AN

ILLUSTRATED

DESCRIPTIVE CATALOGUE

OF

OPTICAL, MATHEMATICAL, PHILOSOPHICAL,

PHOTOGRAPHIC

AND

STANDARD

METEOROLOGICAL

INSTRUMENTS,

MANUFACTURED AND SOLD BY

NEGRETTI AND ZAMBRA,

OPTICIANS AND METEOROLOGICAL INSTRUMENT
MAKERS TO

HER MAJESTY THE QUEEN, H.R.H. THE PRINCE CONSORT,

THE ROYAL OBSERVATORY, GREENWICH;
THE ADMIRALTY; HON. BOARD OF ORDNANCE; BOARD OF TRADE; THE
BRITISH METEOROLOGICAL SOCIETY;
THE OBSERVATORIES, KEW, TORONTO, WASHINGTON, VICTORIA;
THE EAST INDIA GOVERNMENT;

PHOTOGRAPHERS TO THE CRYSTAL PALACE, SYDENHAM.

No. 1, HATTON GARDEN, 107, HOLBORN HILL,

ALSO,

59, CORNHILL,

LONDON, E.C.

PRICE TWO SHILLINGS AND SIXPENCE.

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CONTENTS.

ADDRESS.

THE constant enquiry for a list of the articles manufactured and sold by us, has compelled us to undertake the publication of the Third Edition of our Catalogue. In so doing, we have endeavoured to include every instrument and article likely to be required by the man of science, the student, or manufacturer.

A Table of Contents, referring to the pages where any section or class of apparatus will be found, and a copious general Index, giving the marginal number of each instrument, combined with upwards of five hundred Wood Engravings, will assist the reader in searching for any particular article.

Owing to our having removed to more extensive premises, we are now enabled to undertake the manufacture of the greater portion of the instruments sold by us, and being practically acquainted with every department of our business, we feel confident of being enabled to give satisfaction with any orders we may be entrusted to execute.

Our extensive and intimate connection with most of the first-class opticians on the continent, enables us to obtain early and correct

information respecting any new instruments manufactured by them, so that if any scientific novelty or apparatus constructed by any foreign optician should be required, we are in a position either to make or procure the same.

In the Meteorological Section will be found every instrument now in general use; many of these have been greatly improved by ourselves, and several of them have been invented and patented by us, and now rank pre-eminent among standard meteorological instruments.

The fact that we now supply Her Majesty the Queen, His Royal Highness the Prince Consort, the Royal Observatory, Greenwich, the Council and Members of the British Meteorological Society, the Kew Observatory, the Admiralty, the Board of Ordnance, the Board of Trade, the War Office, Her Majesty's Corps of Royal Engineers, all the Scientific Departments of Her Majesty's Government, the Indian Council, the Colonial Observatories, and the American, Brazilian, Spanish, and Portugese Governments, etc., etc., is in itself a sufficient guarantee for the quality of the instruments supplied by us; and having paid the greatest attention to this branch of our business, we can confidently state, that in point of accuracy, they will be found superior to any, an assertion fully endorsed by our receiving the only Prize Medal awarded for Meteorological Instruments at the Exhibition of 1851.

The Photographic Section contains all the apparatus now in use, but as fresh processes are daily brought out (a circumstance that will naturally arise in any new branch of science), we merely state that any new apparatus of practical utility that may be suggested, will at once be added to our stock, so that although some articles may not be enumerated in the list, they will nevertheless be obtainable at our establishment; and from our great experience as Photographers to the Crystal Palace, Sydenham, and opportunities we have for testing all lenses and apparatus at the above establishment, our customers may rest assured that their orders will be executed in a satisfactory manner.

The manufacture of Chemical Glass Apparatus forms one of the principal features of our establishment, where any kind of glass vessel can be procured; or if an instrument of novel construction is required, it can be had blown, on the premises, from either flint or Bohemian glass, at the shortest notice.

Explicit instructions should accompany orders as to the address, mode of conveyance, or shipment.

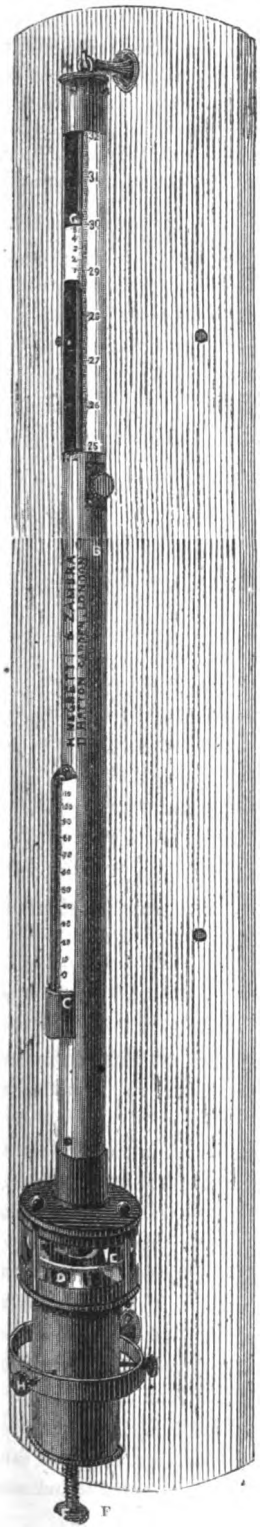
The greatest possible care being taken in packing apparatus and instruments to ensure safety in carriage, and none but experienced packers employed, under our own immediate superintendence, we cannot be responsible for any breakage or damage that may occur in transit by railway, ship, or other conveyance, after the goods leave our establishment; but having correspondents in nearly every part of the globe, we will, for a small extra charge, guarantee the safe transmission of instruments to any principal sea port.

Foreign orders must be accompanied by a remittance or order for payment in London.

A liberal discount allowed to merchants, shippers, or agents, on large orders.

NEGRETTI & ZAMBRA.

Fig. 1.



STANDARD

METEOROLOGICAL INSTRUMENTS.

1.—**Standard Barometer** (fig. 1), on Fortin's principle, reading from an ivory point in the cistern, to ensure a constant level—with mercury boiled in the tube. The barometer tube is enclosed and protected by a tube of brass extending throughout its whole length; the upper portion of the brass tube has two longitudinal openings opposite each other; on one side of the front opening is the barometrical scale of English inches, divided to show, by means of a vernier, $\frac{1}{500}$th of an inch; on the opposite side is sometimes divided a scale of French millimetres, reading also by a vernier to $\frac{1}{10}$th of a millimetre; the reservoir or cistern of the barometer is of glass, closed at bottom by means of a leather bag, acted upon by a thumb-screw passing through the bottom of an arrangement of brass work, by which it is protected.

As received by the observer, the barometer will consist of three parts, packed separately for safety in carriage, —1st, the barometer tube and cistern, filled with mercury; 2nd, the brass tube, with its divided scale and thermometer; and 3rd, a mahogany board, with bracket at top, and brass ring with three adjusting screws at bottom.

Directions for fixing the Barometer.—Having determined upon the position in which to place the instrument, fix the mahogany board as nearly vertical as possible; then screw the barometer tube and its cistern into the brass tube, and ascertain if it is perfect and free from air, in the following manner:—lower the screw at the bottom of cistern three or four turns, that the mercury in the tube, when held upright, may fall two or three inches from the top; then slightly incline the instrument from the vertical position, and if the mercury in striking the top elicit a sharp tap, the instrument is perfect. If the tap be dull, or not heard at all, there is air above the mercury, and must be driven into the cistern by *inverting the instrument, and gently tapping it with the hand.* Supposing the barometer to be in perfect condition, it is next suspended on the brass bracket, its cistern passing through the ring at bottom, and allowed to find its vertical position, after which it is firmly clamped by means of the three thumb-screws.

Before making an observation, the mercury in the cistern must be raised or lowered by means of the thumb-screw (F), until the ivory point and its reflected image are just in contact; the vernier is then moved by means of the milled head, until its lower termination just excludes the light from the top of the mercurial column; the reading is then taken by means of the scale on the limb and the vernier.

Price, ... £8 8 0

With Millimetre Scale (*extra*) 0 15 0

2.—**Standard Mountain Barometer** (fig. 71, page 21), on the same principle as fig. 1. This instrument is the only small portable mountain barometer made possessing all the essentials of a standard instrument. Its size is such, that for portability, will recommend it to those who have hitherto used the "Aneroid," in preference to mercurial barometers, the latter having been made so large that, in many instances, they have been dispensed with in favour of the "Aneroid," where for accurate observation they should have been employed.

Price, including Tripod Stand, which forms a Travelling Case for the Barometer £8 8 0

TABLE shewing Readings of the Barometer and corresponding Height in feet.

31	0	28	2.675	25	5.658	22	9.026
	170		2.864		5.869		9.267
	341		3.053		6.083		9.510
5	513	5	3.245	5	6.297	5	9.755
	687		3.438		6.514		10.002
30	862	27	3.633	24	6.733	21	10.253
	1.038		3.827		6.953		10.506
	1.215		4.025		7.175		10.760
5	1.394	5	4.223	5	7.400	5	11.018
	1.572		4.423		7.625		11.278
29	1.753	26	4.625	23	7.856	20	11.541
	1.935		4.828		8.085		11.805
	2.119		5.033		8.317		12.074
5	2.303	5	5.240	5	8.551	5	12.346
	2.489		5.448		8.787		12.620

3.—**Mountain Barometer** (Gay Lussac's), in brass frame, with attached thermometer, and leather travelling case (shown packed, fig. 72, page 21).

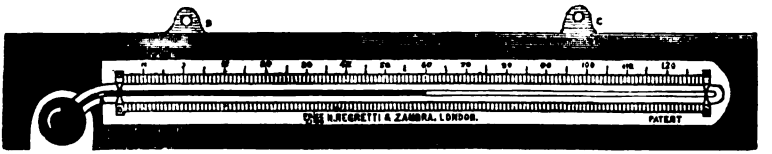
Price of Barometer		. . . . .	£6 6 0
Ditto	ditto	with Brass Tripod Stand	8 8 0
Ditto	ditto	superior finish ditto	10 10 0

4.—**Negretti and Zambra's Patent Self-Registering Maximum Thermometer,** THE ONLY INSTRUMENT OF THE KIND ADAPTED FOR TRANSMISSION TO INDIA AND THE COLONIES. (fig. 4.)

Previous to the Great Exhibition of 1851, all persons interested in meteorological observations were constantly annoyed by the inconvenience arising from the imperfect construction of Maximum Thermometers; and, although Messrs. Negretti and Zambra at that time exhibited one or two new forms of instruments, nothing new in *principle* was brought forward. A thermometer, old in principle, greatly improved by Negretti and Zambra, wherein a *bubble of air* caused a separation in the mercurial column to form an index, was exhibited by them; but, as the air bubble at different temperatures assumed different lengths, it was not approved by the Jury appointed to examine Meteorological Instruments. The instruments invented by Dr. Rutherford and Six, as Maximum Thermometers, had both proved inefficient for the purposes required; and although the best and most correct forms of these were also exhibited by Negretti and Zambra, they still saw that a great want would be met if a perfect instrument could be invented to indicate

Maximum temperatures, all the above being imperfect—Rutherford's from the tendency of the index to plunge in the mercury, Six's from the different expansive properties of the alcohol, mercury, &c., of which it is composed, and the one already alluded to not only from the defects before noticed, but also from its liability to resolve itself into an ordinary thermometer when used, unless in the hands of a skilful manipulator. How far the New Patent Maximum Thermometer of Negretti and Zambra has supplied all these deficiencies may be judged from the fact that in all the principal Observatories throughout the globe it is used, *to the exclusion of all others unless for the purposes of comparison.* There are now in the hands of our most scientific men upwards of two thousand two hundred of these instruments, which have given universal satisfaction. The simplicity of their construction enables the most uninitiated in thermometers to use them with confidence and safety; and another important feature in them is the impossibility of deranging or putting them out of order, for nothing short of actual breakage can in any way cause them to fail.

FIG. 4.



The Patent Self-Registering Thermometer consists of a tube of mercury fitted on an engraved scale, as shown in (fig. 4). The thermometer tube above the mercury is entirely free from air; and at the point (A) in the bend above the ball, is inserted and fixed with the blow-pipe, a small piece of solid glass, or enamel, which acts as a valve, allowing mercury to pass on one side of it when heat is applied; but not allowing it to return when the thermometer cools. When mercury has been once made to pass the valve, which nothing but heat can effect, and has risen in the tube, the upper end of the column registers the maximum temperature. To return the mercury to the bulb, we must apply a force equal to that which raised it in the tube; the force employed is gravity, and is applied by simply lowering the bulb end of the thermometer when the gravity of the mercury in the tube will be sufficient to unite it with that in the bulb, and thus prepare the instrument for future observation.

Directions for using Negretti and Zambra's Self-Registering Maximum Thermometer, for the Determination of the Maximum Temperature of the Air.—Suspend the thermometer by means of two brass plates (B, C,) attached for that purpose, in such manner that the instrument hangs horizontally, and so placed that it is in the shade, with the air passing freely to it from all sides; then, on an increase of heat, the mercury will pass up the tube as in an ordinary thermometer, and continue doing so as long as the heat increases.

On a decrease of heat, the contraction of mercury will take place *below* the *bend* in the tube, leaving the whole column of mercury in the tube, thus registering the highest temperature, and showing such till the instrument is disturbed.

To prepare the instrument for future observations, it is only necessary to remove the plate (C) from its hook and raise it till the instrument is nearly perpendicular, and then to slightly agitate it while the brass plate (B) at the end is still suspended from its hook. The mercury will then descend in the tube and indicate the temperature of the air at that time; and, when again suspended, is prepared for future observation.

Price, mounted on Negretti and Zambra's Patent Porcelain Scale, £1 1 0

The following is an extract from the *Report of the Astronomer Royal*, published shortly after the invention of the instrument—it, however, applies more strongly now, inasmuch as the intervening period of seven years has fully proved the efficiency and value of this invention:

Report of the Astronomer Royal, May, 1852.

"We have for several years been very much troubled by the failures of the Maximum Self-Registering Thermometers, especially those exposed to the sun: the part of the tube in which the index ought to slide becomes foul, apparently lined with a coat of metal, and the index is immoveable. A construction invented by Messrs. Negretti and Zambra appears likely to evade this difficulty. The mercury in its expansion is forced past an obstruction in the tube, and does not return past in its contraction. No index is required in this construction. The specimens of this instrument which we have tried answer well."

In the *Quarterly Report of the Registrar-General*, about the same time, there is the following annotation:

"The form of instrument adopted during the past quarter for maximum temperature is that of Negretti and Zambra, which is found to act admirably."

J. GLAISHER, Esq., F.R.S., in his *Lectures on the Results of the Great Exhibition*, delivered at the Society of Arts, at the suggestion of His Royal Highness Prince Albert, when speaking of Meteorological Instruments (page 363), says:

"In maximum and minimum thermometers there was nothing new exhibited, although great need had long existed for an effective Maximum Thermometer. Thanks to the Exhibition, however, this want has since been supplied.* Messrs. Negretti and Zambra have invented a thermometer, the construction of which is as follows: a small piece of glass is inserted in the bend, near the bulb and within the tube, which it nearly fills: at an increase of temperature, the mercury passes this piece of glass; but on a decrease of heat, not being able to recede, it remains in the tube, and thus indicates the maximum temperature. After reading, it is easily adjusted. Four of these instruments I have had at work for upwards of a month, two in ordinary observations, and two subjected to severe tests, and all have answered admirably. Hitherto every series of meteorological observations has been more or less broken by the frequent plunging of the steel index into the mercury, or becoming otherwise deranged. Messrs. Negretti and Zambra have in their Maximum Thermometer supplied a want long felt."

Extract from the *Report of the Council of the British Meteorological Society*, read at a general annual meeting of its members, 1852;

"Negretti and Zambra's Thermometer, for the determination of maximum temperature, is one of the good results of the Great National Exhibition, which proved itself, as regarded meteorological instruments, a most useful exponent of the insufficiency of those sold to the general public; *this Thermometer is the best which has yet been constructed for maximum temperatures, and particularly for sun observations;* for as the reading is determined by the entire mercurial column being detained at its highest point by a simple contrivance within the tube, the necessity for an index is avoided, and with it the constant and distressing recurrence of derangement attendant upon the employment of those generally in use. This thermometer, constructed and brought into operation since the close of the Exhibition, has been for some time in the hands of Members of the Council, but only recently among its meteorological contributors, from its having been esteemed desirable that the Council should be well informed, by actual experiment, of the well-working of the instrument before sanctioning its general circulation. Accordingly, in the early part of the year, for some months several of Negretti and Zambra's Maximum Thermometers were subjected by our Secretary to severe tests, and as the results were highly satisfactory, *the Council have not only viewed this instrument as an addition to the practical meteorologist, but strongly recommended its adoption and general use.*"

Copy from the *Report of the Kew Committee of the British Association*, 1853—4:

The very ingenious instrument of Messrs. Negretti and Zambra has one quality which, as regards durability, places *it above every other form of Maximum Thermometer*, for when once well constructed, it can never get out of order,"—the observer having first satisfied himself as to its correctness, may ever afterwards use it with confidence, relying that his register will not be interrupted by any of those annoyances to which he may have been accustomed in *other forms of this instrument.*

The following is from the late JOHN Drew, Ph. D., F.R.A.S., Author of *Practical Meteorology, &c., &c.*

"GENTLEMEN,—In my opinion your Maximum Thermometer, as it becomes more generally known, will supersede every other. *The impossibility* of the index getting out of place, how much soever the instrument may be agitated, will always give it the preference over every other maximum thermometer with a moveable index."

Our instrument was not invented until the Exhibition had closed.

† It is now seven years that the same thermometers have been in constant use, and the same remark applies.

From E. J. LOWE., Esq.. F.R.A.S., F.G.S., &c., &c., to Messrs. NEGRETTI and ZAMBRA.

"GENTLEMEN,—It affords me the greatest pleasure in being enabled to speak with praise regarding your Patent Maximum Thermometer. I have used a dozen of them for some time at both my observatories, and of these several since the date of their invention. In no single instance has there been any cause of complaint. Within the last few months I have carefully tested them in various ways, yet always with most satisfactory results. I can therefore say with truth that your patent instrument is the best Self-registering Maximum Thermometer which has ever passed through my hands; indeed, no observer can do without it."

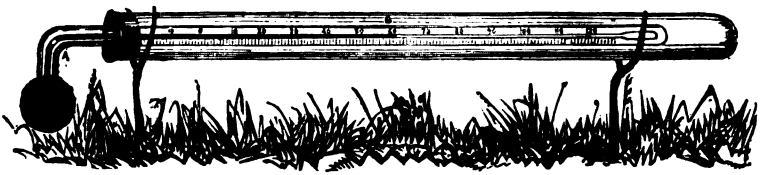
HIGHFIELD HOUSE OBSERVATORY, NEAR NOTTINGHAM,
September 1st, 1856.

M. J. JOHNSON, Esq., to Messrs. NEGRETTI and ZAMBRA.

"GENTLEMEN,—I beg to state that your meteorological instruments, with glass mountings and graduated stems, have been in use at this Observatory since February, and I have every reason to be satisfied with their performance, both as regards the ordinary and the self-registering instruments, the Maximum Thermometer, in the latter class, is one of your own invention and construction."

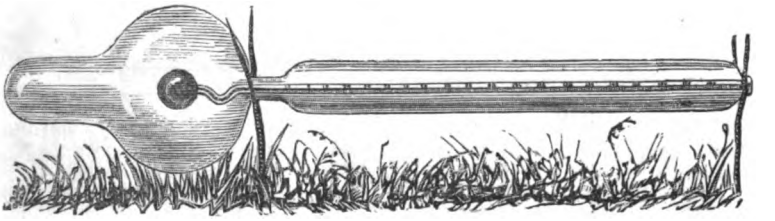
RADCLIFFE OBSERVATORY, OXFORD,
21st August, 1856.

FIG. 6.



6.—Negretti and Zambra's Patent Solar Radiation Thermometer, (fig. 6.)—This instrument has a blackened bulb, the scale divided on its own stem, and the divisions protected by a glass shield. In use, it should be placed horizontally, with its bulb in the full rays of the sun, resting on grass, and, if possible, so that lateral winds should not strike the bulb. The directions for use are identical with those for the determining of the temperature of the air. *Price*, £1 5 0

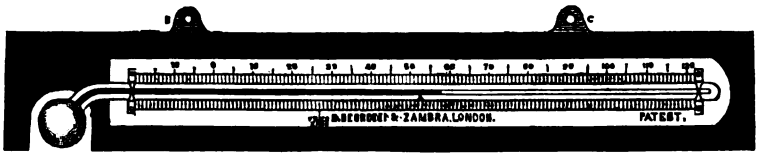
FIG. 7.



7.—Vacuum Solar Radiation Thermometer, (fig. 7).—This instrument consists of Negretti and Zambra's blackened-bulb Radiation Thermometer (fig. 6), enclosed in a glass tube and globe, from which all air is exhausted. Thus protected from the loss of heat which would ensue if the bulb were exposed, its indications are from 20° to 30° higher than when placed side by side with a similar instrument with the bulb exposed to the passing air. At times when the air has been in rapid motion, the difference between the reading of a thermometer giving the true temperature of the air in the shade, and an ordinary solar radiation thermometer, has been 20° only, whilst the difference between the air temperature and the reading of a Radiation Thermometer in vacuo has been as large as 50°. It is also found that the readings are almost identical at distances from the earth varying from six inches to eighteen inches. By the use of this improved Solar Radiator it is hoped that the amounts of solar radiation at different places may be rendered comparable; at present they are not; the results found at different places cannot be compared, as the bulbs of the thermometers are under very different circumstances as to exposure, and currents of air. This new arrangement causes the readings to be much more uniform, and will be found a decided improvement.

Price, £1 10 0

FIG. 8.

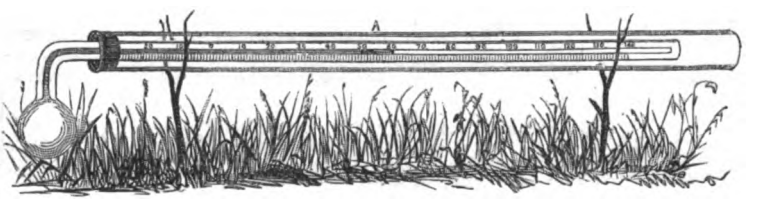


8.—**Minimum Thermometer** (Alcohol, fig. 8).—Consists of a glass tube, the bulb and part of the bore of which is filled with perfectly pure spirits of wine, in which floats freely a black glass index. A slight elevation of the thermometer, bulb uppermost, will cause the glass index to flow to the surface of the liquid, where it will remain, unless violently shaken. On a *decrease* of temperature, the alcohol recedes, taking with it the glass index; on an *increase* of temperature, the alcohol alone ascends in the tube, leaving the end of the index *furthest* from the bulb indicating the minimum temperature.

Directions for using the Minimum Thermometer, for the Determination of the Minimum Temperature of the Air.—Having caused the glass index to flow to the end of the column of spirits, by slightly tilting the thermometer, bulb uppermost, suspend the instrument (in the shade with the air passing freely to it on all sides) by the two brass plates attached for that purpose,—in such manner that the bulb is about half an inch lower than the upper, or the end of the thermometer furthest from the bulb,—then on a decrease of temperature, the spirits of wine will descend, carrying with it the glass index; on an increase of temperature, however, the spirits of wine will ascend in the tube, leaving that end of the small glass index furthest from the bulb indicating the minimum temperature. To re-set the instrument, simply raise the bulb end of the thermometer a little, as before observed, and the index will again descend to the end of the column, ready for future observation.

Price, in similar mounting to fig. 4, £1 1 0

FIG. 9.



9.—**Negretti and Zambra's Terrestrial Radiation Thermometer** (fig. 9). The bulb of this instrument is transparent, and the divisions engraved on its glass stem, similar to that for solar radiation. In use, to be placed with its bulb fully exposed to the sky, resting on grass, with its stem supported by little forks of wood.

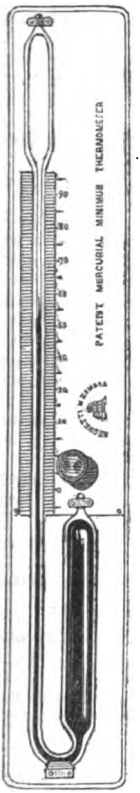
N.B.—By no means jerk or shake an Alcohol Minimum Thermometer *when re-setting* it, for by so doing it is liable to disarrange the instrument, either by causing the index to leave the spirits, or by separating a portion of the spirits from the main column.

