.—Telescopic Handle Net**, two-piece, with folding cane ring and net, new pattern .. **12/6**

**2063.—Collecting Boxes**, deal, corked and papered .. .. . **1/-, 1/6, 2/- and 3/-**

**2064.—Cork**, best quality, in sheets.  
 $7 \times 3\frac{1}{2}$  in. **2/6**       $11 \times 4\frac{1}{2}$  in. **4/6** per doz. sheets.

**2065.—Forceps**, green gauze, scissors pattern, for large insects .. .. . **4/-**

## MAGNIFIERS, Etc.



**2066.—Magnifier**, in brass case with wire handle, for botany students. This has a much higher magnification than No. 2067. Each .. .. . **1/9**



**2067.—Single-Power Lens**, folding, mounted in horn, best make; diameter, 1 in. Each .. .. . **1/3**  
 Per dozen .. .. . **13/-**

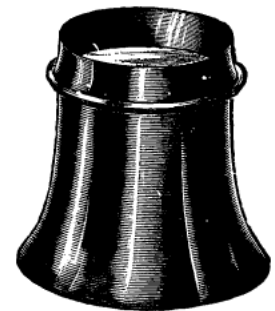


**2068.—Double-Power Lens**, folding, mounted in horn, best make; diameter, 1 in. Each .. .. . **2/-**  
 Per dozen .. .. . **21/-**



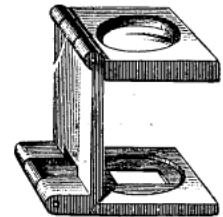
**2069.—Triple-Power Lens**, folding, mounted in horn, best make; diameter, 1 in. Each .. .. . **2/6**  
 Per dozen .. .. . **28/-**

**2070.—Powerful Magnifier**, in vulcanite mount .. .. each **1/9**



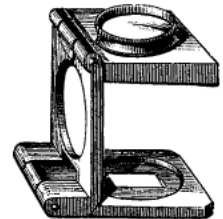
**2071.—Double Convex Lenses**, commonly called linen provers; folding brass case.

Size of opening  $\frac{1}{4} \times \frac{1}{4}$   $\frac{1}{2} \times \frac{1}{2}$   $1 \times 1$  in.  
 Price, each .. **2/- 3/6 5/-**



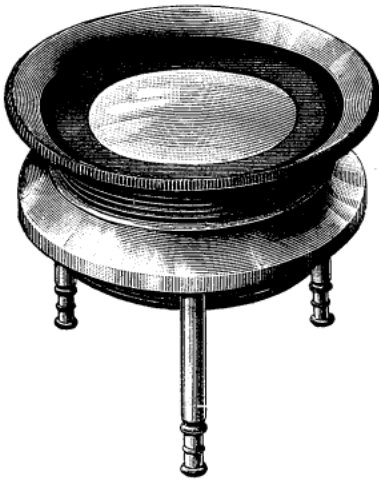
**2072.—Double Convex Lenses**, as No. 2071, but fitted with achromatic lenses and superior nickel-plated folding cases.

Size of opening  $\frac{1}{4} \times \frac{1}{4}$   $\frac{1}{2} \times \frac{1}{2}$   $1 \times 1$  in.  
 Price, each .. **4/6 6/6 11/-**



Our Balances and Weights have achieved World-wide Reputation: *vide* Opinions of the Leading Scientific Press.

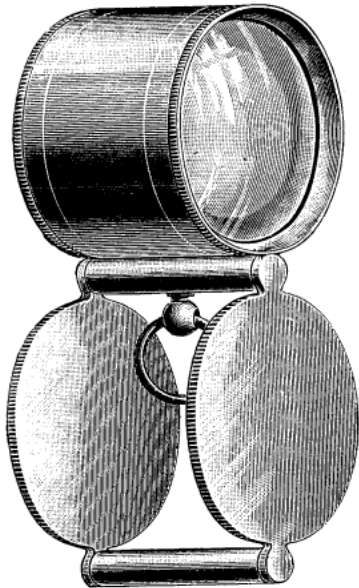
### MAGNIFIERS



2073

**2073.—Stanhope Lens**, in lacquered brass case with screw focussing; suitable for examining seeds, botanical specimens, and insects.

- A. Diameter,  $1\frac{1}{2}$  in. . . each 3/-
- B. " "  $1\frac{3}{8}$  in. . . " 4/9



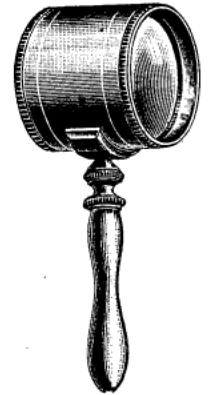
2074

**2074.—Coddington Lens**, folding pattern, fitted with very powerful lenses in highly-finished nickelled case, with ring handle for chain; highly recommended.

- A. Diameter,  $\frac{3}{8}$  in. each 9/6
- B. " " 1 in. " 11/6
- C. " "  $1\frac{3}{8}$  in. " 13/-

**2075.—Coddington Magnifiers**, for examining minute botanical and other specimens; in nickel-plated brass case with handle, as figured.

- A. Diameter,  $\frac{3}{8}$  in. . . . . each 5/6
- B. " "  $\frac{5}{8}$  in. . . . . " 7/6
- C. " "  $\frac{7}{8}$  in. . . . . " 8/6



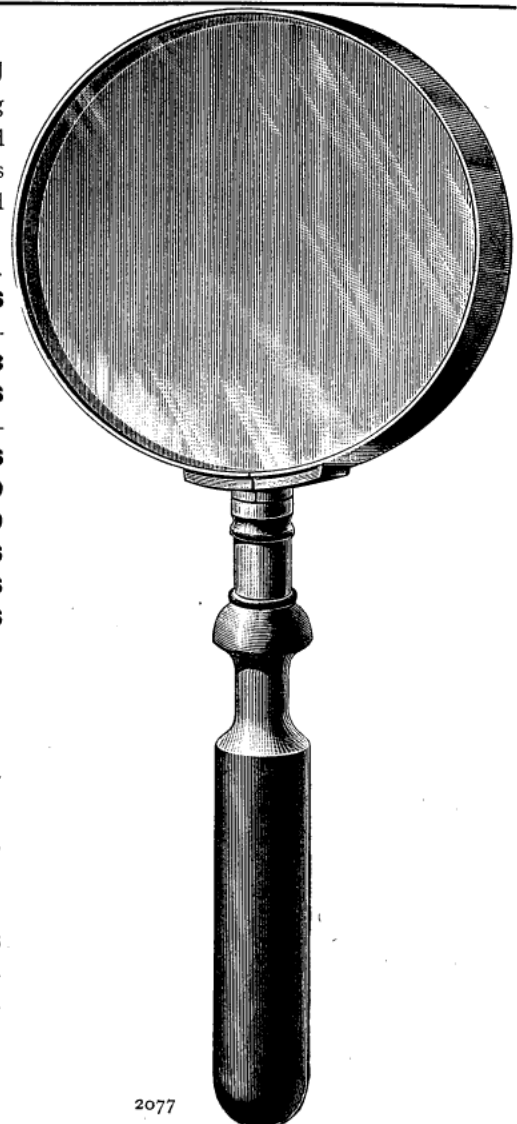
2075

**2076.—Ditto**, superior make and finish, with extra high-power lenses.

- A. Diameter, 1 in. . . . . each 8/6
- B. " "  $1\frac{3}{8}$  in. . . . . " 10/6
- C. " "  $1\frac{3}{4}$  in. . . . . " 12/6

**2077.—Reading Glasses**, comprising double convex lens, mounted in a nickel-plated brass mount fitted in ebonised handle.

- |                                  | Each. |
|----------------------------------|-------|
| A. Diameter, $1\frac{1}{16}$ in. | 2/6   |
| B. " " $2\frac{3}{16}$ in.       | 3/-   |
| C. " " $2\frac{3}{8}$ in.        | 3/3   |
| D. " " $2\frac{9}{16}$ in.       | 3/6   |
| E. " " $2\frac{3}{4}$ in.        | 4/-   |
| F. " " 3 in.                     | 4/6   |
| G. " " $3\frac{1}{2}$ in.        | 5/9   |
| H. " " $3\frac{3}{4}$ in.        | 6/9   |
| J. " " 4 in.                     | 7/6   |
| K. " " $4\frac{5}{16}$ in.       | 9/6   |
| L. " " $4\frac{3}{4}$ in.        | 12/6  |



2077

**2078.—Reading Glasses**, as No. 2077, but fitted with superior quality *achromatic* lenses, highly finished, and mounts oxidised.

- |                                 | Each. |
|---------------------------------|-------|
| A. Diameter, $1\frac{7}{8}$ in. | 4/6   |
| B. " " $2\frac{3}{8}$ in.       | 5/-   |
| C. " " $2\frac{3}{4}$ in.       | 6/-   |
| D. " " $3\frac{1}{2}$ in.       | 8/6   |
| E. " " $3\frac{3}{4}$ in.       | 9/6   |
| F. " " $4\frac{1}{2}$ in.       | 11/6  |

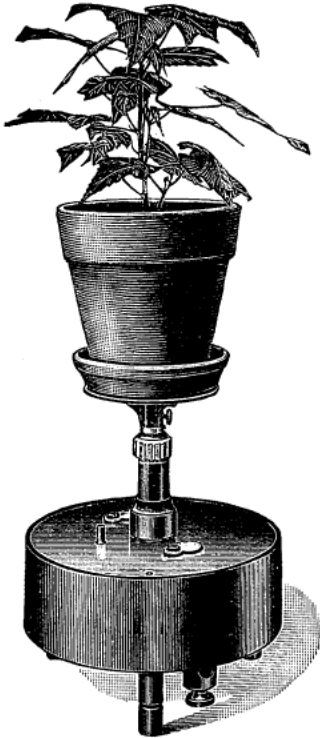
Our stock of pure Chemicals and Acids is very considerable; hence all orders are executed with the utmost despatch. See comprehensive list at end of Catalogue.

## PROFESSOR GANONG'S BOTANICAL APPARATUS

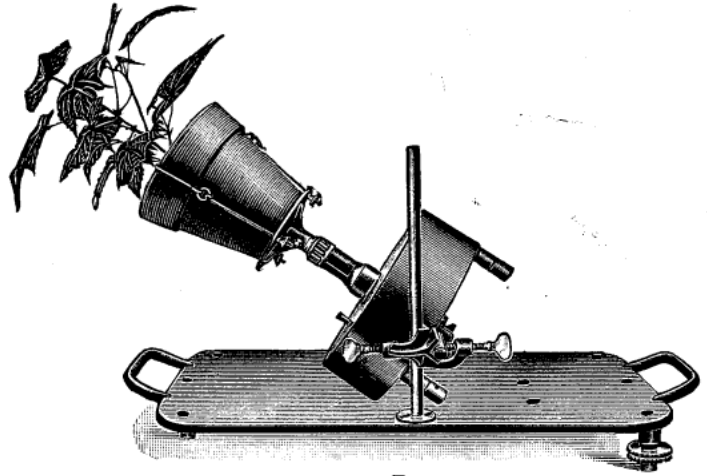
2079.

**Demonstration Clinostat.** A most essential single piece of apparatus for the study of plant physiology; designed primarily for educational demonstration, but it is available for investigation involving plants of moderate weight where great precision of revolution is not required. It can be used in any position whatever, as shown by the illustrations.

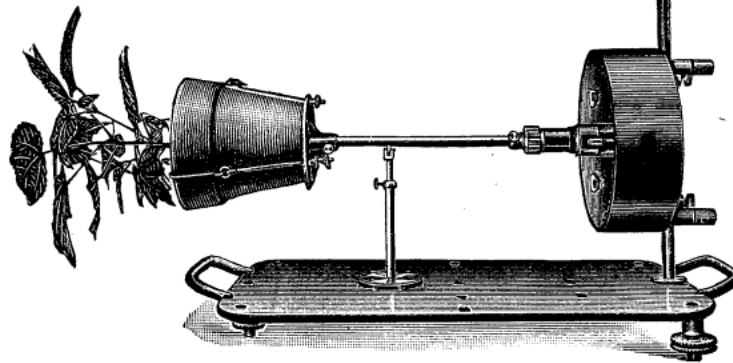
Price .. £19 17 6



2079. FIG. 1.



2079. FIG. 2.

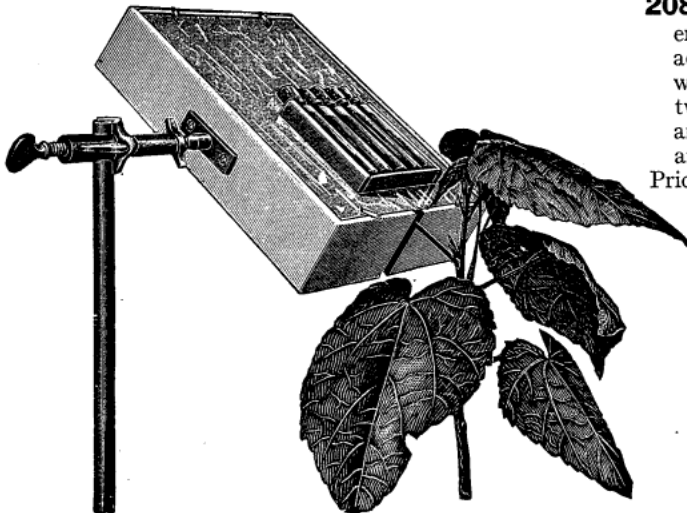


2079. FIG. 3.

## NORMAL LIGHT SCREENS

**2080.—Norman Light Screen.** Designed to take an entire leaf of moderate size, consisting of a wooden box readily adjustable for height and angle, 5 by 7 by 1½ in. (internal), white without and black within, separated lengthwise into two compartments, with an intermediate space for petiole and midrib. This instrument is very convenient in practice, and yields most satisfactory results.

Price .. .. . £4 10 0



2080

**2081.—Normal Light Screen.** Smaller screen, of a lesser range of usefulness than No. 2080, but much cheaper, is made upon the same principle, except that it is arranged to clasp a portion of a leaf.

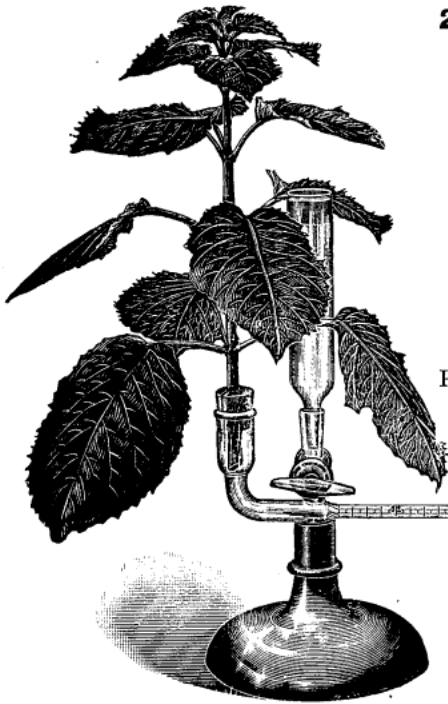
Price .. .. 7/6



2081

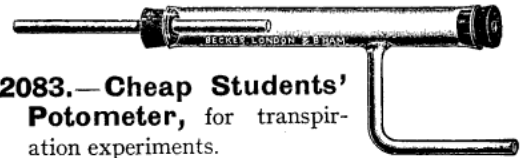
Every requisite for Chemical, Physical, and Bacteriological work supplied, from a test tube to the complete furnishing of the largest laboratory.

## PROFESSOR GANONG'S BOTANICAL APPARATUS



**2082.—Potometer.** One of the methods commonly used for the quantitative determination of transpiration consists in the measurement of the water absorbed by a cut shoot. This is best effected by aid of the potometer, an instrument of small worth as a measurer of the actual transpiration of a plant on its own roots, but of much value for determining, and especially for demonstrating, the relative rates of transpiration in the same plant under different external conditions. The instrument here presented is designed to embody the best features of the many and protean forms which have been described. It has four parts: firstly, the shoot-chamber, made small, that its water may more quickly take a new temperature, and hence not affect the record while changing volume; secondly, the small-bore record-tube, calibrated to cc. and decimals thereof—it is bent down at its distal end, which is sealed but provided with a small lateral air-opening readily closed by a sliding piece of rubber tubing; thirdly, the reservoir connecting with the other parts through a stopcock; and, fourthly, a firm wooden base.

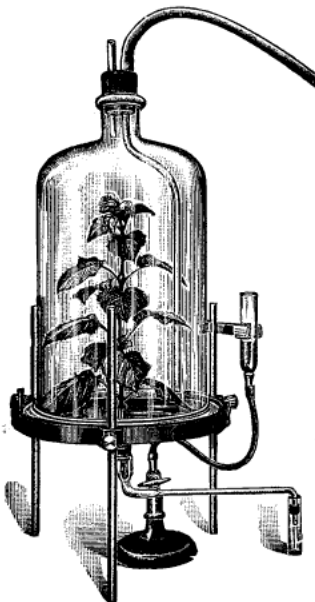
Price .. .. . £1 15 0



**2083.—Cheap Students' Potometer,** for transpiration experiments.

- A. Complete as figured with india-rubber corks and tube .. .. . each 2/-
- B. Ditto, but without rubber corks each 1/3

**2084. — Bell-jar Support.** For several purposes of plant physiology it is necessary to insert into a closed bell-jar, through which air may be drawn, the stem and leaves of a plant whose roots or lower part must remain attached, but outside.



A suitable arrangement for this purpose is presented herewith. It consists of three parts: firstly, a bell-jar of standard size and form, whose ground stopper may readily be replaced by one of rubber, carrying inlet and outlet tubes; secondly, the firm ring-support of iron, having a projecting inside rim and three sockets holding metal legs which may be clamped in any desired position; and thirdly, the thick glass plates which rest upon the ring—one of these is perfectly plain, for use when it is desired simply to seal in an entire plant, but the other is split through its diameter and has a hole 1 cm. in diameter in its middle.

The illustration shows the apparatus in use with the potometer described under No. 2082, the two forming a very convenient and efficient combination.

It happens that the ring serves well for support of the glass plate commonly used in observation of circumnutation, for which purpose it is supplied with a thinner plate and longer supporting legs.

Price complete, including two glass plates (one solid and one split), bell-jar with solid glass stopper and rubber stopper .. £4 15 0



**2085.—Aluminium Shells for Transpiration Experiments, etc.** Designed to provide light, neat, clean, and easily applied covers for pots.

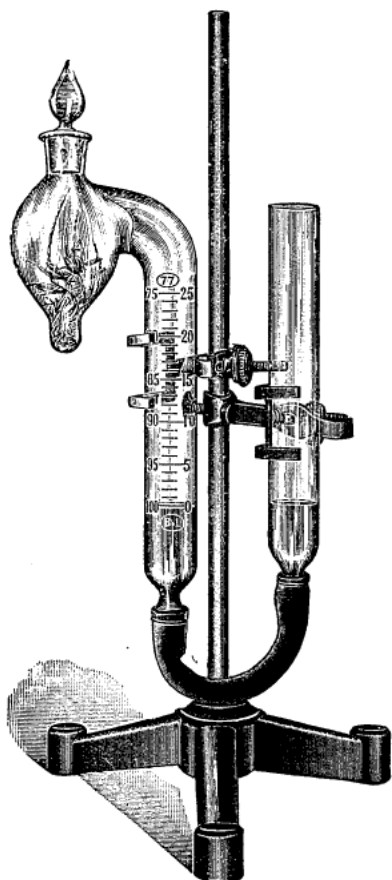
Flower-pots are now made so easily in standard sizes that it is possible to make the shells to fit them closely, and shells are made in 3 in., 3½ in., 4 in. and 5 in. sizes.

Size No. ..	1	2	3
Diameter ..	3	4	5 in.
Price ..	11/6	15/-	21/- each.

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## PROFESSOR GANONG'S BOTANICAL APPARATUS



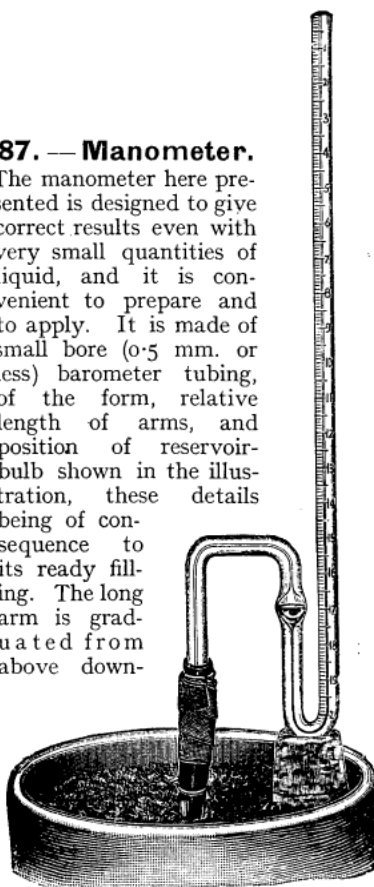
### 2086.—Respirometer.

Designed both to exhibit and to measure the gas exchanges in typical respiring material (e.g. germinating seeds), and to accomplish this with considerable accuracy and convenience of manipulation.

Price, complete, with measuring and reservoir cylinders and rubber tubing, but without stand .. £2 5 0

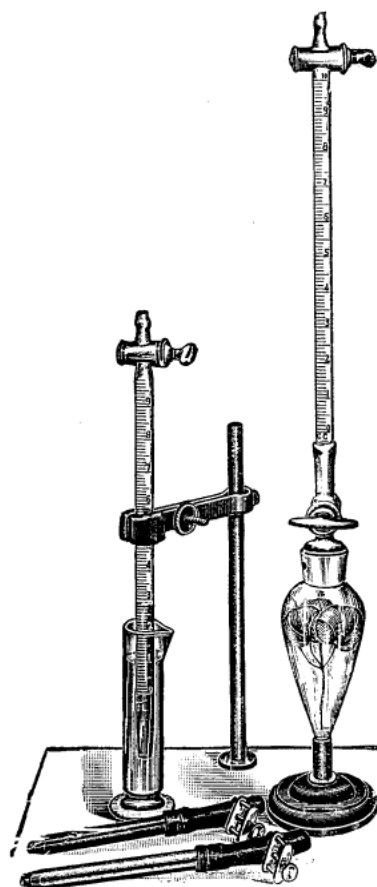
### 2087.—Manometer.

The manometer here presented is designed to give correct results even with very small quantities of liquid, and it is convenient to prepare and to apply. It is made of small bore (0.5 mm. or less) barometer tubing, of the form, relative length of arms, and position of reservoir-bulb shown in the illustration, these details being of consequence to its ready filling. The long arm is graduated from above down-



wards to admit of ready computation of the air column, and the short arm is provided with three glass sleeves, which serve, when cemented over one another and over the gauge with sealing-wax or shellac, to make the gauge large enough for ready attachment to larger stems.

Price .. .. . 19/6



### 2088.—Photosynthometer,

for demonstrating the absorption of carbon-dioxide by green plants in light, with the equivolumetric release of oxygen.

Price, including two reagent tubes, clamp support, two pieces I.R. tubing and two clips .. .. £3 2 6

### 2089.—Portable Clamp-Stand.

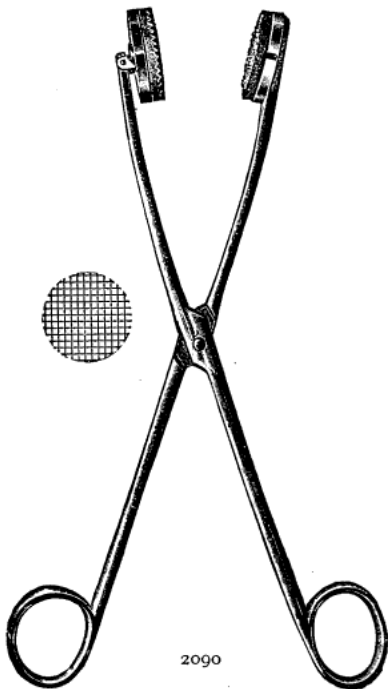
For many purposes in experimental plant physiology some form of clamp-stand, to support apparatus in special positions, is necessary, and some one of the forms used in chemistry is generally adopted. For the simpler uses these answer perfectly; but when, as happens often in educational work, several pieces must be supported near together, and when some articles must be set level, and especially where the whole must be removed from greenhouse or Wardian case to lecture or laboratory table, it is necessary to improvise some form of tray or other support to carry the stands, which are levelled by wedges, etc. The new portable clamp-stand illustrated on page 299—see Figs. 2 and 3, No. 2079—is intended to meet all

these needs in a single instrument. It is made of thin cast steel, reinforced underneath on the margin and at the holes, and is some 40 × 22 cm. in size. It is perfectly flat on top, is provided with convenient handles, rests upon three legs in which levelling screws are set, and is pierced by holes for the upright rods at points where experience and experiment show these to be most needed. The rods are of the size and thread usual in chemical supports, two in number, one about 50 and one about 25 cm. long, though of course others can be added. The clamps supplied with it are the lighter of one of the usual forms.

Price .. .. . £2 17 6

Our stock of pure Chemicals and Acids is very considerable; hence all orders are executed with the utmost despatch. See comprehensive list at end of Catalogue.

**PROFESSOR GANONG'S BOTANICAL APPARATUS**



**2090.—Space Marker, for Marking Areas.**

The instrument is a disc, likewise a rubber stamp, having raised lines in the form of squares 2 mm. on a side. It is carried by means of a scissors-frame against a cushion disc, which is covered with soft felt, and provided with a radial slot to admit the petiole of a peltate leaf. When the marking disc is inked and pressed firmly against a leaf held on the cushion disc, it marks a network of even fine black lines like the sample shown in the figure. The marking disc is hinged to its supporting arm in a way to permit the disc to settle evenly upon the surface, no matter what the thickness of the leaf.

Both instruments may be inked from an ordinary rubber-stamp pad, and the black record kind gives good results. Price **£1 15 0**



2093

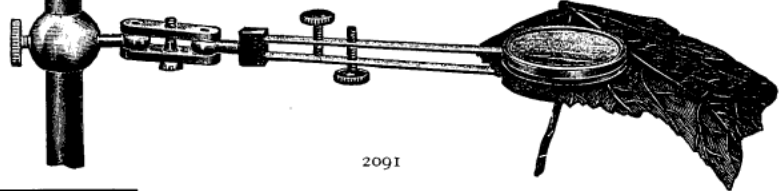


**2093.—Leaf-area Cutter,** for demonstrating the fundamentally important fact of increase of organic substance through photosynthesis by Sachs' method of comparing the morning and evening dry weights of equal

areas of similar green tissue. The leaf-area cutter here presented is designed to permit all parts of this valuable experiment to be performed with exactness and facility.



**2091.—Leaf Clasp,** for applying special treatment to two exactly corresponding areas on the two surfaces of a leaf.



2091

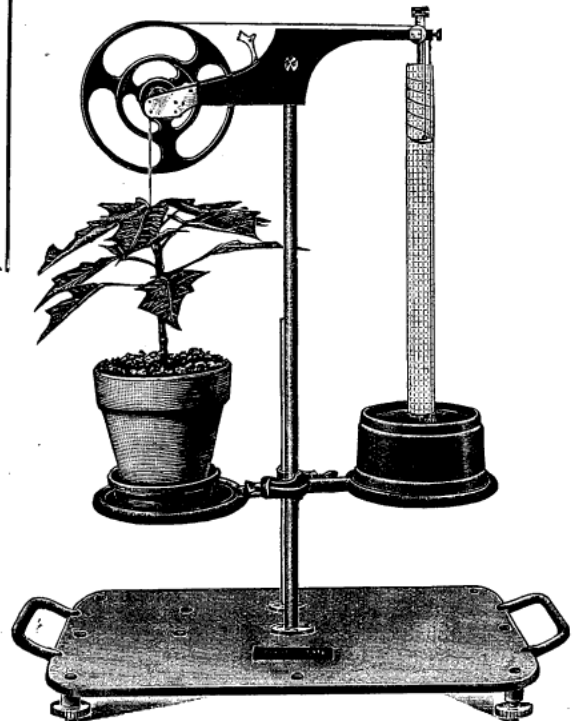
A universal joint with a screw-joint fitting over any laboratory support permits the instrument to be applied in any position and in any plane.

Price, without vertical stand .. .. . **£2 10 0**



**2092.—Space Marker,** for marking plant structures accurately and quickly.

Price .. **12/6**



**2094. — Demonstration Auxograph.** A

good demonstration instrument of reasonable accuracy, easy applicability to its work, durability, ready portability, visibility of record from some distance, and clear exhibition of its mechanism and principle.

While designed primarily for marking records of growth, this instrument can be used for any measurements involving movement, e.g., the rise of water in a tube.

With the auxograph are supplied two glass pens, a rubber tube for filling the same and a bottle of chronograph ink. An additional recording cylinder, convenient for saving delay in changing the papers, may also be obtained if desired.

Price .. .. . **£13 5 0**

**2095.—Chronograph Ink.** A special slow-drying glycerin ink for use with recording pens.

Per oz. .. .. . **2/6**

## ANATOMICAL MODELS

These models are made in papier mâché, and are guaranteed highest quality and finish.

### THE EYE.

**2096.—Eyeball**, enlarged five times, dissectable, with attachment of the muscles, divisible into cornea, choroida, etc .. .. . each **35/-**

**2097.—Eyeball**, as No. 2096, but enlarged ten times each **£2 2 0**

**2098.—Eyeball**, enlarged five times with microscopic representation of the layers of the retina. each **£2 10 0**

**2099.—Eyeball**, entirely dismountable. Best scientific execution .. .. . each **£2 10 0**

**2100.—Eye**, vertically dissected, on board. Enlarged ten times. A most instructive model for teaching each **17/6**

**2101.—Eyeball** in the orbit, vertical section, enlarged five times, showing all the muscles, dissected arteries and nerves. When the sphincter is removed the lachrymal glands are visible below .. .. . each **£7 15 0**

**2102.—Large Demonstration Model of the Human Eye**, "University" model. Most perfect construction. Dissectable to show the complete formation of the eye, its coats, humours, muscles, nerves and vessels. Price **£5 5 0**



**2103.—Lachrymal Glands**, showing the course from the glands to the nose, with all the arteries and muscles .. .. . each **£2 10 0**

### THE HEAD.

**2104.—Brain**, natural size, vertically cut, divisible with medulla oblongata, spinal cord, and the nerve roots .. .. . **19/6**

**2105.—Brain**, divisible into four parts, and with the first ventricle well finished .. .. **£1 5 0**

**2106.—Brain**, in six parts, latest improved model. **£1 15 0**

**2107.—Brain**, as No. 2106, but with coloured designation of the brain centres .. .. **£2 5 0**

**2108.—Brain**, natural size. A nice preparation, divisible into eleven parts. Very accurate execution. **£3 17 6**

**2109.—Brain**, natural size, wholly dismountable and very suitable for teaching purposes. **£4 15 0**

**2110.—Section of Head**, with special attention to the nose, mouth, and throat cavities. The brain is shown, and the whole model is of best possible finish. **£1 17 6**

**2111.—Skull**, left half removable, on board. On removing the top of the skull, the cerebrum presents itself. The eye, with muscles and optic nerve, is removable, and the bones of the skull and face are well marked. At the roots of the teeth the entering arteries, veins and nerves are visible .. .. **£1 5 0**

**2112.—Skull from an Adult.** A substitute for the rare and expensive natural skulls. We have manufactured this imitation of papier-mâché, completely true to nature, with movable and removable lower jaw bone. Perfect execution. .. **£2 7 6**

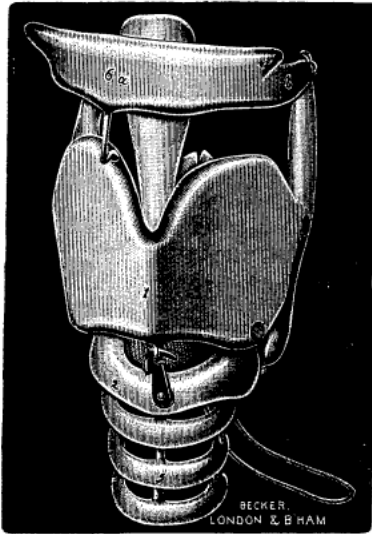
**2113.—Half of a Head**, on board, showing the superficial muscles, arteries, veins, nerves and glands. **£1 12 6**

**2114.—Head**, natural size, vertical section, showing the bones of the skull cavities, cerebrum, cerebellum, medulla oblongata, nasal cavity, trachea, tongue, palate, cesophagus .. .. . **£1 1 0**

(Continued on next page.)

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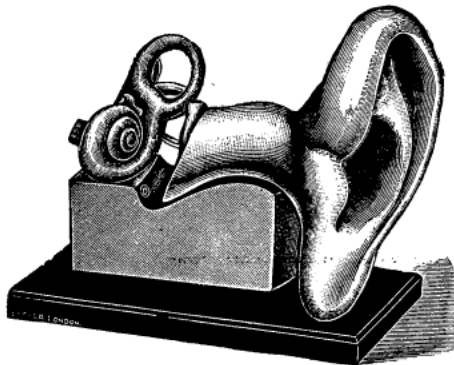
## ANATOMICAL MODELS



2117.

### THE LARYNX.

- 2115.**—Model of Larynx, natural size, with muscles. Divisible into two parts .. .. . each **13/6**
- 2116.**—Model of Larynx, with muscles, arteries, nerves and glands. Can be taken to pieces.. .. . each **19/6**
- 2117.**—Model of Larynx, as illustrated. Made specially for demonstrating the production of different sounds. This model can be taken to pieces; also the vocal chords can be removed .. .. . each **£1 17 6**
- 2118.**—Model of Larynx, natural size, showing the vessels, nerves and thyroid glands in addition to the muscles and ligaments .. each **£1 17 6**
- 2119.**—Model of Larynx, enlarged three diameters, with movable muscles, cartilages and epiglottis. Best model for the study of the larynx and voice-formation, showing plainly all movements of the human larynx. .. .. . each **£3 7 6**



### THE EAR.

- 2120.**—Model of Ear, five times natural size.  
*Specification:—*
- A. The external ear consists of an expanded portion named pinna or auricle, the ext. auditory meatus, (a) a cartilaginous portion of the auditory canal, (b) an osseous portion of the auditory canal.
- B. The middle ear, meatus and med.: (a) membrana tympani, (b) hammer or malleus, (c) incus or anvil, (d) stapes or stirrup closing the fenestra ovalis, (e) Eustachian tube.
- C. Internal ear or labyrinth: (a) vestibule—(1) fenestra ovalis, (2) fenestra rotunda; (b) semicircular canals, (c) cochlea, (d) acoustic nerve.
- This model does not take to pieces. .. .. . Price **£1 2 6**

- 2121.**—Model of Ear, five times natural size. This model is divisible into three parts: the external, the middle ear or tympanum, and the inner ear or labyrinth. The external ear consists of an expanded portion or auricle (prima), the external auditory canal and the tympanic membrane. The middle ear is composed of the cavity of the tympanum, mastoid cells and the Eustachian tube. The internal ear consists of the osseous and the membranous labyrinth. .. .. . Price complete **£1 19 6**
- 2122.**—Model of Ear, large size, and entirely dissectible.. .. . **£4 15 0**

## ANATOMICAL MODELS (VARIOUS)

(See also next page.)

### THE HEART.

- 2123.**—Heart, natural size, on stand. This model can be opened .. .. . each **19/6**
- 2124.**—Heart, with ramifications of the arteries and veins; can be opened, and the different parts are removable .. .. . each **£2 7 6**
- 2125.**—Lung and Heart, natural size, both parts dismountable .. .. . **£2 15 0**
- 2126.**—Heart. Very instructive model. Ventricles can be opened, the atrium is divided into two parts, an upper and a lower one, by a transversal cut, dividing also the auricles and the root of the aorta, the pulmonary artery and the venal canal. After lifting off the upper part all the valves and ostiæ become visible. .. .. . Each .. .. . **£4 7 6**

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## ANATOMICAL MODELS (VARIOUS)

### THE TEETH.

**2127.—Teeth**, a model showing the innervation, vessels, shedding of the teeth and caries.

Each .. .. . £1 1 0

**2128.—Teeth**, a glass case, containing 15 natural teeth, showing all important diseases, such as the different forms of pulpitis, periodontitis, alveolar abscess, etc. .. .. . £1 2 6

### THE SKIN.

**2129.—Skin**, vertical section through the skin, 200 times enlarged, showing the three principal layers, sebaceous and sweat glands, hair roots, muscles, arteries and veins .. .. . each £1 1 0

**2130.—Skin**, vertical section through the skin as No. 2129, but considerably enlarged each £1 12 6

### THE DIGESTIVE ORGANS.

**2131.—Digestive Organs**, abdomen, natural size, in which the intestines can be taken to pieces, showing stomach, liver, spleen, and small and large intestines. £5 19 6

### THE KIDNEYS.

**2132.—Kidneys**, model to take to pieces £1 1 0

**2133.—Kidneys**, "University" model, both kidneys made to take to pieces; all details clearly shown. £1 7 6

### THE NOSE.

**2134.—Nose**, represented in two halves, and considerably enlarged. One part represents the bridge of the nose, the other the external wall, turbinated bones, etc. This is a very instructive model in that all the arteries, nerves and veins are visible .. £2 15 0

### THE TRUNK.

**2135.—Trunk**, open in front showing larynx, lungs, heart, diaphragm, stomach, liver with gall bladder, spleen, small and large intestines, with bladder, section of ribs, clavicle, and pelvis.. .. £1 3 6

**2136.—Trunk**, open behind, showing œsophagus, lungs, with ramifications of the trachea and blood vessels, stomach, spleen, kidneys, liver, section of bowels and pelvis .. .. . £1 3 6

**2137.—Trunk**, natural size, without head. The abdominal organs, lungs and heart (dismountable), with the great arteries and veins clearly shown. A very instructive model .. .. . each £7 10 0

**2138.—Trunk**, natural size, with head. The brain is divisible into eight parts, the lungs into two parts. The larynx is dismountable and divisible into two parts. All the abdominal intestines are removable; with thoracic and abdominal wall .. each £14 10 0

### THE TONGUE.

**2139.—Tongue**, natural size, takes to pieces 17/6

**2140.—Tongue** (Section of), enlarged eight times, with all muscles, arteries, and nerves .. £3 5 0

**2141.—Larynx with Tongue**, divisible into two parts .. .. . £1 5 0

### SKELETONS AND BONES

Prices and Details on application.

**OTHER ANATOMICAL MODELS NOT LISTED ABOVE  
 SUPPLIED AT SHORT NOTICE.  
 LOWEST PRICES ON APPLICATION.**

Every requisite for Chemical, Physical, and Bacteriological work supplied, from a test tube to the complete furnishing of the largest laboratory.

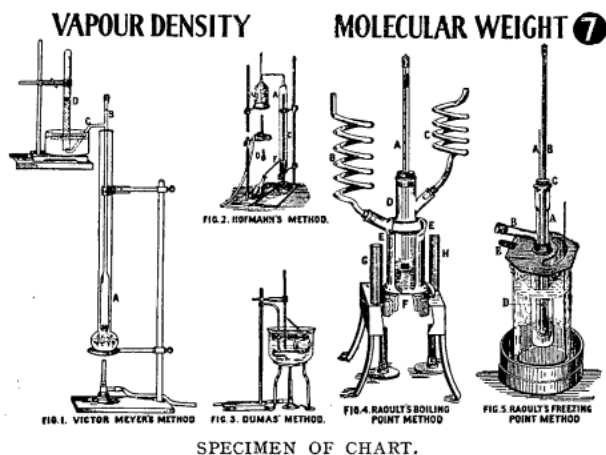
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## DR. GEOFFREY MARTIN'S CHEMICAL LECTURE DIAGRAMS

The object of these diagrams is to simplify the work of the teacher by supplying him with first-rate drawings in bold outline of the more complicated apparatus and processes usually dealt with in courses of chemistry. The more costly pieces of apparatus are usually inaccessible to ninety-nine per cent. of the schools of the country on grounds of expense; and even in large institutions where they are available it greatly aids the lecturer to have at hand a clear diagram hung on the walls of the lecture room in order to explain the principles of the exhibited apparatus or process to a large class, thus obviating the necessity for making complicated drawings in chalk on the blackboard in order to explain the various points.

THE DIAGRAMS HAVE BEEN BROUGHT THOROUGHLY UP TO DATE, THE MOST RECENT ADVANCES IN CHEMISTRY BEING ILLUSTRATED BY SIMPLE BUT CLEAR DRAWINGS. For example, complete tables are given of the new radio-active elements, together with their constants; while a special chart represents the chief experimental apparatus employed in radioactivity. Electrical furnaces, a recent development of chemistry, are illustrated at length, pictures being given of the furnaces used for making graphite and calcium carbide; also the new electrical furnaces used for refining steel and making alloys (both induction and arc furnaces being illustrated). The plant employed for liquefying the air and for manufacturing oxygen and nitrogen therefrom (including Linde's and Claude's processes) are described. A special diagram deals with the process of fixation of atmospheric nitrogen and the manufacture of nitric acid and nitrates from the atmosphere, the new processes being fully illustrated; thus diagrams are given of the Birkeland-Eyde, Pauling and Schönherr arc-furnaces now used for the purpose.

The new processes of making synthetic ammonia by Haber and Le Rossignal's method are clearly illustrated, and Stratt's apparatus for active nitrogen is also described.



SPECIMEN OF CHART.

GREAT CARE HAS BEEN TAKEN TO AVOID ALL UNNECESSARY DETAIL AND ELABORATION IN THE DIAGRAMS. THEY HAVE ALL BEEN MADE SO SIMPLE THAT ANY ONE CAN BE COPIED INTO THE NOTE-BOOKS OF THE STUDENTS IN THE SCANTY TIME AVAILABLE IN A LECTURE.

AN INSPECTION OF THE ACCOMPANYING LIST OF SUBJECTS FIGURED ON THE SET OF DIAGRAMS WILL CONVEY A CLEAR NOTION OF THEIR SCOPE AND USE.

### LIST OF DIAGRAMS.

1. Radioactivity (8 diagrams).
2. Table of Radioactive Substances.
3. Solubility Curves and Carbonic Acid Isothermals.
4. Liquefaction of Gases. Pictet's and Cailletet's Methods.
5. Liquefaction of Gases. Modern Processes (3 diagrams).
6. Low Temperature Experiments (5 diagrams) and Ammonia Ice-Making Plant.
7. Vapour Density and Molecular Weight Determinations (5 diagrams).
8. Manufacture of Fluorine and Anhydrous Hydrofluoric Acid (3 diagrams).
9. Manufacture of Chlorine (2 diagrams).
10. Manufacture of Bromine and Distillation of Iodine.
11. Ozone (4 diagrams).
12. Water (6 diagrams).
13. Composition of Gases, etc. (5 diagrams).
14. Sulphur, SO<sub>2</sub>, etc. (4 diagrams).
15. Chamber Process for Sulphuric Acid.
16. Concentration of Sulphuric Acid.
17. The Atmosphere (preparation of nitrogen from, and gravimetric composition of, etc.).
18. Synthetic Ammonia and Nitric Acid.
19. Nitric Acid and Nitrates from the Atmosphere (6 diagrams).
20. Types of Electric Furnaces (6 diagrams).
21. Phosphorus; Boracic Acid (3 diagrams).
22. Carbon; Coal Gas; Manufacture of Diamonds, etc.
23. Flame and Combustion (9 diagrams).
24. Mendeléeff's Periodic System.
25. Lothar Meyer's Curve of Atomic Volumes.
26. Spectrum Analysis (2 diagrams).
27. Sodium and Aluminium.
28. The Leblanc Process (3 diagrams).
29. The Ammonia-Soda Process (3 diagrams).
30. Electrolytic Process for Caustic Alkalis and Chlorine (5 diagrams).
31. Copper (4 diagrams).
32. Silver; Gold; Platinum.
33. Lead (Reverberatory Furnace; Pattinson's Process).
34. Bismuth; Chromium.
35. Iron and Steel (3 diagrams).
36. Zinc and Mercury.