N. B.—As Alcohol Thermometers have a tendency to read lower by age, owing to the volatile nature of the alcohol allowing particles in the form of vapour to rise and lodge in the tube, it becomes necessary to compare them occasionally with a mercurial thermometer whose index error is known; and if the difference be more than a few tenths of a degree, examine well the upper part of the tube to see if any alcohol is hanging in the bore thereof, if so, the detached portion of it can be joined to the main column by swinging the thermometer with a pendulous motion, *bulb downwards*.

Price, £1 5 0

10.—**Negretti and Zambra's Patent Mercurial Minimum Thermometer,** represented by (figure 1,) has a cylindrical bulb of large size, which at first sight, might induce the idea that the instrument would not be sufficiently sensitive, but as length is given to the cylinder instead of increasing its diameter, it will be found as sensitive as a bulb of the same diameter as the cylinder employed, and much more so than an ordinary alcohol thermometer.

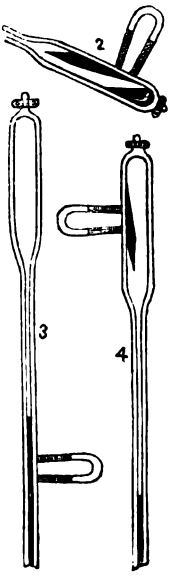
FIG. 1.



The reason for having the bulb large is to allow the internal diameter of the thermometer tube being larger than that generally used for thermometrical purposes so that a steel index pointed at both ends, may move freely within when required.

To use the Thermometer, it is suspended perpendicularly (figure 1) with the steel index resting on the surface of the mercurial column. As the mercury in the cylinder contracts from the effect of cold, that in the tube descends, and the index, of its own gravity, follows it; on the contrary, as the mercury expands and rises in the tube, it passes the index on one side, and in rising, exerts a lateral pressure on the needle, and jams it to one side of the tube, where it remains firmly fixed, leaving the upper point of the needle indicating the minimum temperature. In this thermometer, the reading is always from the upper point of the needle and not from the mercury itself.

To extricate the Needle from the mercury, a magnet is used, when, if the needle is embedded only a few degrees, it can readily be withdrawn without altering the position of the instrument. Should the magnet not be sufficient for the purpose, we simply turn the thermometer on its support from the upright position, slightly elevating the bulb (figure 2). The mercury and index will then flow into the small reservoir. Should the index not freely leave the tube with the mercury, assist it with a magnet, and when the mercury and index are in the upper bulb (fig. 2), apply a magnet outside, which will attract and hold fast the index; and whilst thus holding it, again bring the thermometer to the upright position, when the mercury will immediately fall back into the tube, leaving the index attached to the magnet (figure 4), with which it is guided down to the surface of the mercury, ready for another observation.



Care must be taken not to withdraw the magnet until the index is in contact with mercury, for, if released before touching, it might plunge too deeply and give a false indication. The rule for re-setting it will be to bring the needle point in contact with the mercury, and then withdraw the magnet, having previously ascertained that no particles of mercury are attached to the index.

It may sometimes, though rarely, happen, that from the time a minimum temperature is registered by the index, and by the time an observation is made, the mercury may have risen so high in the tube as to completely pass the index, as shown (figure 3). Should it so happen, the space which the index occupies will readily be observed, as it will be pressed to one side of the tube, causing a different appearance in that part, although the point of the needle may not be seen. If such be the case, apply a magnet to the spot where you see the

index is fixed: this will hold the needle firmly. Then, by slightly tilting the thermometer bulb uppermost, the mercury will flow into the top bulb, leaving the index attached to the magnet, and quite uncovered. Having taken the reading, draw the needle into the top bulb, and hold it there whilst you adjust the thermometer by again bringing it to the upright position.

Price, £2 2 0

The value of these instruments may be estimated from the following letters, received from gentlemen by whom the thermometers have been tested since their invention:

LEWISHAM, 1856, February 27.

"GENTLEMEN,—In reply to your note just received, I beg to say that your new Mercurial Minimum Thermometer was suspended by the side of two Minimum Thermometers of the best kind of the ordinary construction, on the day I received it from you, viz., 1855, November 21, and it has been examined and read every day since, during which interval of time the temperature has varied from 15° to 60°. It has acted equally well within this range. In the course of the experiments, it was found that at times differences amounting to 2° and 3° existed in the minimum readings between those of the new mercurial and old spirit thermometers. These differences were found due to two causes. The one occurred at low temperatures, and on reference to independent registers, it was found that the readings of the mercurial were right, the difference being attributable to the sluggishness of the alcohol; and, in the other case, it was found that the index of the ordinary thermometer had unduly moved towards the bulb, the instrument having been shaken by the wind.

I consider the new Minimum Thermometer a very important addition—indeed a more important one than the Maximum Thermometer of your invention, as by its means we can register all observations of temperature by the use of one fluid, and that the recognized standard for the measurement of heat.

"With respect to your Maximum Thermometer, it acts admirably, and leaves scarcely anything to be desired. It has never been out of order in the four years* I have had it in constant use, and it does not seem possible to put it out of order, except by the destruction of the instrument.

"I am Gentlemen, your obedient Servant,

"JAMES GLAISHER, F.R.S.,

Secretary to the British Meteorological Society."

"Messrs. NEGRETTI and ZAMBRA, Opticians."

The following is an extract from a letter to the inventors, Messrs. NEGRETTI and ZAMBRA, from E. J. LOWE, Esq., dated *Observatory, Boston, near Nottingham:*

"Your patent mercurial thermometer is an admirable invention. I have worked it to my entire satisfaction. I have tested its usefulness in many different ways, every one of which has been perfectly satisfactory. It is certainly a meteorological triumph for which meteorologists must return you thanks."

The following is an extract from a paper read by Dr. LEE, President of the British Meteorological Society, before the British Association, Cheltenham, August 11th, 1856, when the Mercurial Minimum Thermometer was exhibited:

"This thermometer has a bulb of very large size, consequently allowing a tube correspondingly large in the bore for that part forming the scale. On the surface of the mercury enclosed in the tube is placed a small steel needle, pointed at both ends, which forms the index. This conical needle, is capable of moving freely in the bore of the tube, and as the mercury descends therein, will of course fall with it; but when the mercury ascends in the tube the mercury will pass the lower pointed end of the needle, and rise above the same without raising or moving the needle. This latter will, therefore, remain stationary, and consequently, its upper point will indicate the lower temperature, to which it has descended during the twelve or twenty-four hours, and will not be effected by any subsequent rise in temperature. To re-set the thermometer for future observation, it is necessary simply to turn it in such a position that the mercury and needle in the tube will flow into the reservoir at the top; but should the needle not freely flow with the mercury, it may be assisted by a magnet, and readily held there until, by re-turning the thermometer to the upright position, the mercury flows back again in the tube, and then with the manget the needle may be returned to the surface of the mercury ready for future observations. Dr. Lee observed, that one of these thermometers had been in the hands of the Secretary of the British Meteorological Society; another at the Royal Observatory, Greenwich; a third at Mr. E. J. Lowe's Observatory, Highfield House; and others had been used by various members of the British Meteorological Society, all of which had acted most accurately, and in two instances had corrected errors in the alcohol minimums *which otherwise would have passed unnoticed.*"

To Messrs. NEGRETTI and ZAMBRA:

"GENTLEMEN,—I have undertaken a series of comparisons between your newly-invented Mercurial Minimum Thermometer and a Rutherford's Minimum of the best construction. There was a constant difference of a small fraction of a degree—the mercurial reading being below that of the spirit thermometer. The result has convinced me of the trustworthiness of your new instrument; while the impossibility of its getting out of order will strongly recommend it as the only minimum thermometer that can be moved from place to place without derangement.

(Signed) JOHN DREW, Ph. D., F.R.A.S., Author of "Practical Meteorology," &c."

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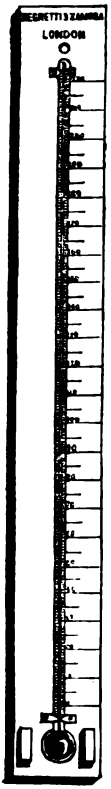
* It is now seven years, and still the thermometer is perfect.

FIG. 11.



11.—**Standard Thermometer,** (figure 11).—Divided on brass into either Fahrenheit or centigrade scale, or the divisions engraved on its own stem.

Price, £2 2 0

N. & Z.'s Standard Thermometers, are made from selected tubes, the internal diameter of which is ascertained, by very carefully conducted experiments. They are also strictly tested for index error, and a copy of the corrections furnished with each instrument.

13.—**Ozonometer.**— Dr. Moffatt's Ozonometer consists of strips of paper, prepared with Iodide of Potassium and Starch; the papers are suspended in a box, or otherwise, so as to be exposed to the free access of air, but not to the direct rays of the sun. The paper when effected by ozone is tinged with various shades of brown, the intensity of which is measured by a scale of ten gradations, furnished with the ozonometer.

Price, £0 8 6

14.—**Schonbien's,** ditto ditto.

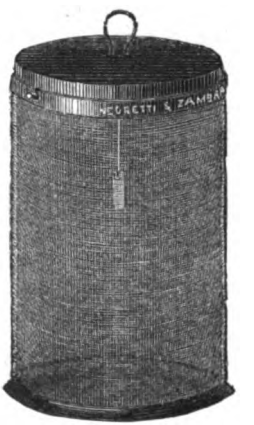
Price, £0 6 0

15.—**Ozone Box,** constructed on the plan recommended by Dr. Moffatt.

Price, £0 18 6

16.—**Sir James Clarke's Ozone Cage** (fig. 16), consists of two cylinders of very fine wire gauze, one fitting into the other; the wire gauze being of such a fineness as to permit the free ingress of air, at the same time that it shuts out all light that would act injuriously on the test paper, which is suspended by a clip or hook attached to the upper part of the inner cylinder.

FIG. 16.



Price £0 18 0
Ditto, in copper . . 1 5 0

17.—**Ostler's Self-Registering Anemometer and Rain Gauge,** for showing the Direction and Force of the Wind, and the quantity of Rain fallen in a given time, with clock-work and all necessary apparatus complete.

Price, from £52 12 0

18.—**Whewell's Self-Registering Anemometer,** for showing the amount of horizontal movement in the air, for twenty-four hours.

Price, £12 12 0 to £15 15 0

19.—**Anemometer** (fig. 19, Robinson's), for ascertaining the velocity of the wind. The readings on the dials of the Anemometer are in simple revolutions; thus a complete revolution of the *first* stamped index-wheel equals 100 revolutions of the cups; the *second,* 1,000; the *third,* 10,000; the *fourth,* 100,000; and necessarily in noting such reading, it must be done backwards, according to the indications on the instrument. The cups travel at a rate equal to one-third that of the wind, therefore the space travelled

through by the cups multiplied by three, equals the velocity of the wind. The cups travel through 3.14 feet each revolution, showing 9.42 feet of wind, which must be referred to time for absolute rate.

Price, £3 3 0

FIG. 19.

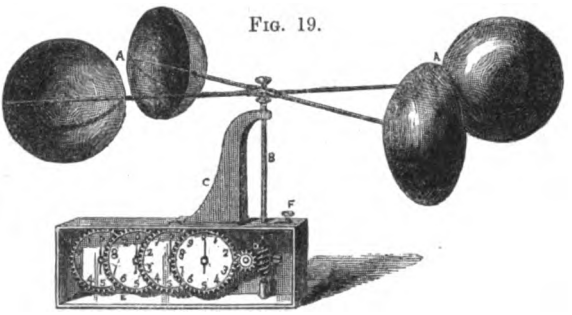
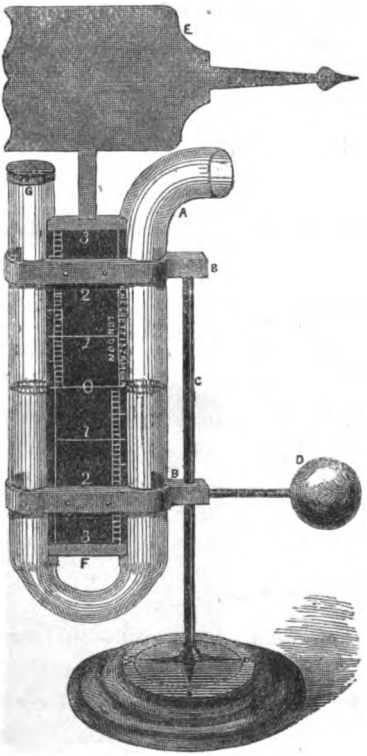


FIG. 20.



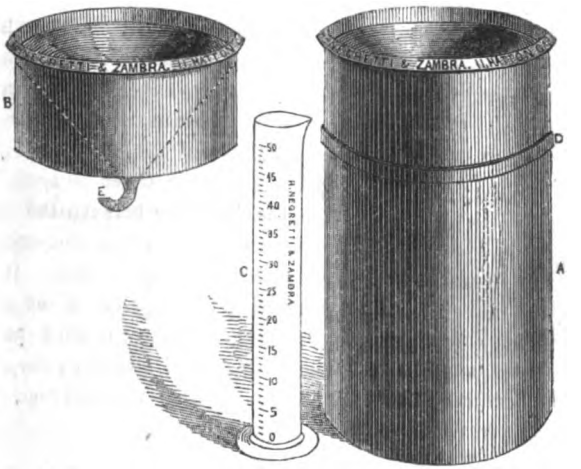
20.—**Anemometer, or Wind Gauge** (fig. 20, Lind's), for showing the pressure of the wind, consists of a glass syphon, the limbs parallel to each other, and each limb the same diameter. One end of the syphon is bent at right angles to the general direction of the tubes, so as to present a horizontal opening to the wind. A graduated scale, divided to inches and tenths, is attached to the syphon tube, reading either way from a zero point in the centre of the scale. The whole instrument is mounted on a spindle, surmounted by a vane, and is moved freely in any direction by the wind, always presenting the open end towards the quarter from which the wind blows. To use the instrument, it is simply filled up to the zero point with water, and then exposed the wind; the difference in the level of the water gives the force of the wind in inches and tenths, by adding together the amount of depression in one limb, and elevation in the other, the *sum of the two* being the height of a column of water which the wind is capable of sustaining at that time.

Price, £2 2 0

TABLE showing the Force of Wind on a square foot, for different heights of the column of water in Lind's Wind Gauge.

Inches.	Force in lbs.	Common designation of such Wind.
6	31·75	A Hurricane.
5	26·04	A very great Storm.
4	20·83	A great Storm.
3	15·62	A Storm.
2	10·42	A very high Wind.
1	5·21	A high Wind.
·5	2·6	A brisk Gale.
·1	·52	A fresh Breeze.
·05	·26	A pleasant Wind.
0·	0·	A Calm.

FIG. 21.



21.—**Glaisher's Rain Gauge** (fig. 21). This Gauge is arranged for the reception of the water only which falls upon its receiving surface, and for the prevention of loss by evaporation. The rain is first collected in a funnel, the receiving surface of which is turned in a lathe, and terminated at its lower extremity in a bent tube, of small aperture (see fig.), in which the last few drops of rain remain. The glass receiving vessel is graduated to hundredths of inches, according to the calculated weight of water, as determined by the area of the receiving surface. In use, the Gauge is partly sunk below the surface of the soil, so that the receiving surface is about five inches above it. Thus situated, no water escapes by evaporation in any month of the year. If placed differently, the readings must be taken daily.

Price, in japanned tin £1 1 0
in copper 1 10 0

22.—**Rain Gauge** (fig. 229, page 36), with 12-inch funnel, mounted with a very accurately turned brass ring, presenting a receiving surface 12-inch diameter; a graduated glass tube, divided to inches, tenths, and hundredths of an inch, for reading by simple inspection, the amount of rain fallen; also a brass cock for emptying the gauge without removing its station.

Price, complete £2 10 0

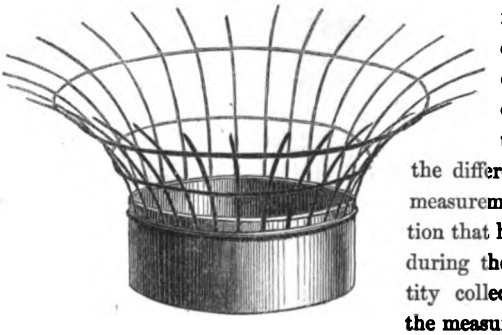
23.—**Rain Gauge**, similar in form to No. 22, but without brass mountings, and instead of graduated glass tube, it is fitted with a boxwood scale, attached to a float inside the gauge, on which can be read off, by simple inspection, the amount of rain fallen, as in No. 20.

Price, complete £1 15 6

24.—**Evaporating Dish, or Gauge** (fig. 24), for showing the amount of evaporation from the earth's surface. This gauge consists of a brass vessel, the area or

evaporating surface of which is accurately determined; and also a glass cylindrical measure, graduated into inches, tenths, and hundredths of inches. In use, the evaporating gauge is nearly filled with water, the quantity having been previously measured by means of the glass cylinder; it is then placed out of doors, freely exposed to the action of the atmosphere; after exposure, the water is again measured, and the difference between the first and second measurement shows the amount of evaporation that has taken place. If rain has fallen during the exposure of the gauge, the quantity collected by it must be deducted from the measured quantity; the amount is shown by the quantity of rain collected in the rain gauge. The wire cage round the gauge is to prevent animals, birds, &c., from drinking the water.

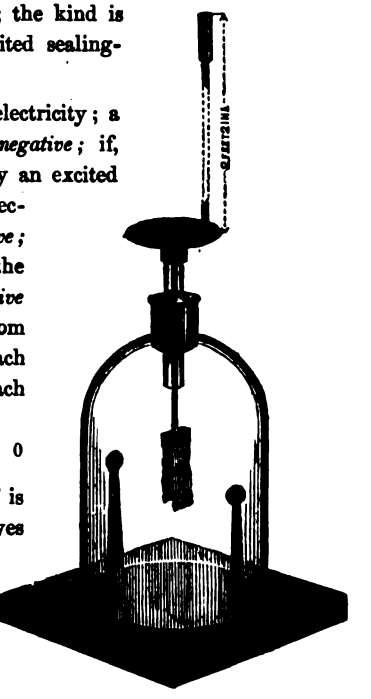
Fig. 24.



Price, with graduated measure, £1 2 6

25.—**Electrometer for Atmospherical Electricity** (fig. 25). This instrument is arranged for the reception of a brass rod about two feet in length, with a clip for the reception of a lighted cigar fusee; the electricity is collected by the flame, and conducted down the rod to a pair of gold leaves, which separate according to the amount; the kind is determined by the effect of either a stick of excited sealing-wax, or a glass rod, supplied with the instrument.

Fig. 25.



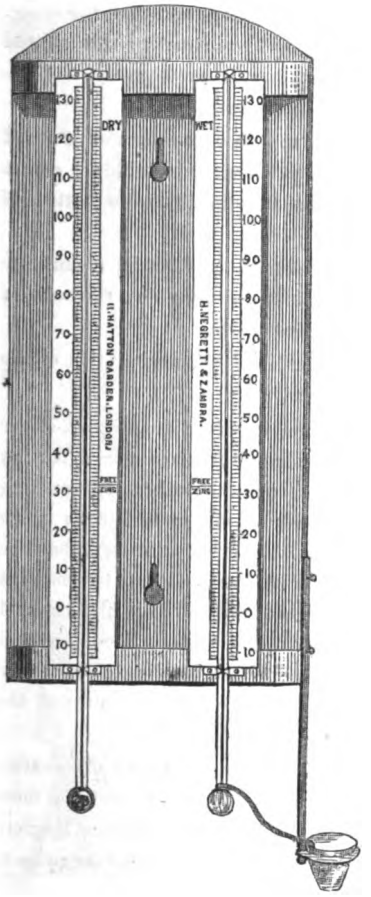
A glass rod when rubbed produces *positive* electricity; a stick of sealing-wax similarly treated produces *negative;* if, therefore, when the leaves are separate, we apply an excited glass rod, and they separate still further, the electricity is *positive;* if they approach it is *negative;* on the contrary, if we use a stick of sealing wax, the leaves will separate if they are charged with *negative* electricity, and converge if *positively* charged, from the fact that all bodies similarly electrified repel each other, whilst those oppositely electrified attract each other.

Price, £1 1 0

Note.—A book containing strips of gold leaf is sent with the Electrometer, to replace the gold leaves when torn or broken in use.

To mount fresh gold leaves, unscrew the brass plate to which is attached the rod supporting the leaves; then moisten with the breath the flat piece of brass, and press it gently down on one strip of gold, whilst the book is only partly opened; the second leaf is attached in the same manner.

FIG. 26.



26.—Dry and Wet Bulb Hygrometer, or Psychrometre (fig. 26), consists of two parallel thermometers, as nearly identical as possible, mounted on a wooden bracket, one marked *dry*, the other *wet*. The bulb of the wet thermometer is covered with thin muslin, round the neck of which is twisted a conducting thread of lamp-wick, or common darning-cotton, this passes into a vessel of water, placed at such a distance as to allow a length of conducting thread, of about three inches; the cup or glass is placed on one side, and a little beneath, so that the water within may not affect the reading of the *Dry Bulb Thermometer*. In observing, the eye should be placed on a level with the top of the mercury in the tube, and the observer should refrain from breathing whilst taking an observation. The temperature of the air and of evaporation is given by the readings of the *two thermometers*, from which can be calculated the dew point, Tables being furnished for that purpose with the instrument.

The above instrument as used by the members of the British Meteorological Society, and supplied to them by Negretti and Zambra.

Price £2 2 0
Tables for ditto . 0 2 6

27.—Glaisher's Thermometer Stand. The thermometer stand consists of a horizontal board as a base, of a vertical board projecting upwards from one edge of the horizontal board, and of two parallel inclined boards, separated from each other by blocks of three inches in thickness, connected at the top with the vertical board, and at the bottom with the horizontal board, and the air passes freely about and between all these boards; to the top of the inclined boards is connected a small projecting roof to prevent the rain falling on the bulbs of the instrument, which are carried on the face of the vertical board, with their bulbs projecting below it, so that the air plays freely on the bulbs from all sides. The whole frame revolves on an upright post firmly fixed to the ground, as shown in the engraving; and in use, the inclined side is always turned towards the sun.

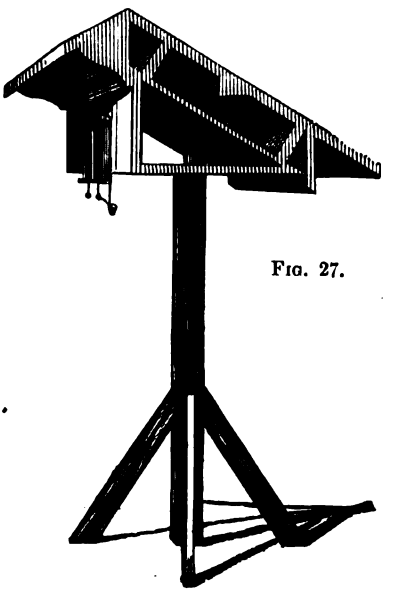
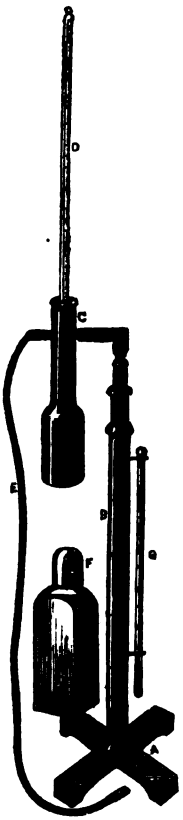


FIG. 27.

Price, £2 2 0

28.—**Regnault's Condenser Hygrometer,** (fig. 28) consists of a tube (C), made of silver, very thin, and perfectly polished; the tube is larger at one end than the other, the large part being 1.8 in depth, by 8.10 in diameter; this is fitted tightly to a brass stand (B), with a telescopic arrangement for adjusting when making an observation.

FIG. 28.



The tube (C) has a small lateral tubulure, to which is attached an India rubber tube, with ivory mouth piece; this tubulure enters (C) at right angles near the top, and traverses it to the bottom of largest part.

A delicate thermometer (D) is inserted in through a cork, or India rubber washer, at the open end of the tube (C), the bulb of which descends to the centre of its largest part.

(G) is an attached thermometer for taking the temperature of the air, and (F) is a bottle containing æther.