(For prices see next page.)

## DR. GEOFFREY MARTIN'S CHEMICAL LECTURE DIAGRAMS

For list of diagrams, see previous page.

### PRICES.

- 2142.**—The Series of 36 sheets on strong paper, 30 in. by 40 in. . . . . **£4 4 0**
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- 2146.**—Included in each of the above will be found a syllabus compiled by Dr. Martin giving details of every diagram in such a way as to form the groundwork of a series of lectures which will be found invaluable by teachers and demonstrators, and which should also be of use to students themselves. These may be obtained at the price of **6d.** net each.
- 2147.**—Handbook giving descriptions and illustrations of Dr. Geoffrey Martin's charts, for the use of students.  
 Each . . . . . **3/6**

## MENDELÉEFF'S PERIODIC SYSTEM

Hitherto the chart of the above diagram has only been obtainable as one of the Series of Dr. Martin's Chemical Charts (a full detailed list of which will be found on page 306; but in response to numerous inquiries the publishers have arranged for the publication of a separate edition. All the other Charts in the Series can still only be obtained by purchasing the complete set, but the important position which Mendeléeff's Periodic System occupies, and the great revolution its discovery occasioned in the realm of Modern Chemistry, have made an exception in this case necessary.

The Chart is larger than the others in the Series, measuring 40 in. × 45 in.

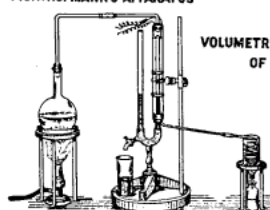
Mounted on linen and varnished, complete on rollers, **17/6** net.

Our stock of pure Chemicals and Acids is very considerable; hence all orders are executed with the utmost despatch. See comprehensive list at end of Catalogue.

### WATER

12

FIG. 1. HOFMANN'S APPARATUS



VOLUMETRIC COMPOSITION OF WATER

FIG. 2. CAVENDISH'S APPARATUS

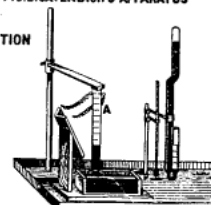


FIG. 3. GRAVIMETRIC COMPOSITION OF WATER (DUMAS)

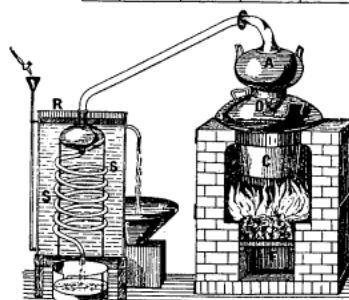
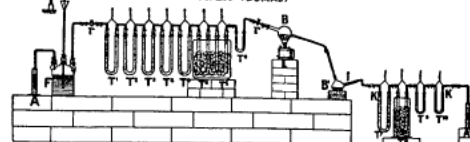


FIG. 4. DISTILLATION OF WATER

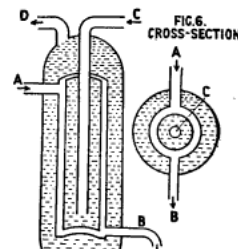
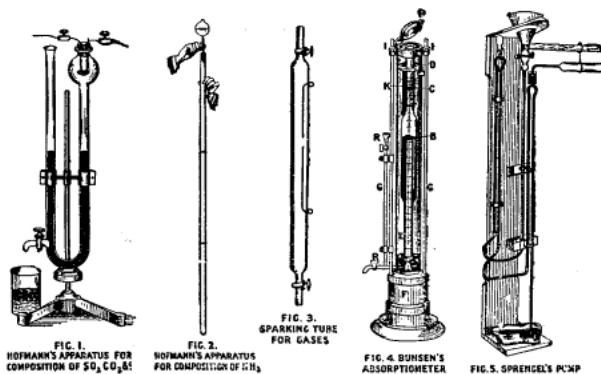


FIG. 5. MODERN DOUBLE-SURFACE CONDENSER

Illustrations show reduced specimens of  
 Dr. Geoffrey Martin's Charts.

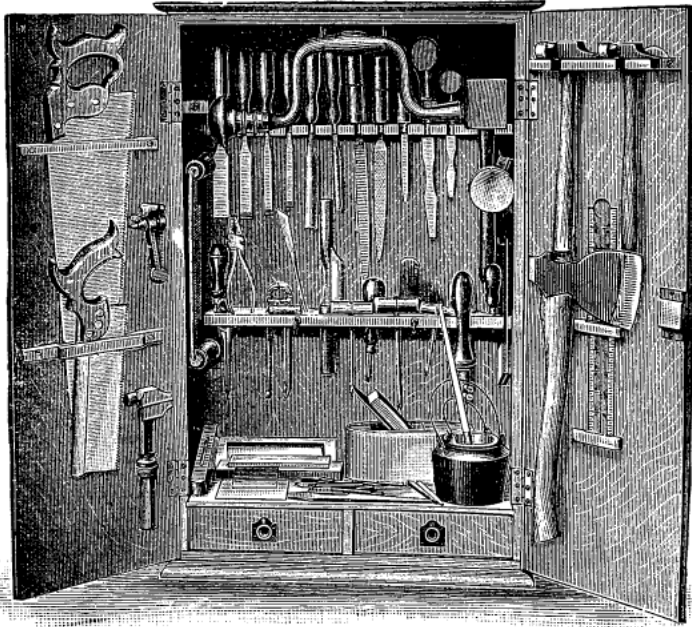
### COMPOSITION OF GASES &c

13



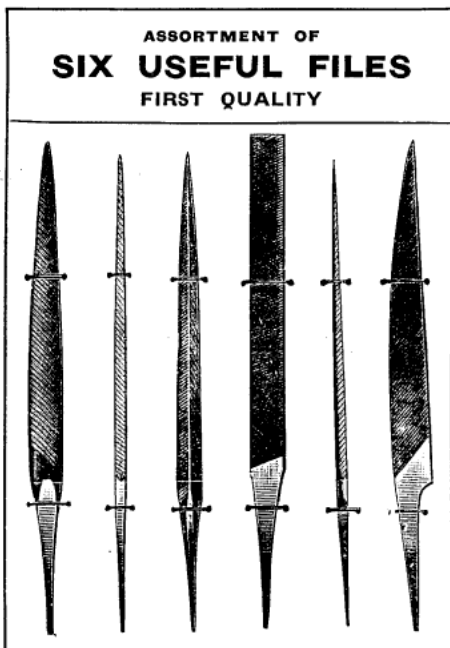


## A FEW TOOLS FOR USE IN THE LABORATORY



**2148.—Tool Cabinets**, large size, containing : 2 hammers, hatchet, mallet, hand saw, pincers, pliers, 2-ft. rule, square, spokeshave, plane, 2 gimlets, 2 bradawls, compasses, 2 turn-screws, tackclaw, cold chisel, brad punch, 2 files, rasp, 2 chisels, gouge, oil stone, oil can, glue pot and brush, nails, etc... .. **£5 5 0**

**2149.—Ditto**, largest size, strongly made, containing : 2 hammers, mallet, hatchet, hand saw, tenon saw, saw pad and saw, hand vice, pincers, cutting pliers, 2-ft. rule, bevel, square, spokeshave, smoothing plane, 4 gimlets, 4 bradawls, compasses, 2 turn-screws, 2 files, rasp, 4 chisels, 2 gouges, 2 brad punches, striking knife, drawing knife, brace and bits, scraper, movable spanner, spirit level, oil stone, oil can, glue pot and brush, nails, etc. .. .. **£9 15 0**



**2150.—Assortment of Six Useful  $3\frac{1}{2}$  in. Files**, first quality, on cards. Series 1, as illustrated, comprises :  $\frac{1}{2}$ -round, 3-square, flat, knife, square and round. Series 2 comprises : oval, slitting, flat, 3-square, pillow and ridge back.  
 Price, either series .. .. each **4/6**



**2151.—Firmer Chisel**, cast steel, with box-handles.

Width ..	$\frac{1}{8}$	$\frac{1}{4}$	$\frac{3}{8}$	$\frac{1}{2}$	$\frac{5}{8}$	$\frac{3}{4}$	$\frac{7}{8}$	$1\frac{1}{8}$	$1\frac{1}{2}$	$1\frac{3}{4}$	$2\frac{1}{8}$	$2\frac{1}{4}$	in.
Price ..	<b>1/-</b>			<b>1/3</b>			<b>1/5</b> each.						
Width ..	$\frac{7}{8}$	$1$	$1\frac{1}{8}$	$1\frac{1}{4}$	$1\frac{3}{8}$	$1\frac{1}{2}$	in.						
Price ..	<b>1/6</b>	<b>1/8</b>	<b>1/10</b>	<b>2/-</b>	<b>2/3</b>	<b>2/6</b>	each.						



**2152.—Hand Forged Chisels for Metal**, best English manufacture.

Diameter ..	$\frac{3}{8}$	$\frac{1}{2}$	$\frac{5}{8}$	$1\frac{1}{4}$	in.
Length ..	6	8	10	10	in.
Price ..	<b>10d.</b>	<b>1/2</b>	<b>1/6</b>	<b>2/-</b>	



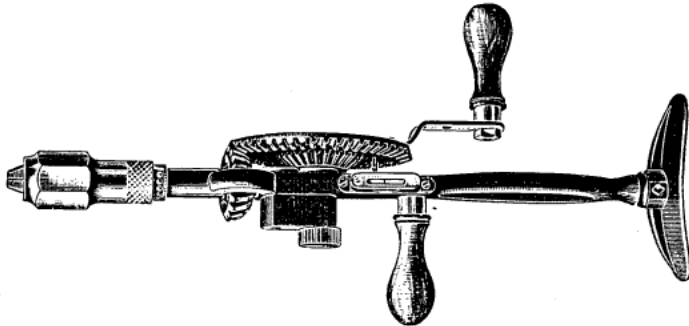
**2153.—File Cleaner or Wire Brush.** No. 1, ordinary, as illustrated.

Each .. .. **9d.**

**FOR OTHER FILES, see page 179.**

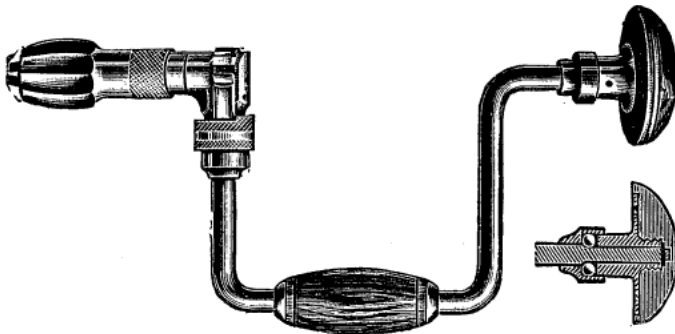
Every requisite for Chemical, Physical, and Bacteriological work supplied, from a test tube to the complete furnishing of the largest laboratory.

## LABORATORY TOOLS



**2154.—Improved Breast Drill**, two speeds, nickel plated, rosewood handles, steel jaws, malleable-iron stock and breast-plate, with two pairs of jaws, cut gears, ball thrust.  
 Price .. .. . **27/6**

**2155.—Archimedean Drill**, with spring head and ebonised handle; length, 10 in. .. .. . **3/-**



**2156.—Superior Sheffield Braces**, perfect alignment, steel sweeps, steel ratchet wheels, ball-bearing heads, with hardened and tempered steel ball races, octagonal grip, drop-forged steel jaws, self-opening spring jaws, interchangeable parts, highest possible finish, best English product.

First Sheffield quality—lignum head, rosewood handle, nickel-plated.

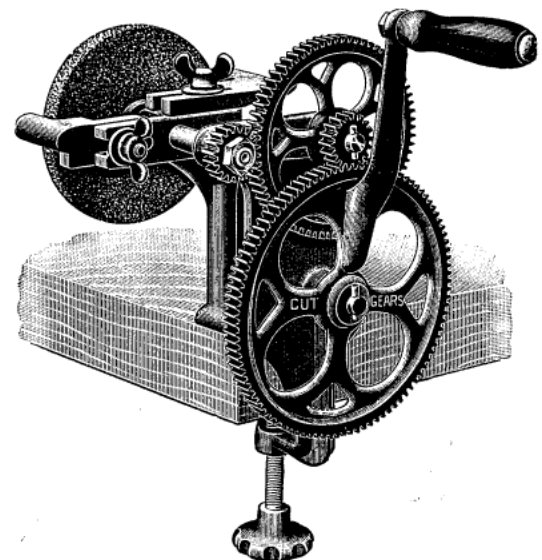
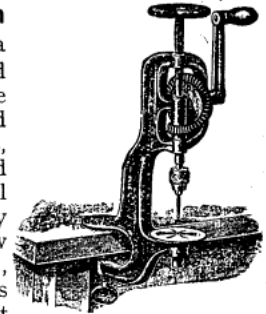
8 in. sweep, plain	<b>9/6</b> ;	with ratchet	.. ..	<b>14/-</b>
10 in. „	<b>11/6</b> ;	„	.. ..	<b>15/6</b>



**2157.—Hammer with Chisel End** .. each **2/6**

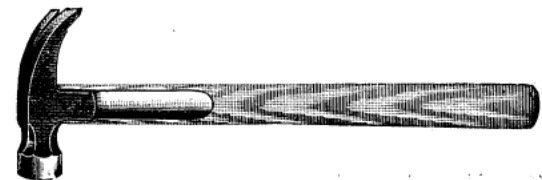
**2158.—Bench Drill.**

This is a nicely-finished and substantial little machine, with solid iron frame, cut gears, steel feed-screw and adjustable table, all well made and nicely fitted. It has a 3-jaw chuck—0 to 1/4 in., eight nicely fluted drills —1/8 to 1/4 in. Height from table to feed-wheel is 13 in. Packed in box, size 16 1/2 x 10 x 6 1/2 in. Gross weight, 11 lb.  
 Price .. .. . **35/-**



**2159.—Bench Grinder.** This has machine cut wheels, the bearings are accurately made. Height, 10 in.; width, 8 in.; depth, 6 in. The clamp will fit on to a 2 in. bench. It carries rests for right and left hand. It is supplied with an emery wheel, 4 x 1 in. Diameter of spindles 1/2 in. Net weight, 8 lb.

Price .. .. . **£2 7 6**



**2100.—Best Canterbury Hammers**, oval handles, strongly made, medium size. each **3/-**

Our Balances and Weights have achieved World-wide Reputation: *vide* Opinions of the Leading Scientific Press.

## LABORATORY TOOLS



**2161.—Nail Puller**, English manufacture.

Small, 16 in.	Medium, 19½ in.	Large, 28 in.
14/6	18/-	27/6

These are most useful tools for the laboratory. With one a box can be opened in half the time, and with hardly any labour. The nails are drawn out without breaking or bending them, and the box and lid remain sound for future use.



**2165.—Pincers**, guaranteed best make.

Length .. ..	6	7	8	9 in.
Price, each .. ..	1/6	2/-	2/6	3/-



**2162.—Case Openers**, best English make, forged steel.

Length .. ..	10	12	14	16 in.
Price, each .. ..	5/6	7/-	7/6	8/-



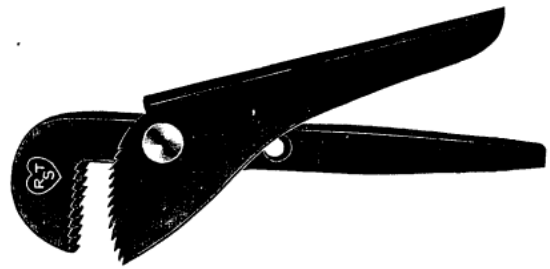
**2166.—Gas Pliers**, best quality.

Length .. ..	6	7	8	9	10	12 in.
Price, each .. ..	2/-	2/6	3/3	4/-	4/9	6/6



**2163.—Turnscrews**, cast steel, beech handles.

3	4	5	6	7	8 in.
10d.	1/-	1/3	1/9	2/-	2/3 each.
9	10	11	12 in.		
2/8	3/-	3/6	4/3 each.		



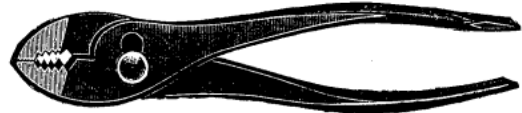
**2167.—Pipe Wrench Pliers**, best quality.

Length .. ..	6	7	9	12	14	16 in.
Price, each .. ..	1/9	2/3	3/-	4/6	6/9	10/-



**2164.—Turnscrews**, spindle.

6	7	8	10 in.		
1/2	1/5	1/6	1/8 each.		
12	14	16	18	20 in.	
1/10	2/-	2/3	2/6	3/3 each.	

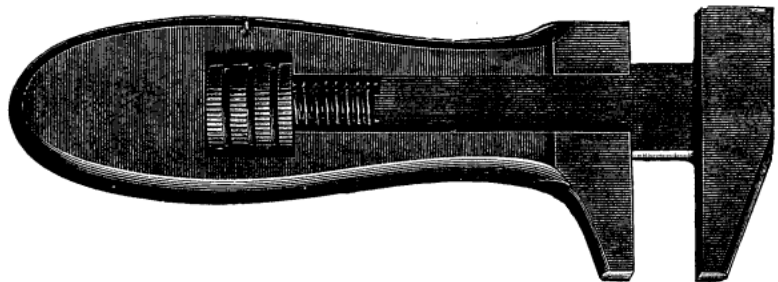


**2168.—Combination Pliers**, containing wire cutter, flat nose pliers, screw driver, wrench and gas pliers—gripping pipes from ¼ to 1¼ in. diameter. Length, 6½ in.

Each .. .. . 3/6

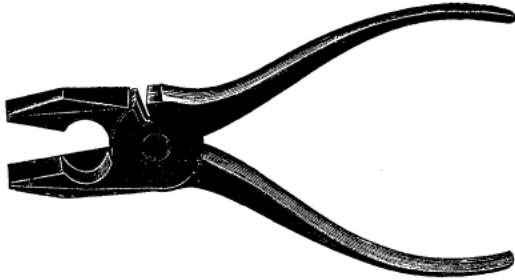
**2169.—Gem Spanner**, wrought steel bar, thoroughly well made and gun-hardened.

Each .. .. . 2/9



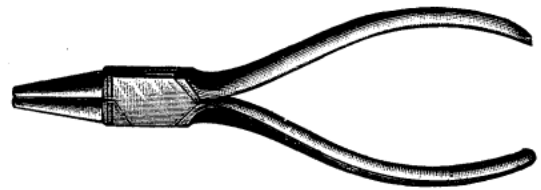
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## LABORATORY TOOLS

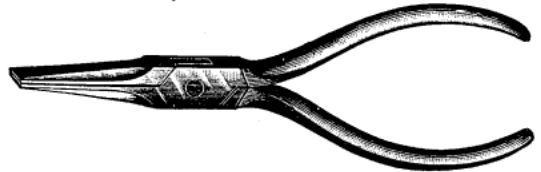


**2170.—Cutting Pliers**, new improved pattern, Solid cast steel, made by machinery, and of very superior quality. Wherever wire is used these pliers will be found invaluable.

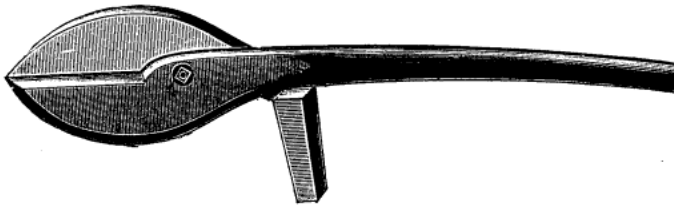
Each .. .. . **3/6**



**2173.—Round Nose Pliers**, solid cast steel, best quality .. .. . each **2/3**



**2174.—Flat Nose Pliers**, solid cast steel, best quality .. .. . each **2/3**



**2171.—Metallurgical Shears**, large, for fixing in block on table, very useful for shearing thick metal.

Each .. .. . **32/6**

**2175.—Cutting Nippers**, very powerful.

Per pair .. .. **5/-**

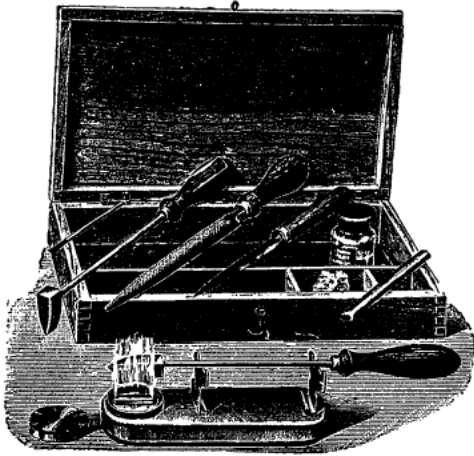


**2176.—Ditto**, cheaper, but good quality per pair **3/9**

**2177.—Shears**, best quality, for cutting metal, wire gauze, etc.

Length ..	7	8	9	10	11	12 in.
Each ..	<b>2/9</b>	<b>3/-</b>	<b>3/3</b>	<b>3/9</b>	<b>4/6</b>	<b>5/-</b>

(If fitted with spring, each extra **10d.**)



**2178.—Complete Soldering Outfit**, in polished wood case.

Box, 11 x 6 x 2½ in. Containing lamp, soldering iron, three-square file, bottle of solution, brush, stick of solder, and piece of sal-ammoniac.

Price .. .. . **11/-**

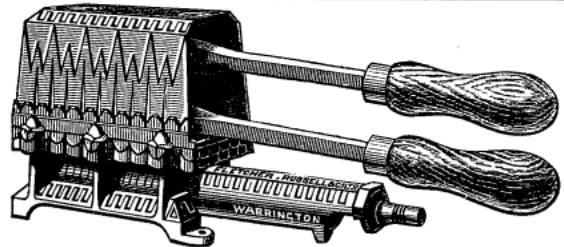
**2179.—Ditto**. Box, 11 x 6 x 2½ in. As illustrated, containing lamp, two soldering irons, half-round file, three-square scraper, bottle of solution, brush, stick of solder, and piece of sal-ammoniac.

Price .. .. . **15/-**



**2172.—Soldering Irons**, best make.

Weight of Copper Head ..	¼	½	¾ lb.
Price, each .. .. .	<b>2/6</b>	<b>3/-</b>	<b>4/-</b>
Weight of Copper Head ..	1	1¼	1½ lb.
Price, each .. .. .	<b>5/-</b>	<b>6/6</b>	<b>7/6</b>

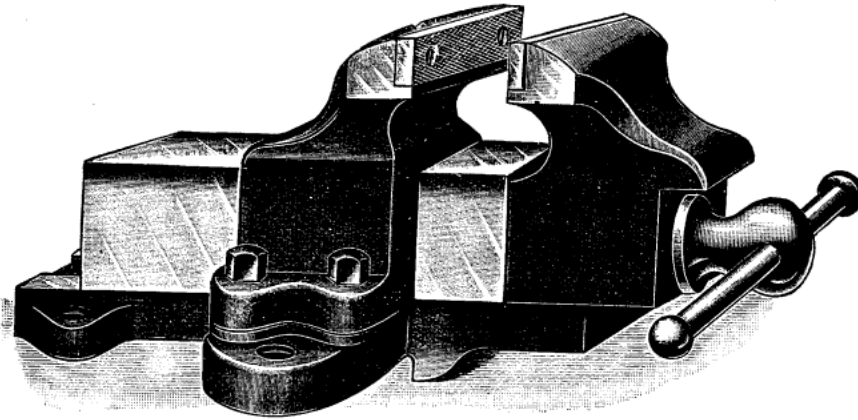


**2180.—Gas Burner and Oven**, for small light soldering bolts. This will heat one bit and keep another nearly ready for use, so that the two can be used in succession.

Price, without bits .. .. . **9/6**

Every requisite for Chemical, Physical, and Bacteriological work supplied, from a test tube to the complete furnishing of the largest laboratory.

## LABORATORY TOOLS

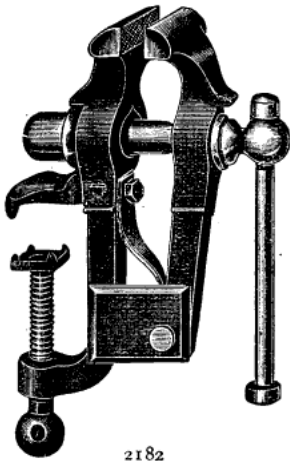


### 2181.—Parallel Bench Vices.

Extra strong. Guaranteed finest make and finish.

Size No.	00	0	1	2
Weight about	5	7	11	20 lb.
Jaws ..	2½	2½	3	3½ in.
Opens ..	2½	3	3½	4½ "
Each ..	12/6	13/6	15/6	24/-

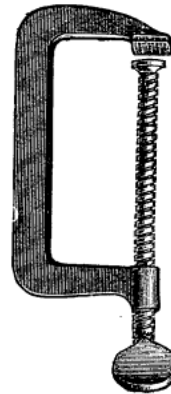
Size No...	3	4	5	6
Weight about	30	45	67	89 lb.
Jaws ..	4	4½	5	6 in.
Opens ..	5	5½	6	7 "
Each ..	33/6	37/6	55/-	70/-



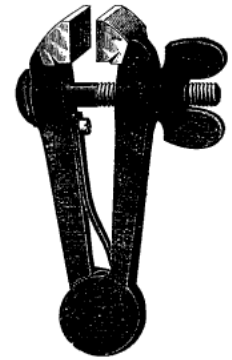
2182

**2182.**  
**Bench Vice,**  
 very strongly  
 made, of solid  
 wrought steel.  
 Each .. **12/6**

**2183.**  
**Clamps,**  
 malleable iron, with  
 machine - turned  
 screw, best make.  
 3 in... each **3/9**  
 4 in... .. **4/6**  
 5 in... .. **5/6**  
 6 in... .. **6/-**



2183



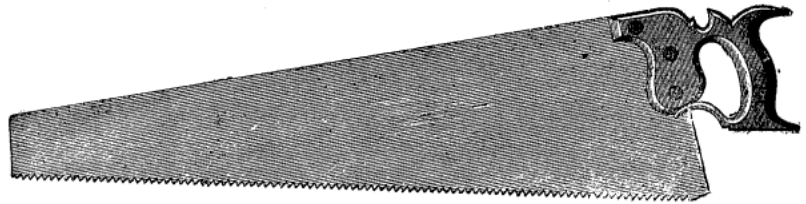
**2185.—Hand Vice,**  
 solid wrought steel,  
 best quality.  
 Each .. .. **3/9**



**2184.—Hand Vice,** nicely  
 nickel plated, for holding small  
 articles steadily in the hand.  
 Each.. .. **3/6**

**2186.—Hand Saws,** excellent quality,  
 cast steel, beech handles, polished edges,  
 three screws. A first-rate cheap saw,  
 excellent finish.

10	12	14	16	18 in.
3/-	3/6	3/9	4/-	4/6
—	20	22	24	26 in.
—	5/-	5/6	6/-	6/6



**2187.—Goniometer,** for meas-  
 uring the angles of crystals, etc., for  
 students' use .. .. each **7/6**  
 For Models of Crystals, see p. 151.

**2188.—Gonio-  
 meter,** steel,  
 nickel-plated;  
 diameter of scale  
 6 in., length of  
 slide 12 in.

Each .. **17/6**



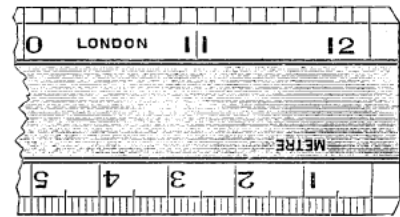
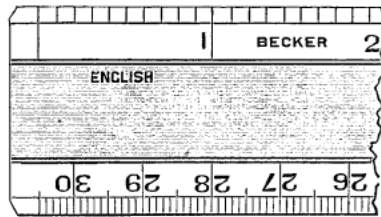
For Goniometers of the more expensive patterns, see  
 Physical Apparatus Catalogue, Section II.

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 Leading Scientific Press.

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**2189.**— **Boxwood Rule**, best quality, 12 in. long, divided into 10ths of an inch on one edge, and mm. and cm. on the other, bevelled edges.

Each .. .. . 5d.



**2190.** **Boxwood Rule**, best quality, 12 in. long, divided into 8ths of an inch on one edge, and mm. and cm. on the other, bevelled edges .. .. . each 5d.

**2191.**— **Boxwood Rule**, 1 metre long, best quality, divided into 10ths of an inch on one edge, and mm. and cm. on the other.

Each .. .. . 2/4  
 Per dozen .. .. . 24/-

**2192.**— **Boxwood Rule**, as No. 2191 but 1/2 metre long.

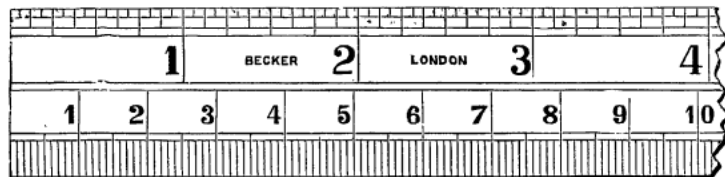
Each .. .. . 1/4  
 Per dozen .. .. . 15/-

**2193.**— **Boxwood Rule**, 1 metre long, best quality, divided into 16ths and 8ths of an inch on one edge, and mm. and cm. on the other.

Each .. .. . 2/4  
 Per dozen .. .. . 27/-

**2194.**— **Boxwood Rule**, as No. 2193 but 1/2 metre long.

Each .. .. . 1/4  
 Per dozen .. .. . 15/-

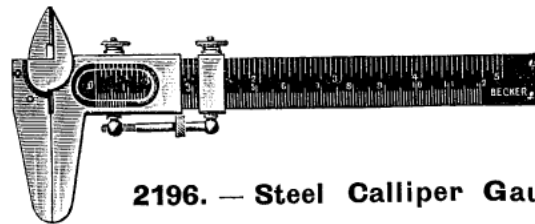


## CALLIPER GAUGES



**2195.**— **Steel Calliper Gauge**, nickel plated, for inside and outside measurements (may also be used as a depth gauge), with English and metric scales and two verniers; measures up to 4 in. and 10 cm.

In flap case .. .. . each 7/-



**2196.**— **Steel Calliper Gauge**, as No. 2195, but with micrometer adjustment.

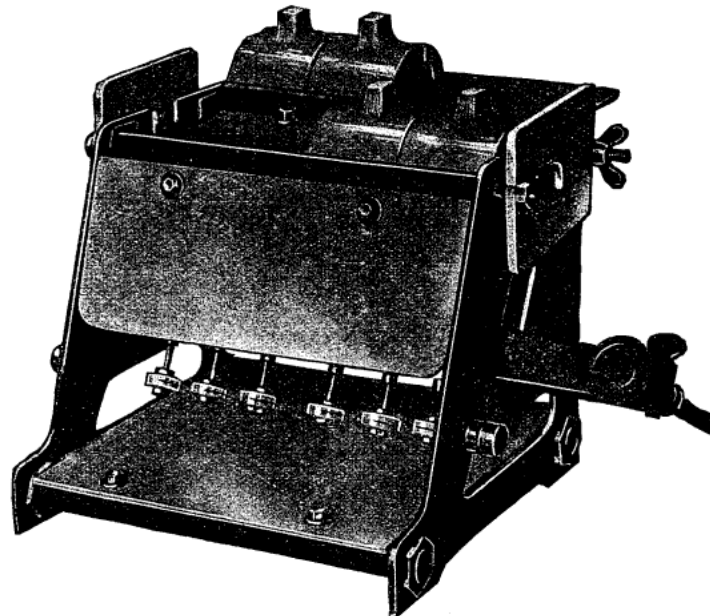
In flap case .. .. . each 10/6

**FOR STEEL AND OTHER BOXWOOD RULES, WIRE GAUGES, MICROMETER SCREW GAUGES, CALLIPERS, ETC., REFER TO OUR PHYSICAL APPARATUS CATALOGUE.**

Our stock of pure Chemicals and Acids is very considerable; hence all orders are executed with the utmost despatch. See comprehensive list at end of Catalogue.

# THE "HEDLEY" COMBUSTION FURNACE

FOR USE  
 IN  
 ORGANIC  
 AND  
 INORGANIC  
 ANALYSIS



AS SUPPLIED  
 TO THE  
 UNIVERSITIES  
 OF  
 BIRMINGHAM,  
 LEEDS, Etc.

An 8-inch Section. No. 2198.

The following is a summary of the more important features of this Gas Combustion Furnace, in which it has been sought to cheapen, while eliminating the disadvantages of the earlier types.

#### Weight.

A 32-inch (standard length) furnace of the new type weighs only 27 lb. complete, and is therefore readily portable by one person.

#### Heat Insulation.

Simple refractory screens completely enclose the furnace, with the exception of the top. It may therefore be safely used on a wooden bench; the operator works in comfort, being fully protected from direct heat radiation.

#### Gas Consumption.

A high temperature may be rapidly attained and easily maintained with a minimum consumption of gas, owing to its small refractories, efficient heat insulation, and elimination of massive metal parts.

#### General.

- (1) No taps are employed in the burner, heating and "gumming," and the consequent use of pliers for gas regulation is obviated.
- (2) A hot tile shelf is provided.
- (3) Permanent adjustable screens are fitted for the protection of tube ends and bungs from radiated heat.
- (4) Air gas mixture is regulated by a single external valve.
- (5) The furnace can be supplied in any length which is a multiple of 4 inches. Standard length 32 inches.

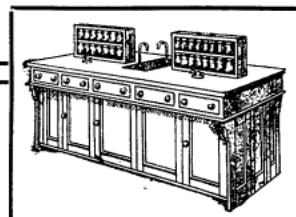
### THE "HEDLEY" COMBUSTION FURNACE.

Cat. No. ..	2197	2198	2199	2200	2201	2202	2203	2204
Length .. ..	4	8	12	16	20	24	28	32 in.
No. of Burners	3	6	9	12	15	18	21	24
Price, each ..	£3 5 0	£4 2 6	£5 0 0	£5 17 6	£6 15 0	£7 12 6	£8 10 0	£9 7 6

## WE ARE THE SOLE MANUFACTURERS OF THESE FURNACES

Every requisite for Chemical, Physical, and Bacteriological work supplied, from a test tube to the complete furnishing of the largest laboratory.

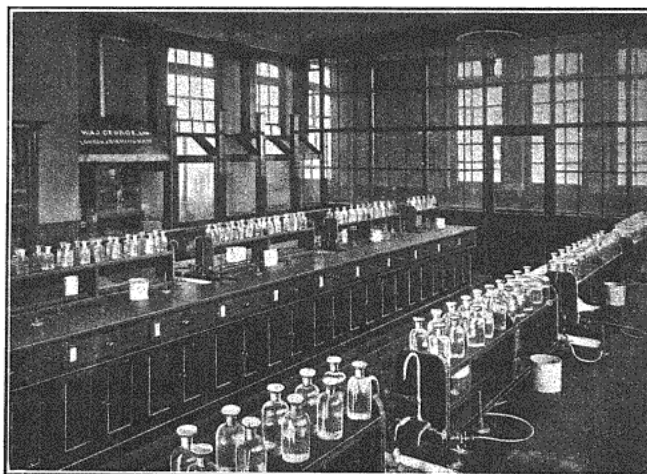




**A SHORT  
DESCRIPTIVE LIST OF**

**Laboratory Furniture, Etc.**

**CHEMICAL  
AND  
PHYSICAL  
BENCHES,  
LECTURE  
TABLES,  
Etc.**



**FUME  
CHAMBERS,  
STORE  
CUPBOARDS,  
GAS AND  
WATER  
FITTINGS,  
SINKS, Etc.**

We strongly emphasise the following points as being the *most difficult to encounter* and requiring the greatest attention in laboratory designing and construction—the actual woodwork, benches, etc., being quite an ordinary and simple matter to contend with *afterwards*.

- (1) Special and careful drainage scheme.
- (2) Very careful selection of gas and water fittings of suitable design and construction.
- (3) Sinks with suitable overflow and of proper anti-splash pattern for laboratory work.

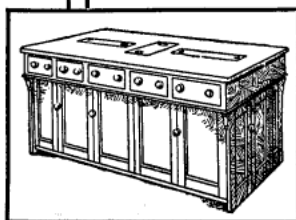
We have numerous schemes, patterns, designs, and patents to cope with the difficulties above mentioned, these being the outcome of many years' actual experience in fitting up laboratories in all parts, and under ever-varying conditions.

We place this valuable experience at the disposal of architects and all interested in the construction and equipping of a laboratory, and we invite correspondence *before building operations are commenced if possible*, when our experts will be at the service of clients.

We would also call special attention to the position we hold as specialists in laboratory fittings, such as water taps, gas taps, condenser taps, filter pumps, etc., suitable for the chemical and physical laboratory. Our special nozzles for rubber tubing are too well known to need lengthy description here.

**ESTIMATES AND DRAWINGS.**—We make any fitting to drawings and specifications. Send us the rough plan of a room required to be fitted up as a chemical or other laboratory, and we will send you the best schemes, with drawings and prices. When writing do not omit to state the number of students to be accommodated, and whether working singly or in pairs.

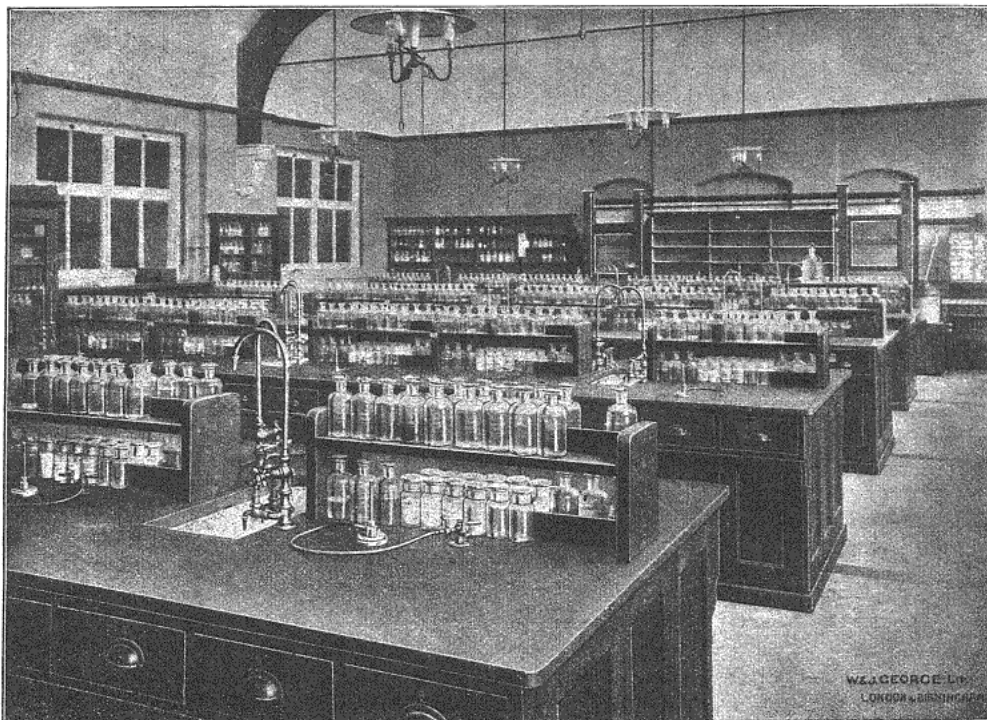
**VARNISHING, Etc.**—Unless otherwise stated, all prices include polishing or varnishing and painted castings.



Our Balances and Weights have achieved World-wide Reputation : *vide* Opinions of the Leading Scientific Press.

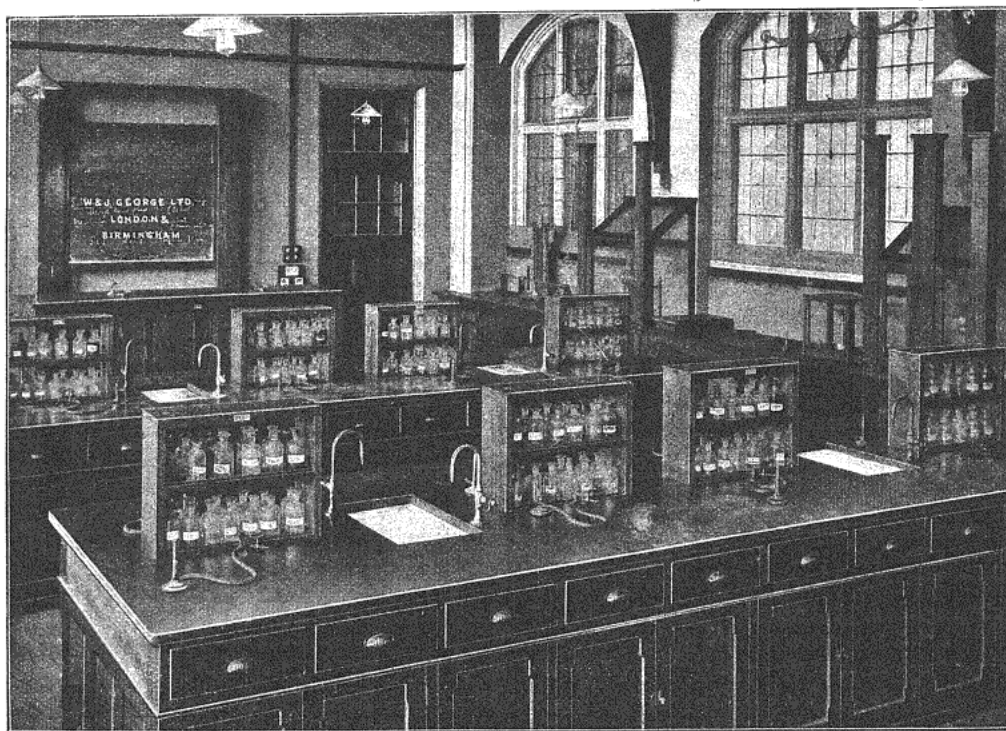
316 F. E. BECKER & CO., NIVOC HOUSE, HATTON WALL, LONDON, E.C.1.  
W. & J. GEORGE (LONDON), Ltd., PROPRIETORS.

## A FEW CHEMICAL LABORATORIES FITTED AND EQUIPPED BY US



VIEW OF LABORATORY,  
SMETHWICK.

ST. MARY'S TRAINING  
COLLEGE, BIRMINGHAM,  
SHOWING OUR COMBINED  
CHEMICAL AND PHYSICAL  
BENCHES IN USE.



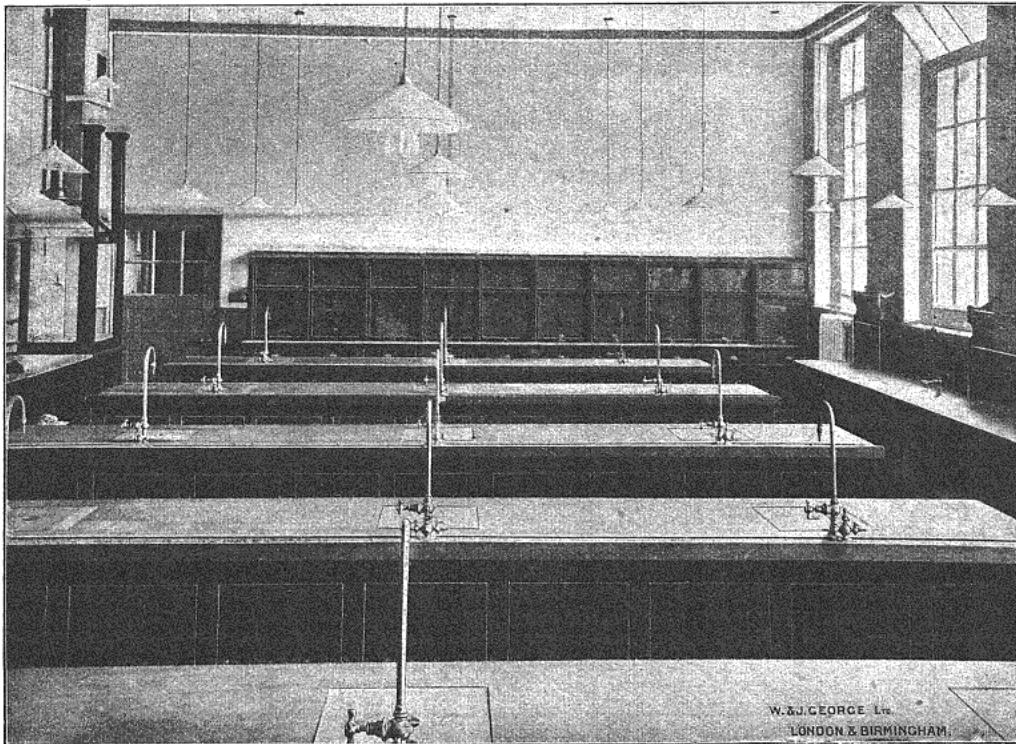
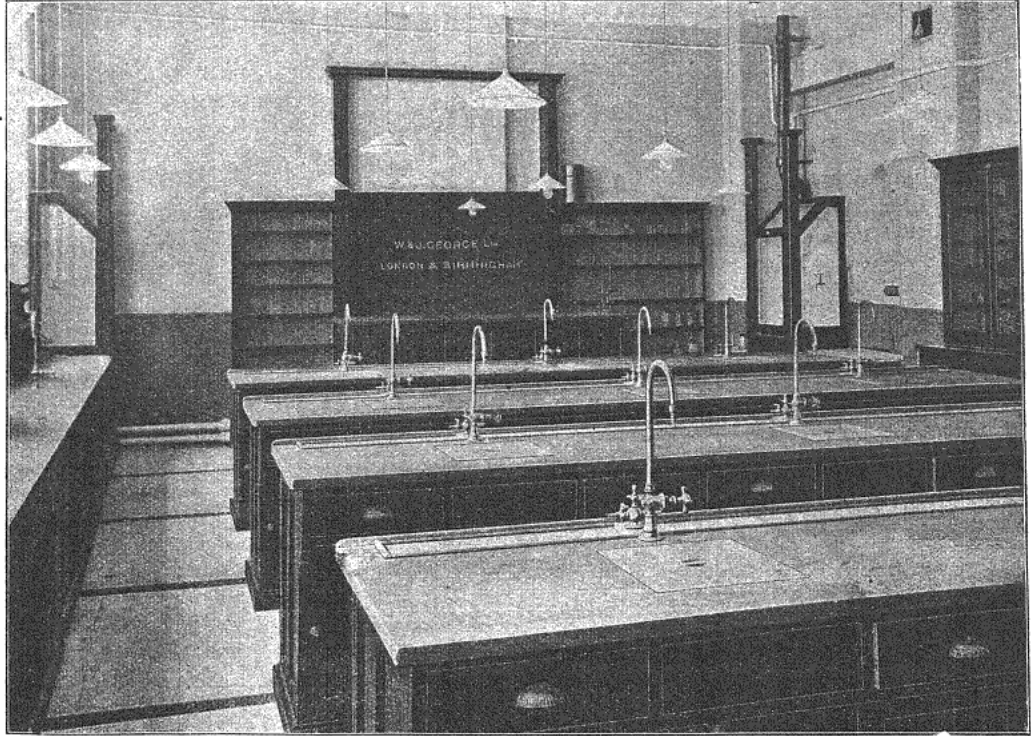
Our stock of pure Chemicals and Acids is very considerable ; hence all orders are executed with the utmost despatch. See comprehensive list at end of Catalogue.

Droits réservés au Cnam et à ses partenaires

F. E. BECKER & CO., NIVOC HOUSE, HATTON WALL, LONDON, E.C.1. 317  
W. & J. GEORGE (LONDON), Ltd., PROPRIETORS.

## SPECIAL TYPE SINGLE BENCH STUDENTS ALL FACING DEMONSTRATION TABLE

GIRLS' HIGH SCHOOL,  
ROTHERHAM.



OPPOSITE VIEW, SAME  
LABORATORY.

## A FEW EXAMPLES OF LABORATORY EQUIPMENT

PRICES ON APPLICATION.

### PATENT CHEMICAL BENCH OR COMBINED CHEMICAL AND PHYSICAL BENCH.

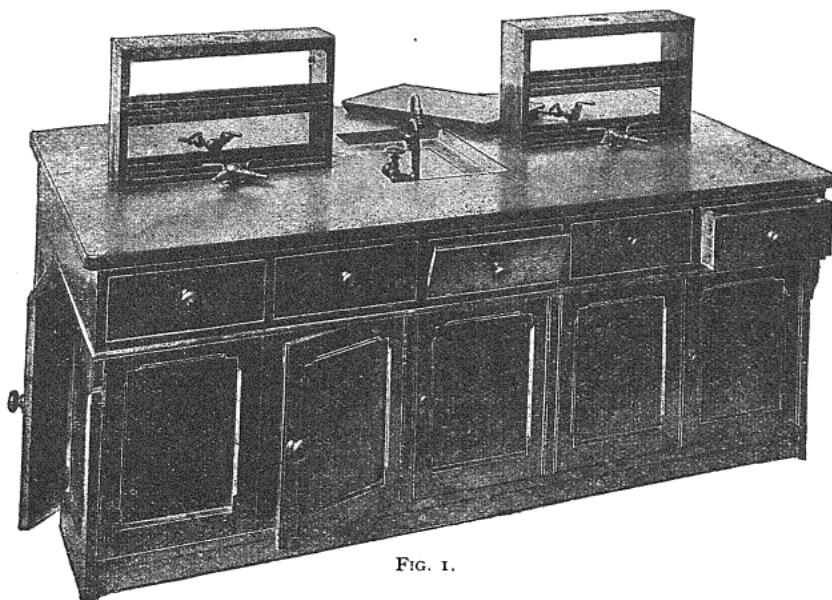


FIG. 1.

We have numerous letters from all parts of the country, giving us very flattering opinions upon the value of our **Patent Bench** in the science room, and on the quality of our workmanship. We have sent these benches to South Africa, Australia, etc., with equally satisfactory results.

Below is an extract from a letter we have just received. The original of this and of other testimonials can be seen on application.

"I think I may say on behalf of the Governors and myself that we very much appreciate the great thought and care that you have bestowed upon the outfit of our Laboratory, which is an ideal one for so small a school.

We should be happy at all times to lay the building open to inspection by any Governing body who may contemplate building upon similar lines."

We strongly recommend this patent bench for use in **Chemical Laboratories alone**, the bottles of reagents being readily enclosed from dust and dirt when not required for actual use.

The Ideal Bench for the Science Room, when as in Fig. 1 it forms a chemical bench. Can be cleared in a few seconds to form the physics table as in Fig. 2.

The bottle shelves can be withdrawn below the bench top, and for this purpose are fitted with strong cords and sash weights.

The bench as illustrated (Fig. 2) has the sliding bottle shelves withdrawn. The water taps are folded down, the lid put on the sink, leaving a clear table for physical work.

T. H. Russell, Esq., M.A., in his book on the "Planning and Fitting up of Chemical and Physical Laboratories," published 1903, says—

"In George's Patent Combined Bench an easy and safe method has been adopted for lowering the reagent shelves and their contents bodily. Sash cords are used, these pass over pulleys and are attached to sliding weights, which are heavier than the shelves and the bottles; these latter can be caused to descend by a downward pressure, and are kept down by a spring catch.

To lift off and remove the reagent shelves and bottles, whenever the bench is required for physical work, is too long and risky a process to be satisfactory, unless the number of bottles and the size of the shelves are both very small."

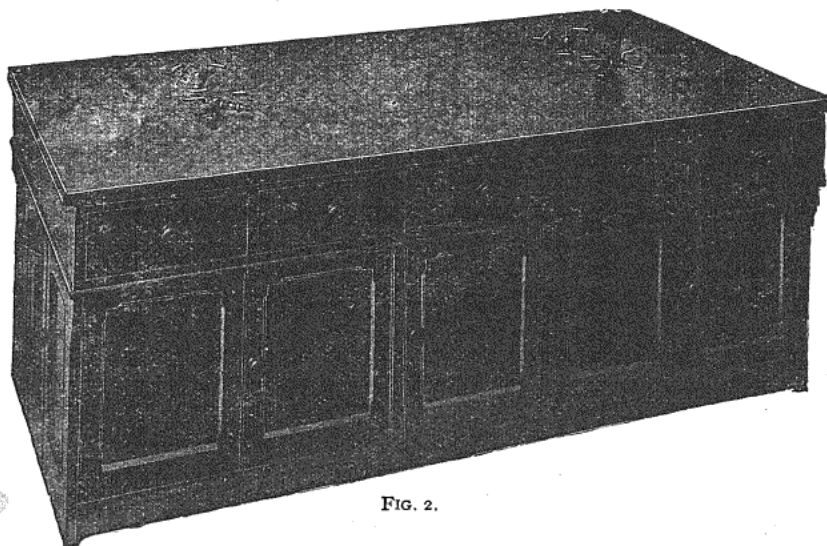


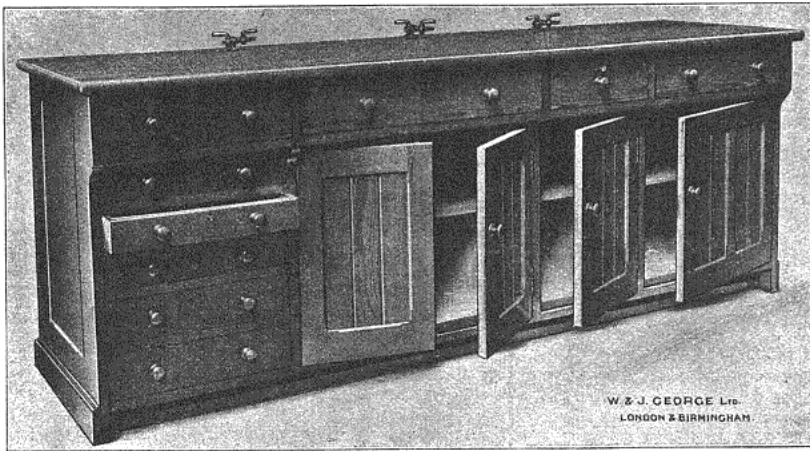
FIG. 2.

**2205**—The stock size bench is 7 ft. long, 4 ft. 6 in. wide, 2 ft. 10 in. high, provided with 4 two-way gas taps, 2 water taps, and porcelain sink. Price on application.

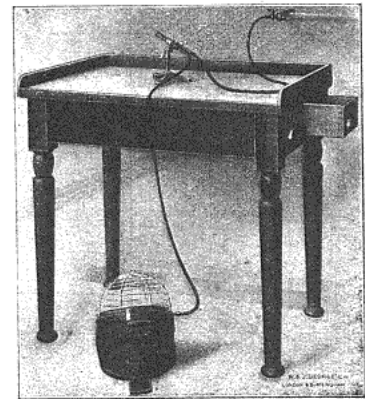
*Other sizes to order.*

**Our Balances and Weights have achieved World-wide Reputation: *vide* Opinions of the Leading Scientific Press.**

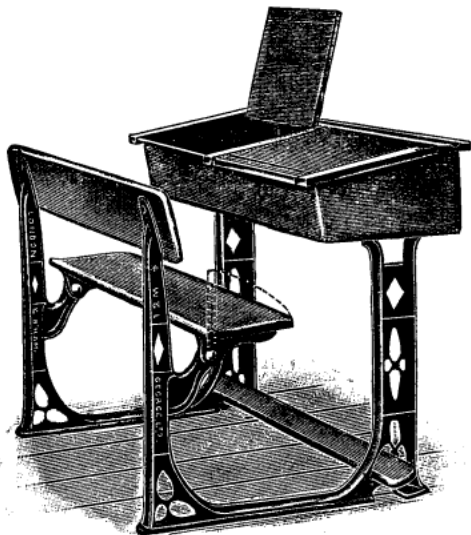




2206.—SIDE BENCH WITH DRAWERS AND CUPBOARDS.

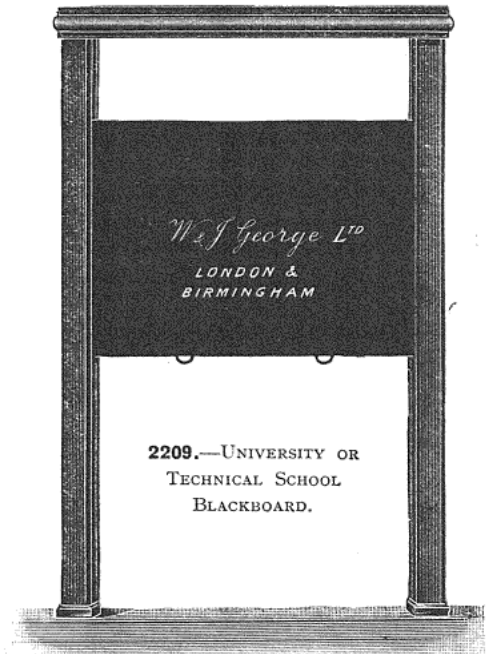


2207.—SIMPLE FORM BLOWPIPE TABLE.



2208.—SECONDARY SCHOOL DESK.

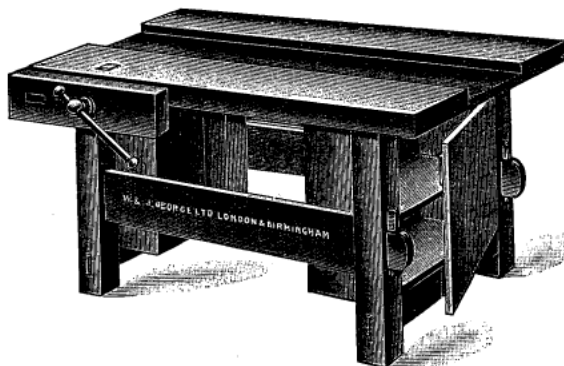
A  
 FEW  
**EXAMPLES**  
 OF OUR  
**LABORATORY**  
**EQUIPMENT**  
 PRICES ON  
 APPLICATION



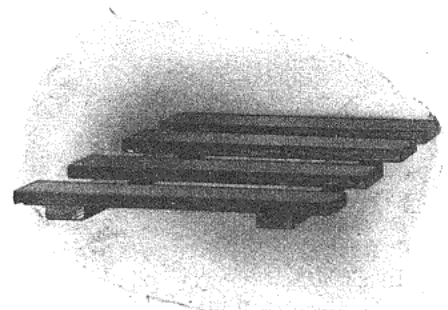
2209.—UNIVERSITY OR  
 TECHNICAL SCHOOL  
 BLACKBOARD.



2210.—  
 STUDENT'S STOOL.



2211.—MANUAL BENCH WITH END CUPBOARDS, ETC.

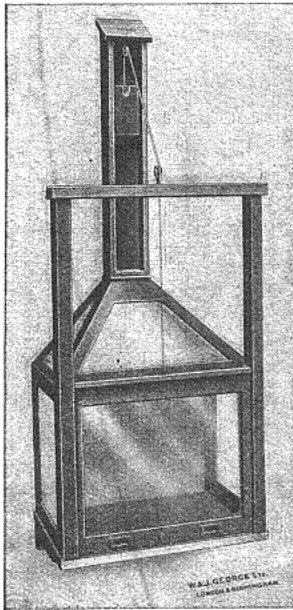


2212.—WOOD DRAINERS.

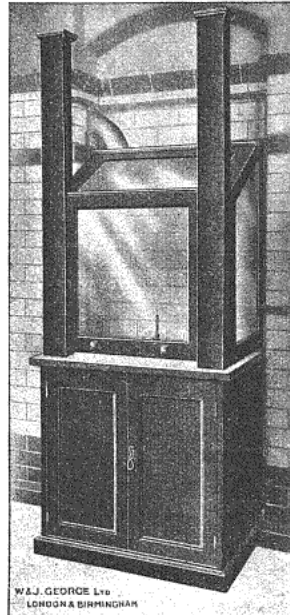
Our stock of pure Chemicals and Acids is very considerable ; hence all orders are executed with the utmost despatch. See comprehensive list at end of Catalogue.

## LABORATORY FURNITURE

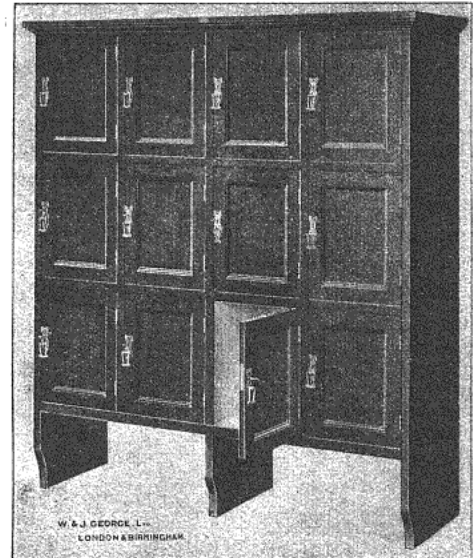
Prices on Application.



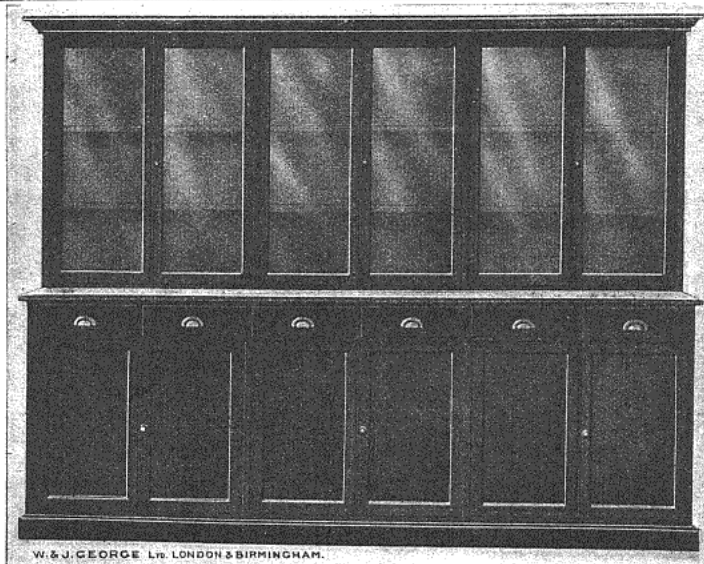
**2213.—Wall Pattern Fume Chamber** (with brackets). Manchester pattern. Fitted with our patent air-tight counterpoised sash.



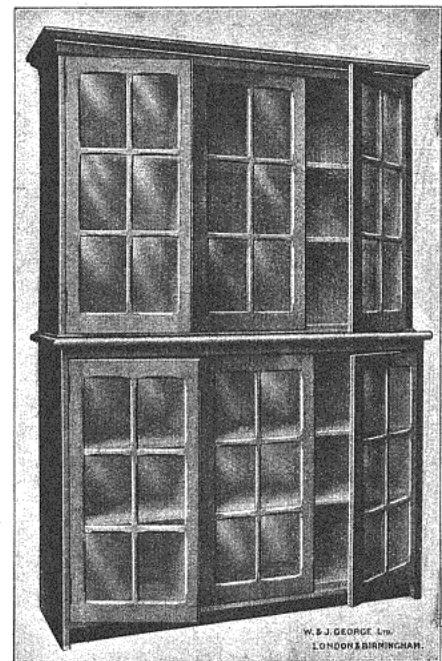
**2214.—Wall Fume Chamber**, fitted with cupboards. Fitted with our patent air-tight counterpoised sash. 6 ft. 5 in. high  $\times$  3 ft.  $\times$  2 ft.



**2215.—Lockers for Students' Use**, fitted with locks and hinges. Each locker measures 12 in.  $\times$  14 in.



**2216.—Useful Store Cupboard**, made in polished oak. In all sizes. Showing plinth at bottom. Length, 9 ft. 6 in.; height, 7 ft. 6 in.; upper part 12 in. deep inside, with three compartments; each with adjustable shelves and glazed doors.

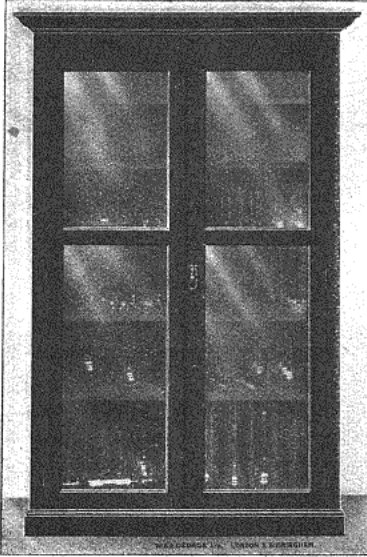


**2217.—Wholly Glazed Cupboard.** Showing toe space instead of plinth. Prices on application, according to length.

Every requisite for Chemical, Physical, and Bacteriological work supplied, from a test tube to the complete furnishing of the largest laboratory.

## LABORATORY FURNITURE

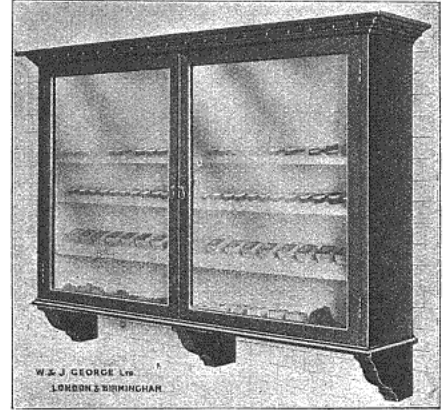
(PRICES ON APPLICATION)



2218

**2218.—Store Cupboard. —**

One carcass. In oak. 4 ft. long,  
6 ft. high.



2219

**2219.—Wall Case for Specimens or Apparatus.—4 ft.**

long, 3 ft. high.

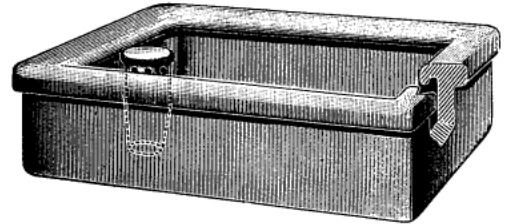
## LABORATORY SINKS

**2220. — Laboratory Sinks. “Double rim” pattern.**  
 White glazed inside and cane glazed outside.

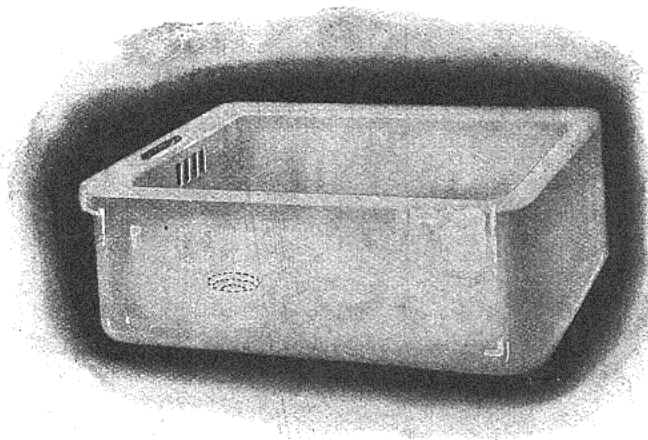
	Outside Dimensions under Rim.	Inside Dimensions.	Each.
A.	12 × 10 × 7 in.	10 × 8 × 6 in.	£0 19 3
B.	12 × 12 × 7 „	10 × 10 × 6 „	1 1 0
C.	16 × 11 × 7 „	14 × 9 × 6 „	1 1 0
D.	17 × 13 × 7 „	15 × 11 × 6 „	1 9 9
E.	20½ × 12½ × 7 „	18 × 10 × 6 „	1 9 9
F.	23½ × 14½ × 7 „	21 × 12 × 6 „	2 3 3

The projection of rim is ½ in. all round.

A part of the illustration is cut away to show section of double rim.



An overflow stopper can be supplied for use  
with these sinks at an extra cost of 8/- each.



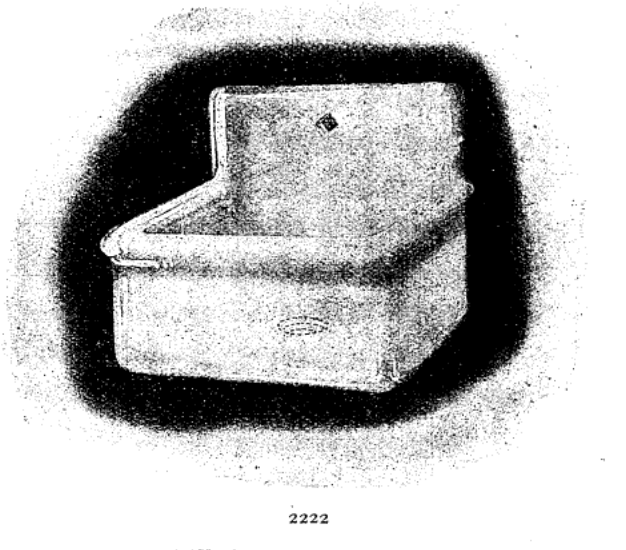
**2221.—Laboratory Sinks, with overflow**  
near top. White glazed inside and cane glazed  
outside.

	Outside Dimensions.		each	
A.	24 × 18 × 7 in.	..	..	£1 18 9
B.	27 × 18 × 7 in.	..	..	2 3 0
C.	30 × 18 × 7 in.	..	..	2 7 0
D.	33 × 18 × 7 in.	..	..	2 11 9
E.	36 × 18 × 7 in.	..	..	2 16 0
F.	24 × 18 × 10 in.	..	..	2 13 9
G.	27 × 18 × 10 in.	..	..	3 0 0
H.	30 × 18 × 10 in.	..	..	3 6 0
K.	33 × 18 × 10 in.	..	..	4 2 9
L.	36 × 18 × 10 in.	..	..	4 9 9

Our Balances and Weights have achieved World-wide Reputation : *vide* Opinions of the  
 Leading Scientific Press.



## LABORATORY SINKS



2222

**2222.—Bench Sink with 6-in. back skirt-**  
**ing.** White glazed inside and cane glazed outside.

	Outside dimensions under Roll.	Inside dimensions.	Each.
A.	12×10×7 in.	10× 8×6 in.	£1 7 5
B.	16×11×7 „	14× 9×6 „	1 12 0
C.	17×13×7 „	15×11×6 „	2 1 0

The projection of roll is  $\frac{1}{2}$  in. on front and two sides.



2223

**2223.—Small Sink,** for end of table. White glazed inside and  
 cane glazed outside.

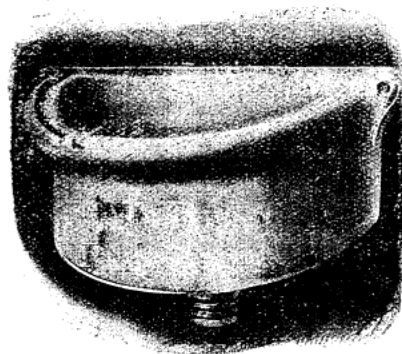
A.	Outside dimensions, 9 × 6 × 7 in.	.. .. .	each	14/6
B.	„ „ 10½ × 6 × 6 „	.. .. .	„	15/3



2224

**2224.—Receiver,** with  
 ordinary horn outlet, in cream  
 enamelled vitrified stoneware. Out-  
 side dimensions, 10½ × 10½ × 8 in.

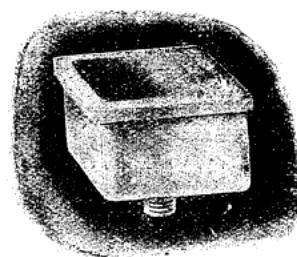
Each .. .. . £1 11 6



2225

**2225.—Semicircular Bench  
 Sink** in cream enamelled vitrified  
 stoneware. Outside dimensions, 16  
 × 9 × 9½ in.

Each .. .. . £1 10 6



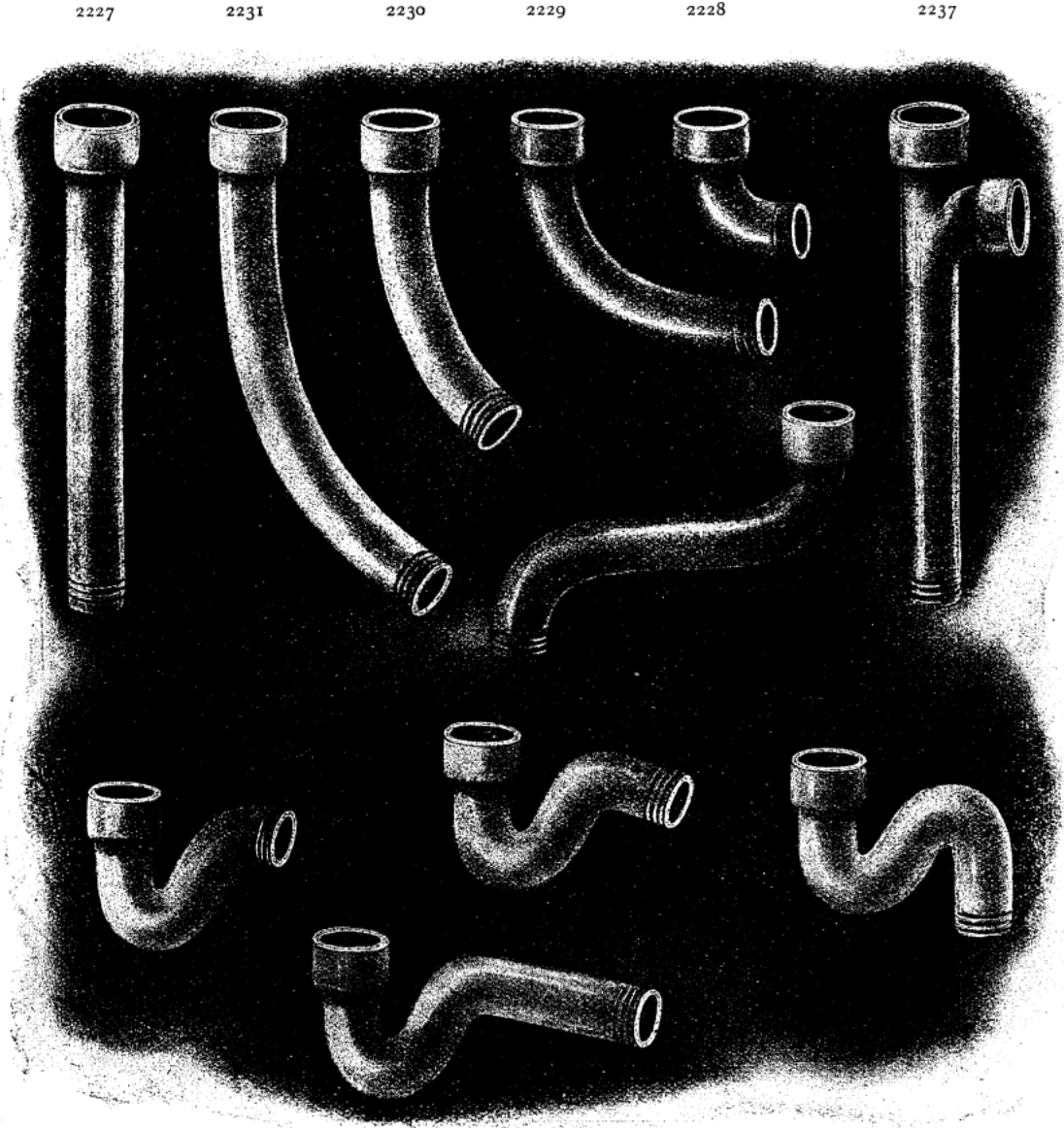
2226

**2226.—Square Sink,** in cream  
 enamelled vitrified stoneware, with  
 single rim on top edge and nozzle  
 outlet. Outside dimensions, 10 ×  
 10 × 5½ in.

Each .. .. . £1 1 0

Our stock of pure Chemicals and Acids is very considerable ; hence all orders are executed with  
 the utmost despatch. See comprehensive list at end of Catalogue.

**LABORATORY WASTE PIPES**  
**VITRIFIED STONEWARE, CREAM ENAMELLED.**



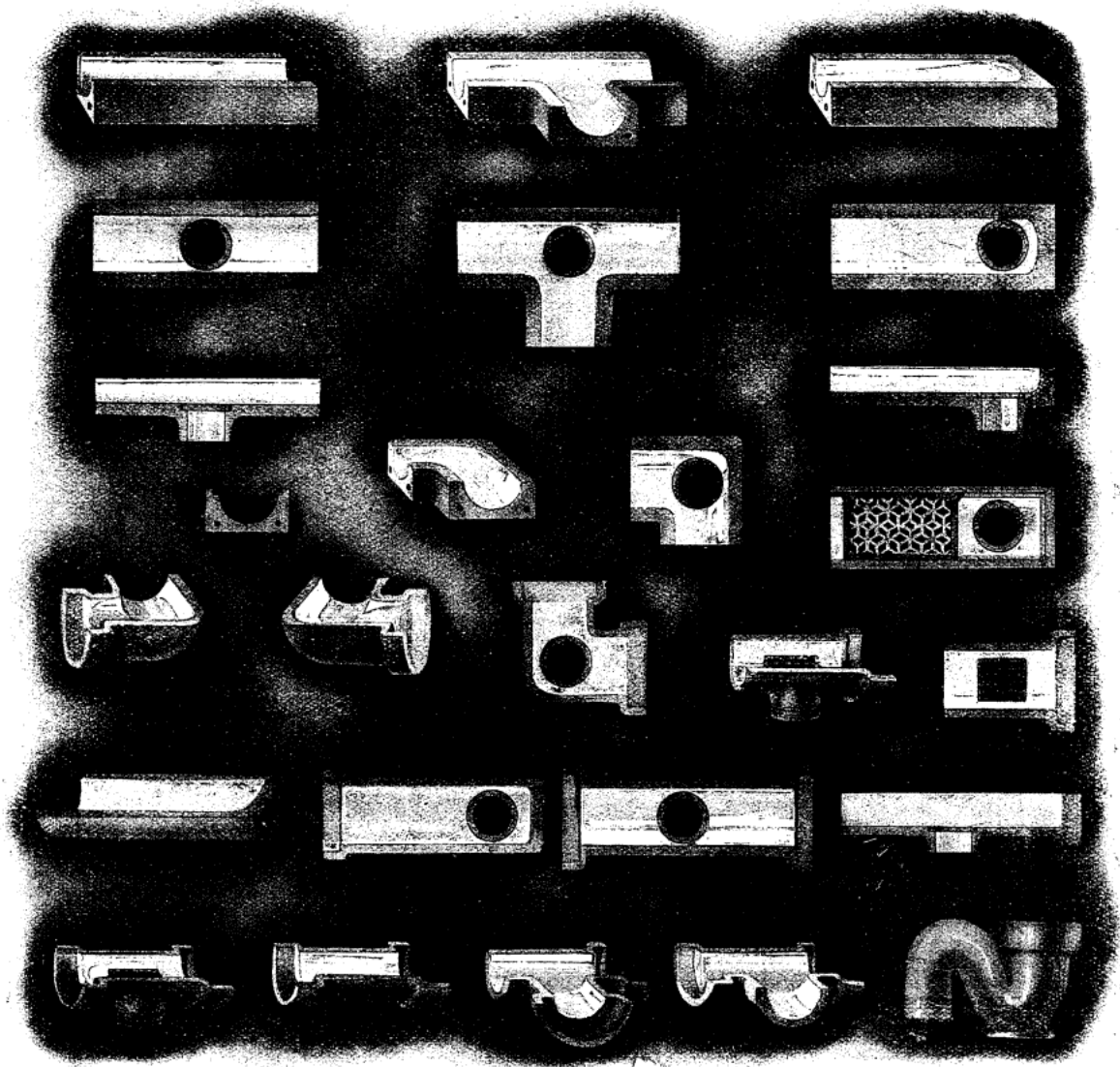
	2238	2241	
<b>2227.</b> —Cream Enamelled Vitrified Stone-ware Socketed Pipes, 2 in. bore, 2 ft. long.		each	<b>4/-</b>
<b>2228.</b> —Ditto, bend .. .. .		.. .. .	<b>6/-</b>
<b>2229.</b> —Ditto, bend .. .. .		.. .. .	<b>6/-</b>
<b>2230.</b> —Ditto, bend .. .. .		.. .. .	<b>6/-</b>
<b>2231.</b> —Ditto, for trapping through 4½ in. wall		.. .. .	<b>9/-</b>
<b>2232.</b> —Ditto, ditto .. .. .		.. .. .	<b>12/9</b>
<b>2233.</b> —Ditto, for trapping through 9 in. wall		.. .. .	<b>9/-</b>
<b>2234.</b> —Ditto, ditto .. .. .		.. .. .	<b>12/9</b>

	2239	2240	
<b>2235.</b> —Cream Enamelled Vitrified Stone-ware Socketed Pipes, 2 in. bore, 2 ft. long, for trapping through 14 in. wall .. .. .		.. .. .	each <b>9/-</b>
<b>2236.</b> —Ditto, ditto .. .. .		.. .. .	<b>12/9</b>
<b>2237.</b> —Ditto, junction, 2 ft. long .. .. .		.. .. .	<b>8/-</b>
<b>2238.</b> —Ditto, traps for sinks .. .. .		.. .. .	<b>11/-</b>
<b>2239.</b> —Ditto, ditto .. .. .		.. .. .	<b>11/-</b>
<b>2240.</b> —Ditto, ditto .. .. .		.. .. .	<b>11/-</b>
<b>2241.</b> —Ditto, ditto .. .. .		.. .. .	<b>11/-</b>

Every requisite for Chemical, Physical, and Bacteriological work supplied, from a test tube to the complete furnishing of the largest laboratory.

## GUTTER BLOCKS AND CHANNELS

Best Quality. White Glazed.



Quotations sent on Receipt of Enquiries giving Details as to Requirements.

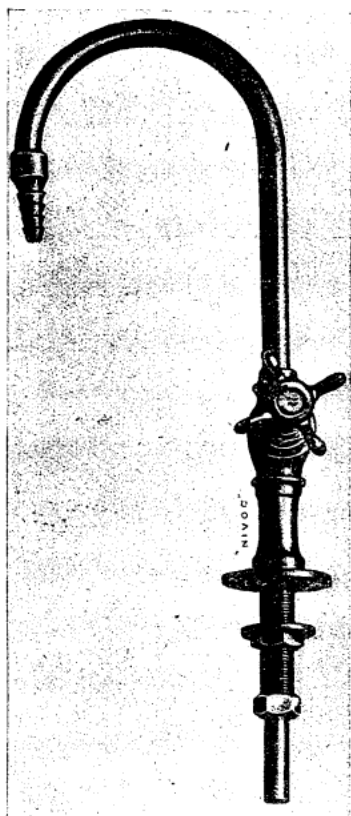
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Our Balances and Weights have achieved World-wide Reputation: *vide* Opinions of the Leading Scientific Press.

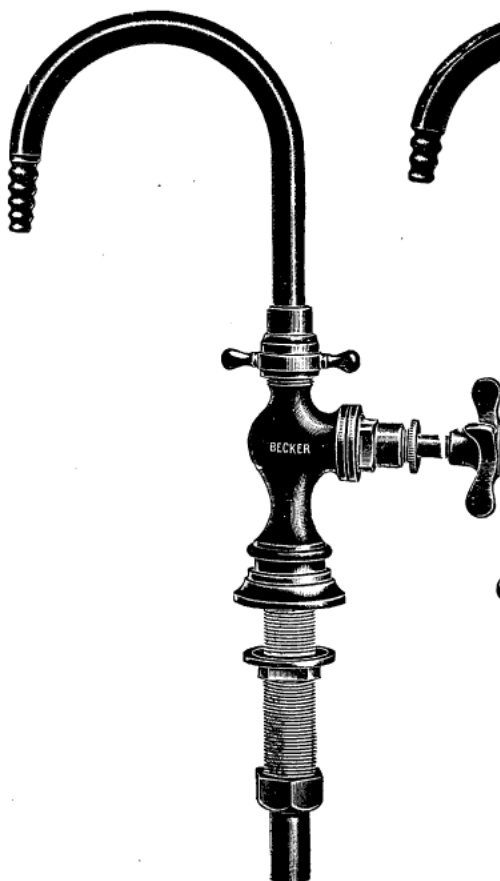
Droits réservés au Cnam et à ses partenaires

## LABORATORY TAPS

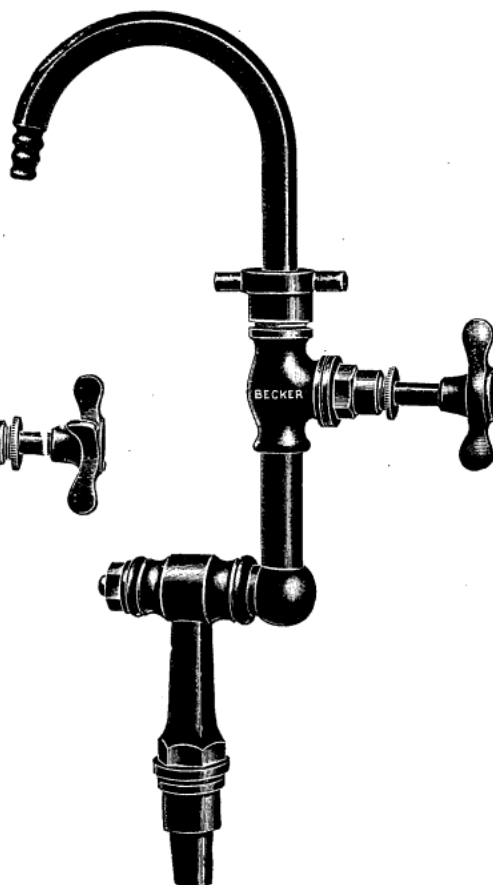
ALL THE GAS AND WATER FITTINGS ILLUSTRATED ARE FITTED WITH OUR PATENT CORRUGATED NOZZLE AND FINISHED IN OUR SPECIAL BLACK BRONZED FINISH UNLESS OTHERWISE ORDERED.