To use the Condenser Hygrometer, a sufficient quantity of æther is poured into the silver tube to cover the thermometer bulb: on allowing air to pass bubble by bubble through the æther, by breathing in the tube (E), an uniform temperature will be obtained; if the æther continues to be agitated, by breathing briskly through the tube a rapid reduction of temperature will be the result; at the moment the æther is cooled down to the dew-point temperature, the external surface of that portion of the silver tube containing the æther will become covered with a coating of moisture, and the degree shown by the thermometer, at that instant, will be the temperature of the dew point.

This form of Hygrometer, for ascertaining by direct observation the dew point, is so superior to "Daniell's," both from its being more certain in its indications, and economical in use, that Messrs. Negretti and Zambra have been induced to modify it, and reduce its price to little more than that of a good Daniell's Hygrometer.

Price, £3 3 0

29.—**Daniell's Hygrometer,** for ascertaining the dew point by direct observation

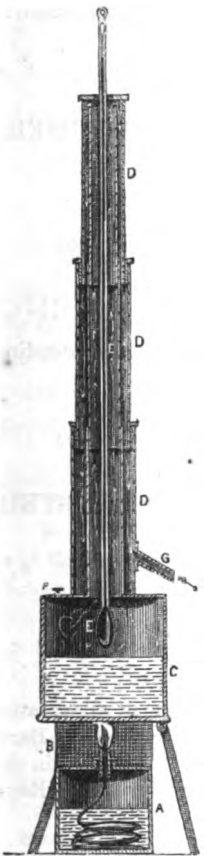
Price, £2 12 6

30.—**Apparatus for Determining Elevations by the Temperature of the Boiling-point of Water.** The Barometrical Thermometer, or Hypsometrical Apparatus, as constructed by Negretti and Zambra, is intended to meet the requirements of travellers in circumstances where the mercurial barometer cannot be conveniently employed. The instrument is very portable, and affords a ready and accurate means of measuring heights by observations of the temperature of boiling water. The apparatus is shown in section (fig. 30). It consists,—

First,—of a very delicate thermometer, about 12 inches long, the scale ranging from 180° to 212°, having each degree subdivided so as to show distinctly 0°·1.

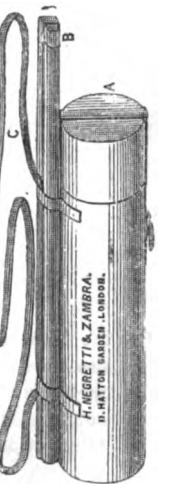
Secondly,—a copper boiler (C) attached to a small tripod stand; from the top of the boiler proceeds a three-draw telescopic tube (E E E), open at top; this tube is surrounded by a second (D D D) similarly constructed, and screwed at the top of the boiler; the outer tube has two openings, one at the top through which the thermometer (E E) is

FIG. 30.



inserted, passing down to within an inch of the water in the boiler, and supported by means of an India-rubber washer, as shewn in (fig. 30;) the second opening forming an outlet for the steam, as shown at (G). The object of the double tube is to ensure a steady boiling-point, which it would be impossible to obtain in open air experiments, were only a single tube employed. (A) is a metallic spirit lamp, surrounded with wire gauze (B) to prevent the flame being extinguished when experimenting in the open air.* The whole instrument when packed for travelling is shown, drawn to a smaller scale, in (fig. 30*a*). Each instrument is furnished with a carefully computed set of tables, from which may be obtained, by an easy calculation the elevation corresponding to any observed boiling point, between the temperatures of 180° and 212°.

FIG. 30*a*.



To use the boiling point Apparatus, it is simply necessary to pour into the boiler, through the small opening (F) on its surface, a sufficient quantity of water to fill it about one-third, and afterwards close it by means of the screw for that purpose; the lighted spirit-lamp is then applied, and when the water is made to boil, the steam rises, surrounding the bulb and tube, and descending between the two tubes, issues from the opening at (G) After a few seconds, the mercury in the thermometer will rise and become stationary; the degree indicated by it must then be noted, when, by reference to the tables, the elevation of the spot where the experiment has been performed may be obtained.

The temperature of the air should be observed by a common thermometer at the same time.

Price, with ordinary Spirit Lamp £5 5 0
With Russian Spirit Furnace* . . . 5 10 0

31.—**Actinometer, Sir John Herschell's,** for ascertaining the absolute heating effect of the solar rays, in which *time* is considered one of the elements of observation. The Actinometer consists of a large cylindrical thermometer bulb, with a scale considerably lengthened, so that minute changes may be easily seen. The bulb is of transparent glass filled with a deep blue liquid, which is expanded when the rays of the sun fall direct on the bulb. To take an observation, the Actinometer is placed in the shade for one minute and read off, it is then exposed for one minute to sunshine, and its indication recorded; it is finally restored to the shade, and its reading noted. The mean of the two readings in the shade, subtracted from that in the sun, gives the actual amount of expansion of the liquid produced by the sun's rays in one minute of time. For further information, see "Report of the Royal Society on Physics and Meteorology."

Price, £7 7 9

* A Russian spirit furnace, surmounted by a small spirit lamp, is sometimes furnished. The object of the Russian furnace is to cause the water to boil rapidly; when that has been accomplished, the small lamp is lighted, and placed over the blast from the furnace, which it extinguishes, at the same time its flame is sufficient to keep the water boiling.

32.—HYGROMETRICAL TABLES,

Adapted to the use of Negretti and Zambra's Wet and Dry Bulb Thermometer,

By JAMES GLAISHER, Esq., F.R.S.

Price, £0 2 6

33.—TABLES FOR CALCULATION OF HEIGHTS FROM OBSERVATIONS ON THE BOILING POINT OF WATER,

Adapted to the use of Negretti & Zambra's Boiling Point Apparatus.

Price, £0 1 0

34.—TABLES OF THE CORRECTIONS FOR TEMPERATURES,

To reduce observations to the 32° Farenheit, for barometers with brass scales extending from the cistern to the top of the mercurial column,

By JAMES GLAISHER, Esq., F.R.S.

Price, £0 1 0

35.—TABLE OF THE DIURNAL RANGE OF THE BAROMETER,

By JAMES GLAISHER, Esq., F.R.S.

Price, £0 0 6

36.—"PRACTICAL METEOROLOGY,"

By JOHN DREW, Ph.D., F.R.A.S.

On the Laws of Heat as affecting Atmospheric Changes—Instruments of Observation described—Deductions from Observations on the Thermometric, Hygrometric, Barometric, and Electric Condition of the Air—The present state of Meteorology in this country—Description of the Photographic Registration of Phenomena at the Royal Observatory, Greenwich.

Price, £0 5 0

37.—A THERMOMETRICAL TABLE,

ON THE SCALES OF FAHRENHEIT, REAMUR, AND CENTIGRADE,

Comprising the most remarkable Phenomena connected with Temperature in relation to Climatology, Physical Geography, Chemistry, and Physiology.

By ALFRED S. TAYLOR, Esq.

Price, in Sheet, with explanatory Pamphlet, £0 1 6

NOTICE.—As the greatest possible care is taken in packing Meteorological Instruments and Apparatus, and none but experienced packers employed, Negretti and Zambra cannot hold themselves responsible for any damage or breakage that may occur in transit, through the rough usage of railway porters, or carriers, &c.

For India, N. and Z. would advise Meteorological Instruments being forwarded *per ship*, in preference to the Overland route, as by the latter, goods are more exposed to injury from the numerous transhipments to which they are subjected.

N. and Z. having correspondence in nearly every part of the globe, can, for very little extra charge, guarantee the safe transmission of Instruments.

Full and explicit directions should accompany orders as to the address, mode of conveyance, or shipment.

BAROMETERS, THERMOMETERS, AND HYGROMETERS,

VACUUM AND STEAM PRESSURE GUAGES.

Separate from the Standard Meteorological Instruments described in the foregoing pages, there are others which partake of a more general character, and are used by the husbandman, the mariner, and the artizan, entirely as "WEATHER GLASSES;" these Barometers and Thermometers, with others for special purposes, form a second portion of this Catalogue. Each Instrument is arranged so as to suit it for the particular work it has to perform.

Barometers can be supplied to order of any style of architecture, so as to correspond with the furniture of libraries, halls, &c., or to drawing from design. Barometers are now mounted in so many varied styles, both plain and carved, that the following are given only as being those most in demand.

BAROMETERS.

FIG. 50.

FIG. 51.

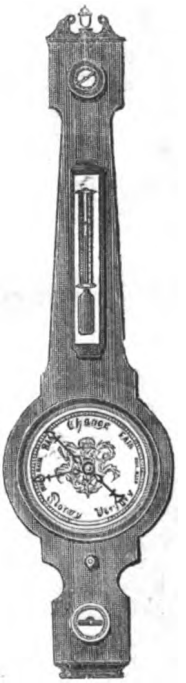


FIG. 56.

DIAL BAROMETERS,

Or Weather Glasses.

		Each. £ s. d.		Each. £ s. d.
50	8-in. **Silvered Brass Dial Barometer,** mounted in common mahogany or rosewood frame, with or without mirror, hygrometer, and level (fig. 50)	1 5 0	to	1 10 0
51	8-in. **Silvered Brass Dial Barometer,** mounted in common mahogany or rosewood frame, with or without mirror, hygrometer, level, and square bottom (fig. 51) . .	1 10 0		2 2 0
52	Ditto, superior finish, best engraving, and large tube, (fig. 51)	2 10 0		3 10 0
53	10-in. **Silvered Brass Dial Barometer,** in common mahogany or rosewood frame, with or without mirror, hygrometer, and level (fig. 50)	1 15 0		2 5 0
54	Ditto, square bottom, (fig. 51)	2 0 0		2 10 0
55	Extra best ditto, both as regards frame, dial, engraving, and tube, (fig. 51)			3 10 0

12-in. dial of the same patterns, from 15*s.* to £1 5*s.* extra.

Fig. 57.

Fig. 60.

Fig. 59.

		Each. £	s.	d.	Each. £	s.	d.
56	8-in. **Scroll Pattern Dial Barometer,** best mahogany or rosewood frame, silvered brass dial, elegantly fitted up with thermometer, (fig. 56 or 57)	2	10	0	3	0	0
57	Ditto, with black enamel figures and divisions on *porcelain dial*, and thermometer in front, (fig. 56)				3	15	0
58	Ditto, rosewood frame inlaid with *pearl*, with silvered brass dial, and thermometer in front	3	0	0	4	0	0
59	10-in. ditto, best rosewood frame inlaid with variegated *pearl and brass*, the dial of silvered brass, with thermometer, double basil ring, and polished-edge plate glass, superior finish, (fig. 59)				6	6	0
	12-in. dial ditto, at proportionate prices.						
60	14-inch best rosewood frame inlaid with variegated *pearl and brass*, the dial of silvered brass, and an eight-day pendulum clock fitted in the frame, thermometer, &c. (fig. 60). .	15	0	0	20	0	0
	Suitable for club-houses, mansions, &c.						

N.B.—DIAL BAROMETERS required for transmission to distant parts, such as India or the colonies, should be ordered *expressly*, as in that case they will be furnished with steel stopcock, to render them portable more effectually than can be done by the old method of plugging the tube. These additions will enhance the price of each barometer, 7*s*. 6*d*.

FIG. 63.

FIG. 64.

FIG. 66.

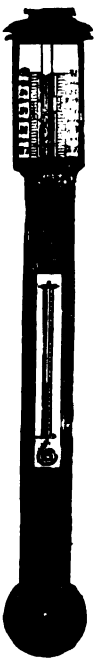


FIG. 67.

FIG. 68.

PORTABLE PEDIMENT BAROMETERS.

		Each. £	s.	d.	Each. £	s.	d.
61	**Small Portable Barometer,** mounted in mahogany frame, with ivory scale and sliding index				0	10	6
62	Ditto, larger size, with vernier reading to $\frac{1}{100}$th of an inch, thermometer, and screw to render it portable . . .				1	1	0
63	**Solid Mahogany or Rosewood Barometers,** with tube 0·25-in. diameter, ivory scale, thermometer, sliding vernier reading to $\frac{1}{1000}$th of an inch, the tube visible throughout the whole length, and portable screw (fig. 63) . . .				2	2	0
64	Ditto with tube covered and glass cover over the face, rackwork vernier, thermometer in front, with glass cover, (fig. 64)	2	10	0			
65	Ditto ditto, with square moulded top and two verniers .	3	0	0	3	10	0
66	Ditto ditto, bow-front, with 0·40-in. diameter tube, double rackwork vernier, the scales elegantly engraved on ivory plates, portable screw and thermometer, in oak, mahogany, walnut, or rosewood frame (fig. 66)	4	0	0	5	0	0
67	**Portable Rosewood Barometer,** elegantly fitted up, inlaid with pearl, thermometer in front, ivory scale, rackwork vernier reading to $\frac{1}{500}$th of an inch (fig. 67) . .	4	0	0	5	5	0
68	**Portable Barometer,** Gothic pattern, in either rosewood, mahogany, or oak frame, ivory scales, with two rackwork verniers reading to $\frac{1}{500}$th of an inch, German silver fittings (fig. 68)	5	5	0	6	0	0
69	**Large Barometers,** fitted in oak, mahogany, walnut or ebony frames, the tube 0·5-in. in internal diameter, and the cistern presenting an area of 3-inches, to ensure uniformity in reading, engraved ivory or *patent porcelain* scales, and two verniers working by rack and pinion, reading to $\frac{1}{500}$th of an inch	6	6	0	8	8	0
70	**The Fisherman's Barometer,** as made by Negretti and Zambra especially for the Board of Trade, to be fixed at all the principal fishing stations on the British coast .				5	5	0

This barometer consists of a large tube ·300-in. bore, mounted in a solid oak frame, firmly screwed together, with scales engraved on *porcelain* by Negretti and Zambra's new patent process. It is strongly recommended as a good sound working instrument, admirably adapted for use in public institutions.

MOUNTAIN BAROMETERS.

71	**Negretti and Zambra's Standard Mountain Barometer,** the only portable instrument made possessing all the essentials of a *standard barometer* (fig. 71), *see* page 2 .				8	8	0

With mahogany tripod stand which forms a travelling case.

FIG. 72.

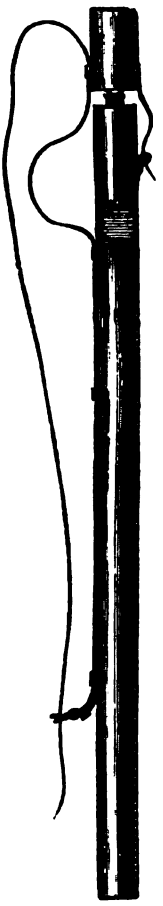


FIG. 71.

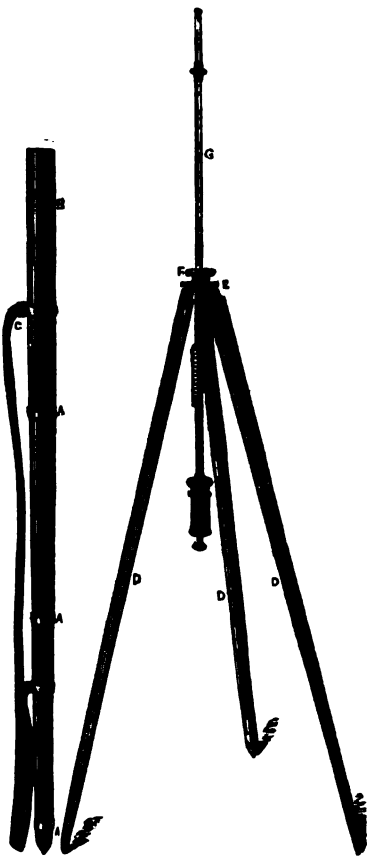


FIG. 74.

		Each. £ s. d.	Each. £ s. d.
72	**Gay-Lassac's Syphon Barometer,** with his original improvement for excluding the air from the column of mercury; running rackwork verniers at each extremity; a thermometer in the centre; the tube so constructed that the barometer will travel safely; reading to $\frac{1}{1000}$th of an inch, either from the centre by adding the two readings together, or from the whole length of the column by substracting the bottom reading from the top; (fig. 72) .		7 7 0
	In brass frame and leather sling case.		
73	Ditto ditto, with brass tripod stand and superior finish .		10 10 0
74	**Mountain Barometer,** with turned wooden frame, having brass shield and portable screw; brass scale, reading by vernier to $\frac{1}{1000}$th of an inch; and detached thermometer, (fig. 74)		4 4 0

Fig. 75.

Fig. 79.

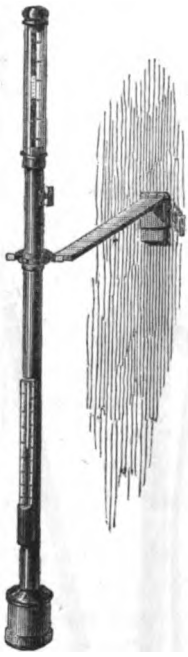


Fig. 76.

MARINE BAROMETER.

		Each. £ s. d.	Each. £ s. d.
75	**Marine Barometer,** in mahogany, rosewood, or oak frame, with ivory scale, sliding vernier, thermometer, and brass arm jimble, for suspension, complete (fig. 75) . . .	2 2 0	2 10 0
76	Marine Barometer, round, moulded, or carved top, with rackwork to vernier, thermometer in the front, and capillary tube to prevent the ingress of air into the column, even during the most violent oscillations of a storm (fig. 76)		3 3 0
77	Ditto ditto, in carved frame, or inlaid with pearl . .		4 4 0
78	Marine Barometer, with sympiesometer in front, combining the mercurial with the air barometer, and serving to check one with the other; the tube of the sympiesometer constructed and laid off with the greatest accuracy by actual experiments	5 5 0	6 6 0
79	**Board of Trade Standard Marine Barometer,** brass frame with iron cistern, as made by Negretti and Zambra for Her Majesty's Government		4 4 0

In travelling case, with lock and key.

FIG. 82.

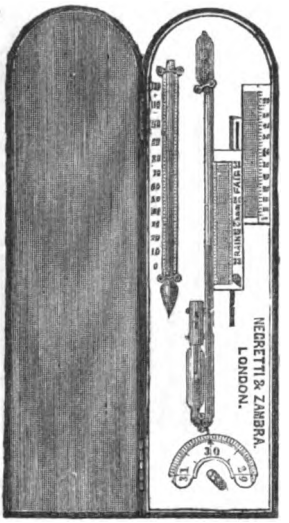


FIG. 83.

SYMPIESOMETERS.

		Each. £	s.	d.	Each. £	s.	d.
80	**Sympiesometers,** in best rosewood or mahogany frames, brass silvered plates, with registering index, plate glass front				2	10	0
81	Ditto ditto, with rack work movement to the barometer scale				3	3	0
82	**Small Sympiesometer,** with ivory plates, in morrocco case, suitable for travelling and for the pocket, 10-in. long, (fig. 82)	2	10	0	3	3	0
83	**Aneroid Barometers,** with card dials (fig. 83)				2	10	0
84	Ditto, with silvered metal dials				3	0	0
85	Ditto, with metal dials and thermometer				3	10	0
86	Ditto, for measuring heights, with vernier, and compensated for temperature, as supplied by Negretti and Zambra to the Royal Navy				4	10	0
87	**Bourdon's Barometers,** card dial				3	3	0
88	Ditto, metal dial and plate glass front				4	4	0
89	**Table Stands** in walnut, ebony, or mahogany, for either of the Aneroid or Bourdon's barometers	0	12	6	0	15	0
90	**Storm Glass,** or chemical barometer				0	5	6
91	Ditto ditto, mounted in mahogany frame				0	10	6

THERMOMETERS.

Fig. 98.

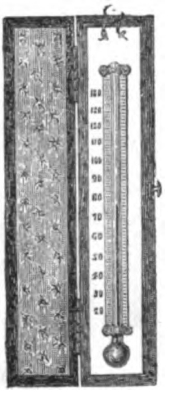


Fig. 99.

Fig. 92.

Fig. 95.

Fig. 105.

		Each. £	s.	d.	Each. £	s.	d.
92	6 or 8-in. **Boxwood Scale Thermometer**, (fig 92) . .	0	1	0	0	1	6
93	6 or 8-in. ditto, with enamel tube, and French polished scale	0	1	6	0	2	6
94	6 or 8-in. ditto, with enamel tube, and French polished scale, best make				0	3	6
95	6 or 8-in. ditto, with enamel tube, the scale bevelled at the edges, very superior (fig. 95)				0	4	6

PORTABLE OR POCKET THERMOMETERS.

96	3 or 4-in. **Ivory or Metal Scale**, in Morocco leather case	0	3	6	0	5	6
97	6-in. ditto ditto	0	4	6	0	7	6
98	8-in. ditto ditto (fig. 98)	0	7	6	0	10	6
99	**Oval Boxwood**, with tube and bulb sunk in the solid wood, to prevent breakage in travelling (fig. 99) . . .				0	7	6
100	**Oval Ivory** ditto				0	15	0
101	**Circular Thermometer**, with ivory scale in leather case, 2-in. in diameter				0	10	6
102	Ditto, 3-in. in diameter, with compass in centre . .	0	14	0	0	18	0
103	Ditto, 3-in. in diameter, with compass and sun dial in centre	0	15	0	1	0	0
104	**Compound Bar Metallic Thermometer**, in the form of a watch	2	10	0	3	0	0
105	**Negretti and Zambra's Improved Travelling Thermometer**, in plated metal or silver case, (fig. 105) . . Not larger than a pencil case; scale accurately divided on its own stem.	0	10	6	1	0	0
106	**Negretti and Zambra's** ditto ditto, in bronzed brass revolving case, 4 to 7-in long (fig. 106)	0	10	6	0	12	6
107	Ditto, German silver				0	15	0

FIG. 106.

FIG. 112A.

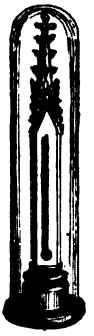


FIG. 112.

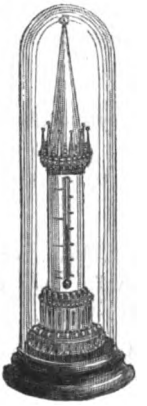


FIG. 113.

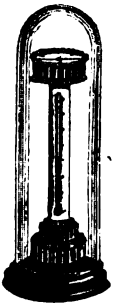


FIG. 110.

DRAWING ROOM THERMOMETERS.

		Each. £	s.	d.	Each. £	s.	d.
108	6 or 8-in. **Ivory Scale on Ebony Back**	0	6	6	0	10	6
109	10-in. ditto, extra large				0	15	0
110	**Ivory Scale on Ebony Stand,** with glass shade for table use, (fig. 110)	0	7	6	0	12	6
111	Ditto, on solid ivory stand	0	18	0	1	5	0
112	Ditto, handsomely engine-turned, and ornamented in numerous designs, (figs. 112 and 112A)	1	10	0	3	0	0
113	Ditto, with compass or sun dial at top, (fig. 113) . . .	1	5	0	2	10	0
114	10 or 12-in. **Glass Scales Thermometers,** superior workmanship and elegant appearance, on oak, mahogany or ebony backs, with Negretti and Zambra's enamelled tubes (fig. 114)	1	5	0	1	10	0

FIG. 119.

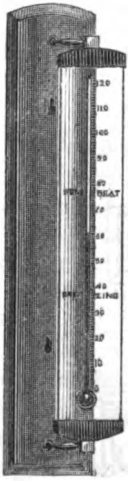
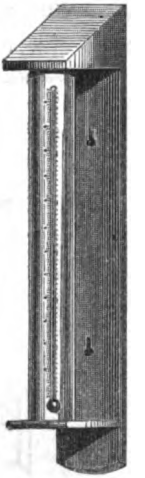


FIG. 114.

FIG. 115.



WINDOW THERMOMETERS,

FOR OUT-DOOR USE.

		Each. £	s.	d.	Each. £	s.	d.
115	8-in. **Ivory Scale**, enclosed in glass cylinder, on oak bracket, with metal top, (fig. 115)				0	10	6
116	10-in. ditto ditto	0	15	0	0	18	0
117	12-in. ditto ditto	0	18	0	1	0	0
118	10-in., 12-in., or 14-in. **Patent Porcelain Scale** mounted on oak or mahogany bracket, with brass supports for fixing at any angle, (see fig. 119)	1	5	0	2	0	0
119	Ditto **Glass Scale**, with enamel tube, the scale divided by engine, and handsomely mounted on oak bracket with brass supports, (fig. 119)	2	10	0	3	0	0

SELF-REGISTERING THERMOMETERS,

FOR HEAT.