2242



2243



2244

**2242. — Gun-metal Swan-necked Water Tap**, height from top of bench to opening of curved outlet tube, 9 in. May be had either black oxidised or polished; when ordering, please state which.

Price, each .. .. £1 8 6

**2243. — Gun-Metal Swan-necked Water Tap**, bore  $\frac{3}{8}$  in., furnished with winged coupling-screw so that the curved outlet can be set in any direction. The height from top of bench to opening of curved outlet tube is 6 in. These taps may be had either black oxidised or polished; when ordering, please state which.

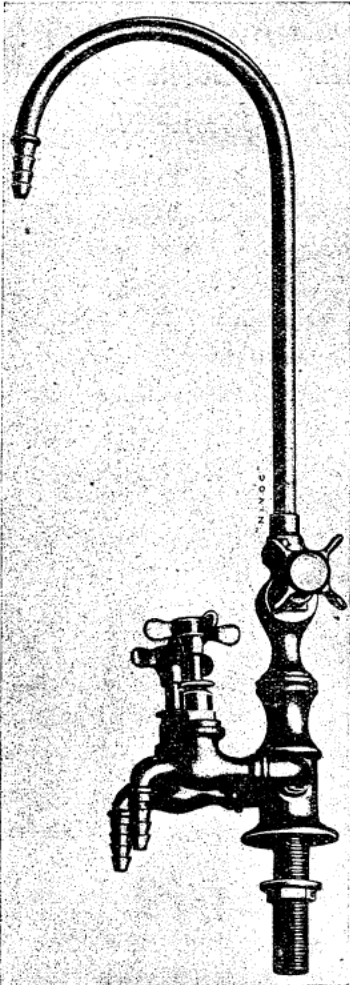
Price, each .. .. £1 10 0

**2244. — Gun-metal Swan-necked Water Tap**, "Folding Down" pattern, of heavy make,  $\frac{3}{8}$  in. bore, with winged coupling screw, so that the curved outlet may be set in any position. The height from elbow joint to outlet of nozzle is 6 in., but can be made shorter or longer to suit customers' requirements. This tap will be found useful to those desiring a tap which can be folded down below the level of bench top.

Price .. .. £1 19 6

Our stock of pure Chemicals and Acids is very considerable; hence all orders are executed with the utmost despatch. See comprehensive list at end of Catalogue.

## LABORATORY WATER TAPS

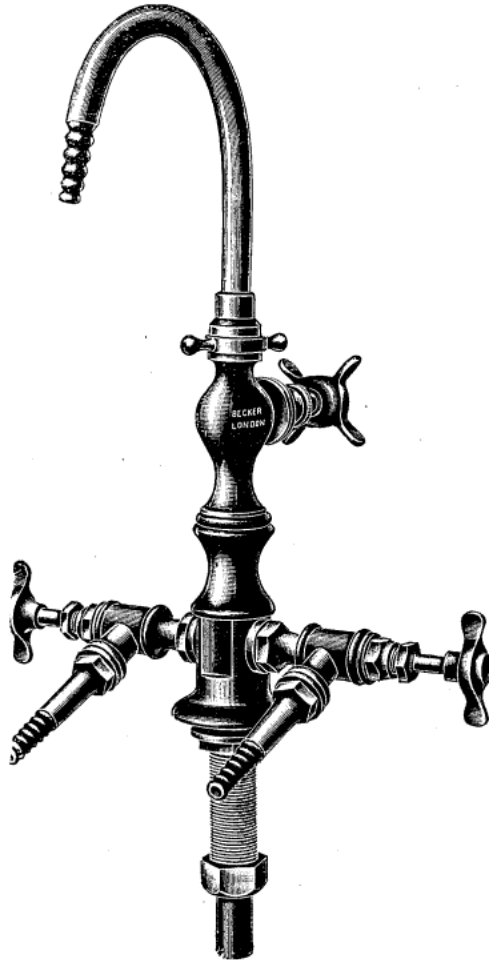


**2245.—Three-way Gun-metal Water Tap**, bore  $\frac{3}{8}$  in., with winged coupling screw, so that curved outlet can be set in any position. The height from top of the bench to outlet of nozzle is  $14\frac{1}{2}$  in. The taps are strongly made to withstand a good water pressure.

(For metal filter pumps suitable for fixing to side taps see No. 953, page 178.)

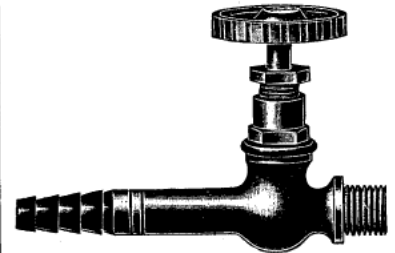
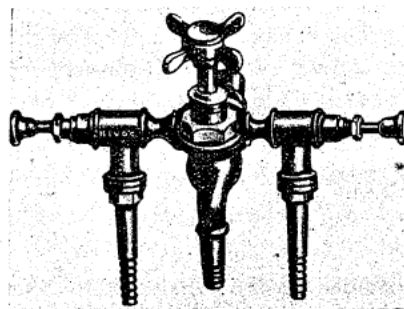
Price.. .. £2 19 0

**2247.—“ Three-Way ” Gun-metal Water Tap**,  $\frac{3}{8}$ -in. bore, with side taps fitted with nozzles for rubber tubing. All the taps are of the screw-down type and the two side ones can be supplied in any position. Screwed  $\frac{3}{8}$  in. standard thread for connection to water supply .. .. £1 10 0.



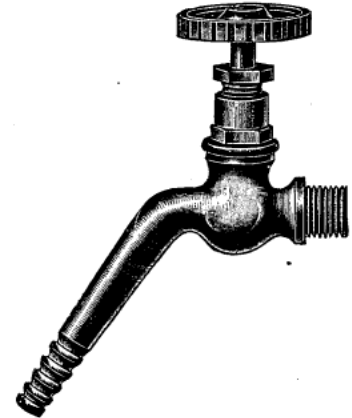
**2246. — Three-Way Gun-Metal Water Tap**, bore  $\frac{3}{8}$  in., with winged coupling screw so that curved outlet may be moved either to the right or to the left. The height from top of bench to opening of curved outlet tube is 9 in. The taps are strongly made to withstand a good water pressure.

Price .. .. £2 17 6



**2248.—Gun-Metal Screw-down Water Tap**, of heavy make for filter pumps, condensers, etc., will withstand a high water pressure. Furnished with standard thread.

Each .. .. 10/-



**2249.—Gun-Metal Screw-down Water Tap**, of heavy make, to withstand a high water pressure. Furnished with a water outlet 3 in. in length.

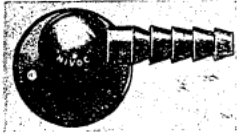
Each .. .. 10/6

**2250. Gun - Metal Screw-down Laboratory Water Tap**, with nozzles to take rubber tubing.

- A.  $\frac{1}{4}$ -in. bore. Each .. 9/6
- B.  $\frac{3}{8}$ -in. bore. Each .. 10/6
- C.  $\frac{1}{2}$ -in. bore. Each .. 11/6

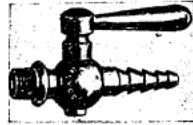


## LABORATORY GAS TAPS



**2251.—Gas Plate and Nozzle**, for screwing on top of benches, etc.

Each .. .. . 3/-



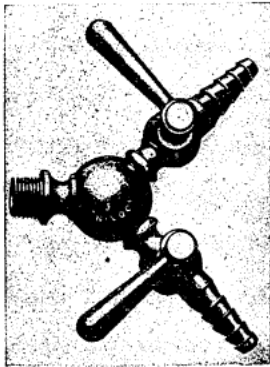
**2252.—Gas Tap, "One-Way,"** Standard thread.

Each .. .. . 2/6



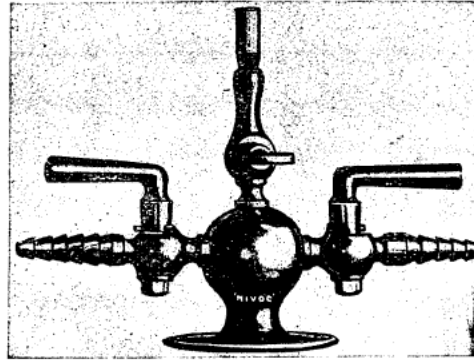
**2253.—"One-Way" Gas Tap**, fitted with lever-handled tap.

Each .. .. . 4/9

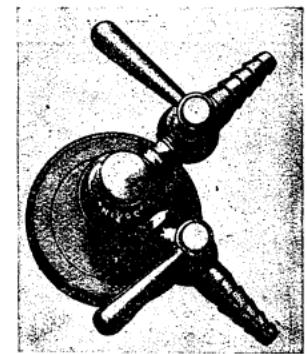


**2254.—Gas Taps, "Two-Way."**

Each.. .. . 6/6

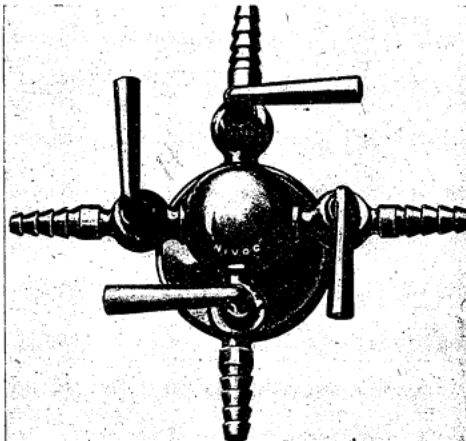


**2255.—"Two-Way" Gas Tap and Plate**, for screwing on top of benches, etc. Made of brass, black oxidised, and fitted with luminous gas-jet in centre, which may be used as a bench light, or for bending small glass tubes. .. .. . each 10/6



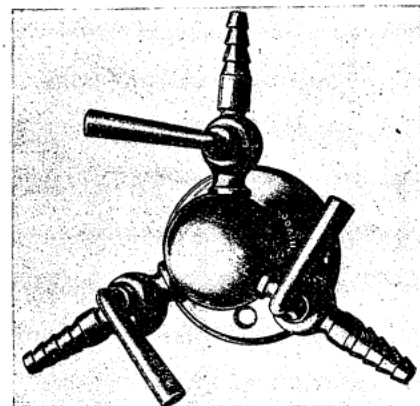
**2256.—"Two-Way" Gas Tap.**

Each.. .. . 7/-



**2257.**  
**"Four-Way" Gas Tap**, for screwing on top of benches, etc. Made of brass (black oxidised), and furnished with our special rubber tube nozzles; inlet screwed to take  $\frac{1}{4}$ -in. gas barrel.

Each .. 12/6



**2258.—"Three-Way" Gas Tap**, for screwing on top of benches, etc.

Each .. .. . 10/-

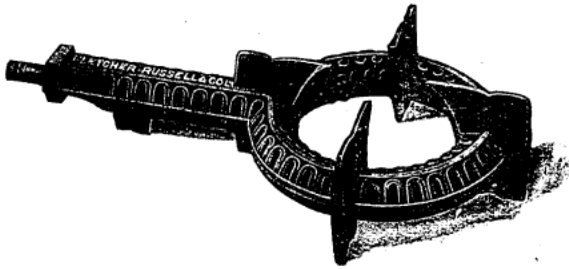
Our Balances and Weights have achieved World-wide Reputation: *vide* Opinions of the Leading Scientific Press.







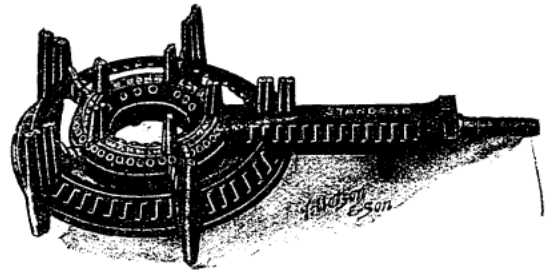
## FLETCHER'S BURNERS



### 2261.—Cheap Standard Burners.

Size No.	Quarts of Water boiled per hour in a light broad-bottomed vessel at $\frac{1}{16}$ gas pressure.	Diameter across support for vessels.	Price.
C 12	12	6 in.	3/-
C 15	15	6½ in.	3/6
C 20	20	7 in.	4/3

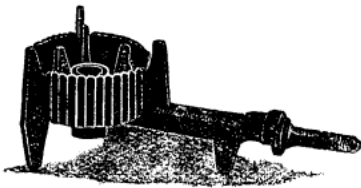
The difference between these and the cheap burners commonly sold will be appreciated when burning, by the appearance of the flame, and by the *smell* of the common make when used.



### 2262.—Standard Boiling Burners.

These Burners are now universally accepted as the most perfect, simplest, and most economical burners ever constructed.

Size No.	Diameter across support for vessels.	Price.
10	5½ in.	3/4
15	7 in.	5/-
20	8 in.	7/6
30 Concentric	10 in.	23/-



### 2263.—Argand Burners.

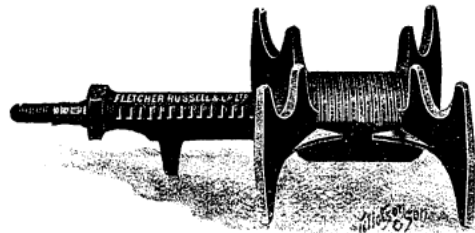
A cheap, simple, and indestructible burner for small laboratory work.

The flame of these burners is shorter, more compact, and higher in temperature than an ordinary Bunsen, and is also free from smell.

The air supply is self-adjusting.

No.	Gas Consumption at $\frac{1}{16}$ pressure.	With Tripod.	PRICE.	
			Without Tripod.	
1.	½ in. size. 3½ ft. per hour	7/6	5/6	
2.	¾ in. ,, 7 ft. ,,	9/6	6/6	

All the above work perfectly with air gas or coal gas, but if the gas is rich, the tip of the brass gas jet may want knocking in a shade smaller. If made too small the burner lights back.



### 2264.—No. 8R Boiling Burner.

This is in one casting, practically indestructible, and will boil water in a light kettle at the rate of over 2 quarts in 12 minutes. Consumption 12 ft. per hour at  $\frac{1}{16}$  pressure.

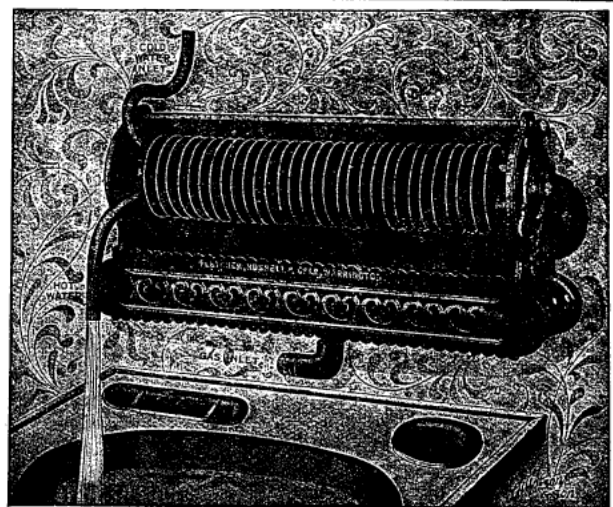
Each	4/3
Ditto, No. 10S, for workshop use, for soldering irons, etc.	
Each	4/6

## INSTANTANEOUS WATER HEATERS

### Horizontal Patterns.

Will deliver one quart of water per minute, from cold to 125° F. (scalding hot).

- 2265.—A. As figured .. .. £3 10 0  
 B. Double pattern .. .. £7 0 0  
 C. Special pattern for use with hard water, fitted with plugs for cleaning entire coil inside.  
 5/- extra.



2265A

Every requisite for Chemical, Physical, and Bacteriological work supplied, from a test tube to the complete furnishing of the largest laboratory.

## LOVIBOND'S TINTOMETERS

*Lovibond's Tintometer* is an instrument by means of which the depth of colour in liquids and solids can be accurately measured in degrees, placed in their position in a permanent colour scale, and registered for reproduction at any time.

It consists of a graded series of standards made of coloured glasses numbered according to their depth of colour, and an instrument for holding the glasses and the object to be measured.

Tintometers are made in the following sets, set No. 8 being most recommended for general work :—

**2266/1.—Set of Apparatus for Dyers and Printers,** applicable to liquids and solids, including the Improved Optical Instrument, 5 vulcanite and 5 silvered cells from 1-in. to  $\frac{1}{8}$ th in., trays and presser for powders, 6 blocks with pins for fabrics, standard white, without standard glasses, polished box with stand and reflector .. .. . **£14 0 0**

**2267/2.—Set of Apparatus for Fabrics and Solids only,** including the Improved Optical Instrument, box with stand, and reflector, trays, blocks, presser, standard white without standard glasses .. .. . **£6 10 0**

**2268/2a.—Set of Apparatus specially for Indigo and other Dark Dyes on Fabrics only,** with glasses .. .. . **£18 0 0**

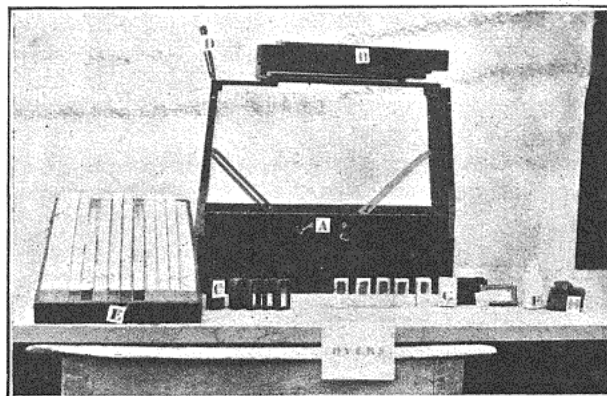
**2269/4.—Set for Estimating the Colour in Water,** including the Monocular Optical Instrument, box with supports and reflector, 2-ft. and 1-ft. brass cells, without standard glasses .. .. . **£9 0 0**

Forty standard glasses (the usual number required) .. .. . **£9 0 0**

**2270/5a.—Set for Estimating Percentage of Ammonia,** in Nessler's Ammonia Test, including the improved Optical Instrument, box with stand and reflector,  $\frac{1}{2}$ -in. glass cell, with 25 standard glasses .. .. . **£12 0 0**

**2271/5b.—Set for Estimating Carbon in Steel,** including the Improved Optical Instrument, box with stand and reflector,  $\frac{1}{2}$ -in. glass cell and 25 standard glasses, series 52, and 16 glasses, series 50 .. .. . **£15 0 0**

**Estimation of Colour in Oils, Waxes, Lards and other Fats** requiring to be kept at an even Temperature.



ANALYSIS OF COLOURS—METHODS OF PROCEDURE AND ARRANGEMENT OF THE INSTRUMENT—FORMULATING THE RESULTS.

**2272/6a.—Set for Estimating the Colours in Oils, Waxes, Lards, and other Fats, Varnishes, Gelatine, Scale,** and other similar substances, including the Improved Optical Instrument, fitted with hot water apparatus for melting solids, with thermometer for taking their melting point, box, 1-in.,  $\frac{1}{2}$ -in.,  $\frac{1}{4}$ -in. silvered cells, without standard glasses .. .. . **£9 0 0**

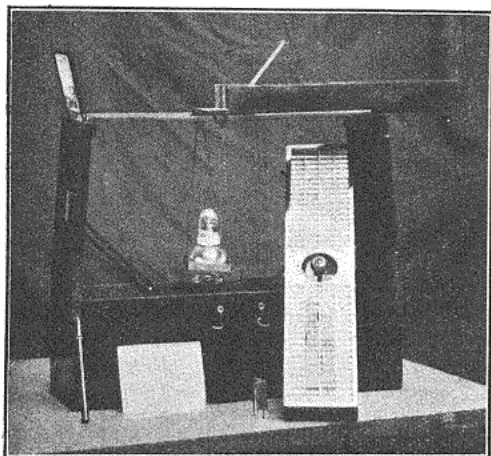
**2273/6b.—Set for Estimating Colour in Cotton Seed Oil,** including the Improved Optical Instrument, fitted with lamp, and hot-water apparatus for liquifying the oil and maintaining a given temperature, 5 $\frac{1}{4}$ -in. cell and 36 standard glasses .. .. . **£16 0 0**

**2274/7.—Set for Standardising Merchantable Petroleum,** including the Monocular Optical Instrument, box with stand and reflector, 18-in. cell (silvered), 4 special standard glasses, for water white, standard white, superfine white, and prime white .. .. . **£9 0 0**

Additional Apparatus for Intermediate, Russian and Lubricating Oils, containing  $\frac{1}{8}$ -in. silvered cell and 5 additional standards .. .. . **£3 5 0**

**2275/7a.—Set for Petroleum and other Oils** for use in works, complete with glasses and cells .. .. . **£15 0 0**

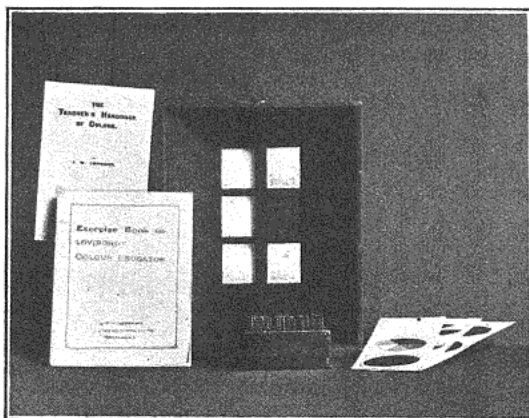
**2276/8.—An Investigator's Laboratory Set** for all purposes, including the Monocular Optical Instrument, in plain box, with stand and reflector 24-in. and 12-in. brass cells; 2-in., 1-in.,  $\frac{1}{2}$ -in.,  $\frac{1}{4}$ -in.,  $\frac{1}{8}$ -in.,  $\frac{1}{16}$ -in. silvered, and 1-in.,  $\frac{1}{2}$ -in.,  $\frac{1}{4}$ -in.,  $\frac{1}{8}$ -in., vulcanite cells, 6 blocks, 6 trays, presser for powder, standard white shoe for opaque work, and filtering apparatus, without standard glasses .. .. . **£20 0 0**



HOT WATER APPARATUS FOR USE AS ABOVE.

**Our Balances and Weights have achieved World-wide Reputation : vide Opinions of the Leading Scientific Press.**

## LOVIBOND'S TINTOMETERS



- 2277/9.**—Set for Estimating the Value of Flour, including the Improved Optical Instrument, standard white, 6 trays, pressing apparatus, and standard glasses .. .. . **£15 15 0**
- 2278/10.**—Set for Estimating the Colouring Matter in Tanning Solutions, consisting of Binocular Instrument in polished box with stand and reflector, 5-cm. and 1.0 cm. cells, and 88 standard glasses **£20 0 0**
- 2279/11.**—Set for Estimation of the Ordinary 1-in. Cubes of Resin .. .. . **£8 8 0**
- 2280/12.**—Educational Set for Colour Educator.—An Apparatus for teaching Colour in Schools, consisting of a frame with six apertures for the standard glasses, 27 standard colours, white plate for dealing with opaque colours, coloured diagrams for illustration and Handbook of Instruction .. .. . **£5 5 0**
- 2281/13.**—Colour Blind Set, consisting of an upright frame pierced with eight apertures for testing the vision for transparent colours and a white table top of opaque colours. The standards consisting of simple and compound colours are arranged in two trays; also cards of instructions and chart for classifying the result of the examination **£6 6 0**
- 2282/13a.**—Colour Blind Set (No. 2). Especially adapted for testing of signalmen with lantern **£18 0 0**
- 2283/14.**—Colour Top, for demonstrating and measuring the effect of definite mixtures of coloured light **£4 10 0**
- Discs for use with the above .. .. . **£0 10 0**
- 2284/15.**—Smoke Density Tester, consisting of an optical instrument with two apertures, one for viewing the smoke, the other being intercepted by the standardised smoked glasses .. .. . **£3 3 0**
- 2285/16.**—Fog Density Tester. An instrument for measuring fog densities and luminosities of lower intensities than daylight. The apparatus consists of an optical instrument on stand, a lamp for the standard light, a reflector and standard glasses in box .. .. . **£15 15 0**
- 2286/17.**—Pigmentation Meter. (Mr. Grey's Suggestion.) An anthropological instrument for registering the colour of the hair, eyes, and skin for racial classification. Instrument alone, £1 1s. Special hair and eye standards (10), 3s. each. Set of 50 standard colours for hair, eyes and skins, £11 5s. Complete set of apparatus, and box to complete **£15 15 0**
- 2287/18.**—The Chromo-Pyrometer, for temperatures of incandescent furnaces of metals. Price with one temperature .. .. . **£20 0 0**
- Additional degrees .. .. . each **£0 18 0**
- 2288/19.**—Special Monocular Tintometer (Medical), with standard glasses, lancet, two capillary pipettes, graded test tube and silvered cell for diagnosing disease by establishing the rate of colour development compared with the rate of absorption in healthy blood .. .. . **£15 0 0**
- 2289/20.**—Radiometer for X-Ray Therapy. The exact measurement of fractions and multiples of the erythema dose as devised by Dr. Dudley Corbett. For use in daylight or electric light.. .. . **£7 0 0**
- 2290.**—“Measurement of Light and Colour Sensations.”—By Joseph W. Lovibond .. .. . **£0 7 6**
- 2291.**—“The Teachers' Handbook of Colour.”—By Joseph W. Lovibond .. .. . **£0 1 0**
- 2292.**—“Light and Colour Theories.”—By Joseph W. Lovibond .. .. . **£0 7 6**

Our stock of pure Chemicals and Acids is very considerable; hence all orders are executed with the utmost despatch. See comprehensive list at end of Catalogue.

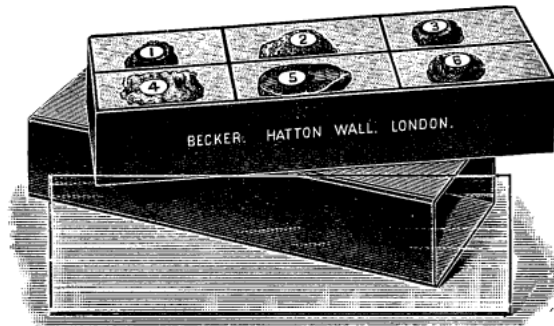
## RADIUM



**2293.—Radium Bromide.** We are now in a position to sell Radium Bromide in neat container of brass and vulcanite, with mica front. This enables all experiments to be carried out without removing the radium, the mica not obstructing the rays to any appreciable extent.

Units (Ur. = 1).	Percentage.	Quantity.											
40	0.002	1	gramme	..	..	..	..	..	..	..	..	..	..
100	0.005	1	"	..	..	..	..	..	..	..	..	..	..
250	0.014	1/2	"	..	..	..	..	..	..	..	..	..	..
1,000	0.05	1	"	..	..	..	..	..	..	..	..	..	..
3,000	0.15	1	decigramme	..	..	..	..	..	..	..	..	..	..
5,000	0.25	1	"	..	..	..	..	..	..	..	..	..	..
10,000	0.5	1	centigramme	..	..	..	..	..	..	..	..	..	..
20,000	1.0	1	"	..	..	..	..	..	..	..	..	..	..
100,000	5.0	5	milligrammes	..	..	..	..	..	..	..	..	..	..
200,000	10.0	5	"	..	..	..	..	..	..	..	..	..	..
600,000	30.0	5	"	..	..	..	..	..	..	..	..	..	..
800,000	40.0	5	"	..	..	..	..	..	..	..	..	..	..
1,000,000	50.0	5	"	..	..	..	..	..	..	..	..	..	..
1,800,000	90.0	5	"	..	..	..	..	..	..	..	..	..	..
2,000,000	Pure	1	milligramme	..	..	..	..	..	..	..	..	..	..
2,000,000	"	5	milligrammes	..	..	..	..	..	..	..	..	..	..

} Prices on Application.



**2294.—Becker's Special Set of the Strongest Radioactive Minerals,** consisting of six specimens, as follows:—

- No. 1. Pitchblende (Joachimstal).
- „ 2. Carnotite (Colorado, U.S.A.).
- „ 3. Fergusonite (Ceylon).
- „ 4. Monazite (Brazil).
- „ 5. Samarskite (Norway).
- „ 6. Thorite (Ceylon).

Radiographs may be taken with any of these as follows: Take a rapid plate in black and orange cover undisturbed, place the ore or mineral on the black paper, and put the whole away in a dark place for two or three days; then develop in the usual way. The rays from the ore will have acted on the plate in a distinctive manner.

Madame Curie has examined many minerals with her own apparatus, and the following table gives in amperes the intensity (*i*) of the current obtained with metallic uranium and different minerals (*i* × 10<sup>n</sup>):—

Uranium	..	..	..	..	..	2.3
Pitchblende (Joachimstal)	..	..	..	..	..	7.0
Cleveite	..	..	..	..	..	1.6
Chalcolite	..	..	..	..	..	5.2
Autunite	..	..	..	..	..	2.7
Orangite	..	..	..	..	..	2.0
Monazite	..	..	..	..	..	0.5
Xenotime	..	..	..	..	..	0.03
Aeschynite	..	..	..	..	..	0.7
Fergusonite	..	..	..	..	..	0.2
Samarskite	..	..	..	..	..	0.1
Niobite	..	..	..	..	..	0.2
Tantalite	..	..	..	..	..	0.02
Carnotite	..	..	..	..	..	6.2
Pitchblende (Cornwall)	..	..	..	..	..	1.6

Becker's Special Set of the strongest Radioactive Minerals, consisting of six specimens, as above, complete in cardboard box with glass plate, each specimen packed in a separate compartment and numbered.

**2294.—Price, complete as figured** .. .. **25/-**

Prices for larger sets sent on application.

Every requisite for Chemical, Physical, and Bacteriological work supplied, from a test tube to the complete furnishing of the largest laboratory.

## RADIOACTIVE MINERALS

The following are the most radioactive minerals of which we can supply typical specimens at low prices :—

<b>2295.—Pitchblende</b> .. .. per oz. 6/-	<b>2308.—Radium Residue</b> , from which Radium is made. Very scarce. Price on application.
<b>2296.—Chalcolite</b> .. .. per grm. 2/6	<b>2309.—Willemite</b> .. .. per oz. 5/-
<b>2297.—Monazite</b> .. .. per oz. 1/6	<b>2310.—Davidite</b> .. .. ,, 6/-
<b>2298.—Fergusonite</b> .. .. ,, 3/6	<b>2311.—Seffstromite</b> .. .. ,, 6/-
<b>2299.—Thorianite</b> .. .. ,, 6/-	<b>2312.—Roscoelith</b> .. .. ,, 6/-
<b>2300.—Carnotite</b> .. .. ,, 2/6	<b>2313.—Xenotime</b> .. .. ,, 3/-
<b>2301.—Autunite</b> .. .. ,, 15/-	<b>2314.—Niobite</b> .. .. ,, 3/6
<b>2302.—Samarskite</b> .. .. ,, 2/-	<b>2314.—Tantalite</b> .. .. ,, 6/-
<b>2303.—Cleveite</b> .. .. ,, 9/-	<b>2316.—Barium Platinocyanide for Screens</b> (price fluctuates) .. .. per gramme
<b>2304.—Orangite</b> .. .. ,, 15/-	<b>2317.—Barium Platinocyanide</b> , crystals (price fluctuates) .. .. per gramme
<b>2305.—Æschynite</b> .. .. ,, 3/-	
<b>2306.—Thorite</b> .. .. ,, 5/-	
<b>2307.—Radioactive Mud.</b> Price on application.	

**2318.—Standardised Solutions of Radium**, for emanation tests, 50 c.c. .. .. 10/-

**2320.—Ionium.** Price upon application.

**2319. — Glew's Radium Collector** from Atmospheric Electricity. Complete outfit.

Each .. .. . £3 3 0

**2321.—Radium Coated Spirals.**

from 15/- each.

**2322. — The Prospector's Scintilloscope** (Glew's patent), for detecting radioactive minerals. This little instrument is very sensitive and thoroughly reliable. Pitchblende, autunite, broggerite, carnotite, monazite, and all other radioactive substances are easily detected by simply holding the Prospector's Scintilloscope near the uncovered specimen; upon looking into the eye-piece, characteristic flashes of light (scintillations) are visible; the sight is very beautiful, impressive and unmistakable. Each flash of light is caused by the impact, on a sensitive screen, of positively electrified atoms of helium (alpha rays), which are always being emitted by all radioactive bodies, at the enormous initial velocity of 18,000 miles per second.

Price .. .. . 6/6

### DIRECTIONS FOR USE.

All testing should be done at night, in perfect darkness (without firelight), the eyes should be well rested for about

ten minutes before beginning. The Scintilloscope should be kept in darkness as much as possible when not in use.

The sensitive screen is to be held as near as possible to the specimen, without actual contact. Upon looking into the eye-piece, the luminous effects will be seen, if the specimen is radioactive.

A known radioactive substance should be experimented with first, so that the observer may become familiar with the phenomena; a Welsbach mantle (containing thorium) will do for this purpose. Good pitchblende is still better.

Specimens should be somewhat flat; contact with the screen must be avoided, for if it or any part of the instrument becomes contaminated it is rendered useless for further testing.

If a specimen is found to be active, this may be due to contact (or even proximity) with some other specimen, therefore the test must be confirmed by using a freshly broken surface.

If the sensitive screen becomes contaminated, or injured, it can be renewed at a slight cost.

Our Balances and Weights have achieved World-wide Reputation: *vide* Opinions of the Leading Scientific Press.

## RADIUM

### 2323.—Autoradiographs of Various Ores.

These are photographs produced by the action of the rays given off by various minerals. The photographic plate is enclosed first in a red, then in an outer black envelope to screen off actinic light, and laid under a sheet of aluminium of 1 mm. thickness. The ore to be tested is laid on the aluminium sheet, over the plate, and exposed for a length of time varying with the radioactivity of the specimen. The plate is then developed and printed in the usual way. Autoradiographs of various ores, mounted.

*Prices upon application.*

### 2324.—Phosphorescent Zinc Sulphide

(special quality), put up in narrow glass tubes, and compressed thus  $\ominus$ . The object is to present the largest surface to the rays of sunlight. These rays do not penetrate deeply into the substance, and only a thin layer of the zinc sulphide becomes luminous. Two kinds are made: one of a beautiful yellow and another of a bright green. These tubes may be kept for years without in the least deteriorating, provided they are not opened. To show the colour, hold them for a few seconds to the light, when they will become luminous for some time; direct sunlight acts strongest.

#### PRICES.

- A. Phosphorescing a beautiful green .. .. per tube, net 5/-  
 B. " " yellow .. .. per tube, net 5/-

2325.—Polonium (Sulphide), per tube containing 1 gramme (price varies).

2326.—Polonium, on bismuth rod or disc (price varies).

2327.—Polonium, on copper rod (price varies).

2328.—Calcium Sulphide, phosphorescing a beautiful violet .. .. per tube,

2329.—Radioactive Residue, from which radium is made (very scarce) .. per tube,

2330.—Zinc Sulphide, for scintillation work. .. per gramme,

*(Prices fluctuate.)*

### 2331.—Radioactive Screens.

- A. Willemite (price varies) .. .. per sq. in.  
 B. Plat. Bar. Cyanide (price varies) per sq. in.  
 C. Zinc Sulphide (price varies) per 10 cm. square

*(Prices fluctuate.)*

2332.—Pitchblende Screens. As the best pitchblende is very expensive and scarce, we can now supply it in the form of a screen, mica covered, giving a large surface of radioactive material most useful for demonstrating its peculiar properties.

*(Prices fluctuate.)*

2333.—Glew's Patent Testing Screens, as supplied to Professors Rutherford and Soddy. Specially prepared for accurate alpha work (price varies).  
 per sq. in., net 3/-

### 2334.—The "Spintharoscope."

Invented by Sir William Crookes, F.R.S. This instrument has been invented by Sir William Crookes, F.R.S., to demonstrate the extraordinary physical properties of radium. A small quantity of radium is placed in front of a fluorescent screen, and upon examination with a high magnifying power a scintillating appearance is observed, as if a number of minute sparks were being thrown against the screen. The rays or atoms which are being continuously given out by the radium are rendered visible when they strike the fluorescent screen. The instrument is made in three forms.



2334

A. As a microscope slide, which requires to be examined with an object-glass of about  $1\frac{1}{2}$  in. power.

Price .. .. . 20/-

B. As a complete instrument for the pocket, consisting of a tube about  $1\frac{1}{2}$  in. long, with a fluorescent screen at one end, a movable pointer carrying the radium being placed over it, and a powerful lens combination in a sliding tube at the other.

Price .. .. . 30/-

In order to see it to the best advantage (in the daytime, the observer should remain in a darkened room for five minutes, so that the eye may become sufficiently sensitive. The screen should then be carefully focussed, in the case of the microscope by the usual adjustment, or in the case of the Spintharoscope by pulling out the lens end of the instrument. The field will then appear as a dark background covered with scintillating points of light. *Nature* says: "The instrument is very satisfactory, and shows the scintillations wonderfully well; it provides a convenient means of observing the action of radium, and can be recommended as a waistcoat-pocket instrument of scientific value."

2335.—Glew's Scintilloscope, superior Lens, with extra-sensitive pitchblende and radium screens, giving brilliant effects .. complete 8/6

2336.—Glew's Scintilloscope, cheaper form, with sensitive pitchblende (or radium) screen only. complete 6/-

2337.—Pieces of Pitchblende Mineral, ground flat and polished, with sensitive screen attached, for use in Scintilloscope or with any strong pocket magnifier, according to size, from .. .. .

2338.—Radium, Polonium, Pitchblende, Actinium, or Thorium Sensitive Screens, may be had separately .. .. .

2339.—Radium Self-luminous Screens.  
*(Prices fluctuate.)*

These screens are for use in any microscope, or with any strong pocket magnifier; also suitable for photographic and electrical experiments.

Our stock of pure Chemicals and Acids is very considerable; hence all orders are executed with the utmost despatch. See comprehensive list at end of Catalogue.



## RADIUM

**2340.—Dolezalek's Quadrant Electro-meter,** 1911 pattern, guaranteed best make, and made in accordance with details published by Dr. Dolezalek. Price, including four spare quartz suspensions .. .. . **£11 17 6**

**2341.—Strut's Radium Clocks.** Prices vary according to Radium content from **£20 0 0** each.

**2342.—Glew's Apparatus,** for showing Cloud condensation in ionisation chamber, compared with ordinary condensation chamber, arranged side by side for simultaneous working, and direct comparison. Very effective, can be shown in ordinary light.

Price, complete .. .. . **£2 2 0**

## RADIUM LANTERN SLIDES

*Set of instructive and unique lantern slides illustrating the action of radium, etc. The experiments illustrated on these slides were performed with 500 MILLIGRAMMES OF RADIUM BROMIDE, VALUE £7,500.*

	Each.
<b>2343.</b> —Photographic action of Radium produced by a medical applicator .. .. .	3/-
<b>2344.</b> —Photographic action of Radium through a penny.. .. .	3/-
<b>2345.</b> —Photographic action of Radium through a purse .. .. .	3/-
<b>2346.</b> —Photographic action of Radium through 15 in. of cast iron .. .. .	5/-
<b>2347.</b> —Photographic action of radium through a laundry iron, 1 inch thick.. .. .	3/-
<b>2348.</b> —Photograph showing the laundry iron experiment arranged .. .. .	3/-
<b>2349.</b> —Photograph of a piece of mineral (Fergusonite), showing the contained volume of Helium, indicating that the age of the mineral exceeds 240 million years .. .. .	3/-
<b>2350.</b> —Photograph of a tube of Radium Bromide containing 500 milligrammes, value £7,500 .. .. .	5/-
<b>2351.</b> —Photograph showing coloration of glass by Radium .. .. .	3/-
<b>2352.</b> —Photograph of various medical applicators .. .. .	3/-

**2353.—Two Lantern Slides** from Sir Oliver Lodge's drawings of structure of "Atoms" of hydrogen and radium, with description .. .. each **2/6**

**2355.—One Rackworth Slide,** showing the "Spinthariscopes" effect of radium, very effective. **21/-**

**2354.—Four Lantern Slides** of Sir William Ramsay working in his laboratory, and his apparatus for collecting the emanations of radium.. each **2/6**

**2356.—Set of Slides** showing the characteristic bright line spectra of barium, helium, and radium, in colours .. .. . the set **19/-**

Every requisite for Chemical, Physical, and Bacteriological work supplied, from a test tube to the complete furnishing of the largest laboratory.



# PRICE LIST

OF

# Chemicals and Reagents

FOR

## ANALYTICAL PURPOSES AND CHEMICAL RESEARCH.

FOR CONDITIONS OF SALE SEE PAGE 355.

NAME OF CHEMICAL.	Per oz. s. d.	Per lb. s. d.	REMARKS.	NAME OF CHEMICAL.	Per oz. s. d.	Per lb. s. d.	REMARKS.
Acenaphthene .. .. .	1 0	—		*Acid Cresylic, Pure .. .. .	0 2	2 0	
*Acetal .. .. .	1 6	—		" " Cresylic, Coml. .. .. .	0 2	1 6	
Acetaldehyde .. .. .	0 10	10 0		" " Dichloroacetic .. .. .	2 6	—	
Acetamide .. .. .	1 0	14 0		" " Diethylbarbituric (see also Bar- bitone) .. .. .	1 3	—	4 ozs. 1/1 oz.
Acetanilide (see also Antifebrine) ..	0 3	2 6		" " Formic, Sp. Gr. 1.200 .. .. .	0 3	3 0	W. Qts. 2/10 lb.
Acetannin .. .. .	1 9	—		" " Formic, Sp. Gr. 1.120 .. .. .	0 2	2 0	W. Qts. 1/10 lb.
*Acetic Anhydride (see also Acid Acetic Anhydrous) .. .. .	0 4	3 6	W. Qts. (3/5 lb.)	" " Formic, Sp. Gr. 1.060 .. .. .	0 2	1 2	W. Qts. 1/1 lb.
Acetin (mono) .. .. .	2 0	—		" " Fumaric .. .. .	6 0	—	
Acetomorphine Hydrochloride .. .. .	20 0	—		" " Gallic .. .. .	0 5	5 0	
*Acetone .. .. .	0 2	2 0	W. Qts. 1/10 lb.	" " Glycerophosphoric, 20% .. .. .	0 8	8 0	
" Sulphite .. .. .	1 0	12 6		" " Glycollic .. .. .	1 0	12 0	
*Acetonitrile (see also Methyl Cyanide)	3 3	—		" " Hippuric .. .. .	4 0	—	4 ozs. 3/9 oz.
Acetophenone (see also Hypnone) ..	1 8	—	4 ozs. 1/6 oz.	" " Hydriodic, Sp. Gr. 1.940 .. .. .	2 6	—	
Acetopyrine .. .. .	1 6	—		" " Hydriodic, Sp. Gr. 1.700 .. .. .	2 0	—	
*Acetotoluide Ortho .. .. .	2 0	—		" " Hydriodic, Sp. Gr. 1.50 .. .. .	1 9	25 0	
Acetoxime .. .. .	10 0	—		" " Hydriodic, Sp. Gr. 1.085 .. .. .	0 6	6 0	
*Acetyl Chloride .. .. .	0 7	7 0		" " Hydrobromic, Fuming .. .. .	1 0	12 0	
*Acid Acetic, Glacial .. .. .	0 2	1 4	W. Qts. 1/3 lb.	" " Hydrobromic, Sp. Gr. 1.375 .. .. .	0 4	3 6	
" " Acetic, Fort B.P. .. .. .	—	0 8	W. Qts. 7d. lb.	" " Hydrobromic, Sp. Gr. 1.308 .. .. .	0 3	3 0	
" " Acetic, Anhydrous (see also Acetic Anhydride) .. .. .	0 4	3 6	W. Qts. (3/5 lb.)	" " Hydrobromic, Sp. Gr. 1.275 .. .. .	0 3	2 9	
" " Acetyl-salicylic (see also Aspirin)	0 5	5 0		" " Hydrobromic, Sp. Gr. 1.208 .. .. .	0 3	2 6	
" " Amidobenzoic, Ortho .. .. .	2 6	—	4 ozs. 2/4 oz.	" " Hydrochloric, Puriss Re-distilled	—	0 8	W. Qts. 7d. lb.; 12 W. Qts. 6 1/4 lb.
" " Amidobenzoic, Meta .. .. .	6 6	—		" " Hydrochloric, Pure, Sp. Gr. 1.16	—	0 5	W. Qts. 4 1/4 d. lb.; 12 W. Qts. 4d. lb.
" " Amidobenzoic, Para .. .. .	7 6	—		" " Hydrochloric, Coml., Sp. Gr. 1.16	—	0 4	W. Qts. 3d. lb.; 12 W. Qts. 2 1/4 lb.
" " Anisic .. .. .	2 9	—		" " Hydrocyanic, " Scheeles " .. .. .	—	—	In 1 oz. bot- tles, 1/- ea. 1/4 lb. bottles 5/- each; 1/2 lb. bottles 6/6 each.
" " Anthranilic .. .. .	2 6	—	4 ozs. 2/4 oz.	" " Hydrofluoric, Puriss, in Cerasine Bottles .. .. .	—	—	Gutta per- cha bottles charged extra.
" " Antimonic .. .. .	0 8	7 6		" " Hydrofluoric, Re-distilled .. .. .	—	4 0	
" " Antimonious (see also Antimoni- ous Oxide) .. .. .	0 4	4 0		" " Hydrofluoric, Coml. .. .. .	—	1 6	
" " Arsenic (see also Arsenic Oxide)	0 4	3 6		" " Hydrofluosilic .. .. .	0 3	2 6	
" " Arsenious (see also Arsenious Oxide) .. .. .	0 2	1 8		" " Hydrofluoboric .. .. .	0 4	4 0	
" " Benzoic, from Gum .. .. .	1 9	—		" " Hypophosphorous, Sp. Gr. 1.136	0 7	7 0	4 ozs. 2/10 oz.
" " Benzoic, from Toluol .. .. .	0 3	2 6		" " Iodic .. .. .	3 0	—	
" " Benzoic, Anhydrous .. .. .	1 9	25 0		" " Lactic, B.P. .. .. .	0 4	4 3	
" " Boracic, Pure Crystals .. .. .	0 2	1 0	7 lbs. 1 1/4 lb.	" " Lactic, Edible (about 45%) .. .. .	0 3	2 6	
" " Boracic, Pure Powder .. .. .	0 2	1 1	7 lbs. 1/- lb.	" " Linoleic .. .. .	0 4	4 0	
* " Bromic, Sp. Gr. 1.12 .. .. .	2 6	—		" " Malic .. .. .	4 0	—	4 ozs. 3/10 oz.
* " Butyric, 100% .. .. .	2 0	—		" " Malonic .. .. .	2 3	—	4 ozs. 2/1 oz.
* " Butyric, Coml. .. .. .	0 8	8 0		" " Mandelic .. .. .	2 6	—	4 ozs. 2/4 oz.
" " Cacodylic .. .. .	4 0	—		" " Margaric .. .. .	1 3	—	
" " Camphoric .. .. .	2 0	30 0		" " Meconic .. .. .	3 6	—	
" " Caproic .. .. .	22 0	—		" " Metanilic .. .. .	1 6	—	
" " Caprylic .. .. .	4 0	—		" " Molybdc .. .. .	1 0	10 0	
* " Carbazotic (see also Acid Picric)	0 6	6 0		" " Mucic .. .. .	1 6	—	
" " Carboic, Crystals .. .. .	0 2	1 6		" " Myristic .. .. .	6 9	—	
" " Carboic, Pure Liquid .. .. .	0 2	1 10		" " Naphthionic .. .. .	0 10	10 0	
" " Carboic, Coml. Liquid .. .. .	—	—	6/- per gall.	" " Naphtholsulphonic .. .. .	0 6	5 0	
" " Chloracetic (Di) .. .. .	2 6	—		" " Nitric, Puriss Redistilled .. .. .	—	1 1	W. Qts. 1/- lb.; 12 W. Qts. 1 1/4 lb.
" " Chloracetic (Mono) .. .. .	0 6	5 6					
" " Chloracetic (Tri) .. .. .	1 6	20 0					
* " Chloric, Sp. Gr. 1.12 .. .. .	0 6	6 0					
" " Chlorosulphonic .. .. .	0 4	4 0					
" " Chromic, Pure Crystals .. .. .	0 5	4 6	7 lbs. 4/3 lb.				
" " Chromic, Coml. .. .. .	0 2	1 9	7 lbs. 1/8 lb.				
" " Chrysophanic .. .. .	0 10	10 0					
" " Cinnamic .. .. .	0 11	11 6					
" " Citric, Pure Crystals .. .. .	0 3	3 0					
" " Citric, Pure Powder .. .. .	0 3	3 0					

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W. & J. GEORGE (LONDON), Ltd., PROPRIETORS.

NAME OF CHEMICAL.	Per oz. s. d.	Per lb. s. d.	REMARKS.	NAME OF CHEMICAL.	Per oz. s. d.	Per lb. s. d.	REMARKS.
* Acid Nitric, Pure, Sp. Gr. 1.42 ..	—	0 10	(W. Qts. 9d. lb.; 12 W. Qts. 8½d. lb.)	* Acid Sulphuric, Nordhausen ..	—	1 8	{ W. Qts. 1/6 lb. Carboys
* „ Nitric, Coml., Sp. Gr. 1.42 ..	—	0 9	(W. Qts. 8d. lb.; 12 W. Qts. 7½d. lb.)	* „ Sulphuric (for Accumulators) Sp. Gr. 1.200 ..	—	0 3	{ 20/- cwt. 6/- each.
* „ Nitric, Fuming, Sp. Gr. 1.500 ..	—	2 0	(W. Qts. 1/10 lb.)	* „ Sulphuric, Anhydrous in Bulbs ..	—	—	{ W. Qts. 4½d. lb. In syphons about 3 lbs.
* „ Nitric, Sp. Gr. 1.360 ..	—	0 9	(W. Qts. 7½d. lb.; 12 W. Qts. 7d. lb.)	* „ Sulphurous, Solution ..	—	0 5	
„ Nitrobenzoic, Meta ..	2 6	—		* „ Sulphurous, Anhydrous (see also Sulphur Dioxide) ..	—	3 0	
„ Nitrobenzoic, Ortho ..	2 6	—		* „ Sulphurous, Anhydrous, in 12 oz. cylinders ..	—	—	3/6 each.
„ Nitrobenzoic, Para ..	2 9	—		„ Tannic, Pure ..	0 6	5 6	
„ Nitrous ..	—	0 10	(W. Qts. 9d. lb.)	„ Tartaric, Pure Crystals ..	0 2	2 0	7 lbs. 1/10 lb.
„ Nucleinic ..	8 0	—		„ Tartaric, Pure Powder ..	0 2	2 0	7 lbs. 1/10 lb.
„ Oleic ..	0 2	1 4	(W. Qts. 1/3 lb.)	„ Thioacetic, Solution ..	2 0	—	
„ Osmic, Crystals, in 1 gram tubes ..	—	—	15/- each.	„ Titanic (see also Titanium Oxide) ..	1 6	—	
„ Osmic, Solution, 1% ..	6 0	—	4 ozs. 5/10 oz.	„ Trichloroacetic ..	1 6	20 0	
„ Oxalic, Pure Anhydrous ..	0 5	5 0		„ Tungstic ..	0 7	7 0	
„ Oxalic, Pure Crystals ..	0 2	1 6	7 lbs. 1/5 lb.	„ Uric ..	4 0	—	
„ Oxalic, Coml. Crystals ..	0 2	1 2	7 lbs. 1/1 lb.	„ Uranic ..	3 0	—	4 ozs. 2/10 oz.
„ Palmitic, Pure ..	1 6	—		„ Valerianic ..	2 2	—	4 ozs. 2/- oz.
„ Palmitic, Coml. ..	0 2	2 0		„ Vanadic ..	4 6	—	
„ Pelargonic ..	6 0	—		„ Vanillic ..	8 6	—	
* „ Perchloric, Sp. Gr. 1.12 ..	0 6	5 6	(W. Qts. 5/4 lb.)	Aconitine ..	—	—	5/6 per gram.
„ Phenol-disulphonic ..	0 3	3 0		„ Hydrochloride ..	—	—	5/6 per gram.
„ Phenylacetic ..	2 0	—		Adonite ..	—	—	24/- per gm.
„ Phosphomolybdic ..	2 6	—		Adrenaline, in 1 grain Tubes ..	—	—	—
„ Phosphomolybdic, Solution ..	0 9	8 6		Aesculin ..	—	—	1/- per gram.
„ Phosphoric, Ortho, Syrupy, Sp. Gr. 1.750 ..	0 2	2 0	(W. Qts. 1/10 lb.)	Aethiop's Mineral ..	0 8	8 0	
„ Phosphoric, Conc., Sp. Gr. 1.500 ..	—	1 8	(W. Qts. 1/7 lb.)	Agar Agar, Fibre ..	0 8	8 0	
„ Phosphoric, Meta, Glacial ..	0 6	5 6		„ „ Powder, Fine ..	0 9	9 0	
* „ Phosphoric, Anhydrous .. (see also Phosphorus Pentoxide)	—	6 0	{ Usually packed in ½ lb. and 1 lb. bottles.	Agaricine ..	9 0	—	
„ Phosphorous, Crystals ..	1 3	—	4 ozs. 1/2 oz.	Alanine ..	21 0	—	
„ Phosphorous, Sp. Gr. 1.120 ..	0 3	3 0		Albumen, Blood ..	0 3	3 0	
„ Phosphotungstic, Crystals ..	1 6	—	4 ozs. 1/5 oz.	„ „ Egg ..	0 6	5 6	
„ Phosphotungstic, Solution ..	0 4	4 0		„ „ Tannate ..	0 7	6 6	
„ Phthalic, Crystals ..	0 8	8 0		* Alcohol, Absolute (Duty Paid) ..	—	26 6	{ W. Qts. 26/- lb. W. Qts. 22/- lb. W. Qts. 3/- each. 27, 6 lb.
„ Phthalic, Anhydrous ..	0 7	7 0		„ „ 90% (Rectified Spirit) (Duty Paid) ..	—	22 6	
* „ Picric (see also Acid Carbazotic) ..	0 6	6 0		„ „ Methylc, Pure (Duty Paid) ..	—	28 0	
„ Propionic ..	1 9	—	4 ozs. 1/8 oz.	We are fully licensed to supply any quantity of Duty Paid Alcohol beyond one pint.			
„ Pyrogallic, Resub ..	1 0	14 0		* Alcohol, ex Bond, for Export only. <i>Special Prices on Application.</i>			
„ Pyrogallic, Heavy Crystals ..	0 10	9 0		„ Allylic ..	2 4	—	4 ozs. 2/2 oz.
„ Pyroigneous, Crude ..	—	0 5		„ Ammoniated ..	1 0	14 0	
„ Pyrophosphoric ..	0 7	7 0		„ Amyl, Pure ..	0 5	4 6	
„ Racemic ..	7 0	—		„ Amyl, Coml. (Fusel Oil) ..	0 3	2 6	
„ Rosolic ..	1 0	—		„ Benzylc (from Toluol) ..	0 7	7 0	
„ Salicylic, Pure ..	0 3	2 6		„ Butyl, Normal ..	0 7	6 6	
„ Salicylic, Natural ..	2 9	—		„ Butyl, Iso ..	0 8	8 0	
„ Salicyl Sulphonic (see also Acid Sulphosalicylic) ..	0 9	9 0		„ Caprylic ..	3 6	—	
„ Salicylous (see also Aldehyde Salicylic) ..	2 3	—		„ Methylc (Coml. Wood Naphtha) ..	0 2	1 9	12/- per gall. 5/3 per gall.
„ Sebacic ..	2 0	—		„ „ Methylated (Methylated Spirit) ..	—	—	
„ Selenic, Solution ..	8 0	—		„ Propyl, Normal ..	1 0	12 6	
„ Selenious, Crystals ..	4 0	—		„ Propyl, Iso ..	1 2	15 0	
„ Silicic ..	0 4	4 0		* Aldehyde Ammonia ..	2 0	—	4 ozs. 1/10 oz.
„ Stearic, Pure ..	1 0	—		„ „ Conc. ..	0 10	10 0	
„ Stearic, Coml. (see also Stearine) ..	—	1 3	7 lbs. 1/2 lb.	„ „ Anisic ..	2 3	—	
„ Succinic ..	0 11	11 0		„ „ Cinnamic ..	1 6	—	
„ Sulphanilic ..	0 10	10 0		„ „ Salicylic (see also Acid Salicylous) ..	2 3	—	
„ Sulphindigotic, Solution ..	0 4	4 0		„ „ Valeric ..	2 6	—	
„ Sulphocarbotic ..	0 3	3 0		„ Alizarine, Dry ..	2 0	—	
„ Sulphomolybdic ..	2 0	—		„ „ Paste ..	0 6	5 0	
„ Sulphosalicylic (see also Acid Salicyl Sulphonic) ..	0 9	9 0		Allantoin ..	15 0	—	
* „ Sulphuric, Puriss, Redistilled ..	—	0 10	(W. Qts. 9d. lb.; 12 W. Qts. 8½d. lb.)	Alloxan ..	10 0	—	
* „ Sulphuric, Pure, Sp. Gr. 1.840 ..	—	0 8	(W. Qts. 7d. lb.; 12 W. Qts. 6½d. lb.)	Alloxantin ..	12 0	—	
* „ Sulphuric, Coml., Sp. Gr. 1.840 ..	—	0 4	(W. Qts. 3½d. lb.; 12 W. Qts. 3d. lb.)	Alloys, see page 355			
				Allyl Bromide ..	3 3	—	
				„ Chloride ..	4 9	—	
				„ Iodide ..	7 0	—	
				„ Isothiocyanate ..	2 6	—	
				„ Sulphocarbamide (see also Thiocinamine) ..	2 0	—	
				Aloin ..	0 10	10 0	
				Alum Ammonia, Pure Crystals ..	—	0 10	7 lbs. 9d. lb.

W. & J. GEORGE (LONDON), Ltd., PROPRIETORS.

NAME OF CHEMICAL.		Per oz. s. d.	Per lb. s. d.	REMARKS.	NAME OF CHEMICAL.	Per oz. s. d.	Per lb. s. d.	REMARKS.
Alum	Chrome, Pure Crystals ..	0 2	1 3	7 lbs. 1/2 lb.	Ammonium Chloride, Compressed			
"	Chrome, Coml. Crystals ..	—	0 9	7 lbs. 8d. lb.	" (Voltoids) ..	0 2	1 2	7 lbs. 1/1 lb.
"	Iron, Pure Crystals ..	0 2	1 6	7 lbs. 1/5 lb.	Chromate ..	0 4	4 0	
"	Manganese ..	0 4	4 0		Citrate ..	0 7	7 0	
"	Potash, Pure Crystals ..	—	0 8	7 lbs. 7d. lb.	Ferricyanide ..	3 6	—	
"	Potash, Coml. Crystals ..	—	0 6	7 lbs. 5 1/2 d. lb.	Ferrocyanide ..	1 6	—	
"	Potash, Pure Powder ..	—	0 10	7 lbs. 9d. lb.	Fluoride ..	0 3	2 9	
"	Potash, Coml. Powder ..	—	0 6	7 lbs. 5 1/2 d. lb.	Ferric-Oxalate ..	0 9	9 0	
"	Roche ..	—	0 11	7 lbs. 10d. lb.	Formate ..	0 6	6 0	
"	Soda, Pure Crystals ..	0 2	1 3	7 lbs. 1/2 lb.	Hippurate ..	4 6	—	
Aluminium	Metal, Ingot ..	0 3	3 0		" Hydrate, Sp. Gr. .880 ..	—	0 9	(W. Qts. 8d. lb.; 12 W. Qts. 7 1/2 d. lb.)
"	Metal, Foil ..	0 7	6 0		" Hydrate, Sp. Gr. .880 ..	—	1 0	(W. Qts. 11d. lb.; 12 W. Qts. 10 1/2 d. lb.)
"	Metal, Wire ..	0 6	5 6		Free Tar Products			(W. Qts. 7 1/2 d. lb.)
"	Metal, Powder, Fine ..	0 6	5 6		" Hydrate, Sp. Gr. .960 ..	—	0 8	(W. Qts. 7 1/2 d. lb.; 12 W. Qts. 7d. lb.)
"	Metal, Powder, Coarse ..	0 5	5 0					
"	Metal, Leaf, in Books ..	—	—	8d. per book.				
"	Acetate, Pure ..	0 4	3 6					
"	Aceto-tartrate ..	0 9	8 6					
"	Arsenate ..	0 7	7 0					
"	Arsenite ..	0 8	8 0					
"	Borate ..	0 5	4 6					
"	Bromide ..	2 3	—					
"	Carbide ..	0 6	6 0					
"	Chloride, Pure Crystals ..	0 4	3 6					
"	Chloride, Anhydrous ..	0 6	6 0					4 ozs. 1/10 oz.
"	Citrate ..	1 2	—	4 ozs. 1/- oz.				
"	Fluoride ..	0 8	8 0					
"	Fluosilicate ..	1 0	—	4 ozs. 11d. oz.				
"	Nitrate, Pure Crystals ..	0 3	3 0					
"	Oleate ..	0 3	3 0					
"	Oxalate ..	0 7	7 0					
"	Oxide, Pure Anhydrous ..	0 5	5 0					
"	Oxide, Coml. Anhydrous ..	0 2	2 0					
"	Oxide, Hydrate, Pure ..	0 4	3 6					
"	Oxide, Hydrate, Coml. ..	0 2	1 2					
"	Palmitate ..	0 3	3 0					
"	Phosphate ..	0 4	3 6					
"	Resinate ..	0 5	4 6					
"	Silicate ..	0 4	4 0					
"	Stearate ..	0 4	4 0					
"	Sulphate, Pure ..	0 2	1 0					
"	Sulphate, Coml. ..	—	0 6	7 lbs. 5d. lb.				
"	Tannate ..	1 4	—					
"	Tartrate ..	0 7	6 6					
"	Tungstate ..	1 3	—					
Amalgam	Copper ..	1 0	14 0		Ammonium Sodium Phosphate			
"	Electrical ..	1 0	12 6		(See also Microcosmic Salt)			
"	Sodium ..	1 0	12 0		Ammonium Succinate ..	1 6	—	
"	Zinc ..	1 0	12 6		Sulphate, Pure Crystals ..	0 2	1 0	7 lbs. 11d. lb.
Amber Cuttings ..		0 8	8 0		Sulphate, Coml. Crystals ..	—	0 6	7 lbs. 5d. lb.
Amidoazobenzene		2 6	—	4 oz. 2/3 oz.	Sulphide, Solution ..	—	1 0	(W. Qts. 10d. lb.)
" Hydrochloride		3 0	—		Sulphite, Crystals ..	0 6	6 0	
Amidoazotoluol, Ortho ..		3 0	—		Sulphocarbonate ..	0 7	6 6	
" Para ..		4 6	—		Sulphocyanide ..	0 4	4 0	
Amidol. Packed in 1 oz. bottles ..		—	—	{ 1/6 per oz. bottle.	Tartrate, Neutral ..	0 6	5 6	
Amidophenol, Ortho ..		3 6	—		Tartrate, Acid ..	0 6	6 0	
" Para ..		2 0	—		Thiomolybdate ..	6 0	—	
" Para, Hydrochloride ..		2 0	—		Tungstate ..	1 3	—	
Amidopyrin		2 0	—	4 ozs. 1/10 oz.	Urate (Boa's Excrement)	1 6	—	
Ammonium	Acetate, Pure Crystals ..	0 3	2 6	7 lbs. 2/4 lb.	Valerianate ..	2 0	—	
"	Arsenate, Pure Crystals ..	0 7	7 0		Vanadate ..	3 6	—	
"	Arsenite, Pure Dry ..	0 7	7 0		Amygdaline ..	5 6	—	
"	Benzoate, Artificial ..	0 6	6 0		* Amyl Acetate, Pure ..	0 4	3 6	
"	Benzoate, from Gum ..	2 0	—	4 ozs. 1/10 oz.	" Acetate, Coml. ..	0 3	2 6	
"	Bicarbonate, Crystals ..	0 3	2 9		" Benzoate ..	2 6	—	
"	Bicarbonate, Powder ..	0 2	1 10	7 lbs. 1/8 lb.	" Bromide ..	3 6	—	
"	Bichromate, Pure Crystals ..	0 4	3 6		" Butyrate ..	1 0	14 0	
"	Bifluoride ..	0 3	2 9		" Formate ..	0 10	10 0	
"	Bisulphate, Pure Crystals ..	0 3	2 6		" Iodide ..	2 3	—	
"	Bisulphite, Crystals ..	0 6	6 0		" Nitrate ..	1 6	—	
"	Bisulphite, Solution ..	0 2	2 0		" Nitrite, B.P. ..	0 8	8 0	
"	Borate ..	0 4	4 0		" Nitrite, Capsules, about 3 min-ims ..	—	—	2/- per doz.
"	Bromide ..	0 2	1 8		" Propionate ..	2 0	—	
"	Carbonate, Pure Resub. ..	0 2	1 7	7 lbs. 1/6 lb.	" Salicylate ..	1 0	12 0	
"	Carbonate, Coml. Lump ..	—	0 10	7 lbs. 9d. lb.	" Valerianate ..	1 6	—	
"	Carbonate, Powder ..	0 2	1 0	7 lbs. 11d. lb.	* Amylene ..	5 0	—	
"	Chloride, Puriss ..	0 2	1 6	7 lbs. 1/4 lb.	" Hydrate ..	4 0	—	
"	Chloride, Pure ..	—	0 10	{ 7 lbs. 9d. lb.; 14 lbs. 8 1/2 d. lb.	Anethol ..	0 9	9 0	
"	Chloride, Coml. ..	—	0 8	{ 7 lbs. 7d. lb.; 14 lbs. 6 1/2 d. lb.	Aniline, Pure ..	0 4	3 0	
					" Coml. ..	0 3	2 6	
					" Acetate ..	0 6	6 0	

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W. & J. GEORGE (LONDON), Ltd., PROPRIETORS.

NAME OF CHEMICAL.	Per oz. s. d.	Per lb. s. d.	REMARKS.	NAME OF CHEMICAL.	Per oz. s. d.	Per lb. s. d.	REMARKS.
Aniline, Hydrochloride .. .. .	0 6	5 0		Barium Carbonate, Native, Ground..	—	0 6	7 lbs. 5d. lb.
" Nitrate .. .. .	0 9	8 6		" Chlorate, Pure .. .. .	0 3	2 6	{ 7 lbs. 8d.
" Oxalate .. .. .	1 0	—		" Chloride, Pure Crystals .. .. .	—	0 9	{ lb.; 14 lbs.
" Phosphate .. .. .	1 0	—		" Chloride, Coml. Crystals .. .. .	—	0 6	{ 7½d. lb.
" Sulphate .. .. .	0 7	6 0		" Chromate .. .. .	0 4	4 0	7 lbs. 5d. lb.
Aniline Colours (see page 353).				" Citrate .. .. .	0 6	6 0	
Anisaldehyde .. .. .	2 0	—		" Cyanide .. .. .	1 9	—	
Anisidine, Ortho .. .. .	3 6	—		" Ferrocyanide .. .. .	0 10	10 0	
" Para .. .. .	4 6	—		" Fluoride .. .. .	0 6	6 0	
Anisol .. .. .	1 0	14 0		" Fluosilicate .. .. .	0 7	7 0	
Anthracene .. .. .	0 9	8 6		" Formate .. .. .	0 8	7 6	
Anthraquinone .. .. .	1 0	14 0		" Hydroxide, Pure .. .. .	0 2	1 6	7 lbs. 1/4 lb.
Antifebrine (see also Acetanilide)	0 3	2 6		" Hypophosphite .. .. .	0 7	7 0	
Antimonial Powder .. .. .	0 4	3 6		" Hyposulphite .. .. .	0 7	6 6	
Antimony Metal, Pure .. .. .	1 6	—	4 ozs. 1/4 oz.	" Iodate .. .. .	2 0	—	
" Metal, Coml. Powder .. .. .	0 2	1 3		" Iodide .. .. .	1 6	—	4 ozs. 1/5 oz.
" Coml. Lump .. .. .	0 2	1 6		" Lactate .. .. .	2 6	—	
" Bromide .. .. .	2 0	—	4 ozs. 1/10 oz.	" Nitrate, Pure Crystals .. .. .	0 2	1 6	7 lbs. 1/4 lb.
" Chloride Penta Solution .. .. .	0 9	9 0		" Nitrate, Coml. Crystals .. .. .	—	0 10	7 lbs. 9d. lb.
" Chloride, Tri. Crystals .. .. .	0 7	6 0		" Nitrate, Coml. Powdered .. .. .	—	0 9	7 lbs. 8d. lb.
" Chloride, Oxy. .. .. .	0 8	8 0		" Nitrite .. .. .	1 0	14 0	
" Oxide, Tri. (see also Acid				" Oleate .. .. .	0 7	7 0	
Antimonious) .. .. .	0 4	4 0		" Oxalate .. .. .	0 4	3 6	
" Phosphide .. .. .	4 6	—		" Oxide, Anhydrous .. .. .	0 4	3 6	
" Potassium Tartrate, Pure				" Permanganate .. .. .	2 0	—	4 ozs. 1/10 oz.
(Tartar Emetic) .. .. .	0 3	3 0		" Peroxide, Anhydrous, Pure..	0 3	2 3	
" Sulphate .. .. .	0 6	6 0		" Peroxide, Hydrated, Pure ..	0 3	2 3	
" Sulphide, Golden .. .. .	0 4	3 6		" Phenolsulphonate .. .. .	0 6	6 0	
" Sulphide, Black .. .. .	—	0 9	7 lbs. 7d. lb.	" Phosphate, Pure .. .. .	0 4	3 6	
" Sulphide, Fused .. .. .	0 4	4 0		" Phosphite .. .. .	1 6	—	
" Sulphide (Kermes Mineral)				" Platinocyanide, 1 gram tubes			11/6 each.
" Tartrate Ver. .. .. .	0 9	9 0		" Silicate .. .. .	0 6	6 0	
Antipyrine (see also Phenazone)				" Succinate .. .. .	1 6	—	
Apiol .. .. .	2 6	—	4 ozs. 2/4 oz.	" Sulphate, Pure .. .. .	0 2	1 8	
Apomorphine Hydrochloride ..	—	—	1/9 per gram.	" Sulphate, Coml. .. .. .	—	0 6	
Arabinose .. .. .	24 0	—		" Sulphide .. .. .	0 3	2 6	
Araroba (Goa Powder) .. .. .	0 8	8 0		" Sulphite .. .. .	0 5	4 6	
Arbutin .. .. .	6 0	—		" Sulphocyanide .. .. .	0 5	4 6	
Argol .. .. .	0 2	1 0		" Sulphovinate .. .. .	0 8	7 6	
Argonin .. .. .	—	—	3/- per gram.	" Tartrate .. .. .	0 6	5 6	
Argyrol .. .. .	12 0	—		" Thiosulphate .. .. .	0 6	6 0	
Arrhenal (Methyl Di-sodium Arsenate)				" Tungstate .. .. .	0 7	6 6	
Arnicin .. .. .	3 0	—	3/- per gram.	* Benzal Chloride .. .. .	0 8	8 0	
Arsenic Metal, Powder .. .. .	0 6	6 0		Benzaldehyde .. .. .	0 6	6 0	
" Metal, Lump .. .. .	0 5	4 6		Benzamide .. .. .	2 0	—	4 ozs. 1/10 oz.
" Bromide .. .. .	0 11	11 0		Benzamine Hydrochloride .. .. .	15 0	—	
" Chloride .. .. .	1 2	—	4 ozs. 1/- oz.	" Lactate .. .. .	15 0	—	
" Iodide .. .. .	2 6	—	4 ozs. 2/4 oz.	Benzanilide .. .. .	2 6	—	
" Oxide (see also Acid Arsenic)				* Benzene, Crystallisable, Pure ..	—	1 6	4 ozs. 2/4 oz.
Arsenious Oxide (see also Acid Arsenious)				" 90% .. .. .	—	1 2	{ W. Qts.
" .. .. .	0 2	1 8		" Free from Thiophene .. .. .	—	2 0	{ 1/4 lb.
Arsenic Sulphide (Orpiment) ..	0 2	2 0		* Benzidine .. .. .	2 6	—	{ W. Qts.
" Sulphide (Realgar) .. .. .	0 2	2 0		" Hydrochloride .. .. .	3 0	—	{ 1/- lb.
Asbestos, Powder .. .. .	0 2	1 2		" Sulphate .. .. .	3 0	—	{ W. Qts.
" Fibre .. .. .	0 5	5 0		Benzil .. .. .	3 6	—	{ 1/9 lb.
" Special for Gooch Crucibles				Benzoic Anhydride .. .. .	1 9	25 0	4 ozs. 2/4 oz.
" Platinised 5% .. .. .	33 0	—	4 ozs. 1/10 oz.	Benzoin .. .. .	4 6	—	4 ozs. 2/10 oz.
" Woolly .. .. .	0 7	7 0	Price varies.	Benzonaphthol .. .. .	0 9	9 0	4 ozs. 4/3 oz.
Asparagin .. .. .	5 0	—		Benzonitriol .. .. .	4 0	—	4 ozs. 3/9 oz.
Asphaltum, Lump .. .. .	0 2	1 2		Benzophenone .. .. .	4 0	—	4 ozs. 3/9 oz.
" Powder .. .. .	0 2	1 6		Benzoquinone (see also Quinone)			4 ozs. 6/2 oz.
Aspirin (see also Acid Acetyl Salicylic)				* Benzotrichloride .. .. .	1 0	12 0	
Atoxy .. .. .	14 0	—		* Benzoyl Chloride .. .. .	0 10	9 6	
Atropine .. .. .	24 0	—	1/9 per gram.	* Benzyl Acetate .. .. .	0 8	8 0	
" Sulphate .. .. .	20 0	—	1/- per gram.	" Benzoate .. .. .	0 7	6 6	
Azobenzene .. .. .	2 6	—	4 ozs. 2/4 oz.	" Chloride .. .. .	0 8	7 6	
Azoxybenzene .. .. .	6 0	—	4 ozs. 5/9 oz.	* Beryllium Metal (Glucinium) ..	—	—	12/- per gram.
Azolitmin .. .. .	9 0	—		" Nitrate .. .. .	2 0	—	
Barbitone (see also Acid Diethylbarbituric)				" Oxide .. .. .	10 6	—	
Barium Metal .. .. .	1 3	—	4 ozs. 1/1 oz.	" Sulphate .. .. .	3 6	—	
" Acetate, Pure .. .. .	0 4	3 6	4/- per gram.	Bismuth Metal .. .. .	1 3	—	4 ozs. 1/2 oz.
" Aluminate .. .. .	1 0	—		" Arsenate .. .. .	3 0	—	
" Arsenate .. .. .	0 10	—		" Benzoate .. .. .	1 10	—	
" Arsenite .. .. .	0 11	—		" Bromide .. .. .	2 4	—	4 ozs. 2/1 oz.
" Benzoate .. .. .	1 0	—		" Carbonate, Pure .. .. .	1 3	—	4 ozs. 1/2 oz.
" Borate .. .. .	0 5	5 0		" Chloride (Tri) Crystals .. .. .	2 0	—	4 ozs. 1/10 oz.
" Bromide .. .. .	0 3	2 9		" Chloride (Oxy.) or Sub. .. .. .	1 6	—	4 ozs. 1/5 oz.
" Carbonate (Puriss Precip. by Ammonia)				" Chromate .. .. .	2 0	—	
" Carbonate (Precip. by Soda) ..	0 3	2 3	7 lbs. 2/1 lb.	" Citrate .. .. .	1 6	—	4 ozs. 1/4 oz.
" Carbonate (Precip. by Soda) ..	0 2	1 10	7 lbs. 1/8 lb.				
" Carbonate, Coml. Precip. .. ..	—	0 6	7 lbs. 5d. lb.				

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W. & J. GEORGE (LONDON), Ltd., PROPRIETORS.

NAME OF CHEMICAL.		Per oz. s. d.	Per lb. s. d.	REMARKS.	NAME OF CHEMICAL.		Per oz. s. d.	Per lb. s. d.	REMARKS.
<b>Bismuth</b>	<b>Gallate</b> (Oxy.)	1 4	—	4 OZS. 1/2 OZ.	<b>Calcium</b>	<b>Borate</b>	0 4	3 6	
"	<b>Iodide</b>	2 6	—	4 OZS. 2/3 OZ.	"	<b>Bromide</b>	0 9	8 6	
"	<b>Lactate</b>	2 0	—	4 OZS. 1/9 OZ.*	"	<b>Carbide</b>	—	1 0	Tins free.
"	<b>Nitrate</b> , Crystals	1 0	13 0		"	<b>Carbonate</b> (Pure Precip. by Ammonia)	0 3	2 3	7 lbs. 2/1 lb.
"	<b>Nitrate</b> (Oxy.)	1 4	18 0		"	<b>Carbonate</b> , Precip.	—	0 6	14 lbs. 5d. lb.
"	<b>Oxalate</b>	2 0	—		"	<b>Carbonate</b> (Marble Chips)	—	0 2	28 lbs. 1 1/2 d. lb.
"	<b>Oxide</b>	1 6	—	4 OZS. 1/4 OZ.	"	<b>Chlorate</b>	0 8	8 0	
"	<b>Phosphate</b>	1 9	—		"	<b>Chloride</b> , Pure Dry Gran.	—	1 6	7 lbs. 1/4 lb.
"	<b>Salicylate</b>	1 6	—	4 OZS. 1/4 OZ.	"	<b>Chloride</b> , Coml. Dry Gran.	—	1 2	7 lbs. 1/- lb.
"	<b>Sulphate</b>	1 8	—	4 OZS. 1/6 OZ.	"	<b>Chloride</b> , Pure Crystals	—	0 9	7 lbs. 8d. lb.
"	<b>Sulphide</b>	2 0	—	4 OZS. 1/10 OZ.	"	<b>Chloride</b> , Fused Sticks	0 5	4 0	
"	<b>Sulphite</b>	2 6	—		"	<b>Chloride</b> , Fused Lumps	0 2	2 0	
"	<b>Tannate</b>	1 4	—		"	<b>Chloride</b> , with Asbestos	0 4	4 0	
"	<b>Tartrate</b>	1 10	—		"	<b>Chromate</b>	0 6	6 0	
<b>Bleaching Powder</b> (see also Calcium-Hypochlorite)		—	0 10	{ Packed in 1 lb. tins.	"	<b>Citrate</b>	0 7	7 0	
<b>Blue Prussian</b>		0 6	6 0		"	<b>Cyanamide</b>	—	0 8	
<b>Bone Ash</b>		—	0 7	14 lbs. 6d. lb.	"	<b>Fluoride</b> , Pure	0 3	2 6	
<b>Borax</b> , Crystals (see also Sodium Borate)		—	0 8	7 lbs. 7d. lb.	"	<b>Fluoride</b> (Fluospur Powder)	—	0 6	7 lbs. 5d. lb.
"	<b>Powder</b>	—	0 9	7 lbs. 8d. lb.	"	<b>Formate</b>	0 4	4 0	
"	<b>Calcined</b>	0 2	1 6	7 lbs. 1/4 lb.	"	<b>Glycerophosphate</b>	0 9	9 0	
<b>Borneol</b>		1 8	23 6		"	<b>Hydrate</b>	—	0 8	7 lbs. 7d. lb.
<b>Boron</b> , Crystals		—	—	2/- per gram.	"	<b>Hypochlorite</b> (see also Bleaching Powder)	—	0 10	{ Packed in 1 lb. tins.
<b>Bornyl Acetate</b>		1 10	—		"	<b>Hypophosphite</b>	0 7	7 0	
<b>Bromal Hydrate</b>		4 6	—		"	<b>Iodate</b>	2 0	—	
* <b>Bromine</b> , Free from Sulphur		0 4	4 0		"	<b>Iodide</b>	2 0	—	4 OZS. 1/10 OZ.
* " Ordinary		0 2	2 0	{ In original bottles about 8 lbs., 1/10 lb.	"	<b>Lactate</b>	0 4	4 0	
* " (in Tubes 2.2 c.c. each)		—	—	{ 5/- per dozen.	"	<b>Lactophosphate</b>	0 7	7 0	
* " (in Tubes 4.4 c.c. each)		—	—	{ 9/- per dozen.	"	<b>Naphtholsulphonate</b>	1 0	—	4 OZS. 10d. oz.
* <b>Bromobenzene</b>		1 4	18 0		"	<b>Nitrate</b> , Pure Crystals	0 2	2 0	
<b>Bromoform</b>		0 10	9 0		"	<b>Oleate</b>	0 5	5 0	
<b>Brucine</b> , Pure Crystals		4 6	—	4 OZS. 4/3 OZ.	"	<b>Oxalate</b> , Pure	0 4	3 6	
"	<b>Sulphate</b>	4 6	—	4 OZS. 4/3 OZ.	"	<b>Oxide</b> , Pure (from Marble)	—	1 1	7 lbs. 1/- lb.
* <b>Butyl Acetate</b> , Normal		0 8	7 6		"	<b>Oxide</b> , Coml. Lump (Quick Lime)	—	0 6	7 lbs. 5d. lb.
* " Acetate, Iso		0 8	7 6		"	<b>Permanganate</b>	1 3	—	4 OZS. 1/- oz.
* " Benzoate		2 0	—		"	<b>Peroxide</b>	1 2	15 0	
* " Butyrate		1 7	—		"	<b>Phosphate</b> , Pure Precip.	0 2	1 6	
" Chloral Hydrate		1 2	16 0		"	<b>Phosphate</b> (Bone Ash)	—	0 7	14 lbs. 6d. lb.
" Iodide		7 0	—		"	<b>Phosphide</b>	0 7	7 0	
" Valerate		3 0	—		"	<b>Phosphite</b>	0 9	9 0	
<b>Butylamine</b> , Iso		12 0	—		"	<b>Pyrophosphate</b>	0 5	5 0	
<b>Cadmium</b>	<b>Metal</b> , Sticks	0 10	10 0		"	<b>Saccharate</b>	0 5	5 0	
"	<b>Metal</b> , Granulated	1 0	—	4 OZS. 11d. oz.	"	<b>Salicylate</b>	1 0	12 6	
"	<b>Metal</b> , Sheet	1 3	—		"	<b>Silicate</b>	0 4	4 0	
"	<b>Acetate</b>	0 11	11 0		"	<b>Stearate</b>	0 6	6 0	
"	<b>Borotungstate</b> , Solution, Sp. Gr. 3.28	4 9	—	4 OZS. 4/6 OZ.	"	<b>Succinate</b>	2 0	—	
"	<b>Bromide</b> , Pure	0 10	10 0		"	<b>Sulphate</b> , Pure Precip.	0 2	1 4	
"	<b>Carbonate</b> , Pure	1 0	12 6		"	<b>Sulphate</b> (Plaster of Paris)	—	0 4	
"	<b>Chloride</b> , Pure	0 10	10 0		"	<b>Sulphide</b> , Powder	0 3	2 8	
"	<b>Chromate</b>	1 6	—		"	<b>Sulphide</b> , Phosphorescent	1 0	—	
"	<b>Iodide</b>	1 6	—		"	<b>Sulphite</b>	0 3	2 6	
"	<b>Nitrate</b>	0 9	8 0		"	<b>Sulphocarbonate</b>	0 5	5 0	
"	<b>Oxalate</b>	1 0	12 0		"	<b>Tartrate</b>	0 7	7 0	
"	<b>Oxide</b> , Anhydrous	1 6	—		"	<b>Tungstate</b> (for X-Rays)	1 0	—	
"	<b>Sulphate</b> , Pure	0 10	10 0		<b>Camphene</b>		3 0	—	
"	<b>Sulphide</b>	0 11	12 0		<b>Camphor</b> , Blocks		0 8	8 0	
<b>Caesium</b>	<b>Metal</b>	—	—	15/- per gram.	"	<b>Flowers</b>	0 7	7 0	
"	<b>Chloride</b>	20 0	—		"	<b>Monobromide</b>	1 2	—	4 OZS. 1/- oz.
"	<b>Sulphate</b>	20 0	—		<b>Canada Balsam</b>		1 0	—	
<b>Caffeine</b> (Theine)		1 6	—	4 OZS. 1/4 OZ.	"	<b>Balsam</b> , Dried (Hard)	1 5	20 0	
"	<b>Benzoate</b>	2 0	—	4 OZS. 1/9 OZ.	"	<b>Balsam</b> , in Benzole	1 2	—	
"	<b>Citrate</b>	1 3	—	4 OZS. 1/2 OZ.	"	<b>Balsam</b> , in Chloroform	1 3	—	
"	<b>Hydrobromide</b>	2 0	—	4 OZS. 1/10 OZ.	"	<b>Balsam</b> , in Xylol	1 2	—	
"	<b>Hydrochloride</b>	2 0	—	4 OZS. 1/10 OZ.	<b>Cantharidin</b>		—	—	6/6 per gram.
"	<b>Salicylate</b>	2 0	—	4 OZS. 1/9 OZ.*	<b>Caramel</b> , Liquid		1 2	—	
"	<b>Sodium Benzoate</b>	1 8	—	4 OZS. 1/6 OZ.	"	<b>Powder</b>	—	1 6	
"	<b>Sodium Salicylate</b>	1 8	—	4 OZS. 1/6 OZ.	<b>Carbamide</b>		0 6	6 0	
"	<b>Valerianate</b>	3 9	—	4 OZS. 3/6 OZ.	<b>Carbazol</b>		2 0	—	4 OZS. 1/10 OZ.
<b>Calamine</b>		0 2	1 10		* <b>Carbon Bisulphide</b> , Pure		—	2 0	{ W. Qts. 1/10 lb.
* <b>Calcium</b>	<b>Metal</b> , Lumps	1 11	—	4 OZS. 1/9 OZ.	"	<b>Bisulphide</b> , Coml.	—	1 4	{ W. Qts. 1/3 lb.
"	<b>Metal</b> , Turnings	2 6	—	4 OZS. 2/3 OZ.	"	<b>Tetrachloride</b>	—	1 10	{ W. Qts. 1/8 lb.
"	<b>Acetate</b> , Pure	0 3	2 6		"	<b>Trichloride</b>	0 5	5 0	
"	<b>Acetyl Salicylate</b>	1 6	20 0		<b>Carborundum</b> , Powder		0 2	2 0	
"	<b>Arsenate</b>	0 6	5 6		"	<b>Lump</b> (Silicon Carbide)	0 4	4 0	
"	<b>Benzoate</b> , Artificial	0 7	6 6		<b>Carmin</b> , Finest		3 0	—	4 OZS. 2/9 OZ.
					<b>Carvacrol</b>		3 0	—	
					<b>Carvene</b>		1 6	—	
					<b>Casein</b>		0 2	2 0	

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W. & J. GEORGE (LONDON), Ltd., PROPRIETORS.