120	**Rutherford's**, on boxwood or metal scale, with steel index (fig. 120)	0	3	6	0	7	6
121	Ditto, on Negretti and Zambra's patent porcelain scale in metal case				0	10	6
122	**Phillips'**, on boxwood or metal scale, with air index				0	7	6
123	Ditto, on Negretti and Zambra's patent porcelain scale, in metal case				0	10	6
124	**Negretti and Zambra's Patent Maximum Thermometer**				1	1	0
125	Ditto ditto, for solar radiation				1	5	0
126	Ditto ditto, in vacuum				1	10	0

See Meteorological Instruments.

FIG. 120.

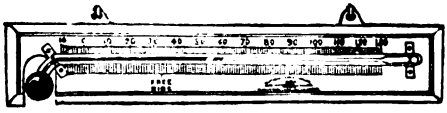
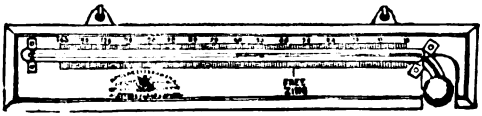


FIG. 127.



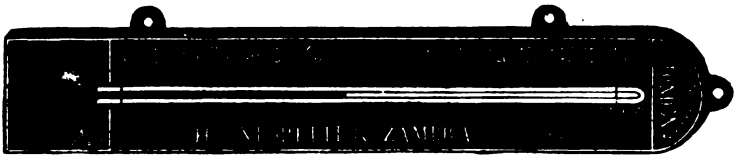
SELF-REGISTERING THERMOMETERS,

FOR COLD.

		Each. £	s.	d.	Each. £	s.	d.
127	**Rutherford's**, on boxwood or metal scale, with glass index (fig. 127)	0	3	6	0	6	6
128	Ditto, on Negretti and Zambra's patent porcelain scale, in metal case				0	10	6
129	**Negretti and Zambra's Standard Minimum Thermometer**				1	1	0
130	Ditto ditto, for terrestrial radiation				1	5	0
131	**Negretti and Zambra's Patent Mecurial Minimum Thermometer**				2	2	0

See Meteorological Instruments.

FIG. 132.



132	**Negretti and Zambra's Horticultural Thermometer** (fig. 132)				0	3	6

Strongly recommended in all the leading Horticultural Journals as the cheapest and best thermometer of the kind for garden purposes.

SELF-REGISTERING THERMOMETERS.

FOR HEAT AND COLD.

133	**Six's** 10-in on **Boxwood** or **Metal Scale**, in japanned case				0	15	0
134	Ditto 12 or 14-in. ditto ditto (fig. 134)				1	1	0
135	Ditto 10-in. on **Ivory** ditto	0	18	0	1	5	0

Copper cases 3s. extra.

136	Ditto, **Ivory Scale on Ebony Back**, for indoor use (fig. 136)				1	10	0
137	Ditto Negretti and Zambra's patent porcelain scale, on oak back	0	15	0	1	5	0
138	Ditto ditto, in metal cases, as fig. 134	0	15	0	1	5	0
139	**Negretti and Zambra's small size Patent Maximum and Minimum Thermometer**, arranged in a mahogany or leather case				1	15	0

Well suited for travellers to whom size and weight is an object.

Fig. 148.

Fig. 136.

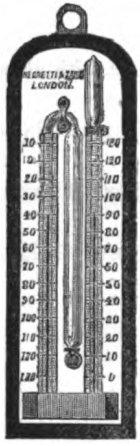


Fig. 134.

BOTANICAL THERMOMETERS.

		Each. £	s.	d.	Each. £	s.	d.
140	8-in. **Boxwood Scale,** in metal cases, range of scale, 0 to 120° or 150°				0	3	6
141	10-in. ditto ditto				0	5	6
142	12 to 14-in. ditto ditto	0	7	6	0	10	6
143	8-in. on Negretti and Zambra's patent porcelain scales				0	5	6
144	10-in. ditto ditto				0	6	0
145	12-in. ditto ditto				0	7	6
146	14-in. ditto ditto				0	7	6
147	**Hot Bed Thermometer,** in mahogany frame, encased in brass cylinder	0	18	0	1	5	0
148	**Thermometer,** for ascertaining the temperature of the earth at various depths, 5-ft. long (fig. 148)	1	5	0	1	10	0
149	**Delicate Thermometers,** for inserting in the stems and flowers of growing plants				0	10	6

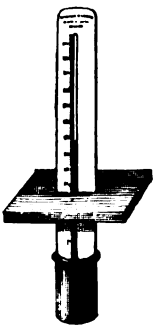
BREWERS' THERMOMETERS.

150	8-in. **Brass Scales,** in japanned metal	0	3	0	0	5	0
151	10-in. ditto ditto	0	3	6	0	6	0
152	12 and 14-in. ditto ditto	0	5	6	0	7	6
153	8-in. ditto, in copper cases enamelled tubes	0	4	6	0	6	6
154	10-in. ditto ditto	0	5	6	0	8	0
155	12 and 14-in. ditto ditto	0	7	6	0	10	6

		Each. £	s.	d.	Each. £	s.	d.
156	**Standard Reference Thermometers**	1	1	0			
157	8-in. **Porcelain Scales** Negretti and Zambra's **patent,** in japanned metal cases				0	4	6
158	10-in. ditto ditto				0	5	6
159	12 and 14-in. ditto ditto				0	7	6
160	8-in. ditto, copper cases				0	5	6
161	10-in. ditto ditto				0	7	0
162	12 and 14-in. ditto ditto (fig. 162)				0	10	6
163	**Gyle Tun Thermometers,** according to length, (fig. 148) .	0	15	0	1	10	0

FIG. 162.

FIG. 164.



BATH THERMOMETERS.

Same price and form as Brewers' Thermometers, (fig. 162.)

164	**Floating Thermometers,** for keeping constantly in water, (fig. 164)				0	7	6

CHEMICAL AND SURGICAL THERMOMETERS.

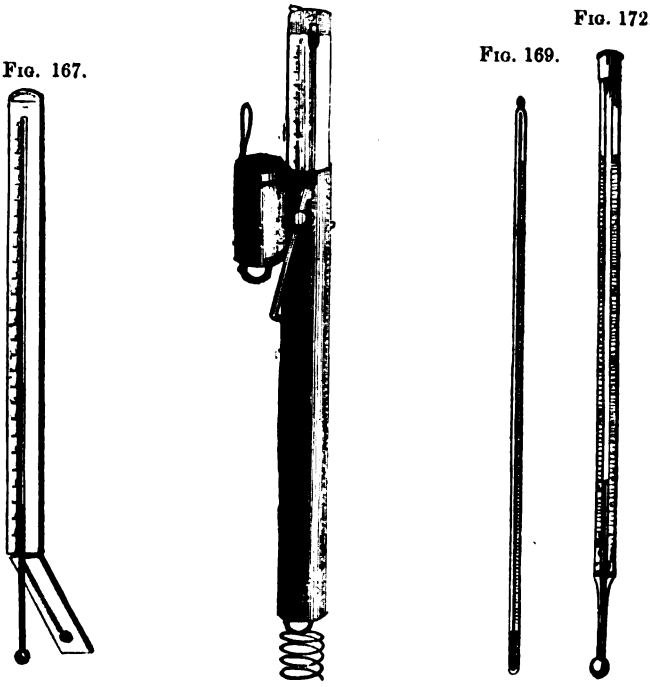
165	**Chemical Thermometer with Boxwood Scale,** graduated to 300°, the bulb projecting below the scale . . .				0	2	6
166	Ditto, graduated to 400°				0	4	0
167	Ditto, with brass hinge and jointed boxwood scale, to 600° (fig. 167)				0	7	6
168	Ditto, superior enamel tube, and French polished . .				0	10	6
169	Ditto, graduated on stem for inserting in the tubulure of retorts, to 400°, (fig. 169)				0	5	6
170	Ditto ditto, to 600°				0	7	6
171	Ditto, best make and engine divided				0	10	6

Fig. 178.

Fig. 172.

Fig. 169.

Fig. 167.



		Each. £	s.	d.	£	s.	d.
172	**Thermometers insulated in Glass Cylinders,** for acids, 40° to 212°, (fig. 172)				0	5	0
173	Ditto, 40° to 300				0	5	6
174	Ditto, 40° to 600°				0	7	6
175	**Delicate Thermometers of various forms,** for ascertaining the heat of the body	0	10	6	0	15	0
176	Ditto, Negretti and Zambra's patent self-registering . .				1	1	0

MARINE THERMOMETERS.

177	**Deep Sea Sounding Thermometer,** in copper case .				1	10	0
178	Ditto, self-registering, with valves and *patent porcelain scales,* as made and supplied to the Board of Trade and Admiralty, by Negretti and Zambra, (fig. 178)				2	2	0
179	**Board of Trade Thermometer,** the scale divided on its own stem, and fixed on Negretti and Zambra's *patent porcelain scales,* in japanned metal case				0	7	6
180	Ditto, copper case				0	8	6

FIG. 186.

FIG. 193.

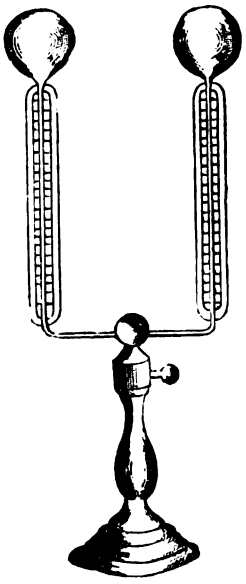
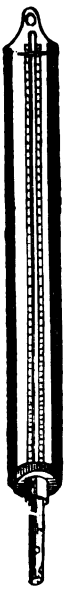


FIG. 198.



THERMOMETERS FOR SPECIAL PURPOSES.

		Each. £	s.	d.	Each. £	s.	d.
181	**Oven Thermometers** for high temperatures, on stand				0	12	6
182	Ditto, self-registering	1	1	0	1	10	0
183	**Milk** ditto for dairy use				0	7	6
184	**Patent** ditto for soap boilers				0	7	6
185	**Sugar-Boiling Thermometer,** 3 to 4-ft. long, graduated to 280° (see fig. 148)	0	18	0	1	5	0
186	**Steam Pressure Thermometers,** in strong brass cases, with plug for closing the boiler when the thermometer is not in use (fig. 186)	1	5	0	2	0	0
187	**Vacuum Pan Thermometers,** in strong brass cases, with hinged doors	1	10	0	2	10	0
188	**Beehive Thermometers**				0	5	6
189	**Boiling Point Thermometers,** for determining heights by observing the boiling point of water, divided to 0·1 degrees				1	10	0
190	Ditto, fitted with boiler lamps, and all necessary apparatus, in mahogany or leather case (see figs. 1 and 2, page 16)	3	0	0	5	5	0
191	**Standard Thermometers**	1	10	0	2	2	0
	See Meteorological Instruments.						
192	**Alcohol Thermometers,** for low temperature, scale 80° to + 100				0	15	0
193	**Leslie's Differential Thermometers,** for experiments on radiation (fig. 193)	0	15	0	1	0	0

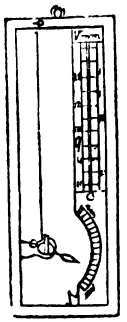
		Each. £ s. d.	Each. £ s. d.
194	**Air Thermometers,** fitted on scale for delicate experiments		0 7 6
195	Sets of six bulbs for illustrating the process of making thermometers		0 2 6
196	Ditto, ditto, for showing the expansion of different fluids		0 5 6
197	**Coloured Bulb Thermometers,** for experiments on radiation and absorption of heat		0 10 6
198	**Thermometer,** in brass frame, for hot air apparatus and high temperatures (fig. 198)		

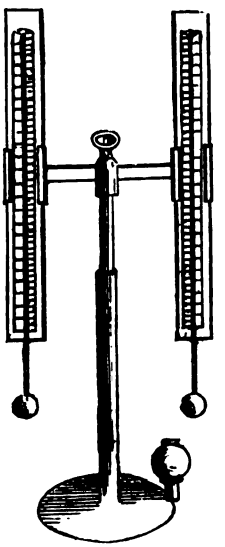
PYROMETERS.

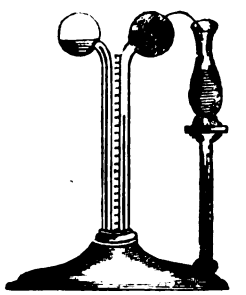
199	**Daniell's,** for indicating high temperatures	4 10 0
200	**Wedgwood's,** ditto ditto	
201	**Ferguson's,** for showing the difference of expansion in metals	3 10 0

HYGROMETERS.

Fig. 203. Fig. 204. Fig. 208.







202 **The Oat-beard Hygrometer,** or Damp Detector, a simple and useful instrument for ascertaining the comparative dryness and dampness of different apartments, beds, etc. . 0 10 6

Size of a small watch, for the pocket.

FIG. 205.

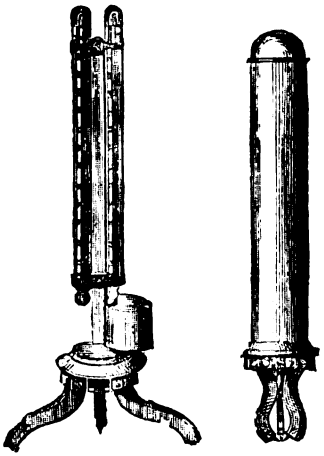
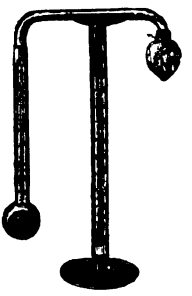


FIG. 206.



		Each. £ s. d.	Each. £ s. d.
203	**Saussure's Hygrometer,** for showing changes in the hygrometric condition of the atmosphere, by the contraction and elongation of a human hair, with thermometer attached to the scale (fig. 203)		1 5 0
204	**Wet and Dry Bulb Hygrometer,** sometimes called Mason's Hygrometer (fig. 204)	0 12 6	1 1 0
	See Meteorological Instruments.		
205	Ditto, arranged on brass tripod stand, with folding legs, and metal cover for protection (fig. 205)		3 3 0
206	**Daniell's Hygrometer,** for ascertaining the dew point by direct observation (fig. 206)		2 12 0
207	**Regnault's Condenser Hygrometer**		3 3 0
	See Meteorological Instruments.		
208	**Leslie's Thermometric Hygrometer** (fig. 208) . .		0 15 0

STEAM, VACUUM, HYDRAULIC, RAIN, AND GAS PRESSURE GAUGES.

STEAM GAUGES.

209	**Steam Gauges** (fig. 209), from 15 to 120-lbs., with mercurial tube, and union joint, adapted either at bottom or at the side of frame :—in mahogany frame . . .			2 2 0
210	Ditto	ditto	in iron ditto	2 7 0
211	Ditto	ditto	in brass ditto	2 10 6

Fig. 209.

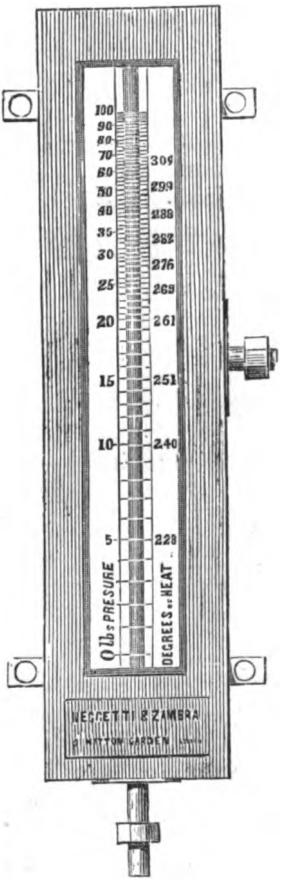
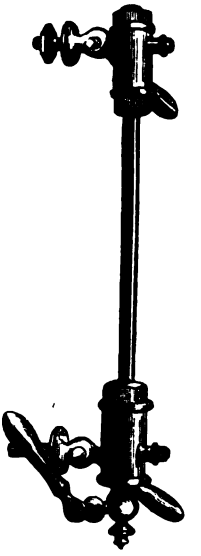


Fig. 212.



GUN METAL WATER GAUGES.

212 On an improved principle, with ebony handle spanners, complete with glass tube and vulcanized rubber rings :—

⅜-in.	½-in.	⅝-in.	¾-in.
30/	35/	40/	48/

		Each. £ s. d.	Each. £ s. d.
213	**Thermometric Pressure Gauge**, for shewing the pressure of vapour by taking its temperature (fig. 186) . .	1 5 0	2 0 0
214	**Schaeffer's Patent Metallic Pressure Gauge**, with graduated dial, ranging from zero to 30, 50, 80, 100, and upwards, to 300 pounds on the square inch . . .		4 0 0
215	Ditto, for hydraulic pressure, to 3,000 pounds . . .		10 10 0
216	**Bourdon's Pressure Gauge**, with metal taps, adapted for all pressures below nine atmospheres, in varnished cast iron box		2 10 0
217	Ditto ditto in round brass box		3 5 0
218	Small portable ditto, to ten atmospheres, with steel screws and plates for fixing to the machines, in case complete .		3 10 0
219	Ditto ditto to eighteen atmospheres		3 10 0

VACUUM GAUGES.

		Each. £ s. d.	Each. £ s. d.
220	**Vacuum Gauge** in mahogany or oak frame, for general purposes		2 2 0
221	Ditto ditto in iron frames		2 7 6
222	Ditto ditto in brass ditto		2 10 0
	These Gauges are the same form as (fig. 209)		
223	**Sugar Pan Vacuum Gauge,** the tube and scale enclosed in stout glass cylinder and brass frame, with door and hinges complete, with ground plug and stop-cock for fitting it to the pan (fig. 223)	1 10 0	2 10 0
224	**Marine Vacuum Gauge** in oak frame, iron cistern, stout glass tube, gun metal taps, and *patent porcelain scales* divided to $\frac{1}{100}$th of an inch, with mercury complete . .		4 4 0

Fig. 223.

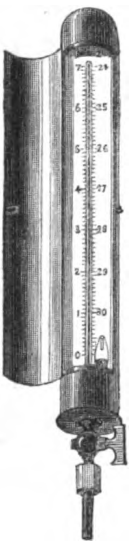


Fig. 225.

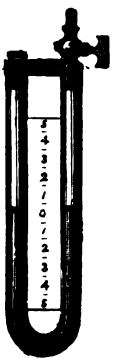
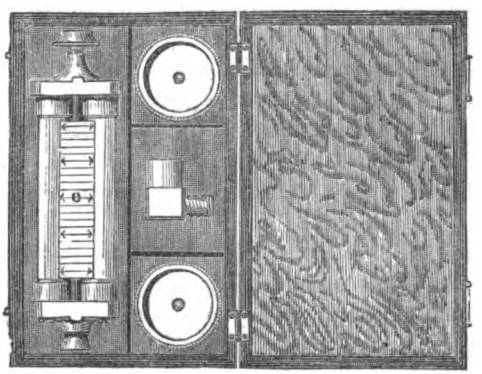


Fig. 226.



GAS PRESSURE GAUGES.

225	**Gas Pressure Gauge,** with 6 to 8-inch glass syphon, box-wood scale divided to inches and tenths, and brass mountings (fig. 225)	0 4 6	0 10 6
	With ivory scale, 1s. to 2s. extra.		
226	**Gas Inspector's Gauge,** with fittings complete in leather case (fig. 226)	1 10 0	2 0 0

FIG. 227.

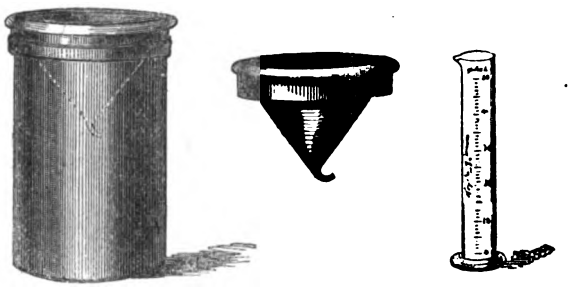
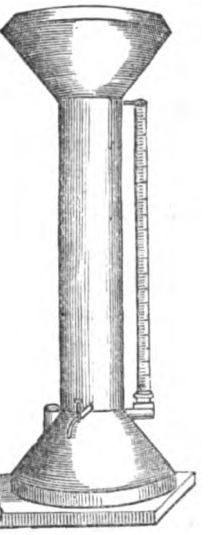


FIG. 229.



RAIN GAUGES.

		Each. £ s. d.	Each. £ s. d.
227	**Glaisher's Rain Gauge,** of japanned metal, with graduated measure (fig. 227)		1 1 0
228	Ditto ditto of japanned copper		1 10 0
	The graduated measure is divided into hundredths of an inch, according to the calculated weight of water, as determined by the area of the receiving surface.		
229	**Rain Gauge,** having accurately turned receiving surface of 12 inches diameter, and graduated glass gauge tube divided to inches, tenths, and hundredths of an inch, shewing by simple inspection the amount of rain fallen. In japanned metal with brass tap for emptying the gauge (fig. 229).	2 10 0	3 3 0
230	**Howard's Portable Rain Gauge,** with graduated glass measure		0 15 0
231	**Rain Gauge,** simple form, fitted with divided gauge rod to shew amount of rain fall in hundredths of an inch, and thousands of gallons per acre		1 10 0

HYDROMETERS, SACCHAROMETERS,

AND OTHER INSTRUMENTS FOR ASCERTAINING THE SPECIFIC GRAVITY OF FLUIDS AND SOLIDS.

232	**Hydrometer,** from ·700 to 1·000, for specific gravities lighter than water	0 6 6
233	**Hydrometer** from 1·000 to 1·850 or 2·000, for fluids heavier than water	0 6 6
234	**Beaume's** Hydrometer, ·0 to ·70, for fluids lighter than water (fig 234)	0 5 0

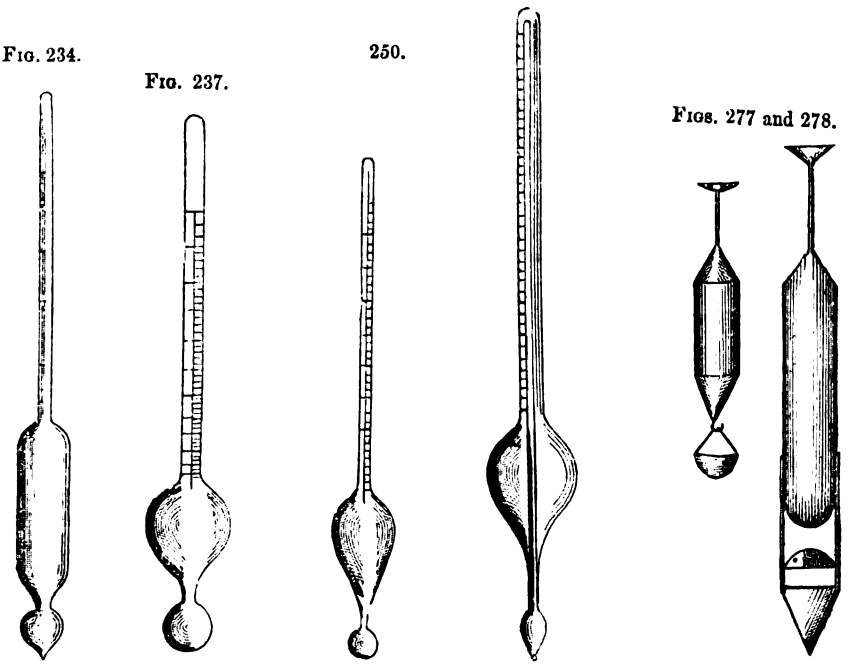
FIG. 264.

FIG. 234.

FIG. 237.

250.

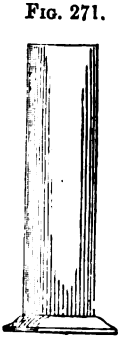
FIGS. 277 and 278.

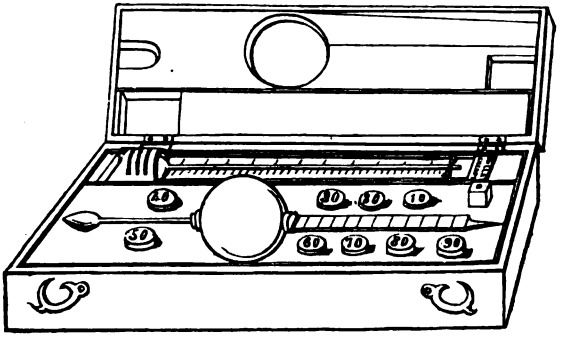


		Each. £ s. d.	Each. £ s. d.
235	**Beaume's** Hydrometer, ·0 to ·40 for cane-juice and similar fluids heavier than water		0 5 0
236	**Scheefer's** Hydrometers, with solution tube, and two spindles, one from ·700 to 1000, the other from 1000 to 1·900 per pair		0 12 0
	Very useful where only small quantities of fluids are to be experimented on.		
237	**Sykes's** glass Hydrometer, shewing per centages of proof spirit from 60 over proof to 40 under proof (fig. 237) .		0 5 6

FIG. 240.

FIG. 271.



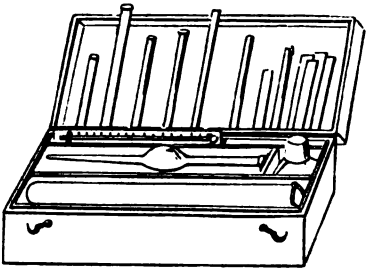


		Each. £	s.	d.	Each. £	s.	d.
238	**Sykes's** glass Hydrometer, in mahogany box, with thermometer				0	15	0
239	Ditto ditto with ivory sliding scale				1	1	0
240	**Sykes's** brass Hydrometer, as used by the Excise and Customs, with weights, thermometer, test glass, and directions for use (fig. 240)				3	10	0
241	Ditto ditto with comparative rule				4	0	0
	Book of Tables for the above, 10s.						
242	**Sykes's Pocket Hydrometer** in German Silver				0	15	0
243	Ditto, with thermometer, jar, and case				1	5	0
244	**Small Glass Hydrometers,** to any range of scale that may be desired, with sample glass and ivory scale thermometer, in mahogany case complete				0	15	0
245	Ditto, two in the set, from water to sulphuric ether				1	1	0
246	**Twaddell's** Hydrometers, Nos. 1, 2, and 3				0	3	6
247	Ditto ditto Nos. 4, 5, and 6				0	4	0
248	Price of the set complete, Nos.1 to 6				1	1	0
249	Set of six Twaddell's Hydrometers, in mahogany case lined with velvet, with thermometer graduated on the stem	1	10	0			
250	**Board of Trade Hydrometers** for taking the gravity of sea water (fig. 250)	0	5	6			
251	**Universal Hydrometer,** for all fluids from ·700 to 1·900, with solution tube, paper scale (fig. 251)	0	8	0			
252	**Hydrometer** for wines	0	5	6			
253	Ditto for syrups	0	5	6			
254	Ditto for soap (Beaumé's)	0	5	0			
255	Ditto for soap ley	0	5	0			
256	**Acidometer,** for estimating the strength of acids	0	7	6			
257	**Acetometer,** for vinegar	0	5	6			
258	**Barktrometer,** for tanners' use	0	6	6			
259	**Oleometer,** for fixed oils	0	5	0			
260	**Lactometer Tubes,** graduated to show the per centage of cream; a set of six in mahogany frame	0	15	6			
261	**Lactometer,** for ascertaining the specific gravity of milk				0	5	0
262	Ditto, simple construction, shewing the strength approximately				0	3	6
263	Ditto, made according to the plan suggested by Dr. Hassel in his work on the adulteration of food, &c.				0	5	0
264	**Negretti and Zambra's Hydrometer,** with thermometer in the stem, for shewing density and temperature in one instrument (fig. 264)				1	10	0
265	**Combined Glass Hydrometer and Saccharometer,** with thermometer, in mahogany case				1	5	0
266	**Brewers' Saccharometer,** glass, shewing pounds per barrel				0	5	6
267	Ditto ditto in mahogany box, with thermometer				0	15	0
268	**Brass Saccharometer,** with density rule, metal thermometer, and assay jar with one weight, in mahogany case				4	10	0

Fig. 251.

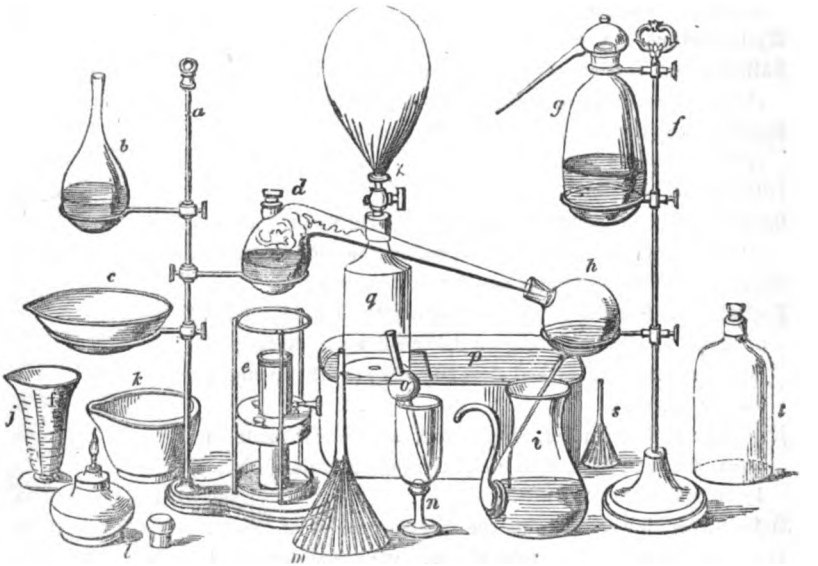
		Each. £ s. d.	Each. £ s. d.
269	**Aquarium Hydrometer,** for shewing the density of salt water		0 2 6
270	**Photographic Hydrometer,** shewing grains per ounce of nitrate of silver in solution		0 5 0
271	**Hydrometer Jars,** on foot (fig. 271)		0 2 0
272	**Salinometer,** for ascertaining the density of salt water in steam boilers, to prevent incrustation, glass or metal .	0 5 6	1 1 0
273	**Specific Gravity Beads,** for shewing the strength of spirits, set of twelve, in japanned tin box		0 6 6
274	Ditto, set of eighteen		0 10 6
275	**Specific Gravity Beads** for heavy and light fluids, such as ether, alcohol, ammonia, oils, wines, naptha, acids . each		0 1 0
276	**Specific Gravity Bottles** (see Chemical Section) . .		
277	**Nicholson's Gravimeter,** for ascertaining the specific gravity of gold, metals, minerals, or other solid substances; of japanned tin, with marked stem (fig. 277); with directions for use		0 6 0
278	**Nicholson's Gravimeter,** larger size, accurately made in *brass*, fitted in case, with weights ranging from $\frac{1}{10}$th to 1,000 grains (fig. 278)	1 15 0	2 0 0
279	**Urinometer,** for ascertaining the specific gravity of urine .		0 3 6
280	Ditto, in round leather pull-off case, with graduated test glass		0 6 6
281	Ditto ditto in case with hinges		0 7 6
282	Ditto ditto with test glass and thermometer . .		0 12 6
283	Ditto ditto in morocco case, handsomely fitted up with thermometer, spirit lamp, acid bottles, test glasses, dropping tube, graduated jar, test papers, &c. (fig. 283) . .		1 10 0

FIG. 283.



284	**Metal Urinometers,** gilt or plated		0 18 0
285	**Urinometer Test Papers** . . . . . per book		0 0 2

CHEMICAL APPARATUS.



GLASS, PORCELAIN, EARTHENWARE, &c.

FIG. 302.

FIG. 304.

		Each. £ s. d.	Each. £ s. d.
300	**Adapters** for connecting retorts to receiver; contents 1oz.		0 0 8
301	Ditto ditto, full size, for large operations:—		
302	Straight 8-oz. (fig. 302)		0 0 9
303	Ditto 16-oz.		0 0 10
304	Bent 8-oz. (fig. 304)		0 0 10
305	Ditto 16-oz.		0 1 0
306	**Air Jars,** per nest of six cylindrical		0 8 6
307	Ditto, larger		0 10 0
308	**Air Jar Tubes,** for experiments on the gases, with a mercurial trough:—		

Long .	2-in.	3-in.	4-in.	6-in.	6-in.
Width .	½-in.	⅝-in.	¾-in.	¾-in.	1-in.
Price .	3*d.*	4*d.*	6*d.*	9*d.*	10*d.*

		Each. £ s. d.	Each. £ s. d.
309	**Air or Gas Jars,** stout bell glass, with ground edges—		

		½ pts.	pts.	qts.	3 pts.	4 pts.
310	Narrow mouth, plain . .	1/	1/9	3/	4/	5/6
311	Ditto stoppered . . .	1/6	2/6	4/	4/6	6/6
312	Ditto, mounted with brass cap .	2/3	3/6	4/9	6/	7/6
313	Wide mouth, plain . . .	1/	1/9	3/	4/6	6/
314	Ditto, stoppered . . .	2/	2/9	4/6	6/	7/6
315	Ditto, mounted, with brass cap.	5/	6/3	7/6		

316 **Air Jars,** graduated into cubic inches and decimal parts, for mixing gases, capped or stoppered . . . from 0 6

317 Ditto, mounted with brass cap, two stop-cocks, connecting piece, ferrule and bladder . . . . . from 0 14 0

Fig. 318.

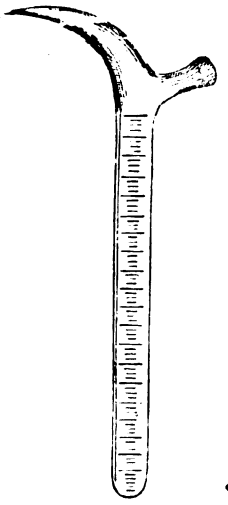


Fig. 321.

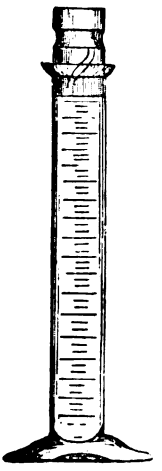


Fig. 320.

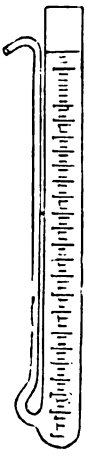


Fig. 319.

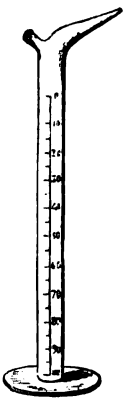
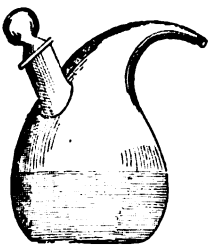


Fig. 322.



318	**Alkalimeters,** Binks' form (fig. 318)					0 5 6
319	Ditto ditto, on foot (fig. 319)					0 6 6
320	Ditto, Gay-Lussac's (fig. 320)					0 5 6
321	Ditto, old form (fig. 321)					0 6 0
322	**Schuster's Alkalimeter** (fig. 322)					0 1 6
323	**Alembics—**	4 oz.	8 oz.	16 oz.	qrt.	
324	Earthenware	2/6	3/6	4/6	6/6	
325	Glass	5/6	6/6	7/6	11/	
326	**Alembics** of German glass, 4 oz. and 6 oz. capacity, with moveable head, for experimental distillations, &c. (fig. 326)					0 2 0

Fig. 326.

Fig. 327.

Fig. 328.

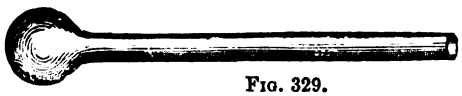


Fig. 329.

Fig. 332.

		Each. £	s.	d.	£	s.	d.
327	**Arsenic Tubes**, of hard German glass, Berzelius's form, (fig. 327) 3-in. long . . . . . per doz.				0	1	6
328	Ditto, Clark's form (fig. 328) 2-in. long,—per dozen . .				0	1	6
329	Ditto, Liebig's form (fig. 329) 3-in. long, ditto . .				0	1	6
330	Ditto ditto . . 3-in. long, ditto . .				0	1	6
331	Ditto, Rose's form . . 3-in. long, ditto . .				0	1	6
332	Funnel for introducing substances into tubes without soiling the sides (fig. 332)				0	0	6

BERLIN PORCELAIN.

333 **Alembics**, Berlin ware, with moveable heads, for the distillation of such substances as require a white heat . . 0 5 0

334 **Basins**, Evaporating, of Berlin ware, the depth equal to one-third the diameter :—

Contents	2-oz.	2½-oz.	3-oz.	4-oz.	6-oz.	8-oz.	10-oz.	16-oz.
Price .	/6	/7	/9	/10	1/	1/3	1/6	2/

Contents	1-pt.	2-pts.	4-pts.	7-pts.	10-pts.	16-pts.
Price .	2/6	3/6	5/	8/	9/	24/

335 **Basins**, evaporating, of Berlin ware, flat bottoms, with spout, shallow form ; depth, one-fourth the diameter :—

Contents	1½-oz.	2-oz.	3½-oz.	5-oz.	8-oz.	12-oz.	18-oz.
Price .	/6	/9	/10	1/	1/3	1/6	2/

336 **Basins**, evaporating, hemispherical form, of Berlin porcelain; depth, one-half the diameter :—

Contents . .	16-oz.	28-oz.	2-pts.	4-pts.	5-pts.
Price . . .	2/6	3/	4/	5/	6/

		Each. £ s. d.	Each. £ s. d.
337	**Basins,** small and thin, for Analytical Experiments, hemispherical form, and uniform in substance :—		
	Contents . ½-oz. ¾-oz. ¾-oz. 1-oz. 1½-oz. 2-oz.		
	Price . . /3 /5 /6 /8 /10 1/		
338	**Capsules** of Berlin porcelain, with spout and handle :—		
	Contents . . . . . 1-oz. 2½-oz. 4-oz.		
	Price . . . . . /10 1/ 1/2		
339	**Capsule** with handle, contents ¼-oz., very light; for weighing the residue of small operations		0 0 4
340	**Crucibles** and covers, conical shape, of Berlin ware, glazed, very thin and uniform .—		
	Contents . ⅛-oz. ¼-oz. ⅜-oz. ½-oz. 1-oz 2-oz. 3½-oz. 7-oz.		
	Price . /4 /6 /8 /10 1/ 1/2 1/4 1/8		
341	**Crucibles** and covers of cylindrical shape, glazed :—		
	Contents . . . . . ½-oz. 1-oz.		
	Price . . . . . /6 /7		
342	**Crucibles** of Berlin porcelain, not glazed, with perforated covers, for fusing nitrate silver, &c. :—		
	Contents . . . . . 1-oz. 2½oz.		
	Price . . . . . /7 /8		
343	**Drainers for Crystals,** Berlin porcelain, 5½-in. diameter, 2½-in. deep		0 2 0
344	Ditto ditto shallow form, 5-in. diameter, 1½-in. deep		0 1 6
345	**Mortars and Pestles** of Berlin porcelain, glazed or biscuit within :—		
	Diameter . . . . . 2-in. 3½-in. 4½-in. 5-in.		
	Price . . . . . /9 2/ 3/ 4/		
346	**Pneumatic Trough** for experiments, with tube apparatus in collecting such gases as require the use of mercury. This Trough works with only 4-lbs. of mercury . .		0 2 6
347	**Retorts** of Berlin porcelain, highly useful where a white heat is to be employed; stoppered or plain :—		
	Contents. Price Stoppered. Price Plain.		
348	3-oz. . . . . 3/6 . . . . . 2/6		
349	6-oz. . . . . 5/ 3/6		
350	12-oz. . . . . 8/ 6/		
351	Ditto ditto, larger size, for working with 10-lbs. of mercury		0 8 6
352	**Sulphuric Acid Dish,** for desiccating purposes by the aid of air-pump		0 4 6
353	**Tubes** of Berlin porcelain, for containing substances to be submitted to the action of gases whilst heated to redness :—		
	Length . 12-in. 18-in. 24-in. 18-in. 24-in. 18-in 24-in.		
	Diameter ⅛-in. ⅛-in. ⅛-in. ¾-in. ¾-in. 1-in. 1-in.		
	Price . 2/6 3/6 4/6 5/6 7/6 7/6 10/		
354	**Water Bath** of Berlin porcelain, consisting of an outer boiler and an inner capsule, for drying powders . .		0 2 6
355	**Water or Oil Bath** of Berlin porcelain, boiler and capsule in one piece, especially adapted for drying a precipitate contained on a filter		0 2 6

Fig. 385.

Fig. 373.

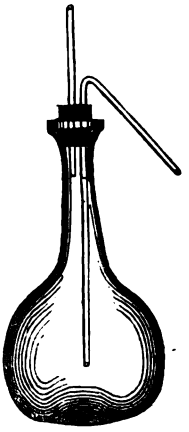


Fig. 356.

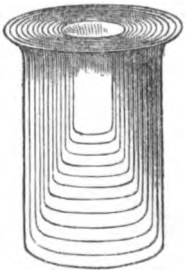


Fig. 357.

		Each. £ s. d.	Each. £ s. d.
356	**Beaker Glasses** (fig. 356), cylindrical form, with overhanging edges, so as to pour well, the glass uniformly thin and well annealed, of German manufacture :—		
	No. 1 No. 2 No. 3 No. 4 No. 5 No. 6 Contents 2-oz. 4-oz. 6-oz. 10-oz. 14-oz. 1-pt. No. 7 No. 8 No. 9 No. 10 No. 11 No. 12 Contents 1¾-pt. 2¼-pts. 4-pts. 5-pts. 7-pts. 9-pts.		
	The above sizes of these useful vessels can be obtained in sets of the following Nos. :—		
	Sets of . 3 5 8 12 5 3 4 7 Price . 1/6 2/6 5/ 10/6 3/6 2/6 5/6 8/		
357	**Beaker Tumblers**, for hot solutions, &c.; from their being less deep than beakers, are easier cleaned, and precipitates more easily removed. In sets of six (fig. 357) . .		0 5 0
358	**Bottles**, best flint glass, London, stoppered :—		

		Narrow mouth.	Wide mouth.
359	½-oz. and 1-oz. each	/6 per doz. 5/	/6 per doz. 5/
360	2-oz. . . .	/8 „ 7/	/9 „ 8/
361	3-oz. . . .	/9 „ 8/	/10 „ 9/
362	4-oz. . . .	/9 „ 8/6	/10 „ 9/6
363	6-oz. . . .	/10 „ 9/6	/11 „ 10/6
364	8-oz. . . .	1/ „ 10/6	1/2 „ 12/
365	16-oz. . . .	1/4 „ 15/	1/6 „ 16/
366	Quarts . . .	2/ „ 21/	2/3 „ 24/
367	3 pints . . .	2/6 „ 28/	3/ „ 33/

		Each. £	s.	d.	£	s.	d.
368	**Bottles,** acid, with elongated stoppers . . . from				0	1	0
369	Ditto, capped for ether, &c. 1-oz. 2/ 2-oz. 2/6 4-oz. 3/6 8-oz. 4/6						
370	Ditto, capped, and fitted into turned wood boxes, various .						
371	Ditto, small tube, for containing rare specimens, plain, per doz.				0	2	0
372	Ditto ditto, stoppered				0	8	0
373	**Bottles,** washing, (fig. 373) . . . . . from				0	1	6
374	Ditto ditto, with handle, for hot water, &c. . . .				0	3	0
375	**Capsules,** glass				0	0	3
376	**Crucibles, real Hessian,** triangular shape, in nests:—						
377	Nest of 3 Crucibles, Nos. 2 to 4				0	0	5
	„ 5 „ 1 to 5				0	0	9
	„ 6 „ 1 to 6				0	1	6
	„ 8 „ 1 to 8				0	2	6
378	**Crucibles, London-made Fire-clay,** round form, as used in the Mint and by the principal assayers and refiners. They are capable of resisting high temperatures without becoming spongy:— Height, without Covers 2½-in. 3-in. 4-in. 4½-in. 5-in. 6-in. 7-in. 8-in. Price . . . /1½ /2 /2½ /3 /3½ /5 /8 1/ Covers of the same material may be obtained to fit the various sizes, at the same prices as the Crucibles.						
379	**Crucible Cases and Covers** of fire-clay, to protect platinum crucibles from the immediate contact of coal in a fire, and raise them to where the heat is the most intense:—						
	2½-in. high . . . 2-in wide				0	0	6
	3¼-in. „ . . . 2½-in. „				0	0	8
	4-in. „ . . . 3-in. „				0	1	0
380	**Crucibles,** Wedgwood ware				0	0	8
381	Ditto, Berlin porcelain, various (*see* Berlin porcelain)						
382	Ditto, skittle shaped, 3 to 12-in. high	0	0	2	0	1	6
383	Ditto, round, with covers . . . . . from				0	1	6
384	**Calcining Pots,** to open in the middle	0	6	0	0	2	0
385	**Cooper's Receiver,** for collecting gases over mercury (fig. 385)				0	1	6
386	Ditto graduated				0	6	0
387	**Cryophorous,** Wollaston's, or Frost Bearer (figs. 387 & 387*)				0	4	0
388	**Cubic Inch Tubes,** graduated into 10ths and 100ths . .				0	4	0
389	Ditto **Bottles** (*see* Specific Gravity Bottles.)						
390	**Deflagrating Jars** (*see* Gas Receivers.)						
391	**Dishes,** glass, various shapes . . . . . from				0	2	6
392	Ditto, evaporating, Berlin ware, various (*see* Berlin porcelain)						

Fig. 387*

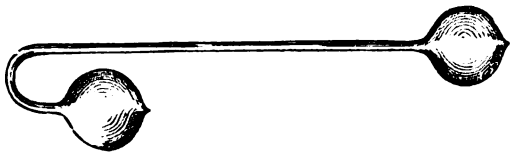


Fig. 387.

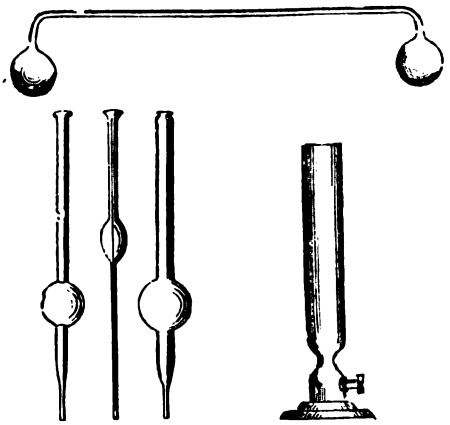


Fig. 394.

Fig. 396.

Fig. 401.

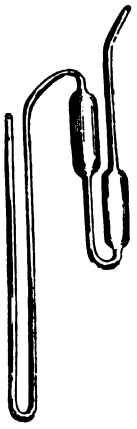


Fig. 402.

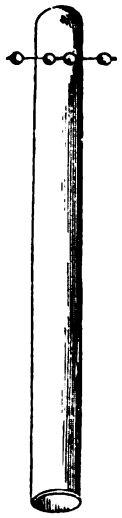
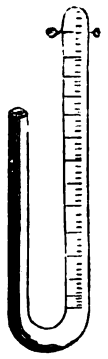
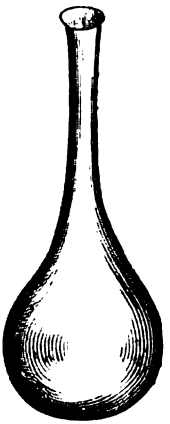


Fig. 403.

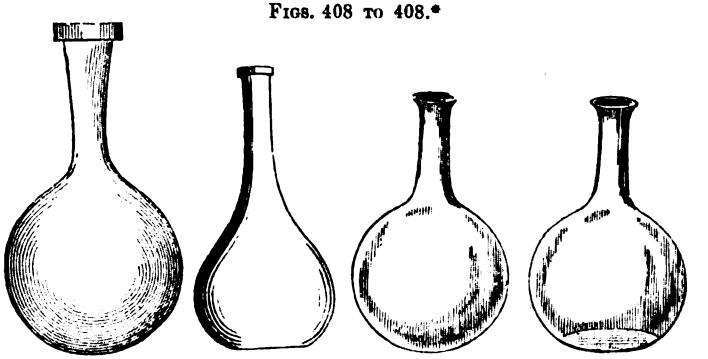


		Each. £ s. d.	£ s. d.
393	**Dishes,** evaporating, Wedgwood ware, not liable to stain or crack :—		
	Diameter . 2-in. 3-in. 4-in. 5-in. 6-in. 7-in.		
	Price . . /4 /6 /9 1/ 1/4 1/8		
	Diameter . . 8-in. 9-in. 10-in. 11-in. 12-in.		
	Price . . . 2/ 2/6 3/ 3/9 4/6		
	Larger sizes to 24-in. diameter.		
394	**Dropping Tubes** (fig. 394) . . . . /4 /6 and		0 0 8
395	**Dropping Bottles**	0 1 6	0 2 6
396	**Desiccating Jars,** for drying gases by the aid of chloride of calcium (fig. 396)		0 10 6
397	**Desiccating Tubes,** for drying small quantities of gases, with one bulb, and the end straight		0 0 6
398	Ditto ditto, the end bent		0 0 6
399	Ditto ditto, larger		0 1 0
400	**Evaporating Dishes** (*see* Dishes.)		
401	**Ettling's Gas Transferrers,** for transferring a small portion of a gas, various forms (fig. 401)		0 3 6
402	**Eudiometer, Volta's,** graduated to 200 divisions = 2 cubic inches (fig. 402)		0 7 6
403	**Eudiometer, Ure's U-shape** (fig. 403), graduated to 200 divisions = 2 cubic inches		0 9 6

FIG. 404.