NAME OF CHEMICAL.	Per oz. s. d.	Per lb. s. d.	REMARKS.	NAME OF CHEMICAL.	Per oz. s. d.	Per lb. s. d.	REMARKS.
Casein Sodium .. .. .	0 5	5 0		Cobalt Chloride .. .. .	0 8	8 0	
Caulophyllin .. .. .	2 0	—		Chloride, Free Nickel ..	3 6	—	
Celloidin .. .. .	7 0	—		Chromate .. .. .	1 9	—	
Celluloid Cuttings .. ..	0 3	3 0	(Special Price for Large Quantity.)	Cyanide .. .. .	2 6	—	
Cellulose Acetate .. .. .	1 0	—		Hydroxide .. .. .	2 0	—	
Cerium Metal .. .. .	—	—	7/6 per gram.	Iodide .. .. .	3 6	—	
Carbonate .. .. .	0 6	6 0		Nitrate .. .. .	0 8	8 0	
Chloride .. .. .	1 0	—	4 ozs. 10d. oz.	Oxalate .. .. .	2 0	—	
Citrate .. .. .	1 3	—		Oxide, Pure .. .. .	2 0	—	
Iodide .. .. .	1 6	—		Oxide, Coml. .. .. .	1 6	—	4 ozs. 1/4 oz.
Nitrate .. .. .	1 0	—	4 ozs. 10d. oz.	Potassium Nitrite .. ..	3 0	—	4 ozs. 2/9 oz.
Oxalate .. .. .	0 5	5 0		Phosphate .. .. .	1 9	—	4 ozs. 1/7 oz.
Oxide .. .. .	1 3	—	4 ozs. 1/1 oz.	Resinate .. .. .	0 8	8 0	
Peroxide .. .. .	4 6	—		Sodium Nitrite, Solution	0 8	8 0	
Salicylate .. .. .	1 9	—	4 ozs. 1/7 oz.	Sulphate .. .. .	0 8	7 6	
Sulphate .. .. .	1 0	—	4 ozs. 10d. oz.	Sulphide .. .. .	1 9	—	4 ozs. 1/7 oz.
Chalk, French .. .. .	—	0 5		Cochineal .. .. .	0 7	6 6	
Charcoal, Animal, Powder	—	0 8		Codein .. .. .	20 0	—	
Animal, Pure Powder ..	0 5	4 6		Hydrochloride .. .. .	18 0	—	
Animal, Granulated ..	—	0 9		Sulphate .. .. .	18 0	—	
Wood, Powder .. .. .	—	0 6		Colchicine .. .. .	—	—	5/- per gram.
Wood, Lumps .. .. .	—	0 6		Salicylate .. .. .	—	—	5/- per gram.
Chertier's Copper (see also Copper Chlorate and Potash) ..	0 5	5 0		Colloidion, B.P. .. .. .	0 8	8 0	
Chinoline (see also Quinoline) ..	2 0	—	4 ozs. 1/9 oz.	Acetone .. .. .	0 7	6 6	
Chloral Hydrate .. .. .	0 8	7 6		Methylated .. .. .	0 3	3 0	
Chloralamide .. .. .	1 8	—		Flexile (Methylated) ..	0 4	3 6	
Chloralformamide .. .. .	1 8	—		Varnish .. .. .	0 6	6 0	
Chloramine T .. .. .	1 6	—		Enamel .. .. .	0 6	6 0	
Chloralose .. .. .	9 6	—		Colophony .. .. .	0 2	1 0	
Chlorbutol .. .. .	1 9	—		Conine .. .. .	—	—	8/- per gram.
Chlorhydrin Di .. .. .	1 4	—		Hydrobromide .. .. .	—	—	7/- per gram.
Mono .. .. .	4 6	—		Copper Metal, Foil .. .. .	0 4	3 6	
Epi .. .. .	1 6	—		Metal, Granulated .. ..	0 3	3 0	
Chlorine Cubes, for Generating Chlorine Solution .. .. .	—	1 6		Metal, Filings .. .. .	0 4	3 6	
	—	0 9		Metal, Turnings .. .. .	0 3	2 9	7 lbs. 2/6 lb.
*Chloroform from Acetone .. .. .	0 6	4 6	{W. Qts. 4/4 lb.	Metal, Gauze .. .. .	—	—	{2/6 per sq. ft.
from Pure Ethyl Alcohol ..	1 0	14 0		Metal, Wire .. .. .	—	3 0	
Chlorophenol, Ortho .. .. .	1 0	—		Metal, Precipitated .. ..	0 8	7 6	
Para .. .. .	0 10	9 0		Metal, Leaf, in Books ..	—	—	8d. each.
Chlorophyll, Water Soluble ..	3 0	—	4 ozs. 2/9 oz.	Acetate, Pure .. .. .	0 5	5 0	
Soluble in Fats .. .. .	3 0	—	4 ozs. 2/9 oz.	Acetate, Coml. .. .. .	0 3	2 6	
Soluble in Spirit .. .. .	2 6	—	4 ozs. 2/3 oz.	Aceto Arsenite (Paris Green)	0 4	4 0	
Cholesterin .. .. .	18 0	—		Ammonium Chloride .. ..	0 4	4 0	
Chromium Metal, Coml. .. .. .	1 6	—	4 ozs. 1/4 oz.	Ammonium Sulphate .. ..	0 3	2 6	
Acetate .. .. .	0 9	9 0		Arsenate .. .. .	0 5	5 0	
Carbonate .. .. .	0 6	5 6		Arsenite (Scheele's Green)	0 5	4 6	
Chloride .. .. .	0 8	8 0		Benzoate .. .. .	1 6	—	
Chromate .. .. .	0 8	8 0		Borate .. .. .	0 6	6 0	
Fluoride .. .. .	0 10	10 0		Bromide (Cupric) .. .. .	0 9	8 0	
Nitrate .. .. .	0 8	8 0		Bromide (Cuprous) .. ..	0 10	9 0	
Oxalate .. .. .	0 8	8 0		Carbonate, Pure .. .. .	0 4	4 0	
Oxide, Green (Cr <sub>2</sub> O <sub>3</sub> ) .. ..	0 4	4 0		Chlorate .. .. .	0 6	5 6	
Oxide, Hydrated .. .. .	0 5	5 0		Chlorate and Potash (Chertier's Copper) .. .. .	0 5	5 0	
Phosphate .. .. .	0 7	7 0		Chloride, Pure Crystals ..	0 3	3 0	
Resinate .. .. .	0 8	8 0		Chloride (Cuprous)—Pure ..	0 7	7 0	
Sulphate .. .. .	0 5	5 0		Chloride, Anhydrous .. ..	0 6	5 6	
Sulphide .. .. .	5 0	—		Citrate .. .. .	0 9	9 0	
Chrysarobin .. .. .	0 10	10 6		Cyanide .. .. .	0 10	10 0	
Gimicifugin .. .. .	3 0	—		Ferrocyanide .. .. .	0 9	8 6	
Cinchonidine .. .. .	5 0	—	4 ozs. 4/9 oz.	Formate .. .. .	0 7	7 0	
Sulphate .. .. .	4 0	—	4 ozs. 3/9 oz.	Iodide .. .. .	2 3	—	4 ozs. 2/1 oz.
Cinchonine .. .. .	4 6	—	4 ozs. 4/3 oz.	Nitrate, Pure Crystals ..	0 3	2 6	
Hydrochloride .. .. .	2 6	—	4 ozs. 2/4 oz.	Nitrate, Coml. Crystals ..	0 2	2 0	
Sulphate .. .. .	2 6	—	4 ozs. 2/4 oz.	Oleate .. .. .	0 4	4 0	
Gineol .. .. .	0 8	8 0		Oxalate .. .. .	0 5	5 0	
Citral .. .. .	2 0	—	4 ozs. 1/10 oz.	Oxide, Pure Granulated (for Organic Analysis) .. ..	0 6	5 6	
Citronellal .. .. .	2 3	—	4 ozs. 2/- oz.	Oxide, Pure Black Powder ..	0 5	5 0	7 lbs. 4/10 lb.
Citronelloi .. .. .	3 6	—	4 ozs. 3/3 oz.	Oxide, Coml. Black Powder ..	0 2	1 9	
Clay China (see also Kaolin) ..	—	0 6		Oxide (Cuprous), Red, Pure ..	0 5	4 6	
Stourbridge .. .. .	—	0 3		Oxide, Hydrated .. .. .	0 5	5 0	
Cobalt Metal, Cubes .. .. .	1 6	20 0		Oxide, from Wire .. .. .	0 5	5 0	
Metal, Powder .. .. .	2 6	—		Phosphate .. .. .	0 5	4 6	
Metal, Foil .. .. .	3 6	—		Phosphide .. .. .	0 8	8 0	
Acetate .. .. .	0 8	8 0		Potassium Chloride .. ..	0 4	3 6	
Arsenate .. .. .	2 0	—		Potassium Sulphate .. ..	0 5	4 6	
Borate .. .. .	1 6	—	4 ozs. 1/4 oz.	Silicate .. .. .	0 5	5 0	
Bromide .. .. .	2 6	—		Stearate .. .. .	0 5	5 0	
Carbonate .. .. .	1 4	16 0		Sulphate, Puriss, free from Iron	0 2	2 0	7 lbs. 1/10 lb.
				Sulphate, Pure Crystals ..	—	1 0	7 lbs. 11d. lb.
				Sulphate, Coml. Crystals ..	—	0 7	14 lbs. 6d. lb.

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NAME OF CHEMICAL.	Per oz. s. d.	Per lb. s. d.	REMARKS.	NAME OF CHEMICAL.	Per oz. s. d.	Per lb. s. d.	REMARKS.
Copper Sulphate, Anhydrous, Pure ..	0 4	3 6		Eserine Salicylate .. .. .	—	—	4/- per gram.
" Sulphide .. .. .	0 6	6 0		" Sulphate .. .. .	—	—	4/- per gram
" Sulphite .. .. .	0 6	6 0		* Ether Acetic, (see also Ethyl Acetate) .. .. .	0 10	9 6	{ W. Qts. 9/3 lb.
" Tartrate .. .. .	0 7	7 0		" Methyated, Sp. Gr. .730 ..	—	2 0	{ W. Qts. 1/10 lb.
Cotarnine Hydrochloride .. .. .	—	—	9d. per gram.	* " Methyated, Sp. Gr. .720 ..	—	2 7	{ W. Qts. 2/5 lb.
Cotarnine Phthalate .. .. .	—	—	9d. per gram.	* " Methyated, Sp. Gr. .717 ..	—	3 3	{ W. Qts. 3/- lb.
Cotton Wool, Absorbent, White, 1st Quality .. .. .	—	2 6	} Packed in 1 lb. rolls.	* " From Duty Paid Rectified Spirit, Sp. Gr. .720 ..	—	15 0	{ W. Qts. 14/6 lb.
" Absorbent White, 2nd Quality ..	—	2 0		} Packed in 1 lb. rolls.	* " Distilled over Sodium ..	—	6 0
" Non-absorbent, White, 1st Quality ..	—	2 6			* " Ozonic .. .. .	0 8	7 6
" Non-absorbent, White, 2nd Quality ..	—	2 0		* " Petroleum .. .. .	—	1 8	{ W. Qts. 1/6 lb.
Coumarin .. .. .	1 8	24 0		Ethylaniline .. .. .	1 2	14 0	{ W. Qts. 9/3 lb.
Cream of Tartar (see also Potassium Bitartrate) .. .. .	0 2	2 0		* Ethyl Acetate (see also Ether Acetic) ..	0 10	9 6	4 ozs. 1/4 oz.
* Creasote (Beechwood) .. .. .	0 6	5 4		" Aceto-acetate .. .. .	1 6	—	—
" Carbonate .. .. .	1 2	16 0		" Bromide .. .. .	1 0	12 6	—
* Cresol, B.P. .. .. .	—	1 6		" Butyrate .. .. .	1 8	—	4 ozs. 1/6 oz.
" Meta .. .. .	0 8	8 0		* " Chloride, Anhydrous, in container with Patent Stopper and Spray Producer Tube ..	—	—	4/- each.
" Ortho .. .. .	0 4	4 0		* " Formate .. .. .	1 3	—	4 ozs. 1/1 oz.
" Para .. .. .	0 9	9 0		* " Iodide .. .. .	2 2	—	4 ozs. 2/- oz.
Cubes, for Generating Chlorine .. ..	—	1 6		* " Nitrite .. .. .	1 0	—	—
" for Generating Oxygen .. .. .	—	2 6		* " Oxalate .. .. .	1 7	—	4 ozs. 1/5 oz.
" for Generating Sulphur Dioxide ..	—	2 0		* " Sulphate .. .. .	2 0	—	—
" for Generating Sulphuretted Hydrogen .. .. .	—	2 0		Ethylamine, Solution 33% .. .. .	3 0	—	4 ozs. 2/9 oz.
* Cumol .. .. .	0 6	6 0		" Hydrochloride .. .. .	4 0	—	4 ozs. 3/9 oz.
Cumidine (Pseudo) .. .. .	6 0	—		" Bromide .. .. .	2 0	—	4 ozs. 1/10 oz.
Cuminol .. .. .	8 0	—		" Chloride .. .. .	2 6	—	4 ozs. 2/3 oz.
Curare .. .. .	—	—	4/- per gram.	" Glycol .. .. .	1 0	—	4 ozs. 10d. oz.
Cymol .. .. .	3 0	—		Eucalyptol (see also Cineol) .. .. .	0 8	8 0	—
				Eugenol .. .. .	2 6	—	4 ozs. 2/3 oz.
Dextrine .. .. .	—	0 8	7 lbs. 6d. lb.	Euonymin, Brown or Green .. .. .	3 0	—	4 ozs. 2/9 oz.
Dextrose, Pure .. .. .	0 11	11 0		Exalgine .. .. .	3 9	—	—
Diamantine .. .. .	6 0	—		Fel Bovinum, B.P. .. .. .	1 3	16 0	—
Diamidophenol Hydrochloride (Amidol) ..	—	—	{ 1/6 per oz. bottle.	Fibrin Blood, Coml. .. .. .	1 2	—	4 ozs. 1/- oz.
Diastase .. .. .	2 0	—	4 ozs. 1/10 oz.	" Vegetable .. .. .	10 6	—	—
Diazo-amidobenzene .. .. .	4 0	—		Flux, Black .. .. .	0 7	7 0	—
Dichlorethylene (C <sub>2</sub> H <sub>2</sub> Cl <sub>2</sub> ) .. .. .	0 6	6 0		" White .. .. .	0 3	3 0	—
Dicyandiamidine Sulphate (Reagent for Nickel) .. .. .	5 0	—		* Formaldehyde, 40% .. .. .	—	1 6	{ W. Qts. 1/5 lb.
Diethylaniline .. .. .	1 0	12 0		" Para .. .. .	0 6	6 0	—
Diethyl Sulphate .. .. .	2 0	—		Formamide .. .. .	2 0	—	—
Didymium Metal .. .. .	—	—	3/- per grain.	Formamol .. .. .	1 9	—	4 ozs. 1/6 oz.
Diethylamine .. .. .	6 0	—		Formanilide .. .. .	2 0	—	4 ozs. 1/10 oz.
" Hydrochloride .. .. .	4 0	—		French Chalk .. .. .	—	0 5	—
Digitalin .. .. .	20 0	—		Fuller's Earth .. .. .	—	0 6	—
Dimethylamidoazobenzene .. .. .	2 6	—		Furfural .. .. .	1 6	—	4 ozs. 1/5 oz.
Dimethylamidobenzaldehyde .. .. .	8 0	—		Fusion Mixture (see also Sodium Potassium Carbonate) .. .. .	0 3	3 0	—
Dimethylaniline .. .. .	1 0	—	4 ozs. 10d. oz.	Galactose .. .. .	3 9	—	4 ozs. 3/6 oz.
Dimethylamine, Solution .. .. .	3 0	—		Gelatine, Sheet .. .. .	0 6	6 0	—
" Hydrochloride .. .. .	4 0	—		Gelsemin (American Opt.) .. .. .	14 0	—	—
* Dimethyl Sulphate .. .. .	0 10	9 0		Geranium .. .. .	3 0	—	4 ozs. 2/10 oz.
Dinitrobenzene .. .. .	0 8	8 0		Geranyl Acetate .. .. .	3 0	—	4 ozs. 2/10 oz.
Dinitronaphthaline .. .. .	0 7	6 0		Gingerine .. .. .	2 2	—	4 ozs. 2/- oz.
Dinitrophenol .. .. .	2 0	—		Glass Wool .. .. .	0 10	10 0	—
Dinitrotoluol .. .. .	1 0	—		" Powdered .. .. .	—	0 6	—
Diphenylamine, Pure .. .. .	1 6	—	4 ozs. 1/3 oz.	Glucose, Pure .. .. .	0 11	11 0	—
" Chloride .. .. .	2 0	—	4 ozs. 1/9 oz.	" Coml. (Grape Sugar) .. .. .	—	0 9	14 lbs. 8d. lb.
" Sulphate .. .. .	2 0	—	4 ozs. 1/9 oz.	Gluc, Marine .. .. .	—	2 6	—
Diphenyl-methane .. .. .	2 0	—		" Hollis .. .. .	—	—	1/- per bot.
Dulcitol (Dulcite) .. .. .	—	—	1/8 per gram.	" Le Page's (Fish) .. .. .	—	—	1/- per bot.
Dutch Metal, Leaf, in Books .. .. .	—	—	9d. per book.	Gluten .. .. .	2 6	—	4 ozs. 2/3 oz.
Dyewoods, see end of List, page 354.				Glutin .. .. .	1 0	—	4 ozs. 10d. oz.
				Glutol .. .. .	4 6	—	—
Eau de Javalle .. .. .	—	1 6		Glycerine, Pure, Redistilled, Sp. Gr. 1.260 .. .. .	—	1 8	{ W. Qts. 1/6 lb.
Eikonogen .. .. .	2 0	—		" Jelly .. .. .	—	—	1/6 per bot.
Emetine (Alkaloid) .. .. .	—	—	5/6 per gram.	Glycine (Acid Amidoacetic) .. .. .	6 0	—	—
" Hydrobromide .. .. .	—	—	3/6 per gram.	Glycocol (Acid Amidoacetic) .. .. .	6 0	—	—
" Hydrochloride .. .. .	—	—	3/10 per gm.	Glycol .. .. .	5 6	—	—
Emery Powder .. .. .	—	1 0		Gold Metal, Precip .. .. .	—	—	6/- per gram.
" Cloth .. .. .	—	—	3/6 per quire.	" Leaf, in Books .. .. .	—	—	3/- per book.
Emulsin .. .. .	5 0	—		" Chloride, in 15 grain Tubes .. .. .	—	—	4/- each.
Erbium Metal .. .. .	—	—	4/- per gram.				
" Chloride .. .. .	—	—	1/- per gram.				
" Nitrate .. .. .	—	—	1/- per gram.				
" Sulphate .. .. .	—	—	1/- per gram.				
Epichlorhydrin .. .. .	1 6	18 0					
Eserine .. .. .	—	—	6/- per gram.				



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NAME OF CHEMICAL.	Per oz. s. d.	Per lb. s. d.	REMARKS.	NAME OF CHEMICAL.	Per oz. s. d.	Per lb. s. d.	REMARKS.
Gold Chloride, Solution .. .. .	5 0	—		Iron Albuminate .. .. .	2 0	—	
” Oxide .. .. .	—	—	9/- per gram.	” Arsenate .. .. .	0 6	6 0	
” Stannate (Purple of Cassius) ..	—	—	3/6 per gram.	” Ammonium Chloride (Ferric) ..	0 3	2 6	
Graphite Powder (see also Plumbago)	—	1 0		” Ammonium Citrate (Scales) ..	0 6	6 0	
Guaiacol, Crystals .. .. .	1 8	—	4 ozs. 1/7 oz.	” Ammonium Oxalate (Ferric) ..	0 6	5 0	
” Liquid .. .. .	1 4	18 0		” Ammonium Sulphate, Crystals	—	—	
” Carbonate .. .. .	1 2	—	4 ozs. 1/- oz.	(Ferrous) .. .. .	0 2	1 0	7 lbs. 1 rd. lb.
Guaiacum Resin .. .. .	0 8	8 0		” Ammonium Sulphate, Puriss	—	—	
Guanidine Carbonate .. .. .	6 0	—		(Ferrous) .. .. .	0 2	1 6	7 lbs. 1/5 lb.
” Thiocyanate .. .. .	5 0	—		” Ammonium Tartrate (Ferric) ..	0 7	7 0	
Gums, see page 354 at end of List.				” and Bismuth Citrate (Scales) ..	1 7	—	
* Gun Cotton (see also Pyroxylin) ..	1 3	18 0		” and Manganese Citrate (Scales)	1 0	—	
Gutta Percha, Tissue .. .. .	—	—	3/- sq. yd.	” and Potassium Citrate .. .. .	0 9	9 0	
” Solution .. .. .	0 7	7 0		” and Quinine Citrate (Scales) ..	1 6	—	
” Masticated .. .. .	1 4	—		” Arsenite .. .. .	0 10	10 0	
Hamameline .. .. .	2 0	—		” Benzoate .. .. .	1 8	—	
Haematein .. .. .	—	—	1/- per gram.	” Borate .. .. .	0 9	9 0	
Haematin .. .. .	—	—	9/6 per gram.	” Bromide .. .. .	1 3	—	
Haematoxylin .. .. .	8 0	—		” Carbonate .. .. .	0 2	1 7	
Haemoglobin .. .. .	0 7	6 6		” Chloride (Ferric), Pure .. .. .	—	0 10	7 lbs. 9d. lb.
Helianthin (see also Methyl Orange)	1 9	—	4 ozs. 1/7 oz.	” Chloride (Ferrous) .. .. .	0 2	2 0	
Heliotropine (see also Piperonal) ..	1 6	—		” Citrate (Scales) .. .. .	0 8	8 0	
Hexachlorethane .. .. .	0 7	6 6		” Dialysed .. .. .	0 3	3 0	
Hexamine (Hexamethylenetetramine)	0 6	6 0		” Ferricyanide (Turnbull's Blue) ..	1 0	12 0	
* Hexane .. .. .	0 4	4 0		” Ferrocyanide (Prussian Blue) ..	0 6	6 0	
Hide Powder (For Tannin Estimation)	2 3	—	4 ozs. 2/1 oz.	” Fluoride .. .. .	0 7	6 6	
Homatropine .. .. .	—	—	4/3 per gram.	” Formate .. .. .	1 6	20 0	
Hydrobromide .. .. .	—	—	3/4 per gram.	” Gallate .. .. .	0 10	11 0	
Hydrastin (Resinoid) .. .. .	12 0	—		” Glycerophosphate .. .. .	1 4	19 0	
Hydrastine .. .. .	—	—	8/- per gram.	” Hypophosphite .. .. .	1 0	14 0	
Sulphate .. .. .	—	—	8/- per gram.	” Iodate .. .. .	2 6	—	
Hydrazine Sulphate .. .. .	1 8	—	4 ozs. 1/6 oz.	” Iodide .. .. .	2 0	—	4 ozs. 1/10 oz.
Hydrazobenzene .. .. .	1 8	—		” Lactate .. .. .	1 0	13 0	
* Hydrogen Peroxide, 20 vols. .. ..	—	1 2	{ W. Qts.	” Lactophosphate .. .. .	1 10	—	4 ozs. 1/8 oz.
” ” 10 vols. .. .. .	—	0 10	{ 1 lb.	” Malate .. .. .	9 0	—	
” ” ” .. .. .	—	—	{ W. Qts.	” Nitrate (Per), Crystals .. .. .	0 4	4 0	
” ” ” .. .. .	—	—	{ 9d. lb.	” Oleate .. .. .	0 4	4 0	
Hydroquinone .. .. .	0 7	7 0		” Oxalate (Ferric) .. .. .	0 6	5 0	
Hydrosulphite .. .. .	0 4	4 0		” Oxalate (Ferrous) .. .. .	0 5	4 0	
Hydroxylamine Hydrochloride .. ..	3 0	—	4 ozs. 2/9 oz.	” Oxide, Black Magnetic .. .. .	0 2	2 0	
Sulphate .. .. .	2 6	—		” Oxide, Brown .. .. .	0 2	1 6	
Hyoscine Hydrobromide .. .. .	—	—	4/- per gram.	” Oxide, Red .. .. .	—	0 9	
Hyoscyamine .. .. .	—	—	4/- per gram.	” Phosphate (Ferric) .. .. .	0 4	4 0	
Hypnone (see also Acetophenone) ..	1 8	—	4 ozs. 1/6 oz.	” Phosphate (Ferrous) .. .. .	0 4	3 6	
Ichthyol, Ammon. .. .. .	—	—	{ 1 lb. tins,	” Phosphide .. .. .	1 9	—	
” ” ” .. .. .	—	—	{ 5/- each.	” Phosphite .. .. .	3 0	—	
India Rubber, Masticated .. .. .	1 2	14 0		” Pyrophosphate Ver	0 7	7 0	
” Solution .. .. .	—	4 0		” Resinate .. .. .	0 4	4 0	
Indicators, see page 352 at end of List.				” Salicylate .. .. .	0 8	8 0	
Indigo, Lump .. .. .	1 6	—	4 ozs. 1/4 oz.	” Succinate .. .. .	2 0	—	
” Refined .. .. .	2 0	—	4 ozs. 1/10 oz.	” Sulphate (Ferric), Pure .. .. .	0 2	1 9	7 lbs. 1/8 lb.
” Carmine, Paste .. .. .	—	5 0		” Sulphate (Ferrous), Pure .. .. .	—	0 6	14 lbs. 4d. lb.
” Carmine, Dry .. .. .	2 0	—	4 ozs. 1/10 oz.	” Sulphate (Ferrous), Exsiccated	—	0 10	7 lbs. 9d. lb.
Sulphate, Solution .. .. .	0 4	4 0		” Sulphide, Stick (suitable for use	—	—	
Indigotine, Coml. .. .. .	2 3	—	4 ozs. 2/1 oz.	in Kipp's Apparatus) .. .. .	—	1 0	14 lbs. 10d. lb.
Indium Metal .. .. .	—	—	22/- per gm.	” Sulphide, Cakes .. .. .	—	0 8	14 lbs. 6d. lb.
Chloride .. .. .	—	—	22/6 per gm.	” Sulphide, Lumps .. .. .	—	0 6	14 lbs. 5d. lb.
Indol .. .. .	38 0	—	2/- per gram.	” Sulphite .. .. .	0 7	6 6	
Inosite .. .. .	—	—	7/- per gram.	” Sulphocarbolate .. .. .	0 7	7 0	
Inuline .. .. .	2 3	—	4 ozs. 2/1 oz.	” Sulphocyanide .. .. .	1 9	—	4 ozs. 1/7 oz.
Iodine, Pure, Resublimed .. .. .	1 10	26 0		” Tannate .. .. .	0 6	6 0	
” Tribromide .. .. .	3 0	—		” Valerianate .. .. .	2 0	—	4 ozs. 1/10 oz.
” Trichloride .. .. .	3 0	—		Isatin .. .. .	4 0	—	
Iodobenzene .. .. .	5 0	—		Isinglass .. .. .	2 0	—	
Iodoform, Pure Crystals .. .. .	2 0	—		Jalap Resin .. .. .	2 6	—	4 ozs. 2/4 oz.
” Pure Precip .. .. .	2 0	—		Jalapin .. .. .	4 0	—	4 ozs. 3/10 oz.
Iodol .. .. .	14 0	—		Kaolin (China Clay) .. .. .	—	0 6	
Ionium .. .. .	—	—	Price on application.	Kelp .. .. .	—	1 0	
Ionone, Solution .. .. .	7 6	—		Keratine .. .. .	5 0	—	
Iridin .. .. .	1 6	—	4 ozs. 1/4 oz.	Kermes Mineral .. .. .	0 6	5 6	
Iridium Metal .. .. .	—	—	Price on application.	Kieselguhr .. .. .	—	1 0	
Chloride .. .. .	—	—		Kreatine .. .. .	—	—	4/- per gram.
Oxide .. .. .	—	—		Kreatinine .. .. .	—	—	8/- per gram.
Iron Filings, Fine .. .. .	—	0 6	14 lbs. 5d. lb.	Lacmoid .. .. .	2 6	—	4 ozs. 2/3 oz.
” Filings, Coarse .. .. .	—	0 6	14 lbs. 5d. lb.	Lactophenin .. .. .	4 0	—	
” Reduced by Hydrogen .. .. .	0 4	4 0		Lactose, Powder (see also Sugar of	—	—	
” Wire, Pure, on reels .. .. .	—	—	{ 6d. each ;	Milk) .. .. .	0 3	2 6	7 lbs. 2/4 lb.
” Wire, for burning in Oxygen, in	—	—	{ 5/- per doz.	Lampblack .. .. .	—	1 0	
Coils .. .. .	—	—	{ 3d. each ;	Lanolin (Anhydrous) .. .. .	—	2 6	
” Acetate, Dry .. .. .	0 6	6 0	{ 2/6 per doz.	Lanolin (Hydrous) .. .. .	—	2 0	

W. & J. GEORGE (LONDON), Ltd., PROPRIETORS.

NAME OF CHEMICAL.	Per oz. s. d.	Per lb. s. d.	REMARKS.	NAME OF CHEMICAL.	Per oz. s. d.	Per lb. s. d.	REMARKS.
Lævulose (Diabetic) .. .. .	1 3	15 0		Lithium Hydroxide .. .. .	3 0	—	
Lanthanum Metal .. .. .	—	—	10/- per gram.	" Iodide .. .. .	2 0	—	
" Chloride .. .. .	—	—	8d. per gram.	" Lactate .. .. .	3 0	—	
" Nitrate .. .. .	12 0	—		" Nitrate .. .. .	1 3	—	4 OZS. 1/2 OZ.
" Oxide .. .. .	—	—	8d. per gram.	" Oxalate .. .. .	2 0	—	
" Sulphate .. .. .	—	—	8d. per gram.	" Phosphate .. .. .	2 0	—	4 OZS. 1/10 OZ.
Lapis Divinus, Sticks .. .. .	0 7	6 6		" Salicylate .. .. .	1 3	—	4 OZS. 1/2 OZ.
Lead Metal, Foil .. .. .	0 2	1 6	7 lbs. 1/4 lb.	" Sulphate .. .. .	1 3	—	4 OZS. 1/2 OZ.
" Metal, Granulated .. .. .	0 2	1 4	7 lbs. 1/2 lb.	" Tartrate .. .. .	2 0	—	
" Metal, Sticks .. .. .	0 2	2 0		Litmus, Granulated .. .. .	0 7	6 6	
" Metal, Shot .. .. .	—	0 10	14 lbs. 9d. lb.	" Powdered .. .. .	0 7	7 0	
" Metal, Wire .. .. .	—	2 0		" Soluble .. .. .	1 6	—	4 OZS. 1/4 OZ.
" Metal, Powder, for Accumulators	0 3	2 6		" Solution .. .. .	—	5 6	
" Acetate, Pure Crystals .. .. .	0 2	1 4	7 lbs. 1/3 lb.	Logwood Chips .. .. .	—	0 10	
" Acetate, Coml. Crystals .. .. .	—	1 0	7 lbs. 11d. lb.	" Extract .. .. .	0 8	8 0	
" Acetate, Basic .. .. .	0 3	3 0		Lycopodium .. .. .	0 10	9 0	
" Acetate, Tribasic .. .. .	0 4	3 6		Lysol .. .. .	—	2 4	
" Arsenate .. .. .	0 4	4 0		Mabor, Powder .. .. .	—	0 10	
" Arsenite .. .. .	0 5	4 6		Magnesium Metal, Ribbon .. .. .	1 5	21 0	
" Benzoate .. .. .	1 4	—		Packed in 1 ounce and			
" Borate .. .. .	0 4	4 0		1/2 ounce Coils.			
" Bromide .. .. .	0 6	6 0		" Metal, Wire .. .. .	1 5	21 0	
" Carbonate, Pure .. .. .	0 3	3 0	7 lbs. 2/10 lb.	Packed in 1 ounce and			
" Carbonate, Coml. .. .. .	0 2	1 0	7 lbs. 11d. lb.	1/2 ounce Coils.			
" Chloride, Pure .. .. .	0 3	3 0		" Metal, Turnings .. .. .	1 0	12 0	
" Chloride, Coml. .. .. .	0 2	2 0		" Metal, Powder .. .. .	1 0	12 0	
" Chromate, Fused .. .. .	0 4	4 0		" Acetate .. .. .	0 6	6 0	
" Chromate, Precip .. .. .	0 3	3 0		" Ammonium Chloride .. .. .	0 3	3 0	
" Citrate .. .. .	0 7	6 6		" Ammonium Phosphate .. .. .	0 6	6 0	
" Cyanide .. .. .	0 8	8 0		" Arsenate .. .. .	0 8	7 6	
" Ferrocyanide .. .. .	0 7	7 0		" Benzoate .. .. .	1 0	14 0	
" Formate .. .. .	0 10	10 0		" Borate .. .. .	0 5	4 6	
" Hyposulphite .. .. .	0 5	5 0		" Bicarbonate, Solution .. .. .	0 2	1 6	
" Hydroxide .. .. .	0 8	7 6		" Borocitrate .. .. .	0 9	8 6	
" Iodate .. .. .	3 6	—		" Bromide .. .. .	1 0	12 0	
" Iodide .. .. .	1 9	24 0		" Carbonate, Heavy .. .. .	0 2	1 6	
" Nitrate, Pure Crystals .. .. .	0 2	2 0	7 lbs. 1/10 lb.	" Carbonate, Light .. .. .	0 2	1 2	
" Nitrate, Coml. Crystals .. .. .	0 2	1 0	7 lbs. 11d. lb.	" Chloride, Pure Fused .. .. .	0 2	2 0	
" Nitrite .. .. .	0 6	5 6		" Chloride, Pure Crystals .. .. .	0 2	1 2	14 lbs. 1/- lb.
" Oleate (Lead Plaster) .. .. .	0 3	3 0		" Chromate .. .. .	1 4	—	
" Oleate, Normal .. .. .	0 5	4 6		" Citrate Ver .. .. .	0 9	8 6	
" Oxalate .. .. .	0 4	4 0		" Fluoride .. .. .	0 8	8 0	
" Oxide (Litharge) free Ag. .. .. .	—	1 3	7 lbs. 1/2 lb.	" Formate .. .. .	0 7	7 0	
" Oxide (Litharge) .. .. .	—	0 9	7 lbs. 8d. lb.	" Fluosilicate .. .. .	0 9	8 6	
" Oxide (Red Lead) .. .. .	—	0 10	7 lbs. 9d. lb.	" Glycerophosphate .. .. .	1 3	17 0	
" Peroxide, Pure, free Mn. .. .. .	0 5	4 6		" Hydroxide .. .. .	0 4	4 0	
" Peroxide, Coml. .. .. .	0 2	1 6	7 lbs. 1/5 lb.	" Hypophosphite .. .. .	1 2	16 0	
" Phosphate .. .. .	0 4	4 0		" Ichthosulphonate .. .. .	3 0	—	
" Resinate .. .. .	0 2	2 0		" Iodide .. .. .	2 10	—	
" Salicylate .. .. .	1 6	—		" Lactate .. .. .	1 3	18 0	
" Succinate .. .. .	2 6	—		" Nitrate, Pure .. .. .	0 2	2 0	
" Silicate .. .. .	0 5	4 6		" Oleate .. .. .	0 5	5 0	
" Silicofluoride, 10% Solution .. .. .	0 3	2 6		" Oxalate .. .. .	0 7	7 0	
" Stearate .. .. .	0 5	5 0		" Oxide, Heavy .. .. .	0 4	3 8	
" Sulphate, Pure .. .. .	0 2	2 0		" Oxide, Light .. .. .	0 2	2 0	
" Sulphide, Pure .. .. .	0 5	5 0		" Peroxide .. .. .	1 0	14 0	
" Sulphite .. .. .	0 5	5 0		" Platinocyanide .. .. .	—	—	7/- per gram.
" Tartrate .. .. .	0 6	6 0		" Phosphate .. .. .	0 5	5 0	
Lecithin (Brain) .. .. .	7 0	—		" Pyrophosphate .. .. .	0 9	9 0	
" (Egg) .. .. .	4 6	—		" Salicylate .. .. .	0 8	8 0	
Legumen .. .. .	7 0	—		" Silicate .. .. .	0 5	5 0	
Leptandrin (American) .. .. .	2 6	—		" Silicofluoride .. .. .	0 9	8 6	
Leucine .. .. .	—	—	4/- per gram.	" Sulphate, Pure Crystals .. .. .	—	0 5	7 lbs. 4d. lb.
Ligroin .. .. .	—	1 3	{ W. Qts. 1/2 lb.	" Sulphate, Pure Dry .. .. .	—	0 8	7 lbs. 7d. lb.
Limonene .. .. .	1 6	—		" Sulphite .. .. .	0 5	5 0	
Linalol .. .. .	2 6	—	4 OZS. 1/4 OZ.	" Tartrate .. .. .	0 6	6 0	
Linalyl Acetate .. .. .	4 0	—		Malourea .. .. .	1 3	—	4 OZS. 1/1 OZ.
Lithium Metal .. .. .	—	—	8/- per gram.	" Sodium .. .. .	2 6	—	4 OZS. 2/4 OZ.
" Acetate .. .. .	2 6	—		" Maltose .. .. .	2 0	—	4 OZS. 1/9 OZ.
" Acetosalicilate .. .. .	2 0	—	4 OZS. 1/10 OZ.	Manganese Metal, Fused .. .. .	0 9	8 0	
" Benzoate .. .. .	1 3	—	4 OZS. 1/- OZ.	" Acetate, Pure .. .. .	0 5	5 0	
" Borocitrate .. .. .	1 3	—		" Ammonium Phosphate .. .. .	0 5	5 0	
" Borate .. .. .	1 6	—		" Arsenate .. .. .	0 10	—	4 OZS. 9d. OZ.
" Bromide .. .. .	1 6	—	4 OZS. 1/3 OZ.	" Benzoate .. .. .	1 0	—	4 OZS. 10d. OZ.
" Carbonate .. .. .	1 4	18 0		" Borate, Pure .. .. .	0 4	4 0	
" Chloride, Crystals .. .. .	1 4	18 0		" Bromide .. .. .	1 6	—	4 OZS. 1/4 OZ.
" Chloride, Anhydrous .. .. .	2 0	—	4 OZS. 1/9 OZ.	" Carbonate, Pure .. .. .	0 4	4 0	
" Citrate .. .. .	1 0	14 0		" Chloride, Pure .. .. .	0 3	2 6	
" Formate .. .. .	2 0	—	4 OZS. 1/10 OZ.	" Citrate .. .. .	1 0	—	4 OZS. 11d. OZ.
" Glycerophosphate .. .. .	2 0	—		" Ferrocyanide .. .. .	1 0	—	4 OZS. 10d. OZ.
" Guaiacate .. .. .	4 6	—		" Fluoride .. .. .	0 10	10 0	
" Hippurate .. .. .	5 0	—		" Formate .. .. .	1 3	—	4 OZS. 1/2 OZ.

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W. & J. GEORGE (LONDON), Ltd., PROPRIETORS.