FIGS. 408 TO 408.*



		Each. £ s. d.	Each. £ s. d.
404	**Flasks,** Florence (fig. 404)		0 0 3
405	Ditto, white flint glass, wide and narrow mouthed, with round and flat bottoms, from 1-oz. to 1-qt. . . from		0 0 3
406	Ditto, with bent tubes for generating gases		0 1 6
407	**Flasks,** mounted with stop-cock, for weighing gases . .		0 7 6
408	**Flasks of hard German Glass,** capable of resisting extreme and sudden changes of temperature; flat or round bottoms (figs. 408 to 408*) :—		

Contents	2-oz.	4-oz.	6-oz.	8-oz.	12-oz.	16-oz.	24-oz.	32-oz.
Price	/4	/5	/6	/9	1/	1/3	1/9	2/3

409 **Funnels** of glass (fig. 409), of such a shape that a vertical section would be an equilateral triangle, to receive the ordinary folded filter without fear of fracture :—

No.	1.	2.	3.	4.	5.	6.	7.	8.
Diameter	1½-in.	1½-in.	2-in.	2½-in.	3-in.	4-in.	5-in.	6-in.
Price	/3	/3	/4	/5	/6	/8	1/	1/6

410 **Funnels** for Gas Bottles, &c., of blown glass :—

Length	4-in.	13-in.	18-in.	20-in.	24-in.
Price	/4	/6	/9	1/	1/3

FIG. 409.

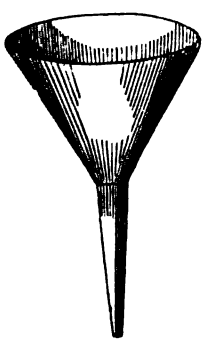


FIG. 413.

FIG. 414.

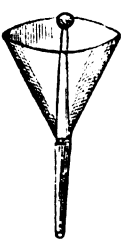


FIG. 411.

Fig. 415.

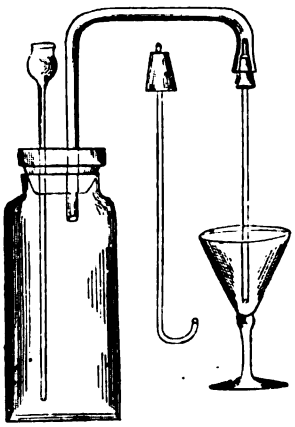


Fig. 418.

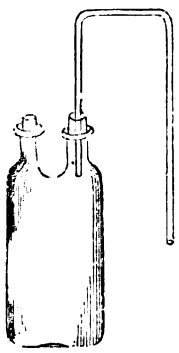
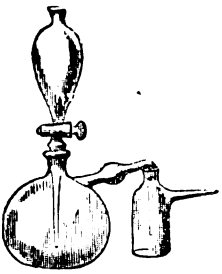


Fig. 418.*



		Each. £ s. d.	Each. £ s. d.
411	**Funnels** for filling plain Retorts without soiling the neck, (fig. 411)		0 2 6
412	**Funnels,** Wedgewood ware, best quality, from 1-oz. to 2-qts. from		0 0 8
413	**Funnels** with handle (fig. 413)		0 2 0
414	Ditto, with stopper (fig. 414)		0 3 6
415	**Clark's Gas Bottle** (fig. 415), for preparing sulphureted hydrogen, &c.		0 2 0
416	**Gas Bottle,** simple form, 16-oz. flask, with bent glass tube .		0 1 0
417	**Oxygen Gas Retort** consisting of a hard glass tube, to which is fitted a bent tube. For making *pure* oxygen from equal parts of dried and pulverised chlorate of potash and oxide of manganese, by the heat of a spirit lamp		0 1 6
418	**Gas Bottle** with intermediate washing vessel, for the production of small quantities of sulphureted hydrogen gas, when used as a test (see fig. 418 or 418*) . . .	0 1 0	0 3 0

419 **Gas Receivers or Deflagrating Jars** (figs. 419 and 419*), for containing and preserving gases for experiment:—

Height.	Width.	Price Plain.	Price Stoppered.
5-in. . .	3-in. . .	1/ . .	1/6
7-in. . .	4-in. . .	1/9 . .	3/
9½-in. . .	5¼-in. . .	2/6 . .	5/
11½-in. . .	6¼-in. . .	4/6 . .	7/6

420	**Gas Receivers** mounted with brass cap, stop-cock, bladder ferrule, and bladder:—		
	7-in. high . . .	4-in. wide	0 8 0
	9-in. „ . . .	5-in. „	0 10 6

FIG. 419.*

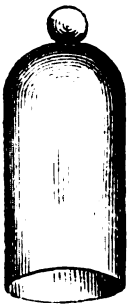


FIG. 419.

FIG. 419.**

FIG. 422.

		Each. £	s.	d.	Each. £	s.	d.
422	**Gas Receiver** (fig. 422) mounted with two stopcocks and globe receiver, for weighing gases; the receiver graduated into cubic inches				1	1	0
423	**Globular Receiver,** with welted mouth, for shewing effectually the combustion of phosphorous, &c., in oxygen gas .				0	4	0
424	Stand for above of iron plate				0	1	0
425	**Gas Jars, Cylindrical,** stoutly made, for exhibiting the explosive nature of a mixture of oxygen and hydrogen:—						
	5-in. high . . . 1¼-in. wide				0	0	6
	6-in. „ . . . . 1½-in. „				0	0	9
	9-in. „ . . . . 1¾-in. „				0	1	0
426	**Graduated Gas Tubes,** for measuring gases, &c. (fig. 426):						
	4-in. ⅜-in. about 1 cubic inch, shewing $\frac{1}{100}$ths cubic inch				0	4	6
	6-in. ½-in. „ 1 „ „ $\frac{1}{100}$ „				0	4	6
	7-in. ¾-in. „ 3 cubic inches „ $\frac{1}{50}$ „				0	5	6
	10-in. 1-in. „ 8 „ „ $\frac{1}{10}$ „				0	6	0
	12½-in. 1¼-in. „ 15 „ „ $\frac{1}{10}$ „				0	9	0
427	**Dumas's Gas Tubes,** for Nitrogen determinations, 17-in. by 1¼-in., containing about 20 cubic inches, and divided to either $\frac{1}{10}$th of a cubic inch or cubic centimetres . .				0	12	6
428	**Liebig's Gas Absorber,** for saturating a liquid with gas, and useful in preparing a solution of any gas . . .				0	1	6
429	**Kerr's Gas Tube,** stoppered and graduated to 2 cubic inches, so as to shew $\frac{1}{10}$th of a cubic inch (fig. 429) . . .				0	6	0
430	**Glass Plates,** ground for covering air jars:—						

Square . . .	2-in.	2½-in.	3-in.	4-in.	8-in.
Price . . .	/6	/9	/10	1/2	2/

431	**German Glass Tubing,** free from lead, in lengths of about 36 or 18 inches, for convenience of packing:—				
	¼-in. bore and under . . . . . per lb.			0	2	6
	½-in. „ down to ¼-in. . . . „			0	2	3
	¾-in. „ „ ½-in. . . . „			0	2	0

Fig. 426. Fig. 429.

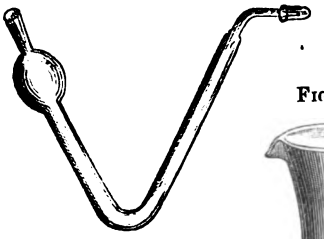


Fig. 438.

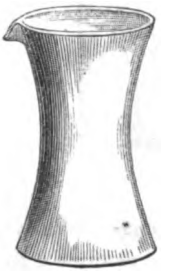


Fig. 440.

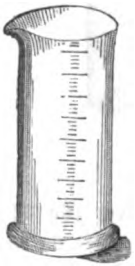
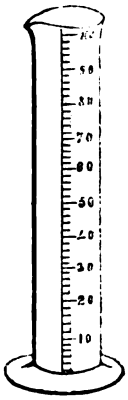


Fig. 450.



		Each. £ s. d.	Each. £ s. d.
432	**Flint Glass Tubing,** containing lead, and consequently very soft, can be easily bent and worked:—		
	¼-in. bore and under . . . . . per lb.		0 2 6
	½-in. „ down to ¼-in. . . . „		0 1 9
	1-in. „ „ ½-in. . . . „		0 1 6
433	**German Glass Combustion Tube** (*see* Organic Analysis).		
434	**Glass Rod,** of various diameters . . . . per lb.		0 2 6
435	**Glass Inhalers**		0 10 6
436	**Lamps,** glass spirit, ground tops . . . . 2/ 3/ 4/ to		0 6 6
437	Ditto, common		0 1 6
438	**Lixiviating Jars** (fig. 438) of German glass, strong and convenient in shape, suitable for all operations where hot fluids are not employed:—		

Contents	1-pt.	1½-pt.	2-pts.	3-pts.
Price	/10	1/	1/4	2/

439 **Measures,** Graduated Glass, conical form, shewing ounces and drachms:—

Conical Form	1-oz.	2-oz.	4-oz.	6-oz.	10-oz.	20-oz.	30-oz.	40-oz.
Price . .	1/3	1/4	2/	2/3	3/6	5/	6/6	8/6

440 Ditto, cylindrical form (fig. 440), shewing ounces and drachms:—

Cylindrical .	1-oz.	2-oz.	4-oz.	6-oz.	10-oz.	20-oz.	30-oz.	40-oz.
Price . .	1/2	1/4	2/	2/3	3/	4/6	6/	7/6

Measures divided to shew any measure or graduation.

441	**Measures,** glass, one dram, divided into drop or 60 minims .		0 1 2
442	Ditto, cubic inch on foot, divided into 10ths . . .		0 5 6
443	**Mercurial Trough,** glass or porcelain. . . from		0 2 6

FIG. 454.

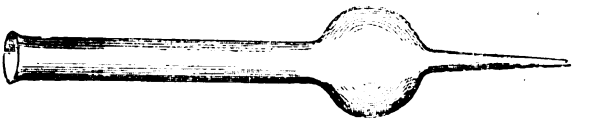


FIG. 455.

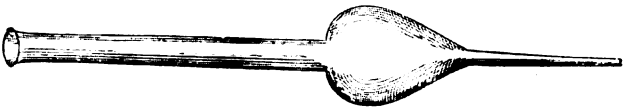


FIG. 456.

		Each. £ s. d.	Each. £ s. d.
444	**Mortars and Pestles,** Agate.		
	The prices given are only approximate, as they vary according to the soundness of the materials, as well as size :—		
	Diameter 1¼-in. 1½-in. 1¾-in. 2-in. 2¼-in. 2½-in.		
	Price . 8/ 9/ 9/6 10/ 12/ 15/		
	Diameter . . 2¾-in. 3-in. 3½-in. 4-in. 4½-in.		
	Price . . . 17/6 20/ 30/ 55/ 60/		
445	**Mortars,** Berlin porcelain (*see* Berlin porcelain)		
446	**Mortars and Pestles,** best quality, Wedgwood ware :		
	Diameter 2¼-in. 2½-in. 3-in. 3½-in. 3¾-in. 4¾-in. 6¼-in.		
	Price . /10 1/ 1/ 1/2 1/4 2/ 4/6		
447	Ditto in stout glass 2/ 2/6 3/6 4/ 6/6		
448	**Muffles** . . . . . /9 1/ 1/6 and		0 2 6
449	**Mixing Jars** for Alcalimetry		0 0 9
450	**Test Mixers** (fig. 450), for preparing Test Acid ; containing 1000 septems, divided into 100 divisions		0 9 0
451	**Parting Glasses,** for assaying . . . . . from		0 0 8

FIG. 457.

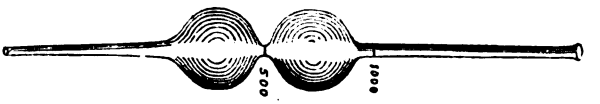


FIG. 465.

FIG. 463.

FIG. 464.

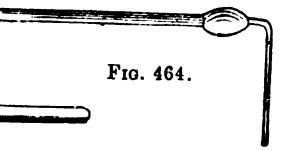


FIG 463.*

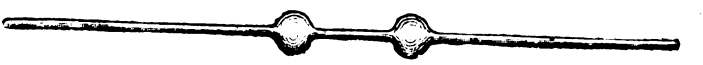


Fig. 471.

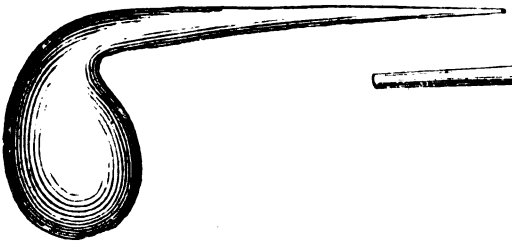
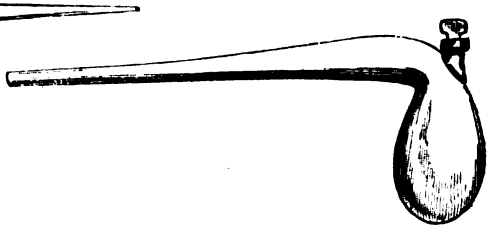


Fig. 470.



		Each. £	s.	d.	Each. £	s.	d.
452	**Pipettes,** or Dropping Tubes:						
453	Straight, 6-in. long				0	0	3
454	Ditto, with bulb (fig. 454)				0	0	6
455	Ditto (fig. 455)				0	0	6
456	Ditto, with elongated bulb, for use in edulcoration (fig. 456)				0	1	0
457	**Pipette,** with two bulbs, for delivering exactly 500 and 1000 grains (fig. 457)				0	5	0
458	**Pipettes,** for delivering exactly 1000, 700, 500, 350, or 50 grains, or any quantity to order				0	3	6
459	**Percolator Glass,** for preparing tinctures, &c. from				1	10	0

		1-oz.	2-oz.	4-oz.	8-oz.	10-oz.					
460	**Precipitating Glasses** on foot	/8	/10	1/2	1/6	2/0					
461	Ditto ditto Phillips's	/7	/8	/9			0	1	0		
462	**Pulse Tubes**						0	1	3		
463	**Reduction Tubes,** 12-in. tube, 1 or 2 bulbs, straight (figs. 463 and 463*)						0	1	0	0	1 3
464	Ditto ditto 1 or 2 bulbs, bent (fig. 464)						0	1	0	0	1 3
465	**Reduction Tube,** with one bulb, the tube bent, for shewing the decomposition of oxide of copper by heat, when submitted to an atmosphere of hydrogen (fig. 465)									0	1 3
466	**Retorts,** earthenware, to open in the middle, for easy removal of contents						0	2	0	0	3 0
467	Ditto, earthenware, plain									0	0 10
468	Ditto, of hard glazed stoneware from									0	7 6
469	Ditto, of Berlin porcelain (*see* Berlin porcelain)										
470	**Retorts** of hard German glass (figs. 470 and 471): —										

	Contents	2-oz.	4-oz.	6-oz.	8-oz.	12-oz.	1-lb.	1½lb.	2lb.	3lb.
471	Plain	/6	/6	/7	/8	/9	1/	1/2	1/6	2/
472	Tubulated	/8	/8	/9	/10	1/	1/3	1/6	1/10	2/6
473	Stoppered.	1/2	1/2	1/3	1/4	1/6	1/10	2/	2/4	3/0

Fig. 475.

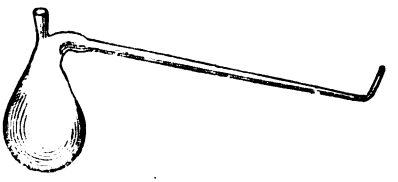


Fig. 476.

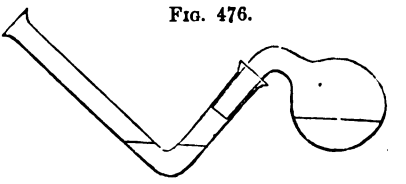


FIG. 478.

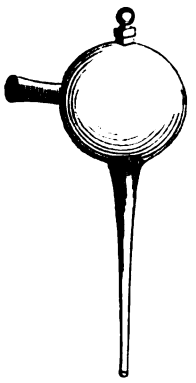


FIG 477.

FIG. 479.

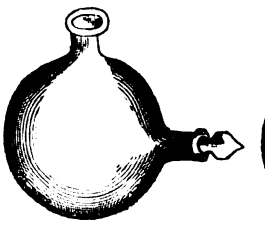
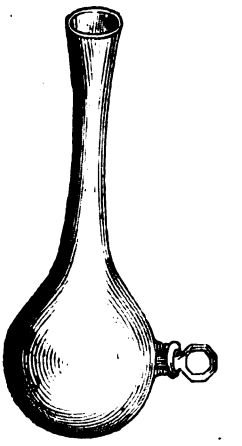


FIG. 481.



		Each. £	s.	d.	£	s.	d.
474	**Retorts** of blown glass, 1 to 2-oz. capacity, plain and stoppered	0	0	9	0	1	3
475	Ditto ditto, with bent point (fig. 475)				0	1	6
476	**Retort and Receiver,** Clark's (fig. 476); capacity of retort, 2-oz.; receiver, 9-in. by ¾-in.				0	1	6
	This apparatus will be found exceedingly useful in small distillation; also for preparing small quantities of the liquid acids for testing.						
477	**Receivers,** plain, bolt heads (fig. 477):—						

Contents .	2-oz.	4-oz.	6-oz.	8-oz.	12-oz.
Price .	/6	/6	/7	/8	/9
Contents .	1-lb.	1½-lb.	2-lb.	3-lb.	
Price .	1/	1/2	1/6	2/	

478	**Receivers** for preparing nitric acid (fig. 478), contents 50-oz.				0	4	6
479	Ditto, with welted rims, short neck (fig. 479):						

Contents .	1-lb.	1½-lb.	2-lb.	3-lb.
Price . .	1/	1/2	1/6	2/0

480 Ditto, with tubulure stoppered, the neck short:—

Contents .	4-oz.	6-oz.	8-oz.	12-oz.
Price . .	/8	/9	/10	1/
Contents .	1-lb.	1½-lb.	2-lb.	3-lb.
Price . .	1/2	1/6	1/10	2/

481 **Receivers,** with tubulure stoppered, the neck long (fig. 481):

Contents .	4-oz.	6-oz.	8-oz.	12-oz.
Price . .	1/2	1/3	1/4	1/6
Contents .	1-lb.	1½-lb.	2-lb.	3-lb.
Price . .	1/10	2/	2/6	3/

482	**Receivers** with three necks	0	3	6	0	8	6
483	**Receivers,** V shaped, small size, of German glass, length of leg 7⅛-in., diameter ¾-in., and 14-in. long, ⅞-in wide (fig. 483)	0	1	0	0	1	3
484	Ditto, U shaped, large size, of German glass, length 17-in. diameter ¾-in.				0	1	6
485	Ditto ditto 21-in. by 1⅛-in.				0	2	6

Fig. 486.

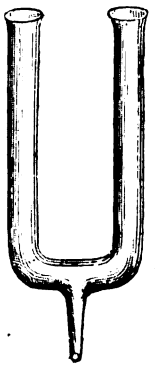


Fig. 489.

Fig. 490.

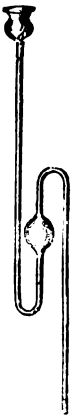
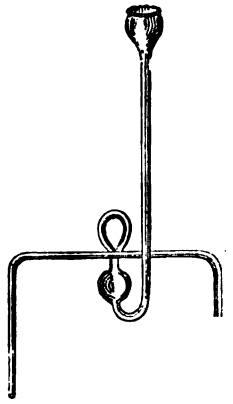


Fig. 491.

Fig. 493.



		Each. £ s. d.	Each. £ s. d.
486	**Receivers,** with delivery tube (fig. 486), for distilling small portions of such substances as require the receiver to be completely surrounded by ice or freezing mixture .		0 3 6
487	Ditto ditto fitted to a japanned copper vessel, forming a very complete apparatus for distillation		0 8 6
488	**Receivers,** of blown glass, 1-oz. to 2-oz. capacity :—		
	Plain		0 0 6
	Tubulated		0 0 9
489	**Safety Funnel** for gas bottle and retorts, simple form (fig. 489)		0 1 6
490	Ditto, with bulb (fig. 490)		0 1 9
491	Ditto, with elongated bulb (fig. 491)		0 1 9
492	Ditto, with four bulbs, preventing any fluid in the funnel reaching the retort by sudden condensation . . .		0 2 6
493	Ditto, Welter's (fig. 493)		0 3 0
494	Ditto, with two valves, which obviate the necessity of using mercury or fluid in the funnel (fig. 494)		0 3 6
495	**Separating Funnel,** with stop-cock and ground glass cover (fig. 495)		0 12 6
496	Ditto, with stop-cock (fig. 496)		0 9 0
497	**Separating or Florentine Receiver** (fig. 497) :—		
	24-oz.		0 2 9
	60-oz.		0 4 0
498	Ditto (figs. 498 and 498*), with stop-cock and stopper .		0 10 6
499	**Specific Gravity Bottles,** of 1000 grains capacity, with adjustable counterpoise, in japanned tin case . . .		0 6 6
500	Ditto, of 500 grains		0 6 0
501	Ditto, of 250 grains		0 5 6
502	Ditto, 1 cubic inch		0 5 6

FIG. 494.

FIG. 495.

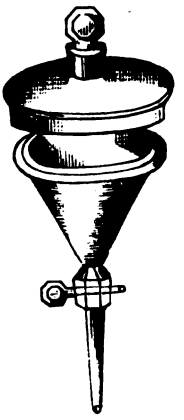


FIG. 483.

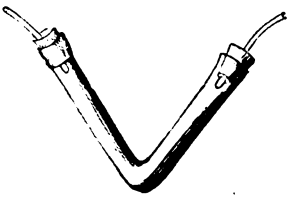


FIG. 496.

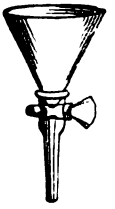


FIG. 497.

FIG. 498.

Each. £ s. d.

Each. £ s. d.

503 **Spirit Lamps** of glass, with ground caps and brass wick-holders (figs. 503 and 503*) :—

Contents	2-oz.	3-oz.	5-oz.	7-oz.
Price	1/6	2/	2/6	5/6

If with screw wick-holders, 6d. each extra.

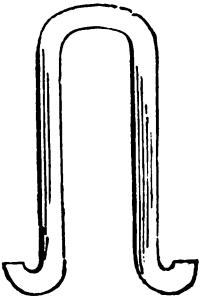
504 **Spoons**, of blown glass, exceedingly useful for transferring small quantities of acid, &c., from one vessel to another . 0 0 6

FIG. 498.*

FIG. 503.

FIG. 503.*

FIG. 515.



505 **Stirrers**, of soft glass, that do not scratch glass vessels in which they are used ; prepared with one end knobbed and the other pointed :—

Length	4-in.	6-in.	9-in.	12-in.
Thickness	¼-in.	¼-in.	¼-in.	¼-in.
Price (per doz)	1/	1/3	2/6	3/0

Fig. 516.

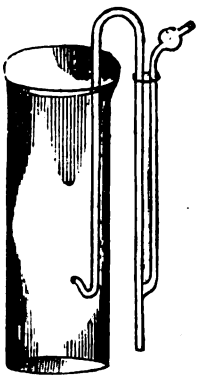


Fig. 517.

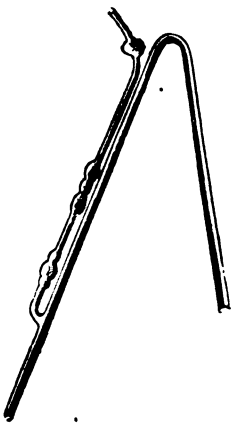
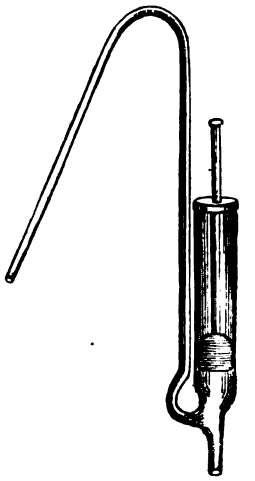
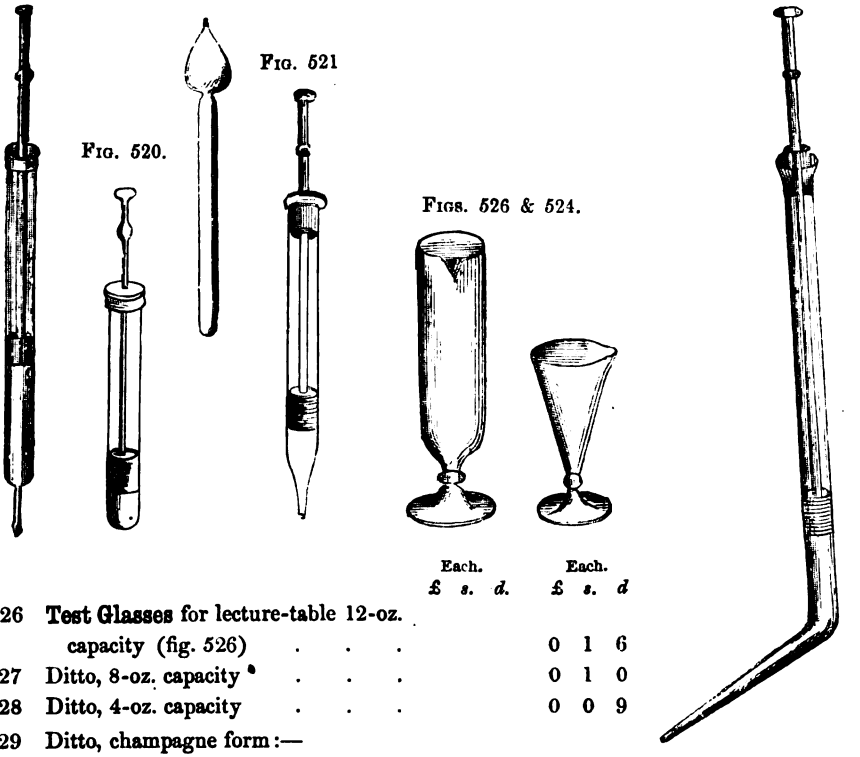


Fig. 519.



		Each. £ s. d.	Each. £ s. d.
506	**Stirrers** unprepared, in lengths of 18 or 24-in, per lb.		0 1 6
507	**Stone Ware**, hard glazed, stills and worms, from 1 gall.		
508	Ditto, Adapters and Taps		
509	Ditto, Acid Jugs, Ladles and Funnels		
510	Ditto, Bottles and Pots of various sizes and shapes		
511	Ditto, evaporating Dishes or Coolers		
512	**Stop-cocks**, solid glass, accurately fitted, the open end straight and adapted to receive a tube fitted with cork		0 5 0
513	Ditto with bent end for running off a liquid		0 5 0
514	**Syphon** of a simple form, without suction tube		0 1 0
515	**Syphon, Wurtemberg,** (fig. 515)	0 2 6	0 5 0
516	**Syphon, Mitscherlich's,** suction tube with bulb, and the end bent upwards, so that the current produced in the vessel containing the liquid is a descending one, and consequently the precipitate is not disturbed (fig. 516)		0 2 6
517	Ditto with five-bulb suction tube (fig. 517)		0 2 0
518	Ditto with stop-cock instead of suction tube		0 3 6
519	Ditto, with Negretti and Zambra's adaptation of syringe, useful where acid or caustic liquids are being drawn off, preventing such fluids reaching the mouth during suction (fig. 519)		0 4 6
520	**Syringe** of glass, with round point (fig. 520)		0 1 6
521	Ditto, with straight point (figs. 521 and 521*)		0 1 0
522	Ditto, with bent point (fig. 522)		
523	**Thermometers** for chemical purposes (see page 29).		
524	**Test Glasses,** Clark's pattern, exceedingly useful; contents 1-oz. (fig. 524)		0 0 6
525	Ditto ditto, larger size		0 0 9

FIG. 521.* FIG. 536. FIG. 521 FIG. 520. FIGS. 526 & 524. FIG. 522.



		Each. £ s. d.	Each. £ s. d
526	**Test Glasses** for lecture-table 12-oz. capacity (fig. 526) . . .		0 1 6
527	Ditto, 8-oz. capacity . . .		0 1 0
528	Ditto, 4-oz. capacity . . .		0 0 9
529	Ditto, champagne form:—		

Contents .	2-oz.	4-oz.	6-oz.	8-oz.
Price .	6/	/8	/10	1/

FIG. 530.

530	**Test Tubes** (fig. 530), of white German glass, free from lead, closed, and carefully rounded at the closed end, and properly bordered at the mouth:—					
	Diameter	Length.			Per Dozen.	
	¼-in. .	2 and 2½-in. . .			0 1 0	
	½-in. .	3, 3½, 4, 4½, 5, and 6-in.			0 1 6	
	⅝-in. .	4½, 5, 5½, and 6-in. .			0 2 0	
	¾-in. .	4, 5, and 6-in. . .			0 2 6	
	1-in. .	5 and 6-in. . . .			0 3 0	
	1-in. .	7 and 9-in. . . .			0 4 6	
531	**Tube Flasks** . . . per dozen		0	4 0	0 6 0	
532	Ditto, Retorts . . . each		0	0 6	0 0 8	
533	**Trays**, flat, porcelain, for washing papers, &c. 1/6		0	2 6	0 4 6	
534	Ditto, shallow, glass, cut and polished from				0 3 0	
535	**Watch Glasses** . . per dozen		0	2 0	0 4 0	
536	**Water Hammers** (fig. 536) . .				0 4 0	

Fig. 544.

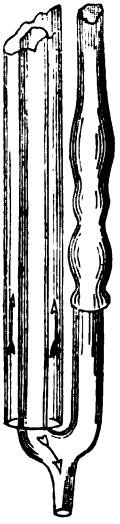


Fig. 538.

Fig. 542.

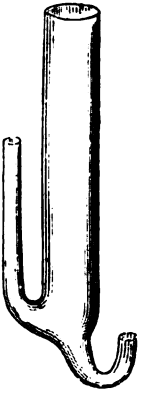
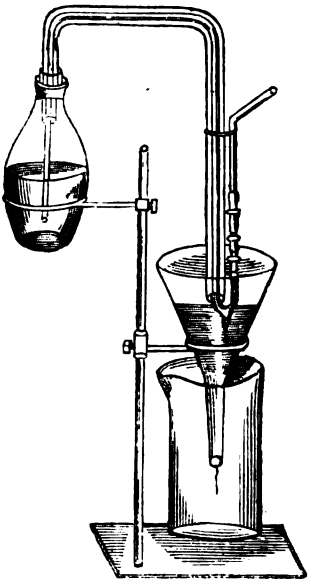


Fig. 543.



		Each. £ s. d.	Each. £ s. d.
537	**Water Baths,** for drying precipitates or explosive compounds stone ware		0 2 6
538	**Water Bottle,** stoppered, with glass tap, for holding distilled water, &c.; also useful as Aspirators (fig. 538):—		
	Contents 2-lb. 3-lb. 4-lb. 6-lb. 8-lb. 12-lb. 20-lb. 24-lb.		
	Price . 10/6 10/6 11/6 12/6 15/ 18/ 25/ 30/		
539	**Berzelius' Washing Bottle,** for washing precipitates by a fine jet of water; 6-oz. flask, fitted with jet and cork (see fig. 373)		0 1 6
540	Ditto, with 16-oz. bottle, similarly mounted, fitted with handle, for use with hot water		0 2 0

Fig. 545.

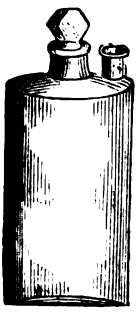


Fig. 546.

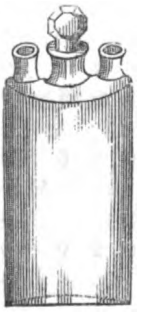
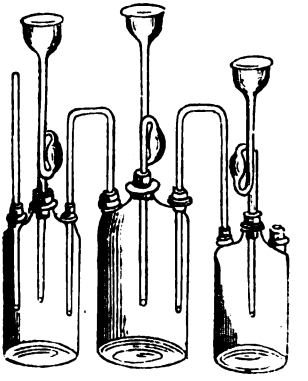


Fig 547.



		Each. £ s. d.	Each. £ s. d.
541	**Gmelin's Washing Bottle,** so arranged that a constant current of water is maintained; fitted to a 16-oz. flask .		0 2 0
542	The tube separately (fig. 542)		0 0 8
543	**Syphon Washing Bottle,** improved form (fig. 543), in which a current of water is supplied continuously, and is applicable for filtrations; fitted with 16-oz. flask . .		0 6 0
544	The tube only (fig. 544)		0 4 9
545	**Woulffe's Bottles,** well made necks, so as to cork easily; with two necks (fig. 545):—		

Contents .	½-lb.	1-lb.	2-lb.	4-lb.	6-lb.	8-lb.	10-lb.
Price . .	1/	1/6	2/6	3/8	5/	7/6	8/6

546 **Woulffe's Bottles,** with three necks (fig. 546):—

Contents .	½-lb.	1-lb.	2lb-.	4-lb.	6-lb.	8-lb.	10-lb.
Price . .	1/6	1/9	2/3	3/	5/	8/	9/

547	**Woulffe's Bottles,** a set of three 1-pint, in a tray, fitted with safety funnels, tubes, and connectors (fig. 547) .		0 16 0

APPARATUS FOR ORGANIC ANALYSIS, &c.

FIG. 552.

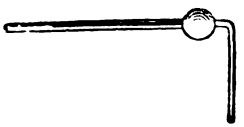


FIG. 553.

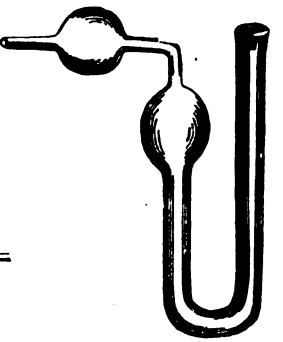
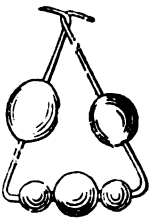


FIG. 551.

FIG. 554.



548	**Combustion Tube,** of hard German glass, very infusible and tough when intensely heated . . . . . per lb.		0 2 6
549	**Combustion Tubes,** prepared from the above glass, per doz.		0 8 0
550	**Combustion Furnace** of stout sheet iron, so constructed that the softened tube is not injured		0 5 0
551	**Chloride of Calcium Tubes,** for absorbing moisture from gases; with straight point (fig. 551)		0 0 6
552	Ditto ditto, with bent point (fig. 552)		0 0 6
553	Ditto, U shaped (fig. 553)		0 1 3
554	**Liebig's Potash Apparatus,** made very light, from German glass, free from lead (fig. 554)		0 2 6
555	Ditto, new forms (figs. 555 and 556)		0 3 6

Fig. 555.

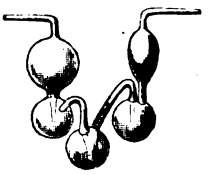


Fig. 556.

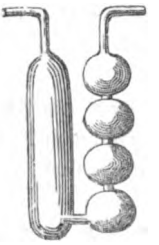
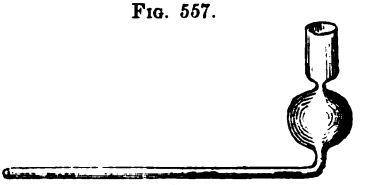


Fig. 557.



		Each. £ s. d.	Each. £ s. d.
556	**Mitscherlich's Potash Apparatus,** very light . . .		0 2 6
557	**Suction Tube** (fig. 557), for filling the potash apparatus, and to ascertain if all the connections are air-tight . .		0 0 9
558	**Drying Tube** (fig. 558). A bent tube, in which the substance to be analysed is placed, to dry it		0 1 3
559	**Three-limb Tube** (fig. 559), for adjusting the apparatus to the exhausting syringe		0 1 9
560	**Letter Z Tube,** for the same purpose		0 0 9
561	**Long Glass Conducting Tube,** U shape, used in connection with the mercurial trough		0 1 0
562	**Pipette** for passing a solution of potash into a gas contained in a tube over mercury (fig. 562)		0 1 0
563	**Ure's Apparatus** for determining the quantity of Nitrogen		0 4 0
564	Ditto ditto, larger with bulbs 2-in. diameter . . .		0 6 6
565	**Will and Varrentrap's Nitrogen Bulb**		0 1 6
566	**Nitrogen Bulb,** with **Horsford's** Modification (fig. 566) .		0 1 6
567	**Bent Connecting Tube**		0 1 0
568	**Graduated Gas Tubes** (*see* No. 426)		
569	**Mercurial Trough** of Berlin porcelain (see Berlin ware)		
570	**Mercurial Trough,** tall glass, 16-in. by 2½-in. . . .		0 5 6

Fig. 566.

Fig. 558.

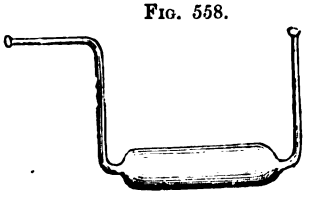
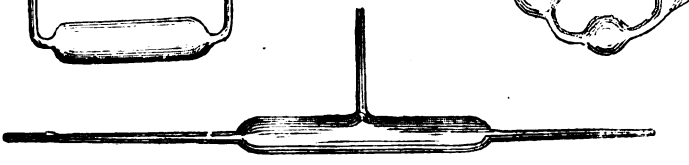


Fig. 559.



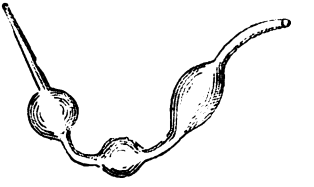
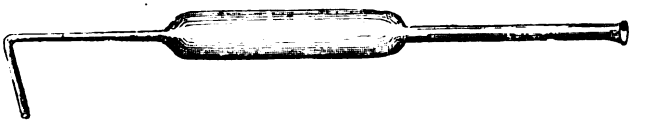


Fig. 562.



		Each. £ s. d.	Each. £ s. d.
571	**Mercurial Trough,** 22-in. by 2-in.		0 4 0
572	**Bulb Tube** in which the oxide of copper is weighed . .		0 0 8
573	**Turpentine Bulbs** of glass for containing volatile substances about to be analyzed . . . . . per doz.		0 1 0
574	**Brunner's Aspirator,** consisting of a glass bottle, one gallon capacity, with tap, for preparing phosphoric acid, measuring the quantity of air passing, &c.		1 0 0
	For other sizes of this useful article, see Water Bottles, page 58.		
575	**Exhausting Syringe,** to be attached to the apparatus for organic analysis, for creating a vacuum		0 12 0

Fig. 578*

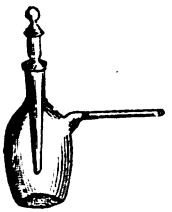
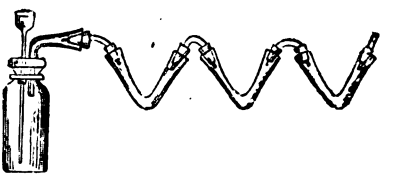


Fig. 579.

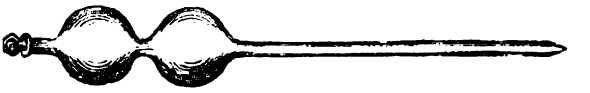
Fig. 580.



576	**Fritzsch's Apparatus** for the analysis of Carbonates (fig. 576)		0 2 0
577	**Percy's** ditto, for ditto		0 7 0
578	**Will's** ditto, consisting of two light flasks, with connecting tubes, &c.		0 3 0
578*	**Berzelius's Sulphuretted Hydrogen Apparatus** (fig. 578*)		0 8 0
579	**Marsh's Apparatus** for detecting Arsenic (fig. 579) .		0 7 6
580	**Clark's Apparatus** for detecting Arsenic (fig. 580) . .		0 10 6
581	**Donovan's Apparatus** for filtering caustic potash . .		0 12 6
582	**Dobereiner's Extracting Apparatus,** consisting of a flask with two necks, and a tube mounted with cork . .		0 2 0

Fig. 576.

Fig. 583.



583	**Glass Apparatus,** for showing diminished bulk by mixing sulphuric acid and water (fig. 583)		0 5 0
584	**Glass Apparatus,** for exhibiting the philosophical candle, and producing musical sounds by hydrogen gas, from .		0 7 6
585	**Cavendish's Apparatus** for detonating a mixture of oxygen and hydrogen gas, illustrating the composition of water .		2 2 0
586	**Apparatus** for illustrating the composition of water synthetically, by burning hydrogen gas in atmospheric air . .		1 5 0

CHEMICAL AND PHILOSOPHICAL INSTRUMENTS AND APPARATUS.

Fig. 593.

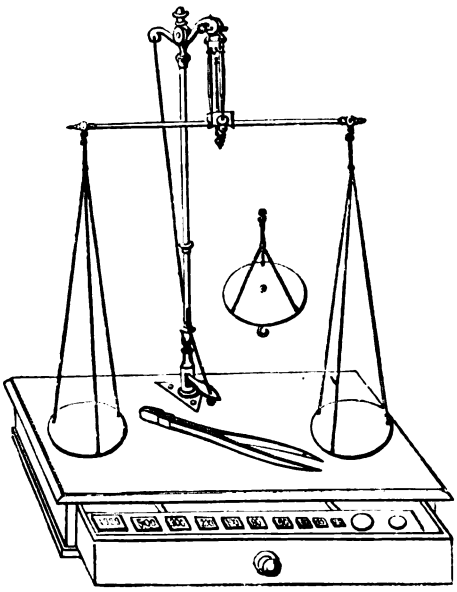
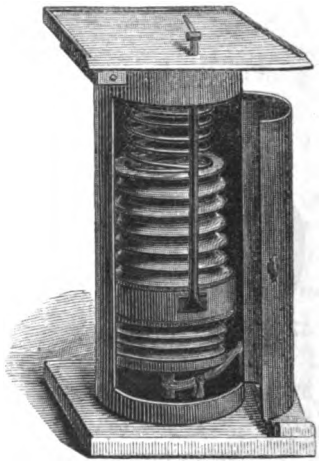
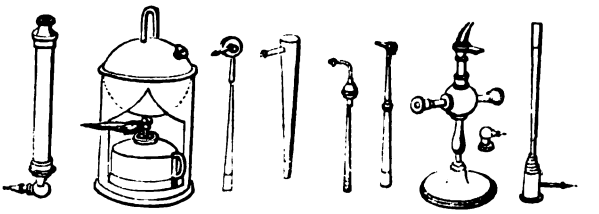


Fig. 618.



		Each. £	s.	d.	£	Each. s.	d.
587	**Anvil's Mineralogical Hardened Steel,** 2 inches square .				0	3	6
588	**Argand Spirit Lamp,** of brass, with circular wick, so arranged that the heat produced does not reach the spirit in the body of the lamp				1	4	0
589	**Balances** with steel beam 6-in. long, brass pans, and set of brass weights, from ¼-oz. to ½-gr., in oak box . . .				0	3	6
590	Ditto, superior make, in mahogany box				0	4	6
591	Ditto, with glass pans, in oak box	0	5	6	0	6	6
592	Ditto, with glass pans and box-end beams, in mahogany box	0	10	6	0	18	0
593	**Balances, Chemical,** with a set of decimal weights to the tenth of a grain, to carry 1000-grs. in each pan, and turn with the tenth of a grain when thus loaded; in mahogany box (fig. 593) . . . 2 10 0	3	3	0	4	4	0
594	**Balances, Chemical,** with glass cases, highly finished and carefully adjusted, to turn with $\frac{1}{100}$ of a grain from	4	4	0	8	8	0
594*	**Balances, Assay,** with framed beam and steel knife, edges resting on agate planes, sliding weight on beam, with adjustments, in glass lantern, with levelling screws, &c., &c., of the most delicate accuracy, to turn with $\frac{1}{1000}$ of a grain	12	0	0	25	0	0

FIGS. 609. 611. 607. 605. 606. 608. 610. 604.



		Each. £	s.	d.	Each. £	s.	d.
595	**Bar Compound,** for shewing the unequal expansion of metals by heat	0	7	6	0	16	0
596	**Bars of Antimony, Bismuth, Copper, Iron, Lead, Tin, and Zinc,** for precipitating metals from solutions from				0	0	3
597	**Balloons** for inflation with hydrogen or carburetted hydrogen gas, spherical :—						
	Diameter 6-in. 9-in. 10½-in. 12-in. 16-in. 18-in. 20-in. 36-in.						
	Price . 1/ 1/6 2/6 3/ 4/ 5/ 7/6 35/						
598	**Balloons,** oval shape, 3-ft. high and 2-ft. diameter . .				0	15	0
599	**Balloons,** fish shape, 15-in. and 30-in. long . . .	0	3	0	0	6	0
600	**Bladders** . . . . . from				0	0	6
601	Ditto, mounted with ferrules . . . . . from	0	2	0	0	3	0
602	Ditto ditto and stop-cocks	0	5	0	0	6	6
603	**Blowpipes,** common	0	0	6	0	1	0
604	Ditto, Berzelius (fig. 604) . . . . . from				0	7	6
605	Ditto, Blacks (fig. 605)	0	1	0	0	2	6
606	Ditto, Bergman's improved (fig. 606)	0	4	6	0	5	0
607	Ditto, Pepys', with jet pipe, can be used at any angle (fig. 607)				0	5	6
608	Ditto, Wollaston's, arranged in three pieces, to enclose in each other for the pocket (fig 608)				0	6	6
609	**Blowpipes,** Hemming's Safety, for the mixed gases (fig. 609)				0	9	6
610	Ditto, Oxy-hydrogen complete, with lime holder, bladders, stop-cocks, &c. (fig. 610)				2	2	0
611	**Blowpipes,** Spirit, self-acting, for bending glass tubes, tin (figs. 611 and 611*)				0	6	0
612	Ditto ditto, copper ball				0	7	6
613	**Blowpipes,** Spirit, Russian . . . . 8/, 10/6 and				0	14	0
614	Ditto ditto, with ring and support				0	15	0

FIG. 611.*

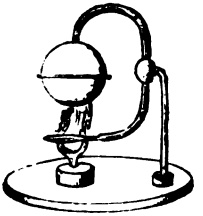


FIG. 616.

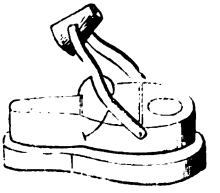


FIG. 616*

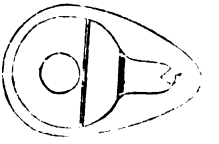
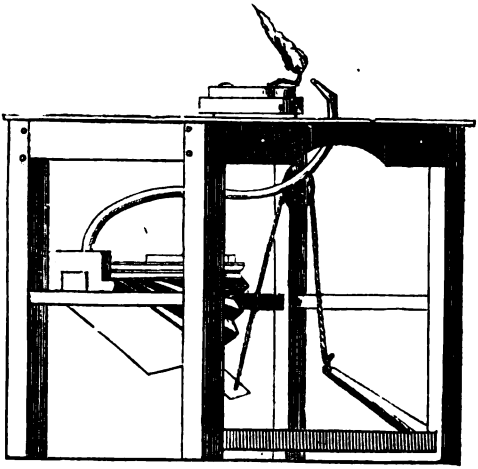


FIG. 617.