NAME OF CHEMICAL.	Per oz. s. d.	Per lb. s. d.	REMARKS	NAME OF CHEMICAL.	Per oz. s. d.	Per lb. s. d.	REMARKS.
<b>Manganese</b> Glycerophosphate .. ..	1 4	—	4 OZS. 1/2 OZ.	<b>Methyl Cyanide</b> (see also Aceto Nitrile)	3 3	—	
" Hypophosphite .. ..	1 3	15 0		" Ethyl-Ketone, Pure .. ..	1 6	—	
" Iodide .. ..	2 6	—		" Formate .. ..	1 3	17 0	
" Lactate .. ..	2 3	—		" Iodide .. ..	2 4	—	4 OZS. 2/2 OZ.
" Lactophosphate .. ..	2 9	—		" Orange .. ..	1 9	—	4 OZS. 1/7 OZ.
" Nitrate, Pure .. ..	0 5	4 6		" Oxalate .. ..	2 3	—	4 OZS. 2/- OZ.
" Oxalate .. ..	0 5	5 0		" Salicylate .. ..	0 4	4 0	
" Peroxide (Dioxide), Pure	0 6	6 0		" Sulphate .. ..	0 10	9 0	
" Peroxide (Dioxide), Pow-	—	0 8	14 lbs. 6d. lb.	" Sulphonol .. ..	1 6	20 0	
" Peroxide (Dioxide), Gran-	—	0 9	14 lbs. 7d. lb.	<b>Methylene Chloride</b> .. ..	7 0	—	
" Peroxide (Dioxide, Lumps)	—	1 0		" Iodide .. ..	7 0	—	
(see also Pyrolusite) ..	—	1 0		<b>Methyleneditannine</b> .. ..	2 0	—	4 OZS. 1/9 OZ.
" Phosphate .. ..	0 5	4 6		<b>Metol</b> , in 1 oz. Bottles	—	—	2/- each.
" Phosphite .. ..	5 0	—		<b>Mica</b> , in Sheets (small)	1 3	—	
" Pyrophosphate .. ..	1 0	12 0		small pieces .. ..	0 9	—	
" Resinate .. ..	—	1 6		<b>Microcosmic Salt</b> (see also Sodium-	—	—	
" Sulphate, Pure .. ..	0 3	3 0		Ammonium Phosphate) .. ..	0 3	2 6	
" Sulphate, Coml. .. ..	—	1 3		<b>Molybdenum Metal</b> .. ..	1 6	—	
" Sulphide .. ..	0 7	7 0		" Oxide .. ..	5 0	—	
" Sulphite .. ..	0 5	5 0		" Sulphide .. ..	5 0	—	
" Tartrate .. ..	0 10	10 0		<b>Monomethylparamidophenol</b> .. ..	—	—	2/- per oz. bottle.
<b>Mannitol</b> (Mannite) .. ..	1 6	—	4 OZS. 1/4 OZ.	<b>Murexide</b> .. ..	11 0	—	
<b>Marble Chips</b> (see also Calcium Car-	—	0 2	28 lbs. 1 1/2 lb.	<b>Musk Synthetic</b> .. ..	2 6	—	4 OZS. 2/4 OZ.
bonate) .. ..	—	2 6		<b>Myrtol</b> .. ..	3 6	—	4 OZS. 3/2 OZ.
<b>Marine Glue</b> .. ..	—	2 6		<b>Naphtha</b> (For Sodium or Potassium)	—	1 6	W. Qts.
<b>Menthol</b> .. ..	3 0	—		" Wood .. ..	0 2	1 9	1/4 lb.
" Valerianate .. ..	7 6	—		<b>Naphthalene</b> , Pure .. ..	0 3	2 6	12/- per gall.
<b>Mercury Metal</b> , Pure Redistilled ..	—	7 0	{ 7 lbs. } { 6/9 lb. } { 7 lbs. } { 4/9 lb. }	" Sticks and Marbles .. ..	—	0 7	14 lbs. 6d. lb.
" Metal, Ordinary .. ..	—	5 0	Price varies.	" Flakes .. ..	—	0 7	14 lbs. 6d. lb.
" Acetate (Per) .. ..	1 3	—		" Monobromide .. ..	2 3	—	
" Acetate (Proto) .. ..	1 3	—		" Monochloride .. ..	3 0	—	
" Ammonium Chloride .. ..	0 8	8 0		" Tetrachloride .. ..	2 6	—	
" Arsenate .. ..	1 6	—		<b>Naphthol</b> , Alpha .. ..	1 0	12 0	
" Arsenite .. ..	1 6	—		" Beta .. ..	0 6	5 0	
" Benzoate .. ..	1 0	—		" Benzoate, Beta .. ..	2 0	—	
" Borate .. ..	1 8	—		<b>Naphthylamine</b> , Alpha .. ..	2 0	—	4 OZS. 1/9 OZ.
" Bromide (Mercuric) .. ..	2 6	—		" Beta .. ..	2 6	—	4 OZS. 2/3 OZ.
" Bromide (Mercurous) .. ..	2 6	—		" Hydrochloride, Alpha .. ..	2 6	—	4 OZS. 2/3 OZ.
" Carbolate .. ..	1 9	—		" Hydrochloride, Beta .. ..	2 0	—	4 OZS. 1/9 OZ.
" Carbonate (Mercuric) .. ..	1 10	—	4 OZS. 1/8 OZ.	<b>Narceine</b> .. ..	—	—	2/- per gram.
" Carbonate (Mercurous) .. ..	1 10	—	4 OZS. 1/8 OZ.	" Hydrochloride .. ..	—	—	2/- per gram.
" Chloride (Mercuric) .. ..	0 8	7 0		<b>Narcotine</b> .. ..	5 0	—	
" Chloride (Mercurous) .. ..	0 8	7 6		" Hydrochloride .. ..	5 0	—	
" Chromate .. ..	2 0	—	4 OZS. 1/10 OZ.	" Sulphate .. ..	5 0	—	
" Cyanide .. ..	1 3	16 0		<b>Neodymium Oxide</b> .. ..	—	—	12/6 per gm.
" Iodide, Red (Mercuric) .. ..	1 9	—	4 OZS. 1/7 OZ.	" Nitrate .. ..	—	—	12/- per gm.
" Iodide, Green (Mercurous) .. ..	1 7	—	4 OZS. 1/5 OZ.	<b>Nerolin</b> .. ..	2 0	—	4 OZS. 1/9 OZ.
" Lactate .. ..	2 3	—		<b>Neurin</b> .. ..	14 0	—	
" Nitrate (Mercuric) .. ..	0 9	8 6		<b>Nickel Metal</b> , Cubes .. ..	0 4	4 0	
" Nitrate (Mercurous) .. ..	0 9	8 6		" Metal, Pure Powder .. ..	1 0	12 6	
" Oleate, 20% .. ..	0 6	5 8		" Metal, Foil .. ..	0 9	9 0	
" Oxide, Red (Mercuric) .. ..	0 9	8 3		" Metal, Granulated .. ..	0 7	7 0	
" Oxide, Yellow (Mercuric) .. ..	0 9	8 0		" Metal, Wire .. ..	1 0	—	
" Oxide, Black (Mercurous) .. ..	1 3	—	4 OZS. 1/1 OZ.	" Metal, Anodes (Cast) .. ..	—	5 6	
" Phosphate (Mercuric) .. ..	1 9	—	4 OZS. 1/7 OZ.	" Acetate .. ..	0 7	7 0	
" Phosphate (Mercurous) .. ..	1 9	—	4 OZS. 1/7 OZ.	" Ammonium Nitrate .. ..	0 9	8 6	
" Salicylate .. ..	1 9	22 0		" Ammonium Sulphate .. ..	0 2	1 6	
" Succinimide .. ..	4 0	—		" Arsenate .. ..	1 2	14 0	
" Sulphate (Mercuric) .. ..	0 7	6 6		" Benzoate .. ..	2 0	—	
" Sulphate (Mercurous) .. ..	0 9	8 6		" Borate .. ..	1 0	10 0	
" Sulphide (Cinnabar) .. ..	0 9	9 0		" Bromide .. ..	1 6	—	4 OZS. 1/4 OZ.
" Sulphide (Vermilion) .. ..	0 9	8 0		" Carbonate, Pure .. ..	0 5	5 0	
" Sulphocyanide .. ..	1 0	13 0		" Chloride .. ..	0 5	4 0	
" Tannate .. ..	1 7	20 0		" Chromate .. ..	0 9	8 6	
<b>Mesitylene</b> .. ..	6 0	—		" Cyanide .. ..	1 0	—	4 OZS. 1/10 OZ.
<b>Mesothorium</b> .. ..	—	—		" Formate .. ..	0 9	9 0	
<b>Metaphenylenediamine Base</b> .. ..	2 0	—	Price on application.	" Hydroxide .. ..	0 7	7 0	
" Hydrochloride .. ..	1 10	—		" Iodide .. ..	2 6	—	
<b>Methylacetanilide</b> .. ..	3 6	—		" Nitrate .. ..	0 4	3 6	
* <b>Methylal</b> .. ..	1 6	—		" Oleate .. ..	0 7	7 0	
" Methylamine, Solution 33% .. ..	4 0	—	4 OZS. 3/9 OZ.	" Oxalate .. ..	0 7	7 0	
" Hydrochloride .. ..	4 0	—	4 OZS. 3/9 OZ.	" Oxide, Green, NiO .. ..	0 6	5 6	
" Methylaniline (Mono) .. ..	1 8	—	4 OZS. 1/6 OZ.	" Oxide, Black, Ni <sub>2</sub> O <sub>3</sub> .. ..	0 6	6 0	
* <b>Methylated Spirit</b> .. ..	—	—	5/3 per gall.	" Oxide, Grey, Ni <sub>3</sub> O <sub>4</sub> .. ..	0 5	4 6	
* <b>Methyl Acetate</b> .. ..	1 0	12 0		" Phosphate .. ..	0 6	5 6	
" Benzoate .. ..	1 6	—		" Sulphate .. ..	0 2	1 6	7 lbs. 1/5 lb.
" Butyrate .. ..	4 6	—		" Sulphide .. ..	0 7	7 0	
" Bromide .. ..	3 6	—		<b>Nicotine</b> , Pure .. ..	12 0	—	
" Caprylate .. ..	5 6	—		Coml. 95% .. ..	2 9	—	4 OZS. 2/7 OZ.
				<b>Niobium Metal</b> .. ..	—	—	9/- per gram.

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W. & J. GEORGE (LONDON), Ltd., PROPRIETORS.

NAME OF CHEMICAL.	Per oz. s. d.	Per lb. s. d.	REMARKS.	NAME OF CHEMICAL.	Per oz. s. d.	Per lb. s. d.	REMARKS.
Niobium Chloride .. .. .	—	—	6/- per gram.	Phenocoll Hydrochloride .. .. .	11 0	—	
Nitraniline, Meta .. .. .	2 0	—	4 ozs. 1/9 oz.	Phenol, Absolute .. .. .	0 2	1 6	
" Ortho .. .. .	1 0	12 0		Phenolphthalein .. .. .	0 9	8 6	
" Para .. .. .	1 0	12 0		Phenolphthalin .. .. .	6 0	—	
Nitranisol, Ortho .. .. .	3 6	—		Phenyl Acetate .. .. .	3 0	—	
Nitrobenzaldehyde, Meta .. .. .	3 0	—		" Benzoate .. .. .	3 0	—	
" Ortho .. .. .	4 0	—		" Carbonate .. .. .	2 0	—	
" Para .. .. .	4 0	—		Phenylendiamine, Meta .. .. .	2 0	—	
*Nitrobenzole .. .. .	—	2 0	{ W. Qts. 1/10 lb.	" Meta, Hydrochloride .. .. .	1 10	—	
Nitroglucose .. .. .	3 0	—		" Meta, Sulphate .. .. .	2 3	—	
Nitroguanidine .. .. .	6 0	—		" Para, Hydrochloride .. .. .	2 0	—	
Nitron .. .. .	14 0	—		" Ortho, Hydrochloride .. .. .	10 0	—	
Nitronaphthalene .. .. .	0 9	9 0		*Phenylhydrazine .. .. .	1 2	16 0	
Nitrophenol, Meta .. .. .	5 0	—		" Hydrochloride .. .. .	1 3	17 0	
" Ortho .. .. .	0 10	9 6		Phloretin .. .. .	12 6	—	
" Para .. .. .	0 9	8 6		Phloridzin .. .. .	10 0	—	
Nitrophenylhydrazine .. .. .	12 6	—		Phloroglucin .. .. .	15 0	—	
Nitropropan .. .. .	15 0	—		Phoron .. .. .	20 0	—	
Nitroso. B. Naphthol .. .. .	2 0	—	4 ozs. 1/9 oz.	*Phosgene, 20% Solution in Toluol ..	1 6	—	
Nitrosophenol, Para .. .. .	3 0	—		*Phosphorus, Yellow Sticks .. .. .	—	—	{ 1 lb. tins 6/- each.
Nitrotoluol, Meta .. .. .	2 0	—		" Red, Amorphous .. .. .	0 7	6 6	
" Ortho .. .. .	0 10	10 0		" Bromide .. .. .	2 0	—	
" Para .. .. .	1 0	12 0		" Chloride (Tri) .. .. .	—	—	{ 1/2 lb. bottles 5/- each; 1 lb. bottles 7/6 each.
Novocain, 5 gram Bottles .. .. .	—	—	8/6 each.	" Chloride (Penta) .. .. .	—	—	{ 1/2 lb. bottles 5/- each; 1 lb. bottles 9/- each.
Nuclein .. .. .	8 6	—		" Chloride (Oxy) .. .. .	—	—	{ 1/2 lb. bottles 5/- each; 1 lb. bottles 9/- each.
Oils, see page 354 at end of List.				" Iodide .. .. .	6 0	—	
Oenanthal .. .. .	3 0	—	4 ozs. 2/9 oz.	" Pentoxide (see also Acid Phosphoric Anhydrous)	—	6 0	{ Usually packed in 1/2 lb. and 1 lb. bottles.
Orcein .. .. .	12 0	—		Picolin .. .. .	14 0	—	
Orcin .. .. .	8 0	—		Picrotoxin .. .. .	—	—	1/- per gram.
Ortol, 1 oz. Bottles .. .. .	—	—	3/- each.	Piocardine .. .. .	—	—	2/6 per gram.
Orthoform .. .. .	15 0	—		" Hydrochloride .. .. .	—	—	2/- per gram.
Osmium Metal .. .. .	—	—	22/- per gm.	" Nitrate .. .. .	—	—	1/6 per gram.
Oxamide .. .. .	2 0	—	4 ozs. 1/10 oz.	Pinen (Laevorotatory) .. .. .	4 0	—	
Oxamethane .. .. .	3 6	—		" Hydrochloride .. .. .	1 0	—	
Oxanilide .. .. .	2 0	—	4 ozs. 1/10 oz.	Piperazine .. .. .	6 0	—	
Oxygen, Mixture .. .. .	—	2 0		Piperine .. .. .	5 0	—	
Oxylith .. .. .	—	—	{ 1/2 kilo tins, 7/6 each.	Piperidine .. .. .	4 0	—	
Ozokerit .. .. .	0 3	2 0		" Tartrate .. .. .	5 0	—	
Palladium Metal, Foil .. .. .	—	—	20/- per gm.	Piperonal .. .. .	1 6	—	
" Metal, Wire .. .. .	—	—	20/- per gm.	Plaster of Paris (see also Calcium Sulphate) ..	—	0 4	
" Sponge .. .. .	—	—	20/- per gm.	Platinum, Foil or Wire .. .. .	—	—	22/- per gm.
" Asbestos, 5% .. .. .	32 0	—		" Sponge .. .. .	—	—	22/- per gm.
" Chloride, Dry .. .. .	—	—	14/- per gm.	" Black .. .. .	—	—	22/- per gm.
" Chloride, Solution .. .. .	10 6	—		" Asbestos 5% .. .. .	33 0	—	
" Nitrate .. .. .	—	—	12/- per gm.	" Chloride, in 15 grain Tubes .. .. .	—	—	9/6 each.
" Nitrate, 5% Solution .. .. .	10 6	—		" Chloride, Solution .. .. .	12 0	—	4 ozs. 11/6 oz.
Pancreatin, Absolute .. .. .	2 0	—		Plumbago (see also Graphite) .. .. .	—	1 0	
" Active .. .. .	1 10	—		Podophyllin .. .. .	2 6	—	
Papain .. .. .	3 0	—		Populin .. .. .	—	—	3/- per gram.
Papaverine .. .. .	5 6	—		*Potassium Metal .. .. .	3 6	—	4 ozs. 3/3 oz.
Paraffin Wax, 115° F. .. .. .	—	0 9		" Acetate .. .. .	0 2	2 2	
" 120° F. .. .. .	—	0 9		" Aluminate .. .. .	0 10	10 0	
" 125° F. .. .. .	—	0 9	{ 7 lb. lots, 1d. lb. less.	" Antimoniate (Bin) .. .. .	0 5	4 6	
" 130° F. .. .. .	—	0 10		" Antimoniate (Meta) .. .. .	0 8	8 0	
" 135° F. .. .. .	—	0 10		" Antimoniate (Pyro) .. .. .	0 6	5 6	
Paraffin, Liquid, B.P. .. .. .	—	2 0		" Arsenate .. .. .	0 6	5 6	
Paraformaldehyde .. .. .	0 6	6 0		" Arsenite .. .. .	0 5	5 0	
Paraldehyde .. .. .	0 3	2 6		" Benzene-Sulphonate .. .. .	1 0	—	4 ozs. 10d. oz.
Paramidophenol .. .. .	2 0	—		" Benzoate .. .. .	1 0	12 6	
" Hydrochloride .. .. .	2 0	—		" Bicarbonate, Pure Crystals .. .. .	0 2	1 2	7 lbs. 1/- lb.
Paraphenylenediamine .. .. .	2 0	—		" Bicarbonate, Pure Powder .. .. .	0 2	1 2	7 lbs. 1/- lb.
" Hydrochloride .. .. .	2 0	—		" Bichromate, Pure Crystals .. .. .	0 2	2 0	7 lbs. 1/10 lb.
Pelletierine .. .. .	—	—	6/- per gram.	" Bichromate, Coml. Crystals .. .. .	—	1 0	14 lbs. 10d. lb.
" Hydrochloride .. .. .	—	—	5/6 per gram.	" Bichromate, Fused .. .. .	0 4	3 3	
Pellotin Hydrochloride .. .. .	—	—	6/- per gram.	" Binoxalate, Pure .. .. .	0 3	3 0	
Pentachlorethane .. .. .	0 3	3 0		" Biphosphate, Pure .. .. .	0 4	4 0	
*Pentane (Standard) .. .. .	0 5	5 0					
Pepsin .. .. .	1 8	—	4 ozs. 1/6 oz.				
Peptone, Dry .. .. .	1 0	12 0					
" For Bacteriological Work .. .. .	1 6	20 0					
Perchlorethylene .. .. .	0 4	3 6					
Phenetidine .. .. .	2 6	—					
Phellandrene .. .. .	1 6	—	4 ozs. 1/3 oz.				
Phenacetin .. .. .	0 9	8 6					
Phenacetolin .. .. .	4 0	—					
Phenanthrene .. .. .	3 0	—					
Phenazone (see also Antipyrine) .. .. .	0 11	11 0					
" Salicylate .. .. .	1 6	20 0					
Phenetole .. .. .	3 0	—					

F. E. BECKER & CO., NIVOC HOUSE, HATTON WALL, LONDON, E.C.1. 347

W. & J. GEORGE (LONDON), Ltd., PROPRIETORS.

NAME OF CHEMICAL.		Per oz. s. d.	Per lb. s. d.	REMARKS.	NAME OF CHEMICAL.	Per oz. s. d.	Per lb. s. d.	REMARKS.
Potassium	Bisulphate, Pure Crystals	0 2	2 0		Potassium Sulphocyanide, Pure	0 6	5 0	
"	Bisulphate, Fused	0 3	3 0		" Tartrate, Pure	0 4	3 6	
"	Bitartrate	0 2	2 0		" Tellurite	—	—	1/6 per gram.
"	Borate	0 5	5 0		" Tellurite	—	—	1/6 per gram.
"	Boratartrate	0 5	5 0		" Tungstate	0 11	11 0	
"	Bromate	0 6	6 0		" Urate	2 9	—	4 ozs. 2/6 oz.
"	Bromide	0 2	1 5	7 lbs. 1/4 lb.	Praseodymium Nitrate	—	—	18/6 per gm.
"	Carbonate, Pure Anhydrous	—	2 2	7 lbs. 2/- lb.	" Oxalate	—	—	18/6 per gm.
"	Carbonate, Coml. (Pearl Ash)	—	1 2	7 lbs. 1/1 lb.	" Oxide	—	—	20/- per gm.
"	Chlorate, Pure Crystals	—	1 0	14 lbs. 10d. lb.	Propionamide	3 6	—	
"	Chlorate, Coml. Crystals	—	0 9	14 lbs. 8d. lb.	*Propionyl Chloride	8 0	—	
"	Chlorate, Powdered	—	0 10	14 lbs. 8d. lb.	Propylamine, Verum Anhydric	30 0	—	
"	Chloride, Pure Crystals	0 2	1 4	7 lbs. 1/3 lb.	" 33%	4 0	—	
"	Chloride, Coml. Crystals	—	0 7	7 lbs. 6d. lb.	*Propyl Acetate	2 0	—	
"	Chloroplatinite, in 15 grain Tubes	—	—	11/6 each.	" Bromide	3 6	—	
"	Chromate, Pure Crystals	0 3	2 6		" Iodide	4 0	—	
"	Citrate, Pure	0 4	3 9		Protargol	2 6	—	
"	Cobalticyanide	2 6	—	4 ozs. 2/4 oz.	Protein	3 3	—	4 ozs. 3/- oz.
"	Cobaltinitrite	3 6	—		Ptyaline	8 0	—	
"	Cyanide, Pure	1 0	—		Pumice Stone, Lumps	—	0 6	
"	Cyanide (Double Salt, 98-100%)	0 3	3 0		" Powder	—	0 5	
"	Cyanide, Sticks 30%	0 4	4 0		Purpurin	8 0	—	
"	Ethyl Sulphate	2 0	—	4 ozs. 1/10 oz.	Pyramidon	2 0	—	4 ozs. 1/10 oz.
"	Ferric Oxalate	0 6	6 0		*Pyridine, Pure	1 0	14 0	
"	Ferricyanide, Pure Crystals	0 7	7 0		" Coml.	0 3	3 0	
"	Ferricyanide, Coml.	0 6	5 6		Pyrocatechin	2 0	—	4 ozs. 1/10 oz.
"	Ferrocyanide, Pure Crystals	0 4	3 6		Pyrogallol, Crystals	0 10	9 0	
"	Ferrocyanide, Coml.	0 3	2 3		" Resub.	1 0	14 0	
"	Fluoborate	1 0	—	4 ozs. 10d. oz.	*Pyroxylin (see also Gun Cotton)	1 3	18 0	
"	Fluoride, Pure	0 4	3 9		Pyrrrol	10 0	—	
"	Fluosilicate	0 6	6 0		Quassia Chips	—	1 0	
"	Formate	0 5	4 6		Quassine, Crystals	—	—	4/- per gram.
"	Glycerophosphate, 50%	0 7	6 6		" Amorphous	—	—	2/3 per gram.
"	Guaiaacolsulphonate	0 9	9 0		Quercetin	8 0	—	
"	Hippurate	5 0	—		Quercitrin	8 0	—	
"	Hydrate, Sticks (Pure by Alcohol)	—	3 0	Packed in 1 lb. bottles.	Quinidine	6 0	—	
"	Hydrate, Sticks (Ordinary)	—	2 6		" Sulphate	4 0	—	
"	Hypophosphite	0 8	8 0		Quinine	5 6	—	
"	Hyposulphite	0 5	4 6		" Acetate	6 6	—	
"	Iodate	2 0	—	4 ozs. 1/10 oz.	" Acetosalicylate	6 6	—	
"	Iodide	1 6	22 0		" Benzoate	6 0	—	
"	Manganate	0 3	3 0		" Citrate	5 0	—	
"	Meconate	8 0	—		" Hydrobromide	5 0	—	
"	Mercuric-Iodide	2 6	—	4 ozs. 2/3 oz.	" Hydrochloride	4 6	—	
"	Metabisulphite	0 2	1 6		" Glycerophosphate	6 6	—	
"	Metaphosphate	0 11	12 0		" Lactate	5 6	—	
"	Methyl Sulphate	2 0	—	4 ozs. 1/10 oz.	" Phosphate	5 6	—	
"	Molybdate	1 8	—	4 ozs. 1/6 oz.	" Saicylate	5 0	—	
"	Nitrate, Pure Crystal	—	1 0	14 lbs. 10d. lb.	" Sulphate	3 6	—	4 ozs. 3/3 oz.
"	Nitrate, Coml.	—	0 9	14 lbs. 7d. lb.	Quinol	0 7	7 0	
"	Nitrate, Sticks	0 3	2 6		Quinone (Benzoquinone)	6 6	—	4 ozs. 6/2 oz.
"	Nitrite, Sticks	—	4 6		Quinoline (Chinoline)	2 0	—	4 ozs. 1/9 oz.
"	Nitrite, Pure Crystals	—	5 0	Packed in 1 lb. bottles.	Radium Bromide	—	—	Prices on application.
"	Nitrite, Coml.	—	3 3		Raffinose	—	—	10d. per gram.
"	Oleate	0 4	4 0		Resin	—	0 6	
"	Oxalate, Neutral	0 4	3 3		" Cerate	—	4 0	
"	Perchlorate	0 2	2 0		Resorcin	1 0	10 0	
"	Periodate	5 6	—		Retinol	—	2 0	
"	Permanganate, Pure, free H <sub>2</sub> SO <sub>4</sub>	0 3	3 0	7 lbs. 2/9 lb.	Rhodinal	—	—	{ 3 oz. bottles. 1/6 each.
"	Permanganate, Pure Crystals	0 2	2 0	7 lbs. 1/10 lb.	Rhodium Metal	—	—	3/- grain.
"	Permanganate, Crystals	0 2	1 6	7 lbs. 1/4 lb.	Rochelle Salts	0 2	1 6	
"	Persulphate	0 3	3 0		Rosaniline Base	2 0	—	4 ozs. 1/10 oz.
"	Phosphate, Pure Crystals	0 4	3 6		" Acetate	3 6	—	
"	Phosphate (Tribasic)	0 6	6 0		" Chloride	3 0	—	
"	Phosphite	0 8	8 0		" Nitrate	4 0	—	
"	Platinocyanide, in 1 gram Tubes	—	—	14/- each.	Rouge, Jeweller's	0 2	1 6	
"	Pyrosulphate	0 5	5 0		Rubidium Metal	—	—	15/- per gm.
"	Salicylate	0 8	8 0		" Bromide	8 0	—	
"	Silicate, Solution	—	1 3		" Carbonate	12 0	—	
"	Silicofluoride	0 6	6 0		" Chloride	12 0	—	
"	Stearate	0 6	6 0		" Iodide	7 6	—	
"	Succinate	2 0	—	4 ozs. 1/10 oz.	" Sulphate	12 0	—	
"	Sulphate, Pure Crystals	0 2	1 6	7 lbs. 1/5 lb.	Ruthenium Metal	—	—	40/- per gm.
"	Sulphate, Coml.	—	0 7	7 lbs. 6d. lb.	Sabadin, Crystals	—	—	6/- per gram.
"	Sulphide (Liver of Sulphur)	—	1 6		Sabadinin, Crystals	—	—	3/6 per gram.
"	Sulphite	0 5	5 0		Sabinol	15 0	—	
					Saccharin, 550	12 6	—	
					" Soluble	12 0	—	
					Saccharose	0 6	5 0	



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W. & J. GEORGE (LONDON), Ltd., PROPRIETORS.

NAME OF CHEMICAL.		Per oz. s. d.	Per lb. s. d.	REMARKS.	NAME OF CHEMICAL.	Per oz. s. d.	Per lb. s. d.	REMARKS.
Sodium	Phosphomolybdate .. ..	2 6	—	4 ozs. 2/3 oz.	Styron .. ..	5 0	—	
"	Phosphotungstate .. ..	2 3	—	4 ozs. 2/1 oz.	Succinamide .. ..	10 0	—	
"	Potassium Carbonate (see also Fusion Mixture) .. ..	0 3	3 0		Sugar Cane .. ..	—	1 6	
"	Pyroantimonate .. ..	1 0	—		" Grape, Coml. (see also Glucose)	—	0 9	14 lbs. 8d. lb.
"	Pyrophosphate .. ..	0 3	2 3		" Milk (see also Lactose) ..	0 3	2 6	7 lbs. 2/4 lb.
"	Pyrosulphate .. ..	0 5	4 6		Sulphocarbamide .. ..	1 9	—	
"	Salicylate .. ..	0 4	3 6		Sulphocarbaniide .. ..	2 0	—	
"	Santonate .. ..	—	—	2/9 per gram.	Sulphonol .. ..	1 10	—	4 ozs. 1/8 oz.
"	Selenate .. ..	4 0	—		Sulphourea .. ..	3 0	—	
"	Selenite .. ..	4 0	—		Sulphur Crystals .. ..	0 6	5 6	
"	Silicate, Pure .. ..	0 3	3 0		" Roll .. ..	—	0 6	
"	Silicate, Solution .. ..	—	0 5	14 lbs. 4d. lb.	" Flowers .. ..	—	0 6	
"	Silicofluoride .. ..	0 4	3 6		" Pieces .. ..	—	0 2	
"	Stannate .. ..	0 5	4 6		" Precip. .. ..	—	1 6	7 lbs. 1/4 lb.
"	Stearate .. ..	0 4	3 6		" Chloride .. ..	—	1 9	
"	Succinate .. ..	1 6	—	4 ozs. 1/4 oz.	" Dioxide (see also Acid Sul- phurous) Anhydrous ..	—	3 0	In syphons about 3 lbs.
"	Sulphanilate .. ..	1 3	—		Sulphuretted Hydrogen, Solution in Glycerine .. ..	—	3 6	
"	Sulphate, Pure Crystals .. ..	—	0 5	14 lbs. 4d. lb.	Sulphuryl Chloride .. ..	0 8	7 6	
"	Sulphate, Pure Dry .. ..	—	0 7	14 lbs. 6d. lb.	Tannin .. ..	0 6	5 6	
"	Sulphide, Pure Crystals .. ..	—	1 11		" Albuminate .. ..	0 9	9 0	
"	Sulphite, Pure Crystals .. ..	—	0 7	14 lbs. 6d. lb.	Tantalum Metal .. ..	—	—	25/- per gm.
"	Sulphite, Pure Anhydrous .. ..	0 2	1 3	7 lbs. 1/1 lb.	" Chloride .. ..	—	—	20/- per gm.
"	Sulphocarbolate .. ..	0 3	2 6		Taurin .. ..	—	—	6/- per gram.
"	Sulphocyanide .. ..	0 6	5 0		Taxin .. ..	—	—	5/- per gram.
"	Sulphomolybdate .. ..	3 0	—	4 ozs. 2/9 oz.	Tellurium Metal .. ..	—	—	1/3 per gram
"	Sulphosalicylate .. ..	2 0	—	4 ozs. 1/10 oz.	" Chloride .. ..	—	—	2/- per gram
"	Tannate .. ..	0 7	7 0		*Terebene .. ..	0 5	4 6	
"	Tartrate .. ..	0 4	4 0		Terpin-Hydrate .. ..	0 4	4 0	
"	Taurocholate (Choleate) .. ..	1 9	—	4 ozs. 1/7 oz.	Terpineol .. ..	0 6	6 0	
"	Tellurate .. ..	—	—	2/- per gram.	Terpinol .. ..	0 5	5 0	
"	Tungstate .. ..	0 5	4 6		Tetrachlorethane .. ..	—	2 0	
"	Urate .. ..	3 0	—		Tetramethyldiamidobenzophenon	3 0	—	
"	Valerianate .. ..	1 9	—	4 ozs. 1/7 oz.	Thallium Metal .. ..	4 6	—	
"	Valerianate .. ..	—	—	2/- per gram.	" Acetate .. ..	5 6	—	
Sorbite .. ..	—	—	—		" Carbonate .. ..	6 0	—	
Sparteine .. ..	—	18 0	—		" Chloride .. ..	4 6	—	
" Hydrochloride .. ..	—	12 0	—		" Nitrate .. ..	4 6	—	
" Sulphate .. ..	—	4 6	—		" Oxide .. ..	6 0	—	
Spermaceti .. ..	—	0 4	2 9		" Sulphate .. ..	4 6	—	
Starch, Maize .. ..	—	—	0 5		Thebaine .. ..	9 6	—	
" Potato .. ..	—	—	0 6		Theine (Caffeine) .. ..	1 6	—	4 ozs. 1/4 oz.
" Rice .. ..	—	—	0 9		Theobromine .. ..	1 6	20 0	
" Wheat .. ..	—	—	0 8		" Sodio Acetate .. ..	1 8	22 0	
" Soluble (Lintner's) .. ..	—	0 4	3 9		" Sodiosalicylate (Diuretin)	1 5	19 0	
" Iodide .. ..	—	0 6	5 6		Theocin Sodium Acetate .. ..	15 0	—	
Stearine .. ..	—	—	1 3	7 lbs. 1/2 lb.	Thermit (Iron) .. ..	0 5	5 0	
Steel Filings .. ..	—	—	0 9		Thiocarbamide .. ..	1 9	—	4 ozs. 1/7 oz.
" Wire .. ..	—	1 0	—		Thionyl Chloride .. ..	0 5	4 6	
Stilbene .. ..	—	—	—	3/- per gram.	Thiophene .. ..	12 0	—	
Stourbridge Clay .. ..	—	—	0 3		Thiosinamine .. ..	2 0	—	
Stovaine, in 5 gramme Bottles	—	—	—	4/6 each.	Thorium Metal .. ..	—	—	9/- per gram.
Strontium Metal .. ..	—	—	—	12/6 per gm.	" Chloride .. ..	7 0	—	
" Acetate .. ..	—	0 5	4 6		" Nitrate .. ..	2 0	—	4 ozs. 1/10 oz.
" Bromide .. ..	—	0 4	3 6		" Oxalate .. ..	5 0	—	
" Borate .. ..	—	0 5	5 0		" Oxide .. ..	5 0	—	
" Carbonate, Pure .. ..	—	0 3	3 0		" Sulphate .. ..	3 6	—	
" Chlorate .. ..	—	0 4	4 0		Thymol .. ..	2 4	—	4 ozs. 2/2 oz.
" Chloride, Pure .. ..	—	0 2	2 0		Tin Metal, Granulated .. ..	0 4	4 0	7 lbs. 3/9 lb.
" Chromate .. ..	—	0 7	7 0		" Metal, Sticks .. ..	0 5	5 0	
" Citrate .. ..	—	0 6	5 0		" Metal, Foil, Pure .. ..	0 6	5 0	
" Fluoride .. ..	—	0 7	6 6		" Metal, Foil, Coml. (Composition)	0 3	2 6	
" Iodide .. ..	—	1 10	—	4 ozs. 1/8 oz.	" Metal, Powder .. ..	0 5	5 0	
" Lactate .. ..	—	1 6	20 0		" Bichloride, Crystals .. ..	0 7	7 6	
" Nitrate, Pure .. ..	—	0 3	2 0		" Bisulphide (Musive Gold)	0 10	10 0	
" Nitrate, Coml. .. ..	—	0 2	1 0		" Chloride (Stannous), Pure ..	0 4	3 6	
" Oxalate .. ..	—	0 6	5 6		" Iodide (Stannic) .. ..	2 6	—	
" Oxide, Pure .. ..	—	0 8	8 0		" Iodide (Stannous) .. ..	2 6	—	
" Oxide, Hydrate .. ..	—	0 3	3 0		" Nitrate, Solution .. ..	0 6	5 0	
" Phosphate .. ..	—	0 6	6 0		" Oleate .. ..	0 7	7 0	
" Phosphide .. ..	—	1 6	—		" Oxalate (Stannous) .. ..	0 7	7 0	
" Salicylate .. ..	—	1 6	—		" Oxide (Stannic) .. ..	0 6	5 0	
" Sulphate, Pure .. ..	—	0 3	3 0		" Oxide (Stannous) .. ..	0 7	7 0	
" Sulphate, Coml. .. ..	—	0 2	1 6		" Phosphate .. ..	0 7	6 6	
" Sulphide .. ..	—	0 5	5 0		" Phosphide .. ..	0 5	4 6	
" Sulphite .. ..	—	0 6	6 0		" Sulphate (Stannic) .. ..	0 7	6 0	
Strophanthin .. ..	—	—	—	8/- per gram.	" Sulphate (Stannous) .. ..	0 7	6 0	
Strychnine, Crystals .. ..	—	8 0	—		" Sulphide, Mono .. ..	1 0	10 0	
" Powder .. ..	—	8 0	—		Titanium Metal .. ..	—	—	2/6 per gram.
" Acetate .. ..	—	3 0	—		" Chloride .. ..	6 0	—	
" Hydrochloride .. ..	—	6 6	—		" Chloride (Proto), Solution	0 3	2 3	
" Nitrate .. ..	—	6 6	—					
" Sulphate .. ..	—	6 0	—					
Styrol .. ..	—	10 0	—					



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W. & J. GEORGE (LONDON), Ltd., PROPRIETORS.

NAME OF CHEMICAL.	Per oz. s. d.	Per lb. s. d.	REMARKS.	NAME OF CHEMICAL.	Per oz. s. d.	Per lb. s. d.	REMARKS.
Titanium Oxide .. .. .	1 6	—		Xanthine .. .. .	—	—	18/- per gram.
" Sulphate .. .. .	0 3	2 6		Xanthone .. .. .	12 0	—	
Tolidin .. .. .	2 6	—	4 ozs. 2/3 oz.	Xylenol .. .. .	10 0	—	
Toluidine, Ortho .. .. .	0 6	6 0		Xylidine .. .. .	0 6	6 0	
" Meta .. .. .	2 6	—		*Xylo, Pure .. .. .	—	1 6	{ W. Qts. 1/4 lb.
" Para .. .. .	1 3	—		" Coml. .. .. .	—	1 2	{ W. Qts. 1/4 lb.
*Toluol, Pure .. .. .	—	1 6	{ W. Qts. 1/4 lb.	Xyloquinone .. .. .	23 0	—	
*" Coml. .. .. .	—	1 2	{ W. Qts. 1/4 lb.	Xylose .. .. .	—	—	2/- per gram.
Toluenediamine .. .. .	2 0	—		Yohimbine Hydrochloride .. .. .	—	—	5/- per gram.
Triacetine .. .. .	0 6	6 0		Yttrium Metal .. .. .	—	—	10/-pergram.
Trichlorethylene (Westrosol) .. .. .	0 2	2 0		" Carbonate .. .. .	15 0	—	
*Trikresol .. .. .	0 4	4 0		" Chloride .. .. .	8 6	—	
Trimethylamine (Propylamine) Verum .. .. .	30 0	—		" Nitrate .. .. .	7 0	—	
" Anhydric .. .. .	5 6	—		" Oxide .. .. .	11 0	—	
" (Propylamine) 33% .. .. .	4 0	—		" Sulphate .. .. .	10 0	—	
" Hydrochloride .. .. .	5 6	—		Zaffre .. .. .	0 5	5 0	
Trinitrine, Solution 1% .. .. .	0 10	10 0		Zinc Metal, Foil .. .. .	0 3	2 6	
*Trinitrocresol .. .. .	2 6	—	4 ozs. 2/4 oz.	" Metal, Granulated, Free As, Sb. .. .. .	0 3	2 6	7 lbs. 2/4 lb.
*Trinitrotoluol .. .. .	3 0	—		" Metal, Granulated, Coml. .. .. .	—	1 0	14 lbs. rod.lb.
Triolein .. .. .	10 0	—		" Metal, Sticks, Free As, Sb. .. .. .	0 3	3 0	7 lbs. 2/10 lb.
Trional .. .. .	1 6	20 0		" Metal, Sticks, Coml. .. .. .	0 2	1 8	7 lbs. 1/6 lb.
Triphenyl Phosphate .. .. .	0 8	8 0		" Metal, Dust or Powder .. .. .	0 2	1 6	7 lbs. 1/4 lb.
Tripoli .. .. .	—	0 7		" Metal, Turnings .. .. .	0 2	1 6	14 lbs. 1/4 lb.
Trypsin .. .. .	7 6	—		" Metal, Filings .. .. .	0 2	1 0	14 lbs. rod. lb.
Tungsten Metal .. .. .	0 7	7 0		" Acetate .. .. .	0 3	2 6	
" Chloride .. .. .	20 0	—		" Benzoate .. .. .	1 6	20 0	
" Oxide .. .. .	1 6	—		" Borate .. .. .	0 4	4 0	
Turmeric Powder .. .. .	—	1 6		" Bromate .. .. .	3 0	—	
*Turpentine .. .. .	—	2 2	{ W. Qts. 2/- lb.	" Bromide .. .. .	1 0	9 0	
Tyrosin .. .. .	—	—	3/- per gram.	" Carbonate, Pure .. .. .	0 3	2 6	7 lbs. 2/4 lb.
Ultramarine .. .. .	0 3	3 0		" Chloride, Pure Fused Sticks .. .. .	—	2 0	{ Packed in 1 lb. bottles.
Uranium Metal .. .. .	—	—	4/- per gram.	" Chloride, Coml., White .. .. .	—	1 0	
" Acetate .. .. .	1 6	20 0		" Chromate .. .. .	0 8	8 0	
" Bromide .. .. .	3 0	—		" Citrate .. .. .	0 7	6 6	
" Chloride .. .. .	2 0	—		" Cyanide .. .. .	0 8	8 0	
" Nitrate .. .. .	1 0	12 0		*" Ethyl, in 1 gramme Tubes .. .. .	—	—	3/6 each.
" Oxalate .. .. .	2 6	—		" Ferrocyanide .. .. .	1 0	—	
" Oxide, Yellow .. .. .	1 2	14 6		" Formate .. .. .	1 6	—	
" Oxide, Black .. .. .	1 6	20 0		" Hypophosphite .. .. .	1 6	—	
" Oxide, Orange .. .. .	1 3	17 0		" Iodate .. .. .	3 0	—	
Urea, Pure Crystals .. .. .	0 4	4 0		" Iodide .. .. .	2 0	—	
" Acetate .. .. .	1 8	—		" Lactate .. .. .	1 0	12 0	
" Hydrochloride .. .. .	1 6	—		" Nitrate .. .. .	0 3	3 0	
" Nitrate .. .. .	0 11	11 0		" Oleate .. .. .	0 4	4 0	
" Oxalate .. .. .	1 3	16 6		" Oxalate .. .. .	0 5	5 0	
" Sulphate .. .. .	1 6	—		" Oxide, Pure .. .. .	0 2	1 4	
Urethane .. .. .	2 0	—	4 ozs. 1/10 oz.	" Oxide, Coml. .. .. .	—	0 10	
Uricedin .. .. .	4 0	—		*" Permanganate .. .. .	1 2	14 0	
Urson .. .. .	6 0	—		" Peroxide .. .. .	1 6	—	4 ozs. 1/4 oz.
Valeraldehyde (Iso) .. .. .	5 0	—		" Phosphate .. .. .	0 5	4 6	
Valeryl Chloride .. .. .	4 0	—		" Phosphate .. .. .	0 8	7 6	
Vanadium Metal .. .. .	—	—	7/- per gram.	" Phosphite .. .. .	1 8	—	
" Chloride .. .. .	5 0	—		" Pyrophosphate .. .. .	0 6	5 6	
" Chloride, Solution 50% .. .. .	3 0	—	4 ozs. 2/9 oz.	" Resinate .. .. .	0 2	2 0	
" Sulphate .. .. .	5 6	—		" Salicylate .. .. .	0 8	7 0	
Vanillin .. .. .	3 0	—	4 ozs. 2/9 oz.	" Silicate .. .. .	1 2	—	
Vaseline, White .. .. .	—	4 0	{ Packed in 1 lb. tins.	" Stearate .. .. .	0 5	4 6	
" Yellow .. .. .	—	3 0		" Sulphanilate .. .. .	1 3	—	
Veratrine .. .. .	8 6	—		" Sulphate, Pure, Crystals .. .. .	—	0 8	7 lbs. 7d. lb.
Voltoids .. .. .	—	1 2	7 lbs. 1/1 lb.	" Sulphate, Coml., Crystals .. .. .	—	0 5	7 lbs. 4d. lb.
Water, Distilled .. .. .	—	—	{ In Carboys containing about 10 gallons, 1/- gallon.	" Sulphate, Pure, Dry .. .. .	0 2	1 4	7 lbs. 1/3 lb.
Wax, Bee's, White .. .. .	—	3 6		" Sulphide, Pure .. .. .	0 7	7 0	
" Bee's, Yellow .. .. .	—	2 6		" Sulphide, Coml. .. .. .	0 3	2 6	
" Carnauba .. .. .	—	2 0		" Sulphide, Phosphorescent .. .. .	—	—	1/- per gram.
" Faraday .. .. .	—	5 0		" Sulphite .. .. .	0 4	4 0	
" Japan .. .. .	—	1 6		" Sulphocarbolate .. .. .	0 3	2 6	
" Paraffin (see Paraffin) .. .. .	—	—		" Sulphocyanide .. .. .	1 0	—	
Westron .. .. .	0 2	2 0		" Tannate .. .. .	1 4	—	4 ozs. 1/2 oz.
Westrosol .. .. .	0 2	2 0		" Tartrate .. .. .	0 9	9 0	
				" Valerianate .. .. .	1 8	22 0	
				Zirconium Metal .. .. .	—	—	3/- per gram.
				" Chloride .. .. .	6 0	—	
				" Nitrate .. .. .	2 6	—	4 ozs. 2/3 oz.
				" Oxalate .. .. .	6 6	—	
				" Oxide, Anhydrous .. .. .	5 6	—	
				" Oxide, Hydrated .. .. .	5 6	—	
				" Sulphate .. .. .	4 0	—	

## A.R. (ANALYTICAL REAGENT) CHEMICALS.

List of Reagents for analytical purposes, which conform to the standards of purity set out by a Special Committee appointed by the Councils of the Institute of Chemistry of Great Britain and Ireland and the Society of Public Analysts and other Analytical Chemists.

NAME OF CHEMICAL.	Per oz. s. d.	Per lb. s. d.	REMARKS.	NAME OF CHEMICAL.	Per oz. s. d.	Per lb. s. d.	REMARKS.
*Acid Acetic, A.R. . . . .	0 2	1 0		Magnesium Chloride, A.R. . . . .	0 3	2 6	
* " Acetic, Glacial, A.R. . . . .	0 2	2 0		" Oxide, A.R. . . . .	0 5	5 0	
*Acetic Anhydride, A.R. . . . .	0 6	6 0		Manganese Sulphate, A.R. . . . .	0 4	4 0	
*Acetone, A.R. . . . .	0 4	3 6		Mercuric Chloride, A.R. . . . .	0 10	10 0	
*Acetyl Chloride, A.R. . . . .	0 11	10 6		*Methyl Alcohol, A.R. . . . .	—	30 0	
Ammonium Acetate, A.R. . . . .	0 4	4 0		Molybdic Acid, A.R. . . . .	1 2	14 0	
" Carbonate, A.R. . . . .	0 3	2 6		*Nitric Acid, A.R. . . . .	0 2	1 6	
" Chloride, A.R. . . . .	0 2	1 9		Oxalic Acid, A.R. . . . .	0 3	3 0	
" Molybdate, A.R. . . . .	1 2	14 0		*Perchloric Acid, A.R. . . . .	1 8	—	
" Nitrate, A.R. . . . .	0 3	3 0		Phosphoric Acid, A.R. . . . .	0 4	3 6	
" Oxalate, A.R. . . . .	0 5	4 6		Potassium Bichromate, A.R. . . . .	0 3	3 0	
" Sulphate, A.R. . . . .	0 2	2 0		" Bisulphate, Fused, A.R. . . . .	0 5	4 6	
" Sulphide, A.R. . . . .	0 2	1 6		" Bromide, A.R. . . . .	0 3	2 6	
" Thiocyanate, A.R. . . . .	0 6	6 0		" Carbonate, A.R. . . . .	0 4	4 0	
*Amyl Alcohol, A.R. . . . .	0 6	6 0		" Chlorate, A.R. . . . .	0 2	2 0	
* " Nitrite, A.R. . . . .	0 11	11 6		" Chloride, A.R. . . . .	0 3	2 6	
*Aniline, A.R. . . . .	0 5	5 0		" Chromate, A.R. . . . .	0 5	5 0	
Arsenious Acid, A.R. . . . .	0 3	3 0		" Cyanide, A.R. . . . .	3 0	—	
Barium Carbonate, A.R. . . . .	0 4	3 6		" Ferricyanide, A.R. . . . .	0 10	10 0	
" Chloride, A.R. . . . .	0 2	2 0		" Ferrocyanide, A.R. . . . .	0 5	5 0	
" Hydroxide, A.R. . . . .	0 4	3 6		" Hydroxide, A.R. . . . .	0 5	5 0	
" Nitrate, A.R. . . . .	0 3	2 6		" Iodide, A.R. . . . .	1 10	—	
*Benzene, A.R. . . . .	0 3	3 0		" Nitrate, A.R. . . . .	0 2	1 9	
*Bromine, A.R. . . . .	0 5	5 0		" Oxalate, A.R. . . . .	0 6	5 6	
Cadmium Sulphate, A.R. . . . .	1 4	18 0		" Permanganate, A.R. . . . .	0 4	3 6	
Calcium Carbonate, A.R. . . . .	0 4	3 6		" Thiocyanate, A.R. . . . .	0 9	8 6	
" Chloride, A.R. . . . .	0 2	1 6		Silver Nitrate, A.R. . . . .	4 0	—	
*Carbon Disulphide, A.R. . . . .	0 3	3 0		Sodium Acetate, A.R. . . . .	0 3	2 6	
*Chloroform, A.R. . . . .	0 9	8 6		" Bicarbonate, A.R. . . . .	—	0 10	
Chromic Acid, A.R. . . . .	0 9	9 0		" Bisulphate, A.R. . . . .	0 3	3 0	
Citric Acid, A.R. . . . .	0 4	4 0		" Borate (Borax), A.R. . . . .	0 2	1 0	
Copper Sulphate, A.R. . . . .	0 2	2 0		" Carbonate (Anhydrous), A.R. . . . .	0 2	2 0	
*Ether, 720, A.R. . . . .	0 4	4 0		" Chloride, A.R. . . . .	0 2	1 0	
*Ethyl Alcohol, A.R. . . . .	—	30 0		" Hydroxide, A.R. . . . .	0 4	4 0	
Ferric Chloride, A.R. . . . .	0 2	2 0		" Nitrite, A.R. . . . .	0 4	3 9	
Ferrous Ammonium Sulphate, A.R. . . . .	0 2	2 0		" Peroxide, A.R. . . . .	0 6	6 0	
" Sulphate, A.R. . . . .	0 2	1 0		" Phosphate, A.R. . . . .	0 2	2 0	
*Hydriodic Acid, A.R. . . . .	2 3	—		" Sulphide, A.R. . . . .	0 3	3 0	
*Hydrochloric Acid, A.R. . . . .	—	0 10		" Thiosulphate, A.R. . . . .	0 2	1 9	
*Hydrofluoric Acid, A.R. . . . .	0 8	8 0		Stannous Chloride, A.R. . . . .	0 6	6 0	
Iodic Acid, A.R. . . . .	4 0	—		*Sulphuric Acid, 1.84, A.R. . . . .	—	1 2	
Iodine Resub, A.R. . . . .	2 4	—		Uranium Acetate, A.R. . . . .	3 0	—	
Lead Acetate, A.R. . . . .	0 2	2 3		" Nitrate, A.R. . . . .	2 0	—	

### STANDARD SOLUTIONS FOR VOLUMETRIC ANALYSIS.

Each solution is carefully tested and may be relied on as accurate.

NAME OF CHEMICAL.	Per litre. s. d.	REMARKS.	NAME OF CHEMICAL.	Per litre. s. d.	REMARKS.
Acid Hydrochloric N/1 (Normal) . . . . .	—	3 0	Ammonia N/10 (Decinormal) . . . . .	—	3 0
" Hydrochloric N/5 . . . . .	—	3 0	" (100 septems contain 1 grain NH <sub>3</sub> ) . . . . .	—	3 0
" Hydrochloric N/10 (Decinormal) . . . . .	—	3 0	Ammonium Thiocyanate N/10 (Decinormal) . . . . .	—	3 0
" Nitric N/1 (Normal) . . . . .	—	3 0	Barium Chloride 1 c.c.=0.01 g. SO <sub>3</sub> . . . . .	—	4 6
" Nitric N/2 . . . . .	—	3 0	" Hydroxide N/5 . . . . .	—	3 0
" Nitric N/5 . . . . .	—	3 0	" Hydroxide N/10 (Decinormal) . . . . .	—	3 0
" Nitric N/10 (Decinormal) . . . . .	—	3 0	Fehling's Solution 10 c.c.=0.05 g. glucose (supplied in two solutions) . . . . .	—	12 0
" Oxalic N/1 (Normal) . . . . .	—	3 0	Gerrard's Solution (for use with Fehling's Solution) . . . . .	—	3 0
" Oxalic N/10 (Decinormal) . . . . .	—	3 0	Hydroxylamine Hydrochloride N/2 (Alcoholic Meth.) . . . . .	—	12 0
" Sulphuric N/1 (Normal) . . . . .	—	3 0	Indigo Sulphate 1 c.c.=0.0001 g. KNO <sub>3</sub> . . . . .	—	3 0
" Sulphuric N/2 . . . . .	—	3 0	Iodine N/1 (Normal) . . . . .	—	26 0
" Sulphuric N/5 . . . . .	—	3 0	" N/10 (Decinormal) . . . . .	—	5 0
" Sulphuric N/10 (Decinormal) . . . . .	—	3 0			
" Sulphuric (25 septems=1 grain NH <sub>3</sub> ) . . . . .	—	3 0			
Ammonia N/1 (Normal) . . . . .	—	3 0			
" N/2 . . . . .	—	3 0			
" N/5 . . . . .	—	3 0			

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NAME OF CHEMICAL.	Per litre. s. d.	REMARKS.
Iodine Hubb's, 2 Solutions .. .. .	40 0	
" Wij's .. .. .	12 0	
Pavy-Fehling's Solution 100 c.c.=0.05 g. glucose	7 6	
Potassium Carbonate N/1 (Normal) ..	4 6	
" Carbonate N/10 (Decinormal) ..	3 6	
" Dichromate N/1 (Normal) ..	3 6	
" Dichromate N/10 (Decinormal) ..	3 6	
" Hydroxide (Alcoholic) N/1 (Normal) ..	54 0	
" Hydroxide (Alcoholic) N/2 ..	54 0	
" Hydroxide (Alcoholic) N/10 (Decinormal) ..	52 0	
" Hydroxide (Alcoholic Meth.) N/1 (Normal) ..	9 6	
" Hydroxide (Alcoholic Meth.) N/2 ..	9 6	
" Hydroxide (Alcoholic Meth.) N/10 (Decinormal) ..	9 6	
" Nitrate N/1 (Normal) ..	3 0	
" Nitrate N/10 (Decinormal) ..	3 0	
" Nitrate N/100 ..	3 0	
" Nitrate N/1000 ..	3 0	
" Permanganate N/10 (Decinormal) ..	3 6	
" Thiocyanate N/10 (Decinormal) ..	3 6	
Silver Nitrate N/10 ..	7 0	
Sodium Arsenite N/10 ..	4 6	
" Carbonate N/10 ..	3 0	
" Carbonate N/1 ..	3 0	
" Chloride N/10 ..	3 0	
" Hydroxide N/1 ..	4 6	
" Hydroxide N/2 ..	4 6	
" Hydroxide N/5 ..	4 0	
" Hydroxide N/10 ..	4 0	
" Hydroxide N/20 ..	4 0	
" Hydroxide, for Cheese Making 1 c.c.=0.01 g. Lactic Acid	4 0	
" Thiosulphate N/10 (Decinormal) ..	4 0	
Uranium Acetate 1 c.c.=0.005 g. P <sub>2</sub> O <sub>5</sub>	11 0	
" Nitrate 1 c.c.=0.005 g. P <sub>2</sub> O <sub>5</sub>	11 0	

Standard Solutions for Water Analysis.

NAME OF CHEMICAL.	Per litre.
Ammonium Chloride 1 c.c. = 1mg. NH <sub>3</sub> .. .. .	3 0
Calcium Chloride (Wanklyn) 1 c.c. = 1 mg. CaCO <sub>3</sub> .. .. .	3 0
Potassium Nitrate 1 c.c.=1 mg. N ..	3 0
" Permanganate 1 c.c.=0.01 mg. O ..	3 0
Silver Nitrate 1 c.c.=1 mg. Cl ..	5 0
Soap Solution (Wanklyn) 1 c.c.=1 mg. CaCO <sub>3</sub> .. .. .	7 6

Reagents for Water Analysis.

NAME OF CHEMICAL.	Per lb.
Alkaline Permanganate Solution ..	2 6
Metaphenylene-diamine Solution 0.5% ..	1 6
Nessler's Solution ..	5 0
Phenoldisulphonic Acid Solution ..	5 6
Potassium Chromate Solution (free from Cl.) .. .. .	1 9

Standardised Solutions for Urine Analysis.

NAME OF CHEMICAL.	Per litre.
Benedict's Solution 25 c.c.=0.05 g. glucose .. .. .	14 0
Fehling's Solution 10 c.c.=0.05 g. glucose .. .. .	12 0
Gerrard's Solution (for use with Fehling's Solution) .. .. .	3 0
Pavy-Fehling's Solution 100 c.c.=0.05 g. glucose .. .. .	7 6
Purdy-Fehling's Solution 34 c.c.=0.20 g. glucose .. .. .	7 6
Potassium Permanganate N/20 1 c.c.=0.00375 g. Uric Acid .. .. .	6 0

Reagents for Urine Analysis.

NAME OF CHEMICAL.	Per lb. s. d.	REMARKS.
Benedict's Reagent (for Sugar) ..	6 0	
Crismmer's Reagent (for Sugar) ..	1 6	
Ehrlich's Sulphanilic Acid Solution ..	2 6	
Esbach's Solution (for Albumen) ..	2 3	
Fischer's Phenylhydrazine Solution (for Sugar) .. .. .	7 6	
*Millon's Reagent .. .. .	8 0	
Nylander's Reagent (for Sugar) ..	3 0	
Picric Acid Solution .. .. .	2 6	
Pollacci's Reagent (for Albumen) ..	3 0	
*Sodium Hypobromite Solution (freshly prepared) .. .. .	6 0	
" Hypobromite, two Solutions ..	7 0	
" Nitroprusside Solution, 1% ..	3 0	
" Nitroprusside Solution, 40% ..	—	2/6 per oz.
Tincture of Guaiacum (freshly prepared) .. .. .	—	1/6 per oz.

Reagents for Gas Analysis.

NAME OF CHEMICAL.	Per lb. s. d.
Cuprous Chloride Solution, Ammoniacal (This solution must be mixed with one-third of its volume of solution of ammonia (sp. gr. 0.91) immediately before use.)	4 6
Cuprous Chloride Solution, with Hydrochloric Acid .. .. .	4 6
Potassium Hydroxide Solution ..	3 0
" Pyrogallate Solution .. .. .	6 0
Sodium Pyrogallate Solution .. .. .	6 0

Indicators in Solution.

NAME OF CHEMICAL.	Per oz. s. d.	Per lb. s. d.
Azolitmin .. .. .	1 0	—
Cochineal .. .. .	0 6	4 0
Congo Red .. .. .	0 6	5 0
Corallin .. .. .	0 4	2 6
Lacmoid .. .. .	1 0	—
Litmus .. .. .	0 7	6 0
Methyl Orange .. .. .	0 6	4 0
Neutral Red .. .. .	1 0	—
Phenacetolin .. .. .	1 2	15 0
Phenolphthalein .. .. .	1 0	—
Turmeric .. .. .	1 3	—

Microscopic Stains (Dry). Special for Bacteriological Work.

NAME OF CHEMICAL.	Per 5 grm. Tube. s. d.	Per 10 grm. Tube. s. d.	Per 25 grm. Tube. s. d.	REMARKS.
Azur I. .. .. .	3 0	5 10	11 6	
" II. .. .. .	2 0	3 10	7 6	
" II. Eosin .. .. .	5 0	9 10	19 6	
Benzopurpurine .. .. .	2 0	3 9	8 0	
Bismarck Brown .. .. .	1 0	1 9	3 9	
Brilliant Green .. .. .	2 0	3 9	—	
Carmalum .. .. .	2 0	3 6	8 0	
Carmine .. .. .	1 1	2 1	4 0	
" Ammonia .. .. .	1 9	3 5	6 8	
Chrysoidine .. .. .	1 3	2 3	4 9	
Congo Red .. .. .	0 10	1 6	2 10	
Corallin .. .. .	1 3	2 3	4 9	
Crystal Violet .. .. .	2 0	3 9	8 0	
Dahlia Violet .. .. .	1 6	2 9	6 0	
Eosin, Soluble in Water, Yellow Shade .. .. .	1 3	2 4	4 6	
" Soluble in Spirit .. .. .	1 6	2 10	5 6	
" Methylene Blue .. .. .	2 6	4 10	9 6	
Erythrosin .. .. .	2 0	3 10	7 6	
Fluorescein .. .. .	1 3	2 4	4 6	
Fuchsin, Crystals .. .. .	1 0	1 11	3 8	
" Acid .. .. .	1 0	1 11	3 8	
Gentian Violet .. .. .	1 3	2 3	4 9	
Giemsa Stain (Powder) .. .. .	4 6	8 10	17 6	
Haemalum .. .. .	1 3	2 3	4 9	
Haematein .. .. .	7 9	15 0	—	
Haematoxylin .. .. .	2 0	3 10	7 6	
Jenner's Stain Powder .. .. .	2 6	4 10	9 6	

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NAME OF CHEMICAL.	Per 5 grm. Tube. s. d.	Per 10 grm. Tube. s. d.	Per 25 grm. Tube. s. d.	REMARKS.	NAME OF CHEMICAL.	25 c.c. s. d.	100 c.c. s. d.	250 c.c. s. d.	REMARKS.
Leishman's Stain (Wright)	8 0	14 6	—		Leishman's Stain (Wright's Modification)	3 9	10 6	25 0	
" (Romanowsky)	8 0	14 6	—		Löffler's Methylene Blue	1 3	3 0	6 9	
Magenta	1 9	3 3	6 9		Malachite Green	1 0	2 6	5 6	
Malachite Green	1 9	3 3	6 9		Methyl Blue	1 0	2 6	5 6	
Methyl Blue	1 3	2 3	4 9		Methylene Blue (Aqueous)	1 0	2 6	5 6	
Methylene Blue	1 6	2 9	6 0		" (Borax)	3 9	10 6	25 0	
" Green	1 6	2 9	6 0		" (Löffler's)	1 3	3 0	6 9	
" Violet	1 6	2 9	6 0		" (Saturated)	3 9	10 6	25 0	
Methyl Green	2 0	3 9	8 0		" (Alcoholic)	1 0	2 6	5 6	
" Violet	1 6	2 9	6 0		" (Mansen's)	1 0	2 6	5 6	
Neutral Red	2 6	4 6	9 6		Methyl Green	1 0	2 6	5 6	
Nigrosine	1 0	1 9	4 0		" Violet (Aqueous)	1 3	3 0	6 9	
Orange G.	1 3	2 3	4 3		" Violet (Saturated)	3 9	10 6	25 0	
Picrocarmine	4 0	7 6	—		" (Alcoholic)	1 0	2 6	5 6	
Rosaniline Hydrochloride	1 6	2 9	6 0		Neisser's Stain A	1 0	2 6	5 6	
Rosein	1 6	2 9	6 0		" B	1 0	2 6	5 6	
Rosolic Acid	1 3	2 3	4 6		Neutral Red	1 3	3 0	6 9	
Ruthenium Red	—	—	—	½ grm. 10/-	Nigrosine	1 0	2 6	5 6	
Safranin	1 6	2 9	6 0		Orange	1 0	2 6	5 6	
Scarlet R.	1 3	2 3	4 6		Picric Acid (Aqueous)	—	1 0	2 0	
Sudan III.	1 3	2 3	4 6		Picro-Aniline Blue	1 0	2 6	5 6	
Thionine	3 0	5 9	12 0		Picro-Carmine Ammonia	1 0	2 6	5 6	
Toluidine Blue	3 0	5 9	—		" Lithia	1 0	2 6	5 6	
Vesuvium Blue	4 9	9 4	18 6		" (Ranvier)	1 0	2 6	5 6	
Victoria Blue	1 3	2 3	4 9		Picro-Fuchsin	1 0	2 6	5 6	
Water Blue	1 3	2 3	4 9		Picro-Nigrosine	1 0	2 6	5 6	

Stains in Solution for Bacteriological Work, &c.

NAME OF CHEMICAL.	25 c.c. s. d.	100 c.c. s. d.	250 c.c. s. d.	REMARKS.
Alum Carmine (Grenacher)	0 10	2 3	5 3	
Ammonia Carmine (Beale's)	1 0	2 6	5 6	
" Picrocarmine	0 10	2 0	4 6	
Aniline Green	1 0	2 6	5 6	
" Gentian Violet	1 0	2 6	5 6	
Babe's Solution	0 10	2 0	4 6	
Benzopurpurin	1 0	2 6	5 6	
Biondi-Ehrlich-Heidenhain's Triple Stain	1 6	5 0	—	
Bismarck Brown (Aqueous)	1 0	2 6	5 6	
" (Alcoholic)	1 6	4 6	—	
Borax-Carmine (Grenacher's)	0 10	2 0	4 6	
Carbol-Fuchsin (Ziehl Neelsen's)	1 0	2 6	5 6	
" Gentian Violet	1 0	2 6	5 6	
" Methylene Blue	1 0	2 6	5 6	
" Thionine	1 0	2 6	5 6	
Carmalum (Mayer)	1 0	2 6	5 6	
Dahlia Violet (Aqueous)	1 0	2 6	5 6	
" (Acid)	1 6	4 6	—	
Ehrlich's Triacid Stain	1 6	3 9	9 0	
" Triple Stain	1 9	5 0	11 0	
Eosin (Aqueous)	1 6	4 6	—	
" (Alcoholic)	2 6	—	—	
" (Alcoholic Saturated)	3 0	—	—	
Erythrosin	1 3	4 0	—	
Fluorescein (Saturated Alcoholic)	3 9	10 0	25 0	
Fuchsin (Aqueous)	1 0	2 6	5 6	
" (Saturated Alcoholic)	3 9	10 0	25 0	
Gabbett's Stain, No. 1	1 0	2 6	5 6	
" No. 2	1 0	2 6	5 6	
Gentian Violet (Aqueous)	1 0	2 6	5 6	
" (Saturated)	3 9	10 0	25 0	
" (Alcoholic)	3 9	10 0	25 0	
Gibbe's Magenta	2 0	5 0	11 0	
" Double Stain	2 0	5 0	11 0	
Giemsa's Stain	2 6	7 0	16 0	
Gower's Fluid	1 0	2 6	5 6	
Gram's Iodine	—	1 6	3 0	
Hayem's Fluid	1 0	2 6	5 6	
Haemalum (Mayer)	1 0	2 6	5 6	
Haematoxylin (Delafield's)	1 0	2 6	5 6	
" (Ehrlich's)	2 0	5 0	11 0	
" (Heidenhain's, in Two Solutions)	1 0	2 6	5 6	
" (Kleinenberg's)	3 0	8 0	19 0	
" (Weigert)	1 3	3 0	6 9	
Jenner's Stain, for Blood	3 9	10 6	25 0	
Kuhne's Solution	2 0	5 0	11 0	

NAME OF CHEMICAL.	25 c.c. s. d.	100 c.c. s. d.	250 c.c. s. d.	REMARKS.
Leishman's Stain (Wright's Modification)	3 9	10 6	25 0	
Löffler's Methylene Blue	1 3	3 0	6 9	
Malachite Green	1 0	2 6	5 6	
Methyl Blue	1 0	2 6	5 6	
Methylene Blue (Aqueous)	1 0	2 6	5 6	
" (Borax)	3 9	10 6	25 0	
" (Löffler's)	1 3	3 0	6 9	
" (Saturated)	3 9	10 6	25 0	
" (Alcoholic)	1 0	2 6	5 6	
" (Mansen's)	1 0	2 6	5 6	
Methyl Green	1 0	2 6	5 6	
" Violet (Aqueous)	1 3	3 0	6 9	
" Violet (Saturated)	3 9	10 6	25 0	
" (Alcoholic)	1 0	2 6	5 6	
Neisser's Stain A	1 0	2 6	5 6	
" B	1 0	2 6	5 6	
Neutral Red	1 3	3 0	6 9	
Nigrosine	1 0	2 6	5 6	
Orange	1 0	2 6	5 6	
Picric Acid (Aqueous)	—	1 0	2 0	
Picro-Aniline Blue	1 0	2 6	5 6	
Picro-Carmine Ammonia	1 0	2 6	5 6	
" Lithia	1 0	2 6	5 6	
" (Ranvier)	1 0	2 6	5 6	
Picro-Fuchsin	1 0	2 6	5 6	
Picro-Nigrosine	1 0	2 6	5 6	
Romanowsky's Stain (Leishman's modification)	3 9	10 6	—	
Safranin	1 6	3 7	8 0	
Schultz Solution	1 6	3 0	7 0	
Thionine Carbol	1 0	3 0	5 6	
Toison's Solution	1 0	2 6	5 0	
Van Ermengem's Stain A	3 9	10 6	25 0	
" B	1 0	2 6	5 0	
" C	1 0	2 6	5 0	
Victoria Blue	1 9	4 6	10 6	
Wedl's Orseille Solution	1 0	2 6	5 6	

Hardening, Fixing and Clearing Solutions.

NAME OF CHEMICAL.	25 c.c. s. d.	100 c.c. s. d.	500 c.c. s. d.	REMARKS.
* Alcohol Absolute	—	—	27 0	
" and Acetic Acid	2 0	5 0	20 0	
Copper Acetate	1 0	2 6	10 0	
Corrosive Sublimate 5% (Acid)	—	1 6	4 6	
" (Alcoholic)	3 0	7 6	28 0	
Chloral Hydrate, 75%	1 0	3 0	12 0	
Eau-de-Javelle	—	1 0	3 0	
Eau-de-Labarraque	—	1 0	3 0	
Ebner's Fluid	3 0	7 6	28 0	
Ericki's Fluid	—	1 6	4 6	
Fleming's Solution	3 0	7 6	28 0	
Fol's Solution	1 0	2 6	9 0	
Klein's Fluid	1 0	2 6	9 0	
Muller's Fluid	—	1 2	3 0	
" and Alcohol	1 0	2 6	10 0	
Oil of Bergamot	3 0	8 0	—	
" Cedar Wood (for immersion)	1 9	4 6	18 0	
" Cloves	1 9	4 6	—	
" Origanum	1 0	2 0	—	
Osmic Acid, 1%	6 0	—	—	
Perenyi's Fluid	1 0	2 6	9 0	
Picro-Sulphuric Acid (Kleinenberg's)	—	1 0	3 0	
Rabl's Fluid	—	1 3	4 0	
* Xylol	—	1 0	2 6	

Aniline Colours not intended for Microscopic Work.

NAME OF CHEMICAL.	Per oz. s. d.	Per lb. s. d.	REMARKS.
Alizarine Red	2 6	—	
" Blue	3 0	—	
Auramine	1 6	—	
Aurantia	2 0	—	

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F. E. BECKER & CO., NIVOC HOUSE, HATTON WALL, LONDON, E.C.1. 355

W. & J. GEORGE (LONDON), Ltd., PROPRIETORS.

Minerals for Analysis.				NAME OF CHEMICAL.		Per oz.	Per lb.	REMARKS.
NAME OF CHEMICAL.	Per oz.	Per lb.	REMARKS.	s. d.	s. d.	s. d.	s. d.	
Alabaster .. .. .	—	2 6		Rock Crystal .. .. .	—	2 0		
Alumstone .. .. .	—	2 0		Rock Salt, Coml. .. .. .	—	0 3		
Anthracite .. .. .	—	0 6		"    Transparent .. .. .	—	2 0		
Apatite .. .. .	—	1 6		Rutile .. .. .	—	2 6		
Aragonite .. .. .	—	2 6		Selenite .. .. .	—	2 0		
Arsenical Pyrites .. .. .	—	2 0		Serpentine .. .. .	—	0 9		
Barytes Carbonate .. .. .	—	0 6		Talc .. .. .	—	1 3		
"    Sulphate .. .. .	—	0 6		Tinstone .. .. .	—	2 6		
Beauxite .. .. .	—	1 2		Tin Pyrites .. .. .	—	6 0		
Blende .. .. .	—	1 6		Topaz .. .. .	—	5 0		
Calamine .. .. .	—	1 6		Zinc Blende .. .. .	—	1 6		
Calcite .. .. .	—	1 0						
Calcspar .. .. .	—	1 0						
Cannel Coal .. .. .	—	0 6						
Cerussite .. .. .	—	3 6						
Chrome Iron Ore .. .. .	—	1 0						
Cinnabar .. .. .	0 10	8 0						
Copper Pyrites .. .. .	—	1 0						
Cryolite .. .. .	—	2 6						
Dolomite .. .. .	—	1 0						
Emery .. .. .	—	1 0						
Felspar .. .. .	—	0 9						
Fluospar .. .. .	—	0 6						
Galena .. .. .	—	1 3						
Gold Ore .. .. .	—	2 0						
Graphite (Ceylon) .. .. .	—	2 0						
Gypsum .. .. .	—	0 9						
Haematite Red .. .. .	—	1 3						
Iceland Spar .. .. .	0 8	6 0						
Ilmenite .. .. .	—	3 0						
Iron Pyrites .. .. .	—	1 0						
Lapis Lazuli (Chili) .. .. .	0 6	5 0						
Lepidolite .. .. .	—	2 0						
Limonite .. .. .	—	1 6						
Magnesite .. .. .	—	1 3						
Magnetite Common .. .. .	—	1 3						
Malachite .. .. .	—	4 0						
Monazite (Sand) .. .. .	—	4 0						
Nickel, Arsenical .. .. .	0 8	7 0						
Petalite .. .. .	—	2 0						
Pitchblende .. .. .	6 0	—						
Pyrolusite .. .. .	—	1 0						
Quartz .. .. .	—	1 0						

Alloys.			
NAME OF CHEMICAL.	Per oz.	Per lb.	REMARKS.
	s. d.	s. d.	
Devada's Alloy .. .. .	1 0	12 0	
Wood's Metal .. .. .	1 0	13 0	
Rose's Metal .. .. .	1 0	14 0	
Aluminium Bronze .. .. .	—	8 0	
Aluminium Zinc .. .. .	—	7 6	
Arsenic Iron .. .. .	—	5 6	
"    Lead .. .. .	—	5 0	
"    Zinc .. .. .	—	5 6	
Bell Metal .. .. .	—	10 6	
Britannia Metal .. .. .	—	10 0	
Brass .. .. .	—	3 0	
Bronze .. .. .	—	6 0	
Chrome Nickel .. .. .	—	14 0	
Copper Aluminium .. .. .	—	7 6	
"    Iron Manganese .. .. .	—	6 6	
"    Magnesium .. .. .	—	11 0	
"    Zinc .. .. .	—	7 0	
Delta Metal .. .. .	—	7 6	
Ferro Chromium .. .. .	—	3 6	
"    Manganese .. .. .	—	3 6	
German Silver .. .. .	—	6 6	
Gun Metal .. .. .	—	6 6	
Magnalium Metal .. .. .	—	12 0	
Magnolia Metal .. .. .	—	10 6	
Manganese Bronze .. .. .	—	6 6	
"    Nickel .. .. .	—	8 0	
Muntz Metal .. .. .	—	7 6	
Nickel Silver .. .. .	—	7 0	
Pewter .. .. .	—	10 6	
Phosphor Bronze .. .. .	—	7 0	
Type Metal .. .. .	—	5 6	

**PRICES.**

**CONDITIONS OF SALE.**

It will be understood that the prices given in this list are without engagement. Customers will be given the benefit of any subsequent reductions.

Quantities for ½ lb. are charged at the lb. rate; smaller quantities at the ounce rate (unless otherwise stated).

**LARGE QUANTITIES.**

We are prepared to quote special prices for large quantities.

**ORDERING.**

When ordering please always state quality required—if not stated, we shall in all cases send chemicals of the best quality.

**DANGEROUS AND INFLAMMABLE GOODS.**

Phosphorus, Potassium, Sodium, Mineral Acids, Bromine, Carbon Bisulphide, Alcohols, Ethers (and other substances which the Carriers may refuse to take under ordinary conditions) are only sent in accordance with the Railway and Shipping Regulations in force for the time being, and we cannot hold ourselves responsible for any leakage or damage which may take place after consignments have been delivered to the Carriers.

Railway Companies only accept dangerous and inflammable goods on specified days, and, as a rule, take a longer time to deliver than in the case of ordinary chemicals. **As the minimum carriage charge for dangerous goods is out of all proportion to the value of small quantities, we strongly advise clients to order as large a consignment as possible.** If only small quantities are required, we advise clients to order from a local source. It must be distinctly understood that on no account can we agree to pay carriage on dangerous goods, and quotations, orders, etc., referring to this list are only accepted on this understanding. **Most of the general chemicals coming under the dangerous clause are shown marked with an asterisk.**

**EMPTY PACKAGES.**

Full value is allowed when returned carriage paid within 14 days from date of invoice. This condition only applies to packages originally supplied by us. Such containers as Potash, Carbolic Acid, Fluoric Acid, Oil Bottles, and Winchester Quarts minus their stoppers, are valueless, and cannot be credited.

**SPECIAL CHEMICALS.**

We invite inquiries for Chemicals, etc., not included in this list. Prices on application.

**THE PRICES IN THIS LIST CANCEL ALL OF AN EARLIER DATE.**

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→ 23rd EDITION. ←

FOR ALL APPARATUS FOR TEACHING:

**ELEMENTARY AND  
PRACTICAL PHYSICS,  
MECHANICS,  
ELECTRICITY,**

**MAGNETISM,  
SOUND,  
LIGHT,  
HEAT, ETC.**

# USEFUL STATISTICS

## TRUE CHEMICAL NAMES AND FORMULÆ OF COMMON CHEMICALS.

Common Name.	Formula.	Chemical Name.	Common Name.	Formula.	Chemical Name.
Alum . . .	$K_2SO_4 \cdot Al_2(SO_4)_3$	Potassium aluminium sulphate	Orpiment . .	$As_2S_3$	Arsenic trisulphide
Alumina . . .	$Al_2O_3$	Aluminium oxide	Pearl ash . .	$K_2CO_3$	Potassium carbonate
Aqua fortis . .	$HNO_3$	Nitric acid	Plaster of Paris	$CaSO_4$	Calcium sulphate
Aspirin . . .		Acetyl - salicylic acid	Plumbago . .	$C$	Graphite
Baryta . . .	$BaO$	Barium oxide	Precipitated chalk	$CaCO_3$	Calcium carbonate
Blue vitriol . .	$CuSO_4 \cdot 5H_2O$	Copper sulphate	Prussian blue . .	$Fe_4[Fe(CN)_6]_3$	Ferric ferrocyanide
Bone ash . . .	—	Impure calcium phosphate	Prussic acid . .	$HCN$	Hydrocyanic acid
Boracic acid . .	$H_3BO_3$	Boric acid	Quick lime . .	$CaO$	Calcium oxide
Brimstone . . .	$S$	Sulphur	Quinol . . .	$\beta-C_6H_4(OH)_2$	Hydroquinone
Burnt lime . . .	$CaO$	Calcium oxide	Realgar . . .	$As_2S_2$	Arsenic disulphide
Calomel . . .	$Hg_2Cl_2$	Mercurous chloride	Red lead . . .	$Pb_3O_4$	Lead tetroxide
Carbolic acid . .	$C_6H_5OH$	Phenol	Red prussiate of potash . . .	$K_3Fe(CN)_6$	Potassium ferricyanide
Carborundum . .	$SiC$	Silicon carbide	Rochelle salt . .	$KNaC_4H_4O_6 \cdot 4H_2O$	Potassium sodium tartrate
Caustic potash .	$KOH$	Potassium hydroxide	Sal ammoniac . .	$NH_4Cl$	Ammonium chloride
Caustic soda . .	$NaOH$	Sodium hydroxide	Salt . . . . .	$NaCl$	Sodium chloride
Chalk . . . . .	$CaCO_3$	Calcium carbonate	Salt of lemon	$KHC_2O_4 \cdot H_2O$	Potassium hydrogen oxalate
Chrome alum . .	$K_2SO_4 \cdot Cr_2(SO_4)_3$	Potassium chromium sulphate	Salt of sorrel		
Corrosive sublimate	$HgCl_2$	Mercuric chloride	Saltpetre . . .	$KNO_3$	Potassium nitrate
Cream of tartar	$KHC_4H_4O_6$	Potassium hydrogen tartrate	Silica . . . . .	$SiO_2$	Silicon dioxide
Dextrose . . . .	$C_6H_{12}O_6$	Glucose	Slaked lime . .	$Ca(OH)_2$	Calcium hydroxide
Epsom salts . . .	$MgSO_4 \cdot 7H_2O$	Magnesium sulphate	Soda crystals . .	$Na_2CO_3 \cdot 10H_2O$	Sodium carbonate
Fluorspar . . . .	$CaF_2$	Calcium fluoride	Sodium hyposulphite	$Na_2S_2O_5 \cdot 5H_2O$	Sodium thiosulphate
Formalin . . . .	$H \cdot CHO$	40% aqueous solution of formaldehyde	Soluble glass . .	$Na_2SiO_3$	Sodium silicate
Glauber's salt . .	$Na_2SO_4 \cdot 10H_2O$	Sodium sulphate	Sugar of lead . .	$Pb(CH_3COO)_2 \cdot 3H_2O$	Lead acetate
Grape sugar . . .	$C_6H_{12}O_6$	Glucose	Tartar emetic . .	$K(SbO)_4C_4H_4O_6$	Potassium antimonyl tartrate
Green vitriol . .	$FeSO_4 \cdot 7H_2O$	Ferrous sulphate	Turnbull's blue .	$Fe_3[Fe(CN)_6]_2$	Ferrous ferricyanide
Hypo . . . . .	$Na_2S_2O_5 \cdot 5H_2O$	Sodium thiosulphate	Verdigris . . .	$2Cu(C_2H_3O_2)_2 + CuO$	Basic copper acetate
Litharge . . . .	$PbO$	Lead monoxide	Vermilion . . .	$HgS$	Red mercuric sulphide
Marble . . . . .	$CaCO_3$	Calcium carbonate	Washing soda . .	$Na_2CO_3 \cdot 10H_2O$	Sodium carbonate
Microcosmic salt	$Na(NH_4)HPO_4$	Sodium ammonium hydrogen phosphate	Water glass . . .	—	Aqueous solution of sodium silicates
Minium . . . . .	$Pb_3O_4$	Lead tetroxide	White lead . . .	$2PbCO_3 + Pb(OH)_2$	Basic lead carbonate
Muriate of ammonia	$NH_4Cl$	Ammonium chloride	Wood alcohol . .	$CH_3OH$	Methyl alcohol
Muriatic acid . .	$HCl$	Hydrochloric acid	Yellow prussiate of potash	$K_4Fe(CN)_6 \cdot 3H_2O$	Potassium ferrocyanide
Nitre . . . . .	$KNO_3$	Potassium nitrate	Zinc white . . .	$ZnO$	Zinc oxide

## HYDROMETERS

### TO CONVERT :

- (1) Degrees of Twaddell's hydrometer into specific gravity (water = 1000)—multiply by 5 and add 1000.
- (2) Specific Gravity (water = 1000) into degrees of Twaddell's hydrometer—subtract 1000 and divide by 5.
- (3) Specific Gravity (air = 1) to specific gravity (H = 1)—multiply by 14.483.
- (4) Specific Gravity (H = 1) to specific gravity (air = 1)—multiply by 0.06926.

# USEFUL STATISTICS

(See also previous page.)

## INTERNATIONAL ATOMIC WEIGHTS 1921.

Name.	Symbol.	Atomic Weight.	Name.	Symbol.	Atomic Weight.
Aluminium . . . . .	Al	27.1	Molybdenum . . . . .	Mo	96.0
Antimony . . . . .	Sb	120.2	Neodymium . . . . .	Nd	144.3
*Argon . . . . .	A	39.9	Neon . . . . .	Ne	20.2
Arsenic . . . . .	As	74.96	Nickel . . . . .	Ni	58.68
Barium . . . . .	Ba	137.37	Niton . . . . .	Nt	222.4
Bismuth . . . . .	Bi	208.0	*Nitrogen . . . . .	N	14.008
*Boron . . . . .	B	10.9	Osmium . . . . .	Os	190.9
Bromine . . . . .	Br	79.92	Oxygen . . . . .	O	16.00
Cadmium . . . . .	Cd	112.40	Palladium . . . . .	Pd	106.7
Cæsium . . . . .	Cs	132.81	Phosphorus . . . . .	P	31.04
Calcium . . . . .	Ca	40.07	Platinum . . . . .	Pt	195.2
*Carbon . . . . .	C	12.00	Potassium . . . . .	K	39.10
Cerium . . . . .	Ce	140.25	Praseodymium . . . . .	Pr	140.9
Chlorine . . . . .	Cl	35.46	Radium . . . . .	Ra	226.0
Chromium . . . . .	Cr	52.0	Rhodium . . . . .	Rh	102.9
Cobalt . . . . .	Co	58.97	Rubidium . . . . .	Rb	85.45
Columbium . . . . .	Cb	93.1	Ruthenium . . . . .	Ru	101.7
Copper . . . . .	Cu	63.57	Samarium . . . . .	Sa	150.4
Dysprosium . . . . .	Dy	162.5	Scandium . . . . .	Sc	45.1
Erbium . . . . .	Er	167.7	Selenium . . . . .	Se	79.2
Europium . . . . .	Eu	152.0	Silicon . . . . .	Si	28.3
Fluorine . . . . .	F	19.0	Silver . . . . .	Ag	107.88
Gadolinium . . . . .	Gd	157.3	Sodium . . . . .	Na	23.00
*Gallium . . . . .	Ga	70.1	Strontium . . . . .	Sr	87.63
Germanium . . . . .	Ge	72.5	Sulphur . . . . .	S	32.06
Glucinum . . . . .	Gl	9.1	Tantalum . . . . .	Ta	181.5
Gold . . . . .	Au	197.2	Tellurium . . . . .	Te	127.5
Helium . . . . .	He	4.00	Terbium . . . . .	Tb	159.2
Holmium . . . . .	Ho	163.5	Thallium . . . . .	Tl	204.0
Hydrogen . . . . .	H	1.008	*Thorium . . . . .	Th	232.15
Indium . . . . .	In	114.8	Thulium . . . . .	Tm	168.5
Iodine . . . . .	I	126.92	Tin . . . . .	Sn	118.7
Iridium . . . . .	Ir	193.1	Titanium . . . . .	Ti	48.1
Iron . . . . .	Fe	55.84	Tungsten . . . . .	W	184.0
Krypton . . . . .	Kr	82.92	Uranium . . . . .	U	238.2
Lanthanum . . . . .	La	139.0	Vanadium . . . . .	V	51.0
Lead . . . . .	Pb	207.20	Xenon . . . . .	Xe	130.2
Lithium . . . . .	Li	6.94	Ytterbium (Neoytterbium)	Yb	173.5
Lutecium . . . . .	Lu	175.0	*Yttrium . . . . .	Yt	89.33
Magnesium . . . . .	Mg	24.32	Zinc . . . . .	Zn	65.37
Manganese . . . . .	Mn	54.93	Zirconium . . . . .	Zr	90.6
Mercury . . . . .	Hg	200.6			

### SPECIFIC GRAVITIES, BOILING POINTS, AND FREEZING POINTS OF PURE LIQUIDS.

	Sp. G.	°C.	Boiling Point.	Freezing Point.
Acid acetic (absolute) . . . . .	1.0497	20	118.5	16.5
Acetone . . . . .	0.7920	20	56.5	-95
Alcohol amyl (Iso) . . . . .	0.8148	14	131	-117
"    ethyl . . . . .	0.7941	15/15	78.4	-112
"    methyl . . . . .	0.7965	15/15	64.5	-95
Benzene . . . . .	0.885	15	80.4	5.4
Carbon disulphide . . . . .	1.268	15	46	-108.6
Chloroform . . . . .	1.500	15	61.2	-62
Ethyl ether . . . . .	0.7195	15	35	-112.6
Glycerol . . . . .	1.2665	15	293	17
Toluene . . . . .	0.871	15	110.3	-92.4
Xylene meta . . . . .	0.869	15/15	139	-54.8

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