		Each. £ s. d.	Each. £ s. d.
615	**Tilley's Water Pressure Blowpipe,** with jets, &c., complete, in japanned tin		0 17 6
	Useful for small operations in glass blowing, bending, sealing, &c.		
616	**Glass Blower's Lamps** of a simple and effective construction (figs. 616 and 616*)		0 3 0
617	**Glass Blower's Table,** with best double-action bellows, brass mounting, jointed motion to jet holder, and two jets (fig. 617)		2 12 6
618	**Patent Glass Blower's Apparatus,** consisting of a circular column of japanned zinc, table covered with zinc (having brass bound edges), double-action circular bellows, drawer, and universal jointed jet (fig. 618)		5 5 0
619	Ditto ditto without zinc cover to the table . .		4 14 6
620	**Blowpipe Jets,** platinum . . . . . from		0 2 0
621	Ditto **Forceps** of brass, with fine points		0 2 6
622	Ditto ditto steel and platinum points . . . 3/6,	0 7 6	0 10 6
623	Ditto **Spoons,** platinum or silver . . . . from		0 4 6
624	Ditto **Apparatus,** for pocket, containing requisites for assaying metals, in case		1 4 0
625	**Bellows,** portable double, for table furnaces . . from		1 1 0
626	**Boxes of Mineral Fragments,** for blowpipe . . .	0 2 0	0 12 0
627	**Brass Tobacco Pipe,** for blowing gas bubbles . . .		0 2 6
628	**Brushes,** test tube . . . . . from		0 0 6
629	Ditto, phial and bottle . . . . . /6,	0 0 10	0 1 6
630	**Caoutchouc Gas Bags,** wedge shape . . . . from		1 10 0
631	Ditto **Connectors,** for joining tube apparatus . . from		0 0 2
632	Ditto in sheets		0 1 0
633	Ditto **Vulcanised Tube** . . . . . per foot, from		0 2 0
634	Ditto **Varnish** . . . . . per oz.		0 0 4

		Each. £	s.	d.	Each. £	s.	d.
635	**Capsules** of platinum, silver, copper, &c.						
636	**Chauffers** with cover and pipe for increasing heat	0	7	0	0	12	0
637	**Chemical Labels** per set	0	0	6	0	3	0
638	**Condensers,** Liebig's form for distillation				0	6	0
	The steam passes through a long glass tube, enclosed in an outer metal tube; in the intervening space water is made to flow continuously, and rapid condensation is effected.						
639	Support for ditto, in black wood, with sliding rod and cross joint, capable of being elevated and inclined to any angle				0	6	0
640	**Cross** of four metals, for shewing unequal power of conducting heat				0	5	0
641	**Connecting Pieces, Angle and T Pieces, Union Joints,** of brass, for uniting stopcocks, &c. 1/, 1/6,	0	2	6	0	4	6
642	**Connecting Ferrules,** for bladders, small	0	1	0	0	1	6
643	**Crucibles,** platinum, silver, iron, &c.						
644	**Crucible Jacket** made of iron plate, to hold any size platinum crucible	0	1	6	0	2	0
645	**Crucible Stands and Supports,** various	0	0	1	0	0	8
646	Ditto **Tongs,** straight, bent, &c., of various sizes 1/, 1/6,	0	2	6	0	4	6
647	**Cork Borers,** of polished brass, set of six, in a case				0	3	6
648	Ditto, a set of twelve				0	6	0
649	Ditto, a set of four, without case				0	1	6
650	**Cuffs, Scale,** of chemical equivalents	0	5	6	0	6	6
651	**Deflagrating Spoon,** of tinned iron, the bowl rivetted to the stem, with a sliding cover for the jar				0	0	6
652	Ditto, of brass, with steel rod and brass bowl, the cover ground to fit the top of the receiver				0	2	0
653	**Drying Apparatus,** or hot air bath, on stand, japanned tin, from				0	18	0
654	Ditto ditto tinned copper, or copper	1	11	6	4	4	0
655	**Decimal Weights,** from 1000 grains to a 10th of a grain, in mahogany box				1	10	0
656	Ditto, accurately adjusted, from 1000 grains to 1-100th of a grain, the smaller weights of platinum and silver				2	0	0
657	**Diamonds,** for writing, engraving, or cutting glass . from				0	8	6
658	**Dishes, Evaporating,** copper . from				0	2	6
659	Ditto ditto copper tinned inside				0	3	0
660	Ditto ditto copper plated with silver				0	5	0
661	Ditto ditto silver				0	7	6
662	**Evaporating Capsules,** of platinum :—						

Diameter	½-in.	¾-in.	1-oz.	1½-in.	2-in.	2½-in.	2¾-in.
Contents	1-16th oz.	1-10th oz.	¼-oz.	½-oz.	¾-oz.	1-oz.	1½-oz.

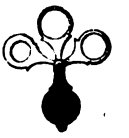
Price various, according to weight.

663	**Files,** for cutting glass tube	0	0	6	0	1	0
664	**Files and Rasps,** for fitting corks to tubes	0	0	8	0	1	0
665	**Flexible Tube,** metal and caoutchouc, &c., for conducting gases, from, per foot				0	1	6

		Each. £ s. d.	Each. £ s. d.
666	**Filter Paper**, thick, per lb.		0 1 6
667	**Circular Filters**, ready cut for use, made from superior paper, without chlorides, muriates, or any soluble matter; gives a very minute portion of ash, and filters rapidly and effectually; in packets of 100 :—		
	Diameter . . 2½-in. 2¾-in. 3½-in. 4½-in. 5½-in. 7½-in.		
	Price per 100 . /3 /5 /7 /8 1/ 1/4		
668	**Filtering Paper**, superior quality, per quire . . .		0 1 3
669	Ditto, Swedish, per quire		0 3 6
670	**Filter Boxes**, of japanned tin plate, with pull-off covers, holding 200 filters :—		
	For No. 1 2 3 4 5 6 Filters.		
	/6 /6 /6 /8 1/ 1/3		
671	**Funnels**, gutta percha . . . . . from		0 1 0
672	Ditto, tin and tinned copper . . . . . „		0 1 0
673	**Furnaces**, Aikin's blast . . . . . „		0 12 0
674	**Furnaces**, Black's universal, applicable to the reduction and assay of metallic ores, cupellation of silver, and various other chemical operations		5 0 0
675	**Furnaces**, portable earthen table . . . . from		0 15 0
676	Ditto, table made of black lead . . . . . „		0 18 0
677	**Furnaces**, round iron, lined with fire lute or brick, applicable for general chemical purposes	2 2 0	5 5 0
678	**Forge**, portable Iron, improved with double bellows, the whole fitted together with nuts and screws for convenience of packing, arranged with connecting screw and pipe for blast furnaces	8 8 0	10 10 0
	A most useful article for persons residing in foreign parts, or emigrants.		
679	**Gas Apparatus** complete, for making oxygen and hydrogen in quantities, for oxy-hydrogen microscope . . .		3 3 0
680	**Gas Retorts**, copper, with **Conducting Tube**, for the preparation of oxygen gas from chlorate of potass and manganese, sufficient size for making two gallons of gas .	1 1 0	1 10 0
681	Ditto, wrought iron		1 0 0
682	Ditto, cast iron, for ditto, small	0 8 6	0 12 6
683	**Gas Burners, or Furnace**, adapted for burning common gas mixed with air, without smoke; for boiling, distilling, &c.	0 8 6	0 12 6
684	**Gas Blowpipe**, with flexible tube and ivory mouth piece .		0 9 0
685	**Gauge Brass**, for shewing expansion of metals by heat .		0 5 0
686	**Gutta Percha Basins, Funnels, Troughs, Trays, Tube**, &c., &c. of various sizes		
687	**Gutta Percha Bottles**, round, for acids, &c. :—		
	1-oz. 2-oz. 4-oz. 8-oz.		
	Price 4/ 5/6 6/6 9/6 per doz.		
688	**Hammers**, Mineralogical . . . . . from		0 2 6

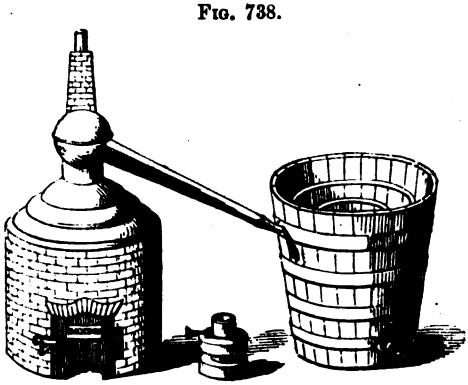
		Each. £	s.	d.	Each. £	s.	d.
689	**Iron Spheres,** strong; this apparatus shows the expansive force in the congelation of water				0	4	6
690	**Ladles,** small, iron . . . . . from				0	0	8
691	**Lamps,** chemical argand, with cottons and mandril, complete (fig. *e*) 6/6,	0	7	6	0	8	6
692	Ditto ditto with double concentric wick . .				0	15	0
693	Ditto, argand fountain, with adjusting screws, for fixing on retort stands				0	15	0
694	**Lamp, Davy Safety,** for miners				0	10	6
695	**Lamps for Blowpipe,** with tray (fig. 669) . . .				0	5	0
696	**Lamps,** brass, spirit, with two sliding rings, forming a convenient stand, for small evaporating dishes, &c. . .				0	7	6
697	**Lamps,** hydrogen, for producing instantaneous light, with a jet of hydrogen thrown upon spongy platinum; best English manufacture 26/,	1	10	0	2	2	0
698	**Magnets,** Horse-shoe . . . . . /6, /9, 1/,	0	1	6	0	5	0
699	**Magnetic Oxide of Iron, or Natural Loadstone,** in pieces . . . . . from				0	2	6
700	**Masks,** of wire gauze, for protecting the face . . .	0	6	0			
701	**Magnifying Glasses** for the pocket, for examining minerals, crystals, &c. (fig. 701, and see Optical Section) 2/6, 4/,	0	5	0			
702	**Metallic Vessel,** with polished and blackened surfaces, for shewing the absorption and radiation of heat . .	0	4	6			
703	**Mercurial Troughs,** iron and mahogany . . . from	0	6	0			
704	**Mortars and Pestles,** of cast iron or brass . . „	0	4	0			
705	**Nippers,** or cutting plyers, for cutting wire . . .	0	2	0	0	3	6
706	**Platinum Crucibles, Basins, and Evaporating Dishes,** various sizes . . . . . per oz. No prices can be given for Platinum Vessels, as the market value of the raw material varies considerably.						
707	**Platinum Forceps and Spoons** . . 1/6, 3/, 5/6,	0	8	0	0	12	0
708	**Pepy's Gas Holder,** of japanned zinc, with long pressure funnel, stopcocks, and connectors, complete . . .				2	10	0
709	Ditto ditto in copper japanned				3	15	0
710	**Pneumatic Troughs,** improved, for collecting gases, small				0	4	6
711	Ditto ditto 2nd size				0	10	6
712	Ditto ditto 3rd size				0	16	0
713	**Pneumatic Troughs,** of any size and shape, made to order, in copper, tin, or zinc, &c.						
714	**Reflectors,** highly polished metallic, for experiments on radiant heat . . . . . from, per pair				0	18	0
715	Ditto, plated copper . . . . . from				2	2	0
716	Ditto, stands for reflectors and iron ball	0	5	0	0	6	0
717	**Retort Stands,** small, on mahogany foot, one ring . „				0	1	6
718	Ditto ditto iron foot and rod 2 and 3 rings . 2/6, 5/,	0	7	6	0	14	0
719	Ditto ditto brass, large, with heavy foot (fig. *f*) .	0	10	6	0	14	0
720	Ditto ditto with fountain, argand lamp, and three rings				1	12	0

FIG. 701.



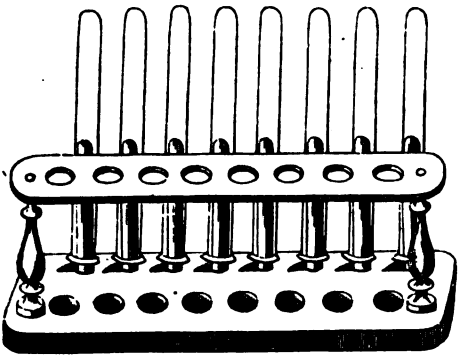
		Each. £	s.	d.	Each. £	s.	d.
721	**Sand Baths,** small round copper	0	1	6	0	2	0
722	Ditto ditto in copper and iron, of various forms, for retort stands and furnaces						
	The use of Sand Baths prevents the cracking of glass vessels exposed suddenly to the flame of a spirit lamp.						
723	**Scales,** for weighing gold and silver, with troy weights .	1	0	0	3	10	0
724	**Scales and Weights,** large, to stand on counter or table, for the rougher uses of the laboratory	1	0	0	3	10	0
725	**Scales,** chemical (see Balances).						
726	**Standard Grain Weights,** in mahogany box, containing 10,000, 6,000, 3,000, 2,000, 1,000, 600, 300, 200, 100, 60, 30, 20, 10, 6, 3, 2, 1, ·6, ·3, ·2, ·1, ·06, ·03, ·02, ·01				4	0	0
727	**Standard Grain Weights,** smaller set . . £3 13 0,	2	0	0	1	15	0
728	**Shears,** cutting, small	0	2	6	0	5	6
729	**Sieves,** of hair, lawn, and wire, for straining or sifting .	0	1	0	0	4	6
730	**Spatulas,** steel, with handles . . . . . from				0	1	0
731	Ditto, platinum . . . . . „				0	12	0
732	Ditto, silver . . . . . „				0	10	0
733	**Stills,** portable, with worm and tub, for use on common fire, 1 gal.	1	1	0	1	5	0
734	Ditto, 2 gals.				2	2	0
735	**Stills,** copper, best make, portable, with pewter worm, tub, iron frame and furnace, 2 gals.				5	5	0
736	Ditto ditto 5 gals.				8	8	0
737	Ditto ditto 10 gals.				13	13	0

Fig. 738.



738	**Stills, Working Model of,** suitable for the lecture table (fig. 738)	1	10	0	2	2	0
739	**Stopcocks,** best make, brass				0	3	0
740	Ditto, iron, small				0	6	0
741	Ditto, gutta percha . . . . . from				0	2	0
742	Ditto, glass				0	7	6
743	**Syphons,** pewter and copper . . . . . from				0	7	0
744	Ditto ditto with stopcock . . . . . „				0	10	6

FIG. 751.



		Each. £	s.	d.	Each. £	s.	d.
745	**Syringes,** exhausting and condensing (see Pneumatic Apparatus)			.	0	7	0
746	**Supports** for tubes, retorts, receivers, &c. 3/6,	0	5	0	0	14	0
747	**Taper Holder,** of wire, for experiments in oxygen gas, &c.				0	0	3
748	**Test Tube Brushes,** for cleaning, made from goat's hair, and tipped with sponge	0	0	6	0	1	0
749	**Test Tube Stands,** for holding 6 test tubes, white wood .				0	0	6
750	Ditto ditto for 12 test tubes				0	1	6
751	Ditto ditto for 8 test tubes, with draining pegs (fig. 751)				0	1	6
752	Ditto ditto for 12 test tubes with draining pegs .				0	3	6
753	**Test Tube Stands,** of mahogany polished, with double set of holes, for 24 and 36 test tubes	0	5	0	0	6	0
754	**Test Papers,** red or blue litmus, and turmeric, bound in small books, each of 50 leaves				0	0	2
755	**Test Papers,** neutral (reddened by acids and turned blue by alkalies), very delicate				0	0	2
756	**Taylor's Hot Air Bath,** made of stout sheet iron, with double body and bottom, and long chimney to produce a draught	0	16	0	1	1	0
757	**Thermometers** (see List).						
758	**Vice,** to fasten to table	0	5	0	0	16	0
759	**Wire Gauze,** of various sizes, for experiments on flame.						

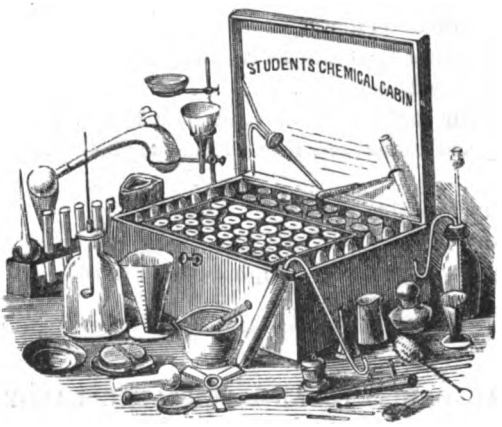
CHEMICAL CABINETS AND PORTABLE LABORATORIES.

760 **Youths' Chemical Cabinet** (fig. 760), containing upwards of sixty chemical preparations, and useful apparatus, without deleterious and dangerous articles; they are perfectly safe in the hands of youth, and adapted as presents, prizes, &c., and for exciting a taste for chemistry in the young. No. 1, in paper case 0 5 6

Fig. 760.

		Each. £ s. d.	Each. £ s. d.
761	**Youths' Chemical Cabinet,** No. 2, in cedar case, with hook fastening (fig. 760)		0 7 6
762	No. 3, in stout mahogany case, French polished, and with lock and key (fig. 760)		0 10 6
763	**First Steps in Chemistry, and Companion to the Youths' Chemical Cabinet;** containing a series of select amusing and instructive chemical experiments		0 0 6
764	**Students' Chemical Cabinets,** containing a larger assortment of apparatus of a practically useful size in mahogany cabinets with lock and key. No. 1		1 1 0
765	No. 2		1 11 6
766	No. 3		2 2 0

Fig. 767.



767 **Students' Chemical Cabinet,** No. 4 (fig. 767), will be found a good useful working chest; it contains upwards of 79 chemical preparations and re-agents, and a very large assortment of apparatus of superior size, carefully arranged in a mahogany cabinet, with lock and key, &c. 3 3 0

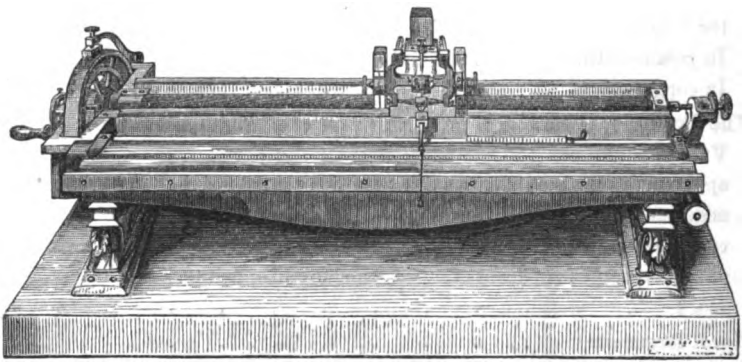
		Each. £ s. d.	Each. £s. d.
768	**Students' Chemical Cabinet,** No. 5. This chest is got up with special reference to the various operations of qualitative analysis; it contains the necessary re-agents and instruments for testing in the humid way, and includes blow-pipe apparatus, fluxes, and tests for the discrimination of ores, minerals, &c. The apparatus is of large size, and concisely arranged in mahogany cabinet with drawer, tray, lock and key		8 8 0
769	**Agricultural Test Chests,** No. 1, fitted with re-agents and apparatus for the qualitative analysis of soils, manures, &c. The tests are pure, and the apparatus of a useful size, carefully arranged in a stout pine cabinet, with lock, key, &c. They will be found cheap and useful chests for farmers, gardeners, &c.		3 3 0
770	No. 2		5 5 0
771	No. 3		8 8 0
772	**Improved Hydro-Pneumatic Apparatus,** comprising in one piece of apparatus a pneumatic trough, with large tray to hold gas jars, a gasometer, and an hydraulic blow-pipe, complete with lamp and tongs. This apparatus will be found a great acquisition to those who purchase any of the before-mentioned cabinets.		
	In japanned tin, with brass mountings, No. 1, 42/. No. 2		3 3 0
	In copper ditto No. 1, 63/. No. 2		4 4 0
773	**The Portable Laboratory, or, Lecturers' and Students' Vade-mecum,** being an adaptation of the hydro-pneumatic apparatus to the purposes of a portable laboratory, by the addition of a japanned tin case with trays and partitions, containing nearly ninety chemical preparations, tests, &c., and a very large assortment of superior and useful apparatus, No. 1		5 5 0
774	No. 2, larger size		10 10 0
775	**Toxicological Test Chests,** contain all the re-agents and apparatus necessary for the accurate analysis of any substance suspected of containing poison, in accordance with the present advanced state of this branch of chemical science. No. 1		2 2 0
776	No. 2		3 3 0
777	No. 3		5 5 0

The Chemical Cabinets and Portable Laboratories described above, are specially arranged and adapted for the use of persons who have not convenient space for keeping such apparatus, or where it is frequently to be moved about, and portability combined with security from breakage is important. In all other cases, where ample and secure space can be devoted to the purpose, Messrs. Negretti and Zambra would recommend one of the following Sets of Apparatus, or purchasers to make their own selection from the Chemical Catalogue.

		Each. £ s. d.		Each. £ s. d.
778	**A Set of 80 Useful Articles,** for elementary chemical study			3 3 0
779	**A Set of 105 ditto,** for ditto			5 5 0
780	**A Set of 170 ditto,** very complete, and adapted for the student, class or lecture			10 10 0
781	**A Set of 220 ditto,** a larger and still more perfect set, for fully illustrating a course of lectures on practical chemistry			21 0 0
782	**Complete Sets of Chemical Apparatus and Tests,** adapted for the analysis of soils, manures, and other matters connected with agricultural and organic chemistry,	£2 2 0	£6 6 0	12 12 0 42 0 0

PURE CHEMICALS, TESTS, OR RE-AGENTS, SUPPLIED IN ANY QUANTITY, AT THE LOWEST MARKET PRICES.

PRIZE DIVIDING ENGINE.



Messrs. Negretti and Zambra's Graduated Instruments, &c., enumerated in the foregoing Sections of the Illustrated Catalogue, are, to ensure the utmost possible precision, all divided by the Dividing Engine *that received a Prize Medal*, and is described in the Report of the Jurors of the Great Exhibition of 1851, as follows:—

"This is a beautifully contrived Divider on Ramsden's principle, with a long fine steel screw. The novelties are—first, the wheel at the screw-head, which is divided into 400 parts, and has cut upon its circumference (which is made broad) a helix screw, in the thread of which runs a detent, carried along by the run of the thread till it meets a stop clamped on the helix at a definite point. This arrests the screw at this point of the motion. A Prize Medal was awarded."

Messrs. N. and Z. supply engines made on the above principle. *Price* £35 to £70.

ELECTRICAL,

GALVANIC, MAGNETIC, ELECTRO-MAGNETIC AND THERMO-ELECTRIC APPARATUS.

FIG. 783.

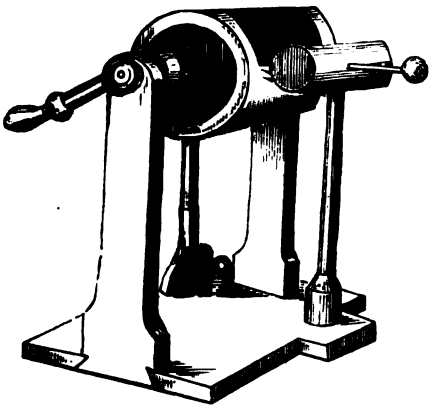
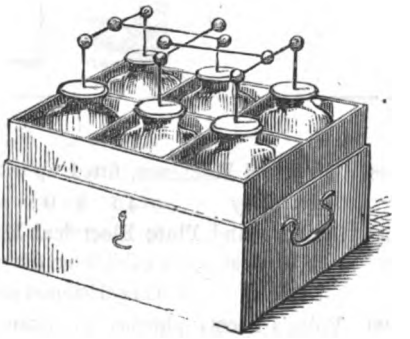


FIG. 803.



FRICTIONAL ELECTRICITY.

		Each. £	s.	d.	£	s.	d.
783	**Cylinder Electrical Machines,** on mahogany stands, with japanned conductor (fig. 783)	1	1	0	1	5	0
784	Ditto, with brass conductor				1	10	0
785	Ditto, second size, 6-in. by 4-in.				1	10	0
786	Ditto, third size, 7-in. by 5-in.				1	17	6
787	Ditto, fourth size, 8-in. by 6-in.				2	16	6
788	Ditto, fifth size, 10-in. by 8-in.				5	5	0
789	Ditto, sixth size, 15-in. by 10-in.				7	7	0
	Larger Cylindrical Machines made to order.						
790	**Plate Electrical Machines,** with brass conductor and double receiving forks, mounted on polished mahogany frames, and finished in a superior manner						
791	Ditto, 9-inch	1	10	0	3	3	0
792	Ditto, 12-inch				4	10	0
793	Ditto, 15-inch				5	5	0
794	Ditto, 18-inch (fig. 794)				7	10	0
795	Ditto, 24-inch				10	10	0
796	**Woodward's Double 18-inch Plate Electrical Machine,** a very splendid and powerful instrument				14	0	0
797	Ditto, 24-inch				21	0	0

Fig. 794.

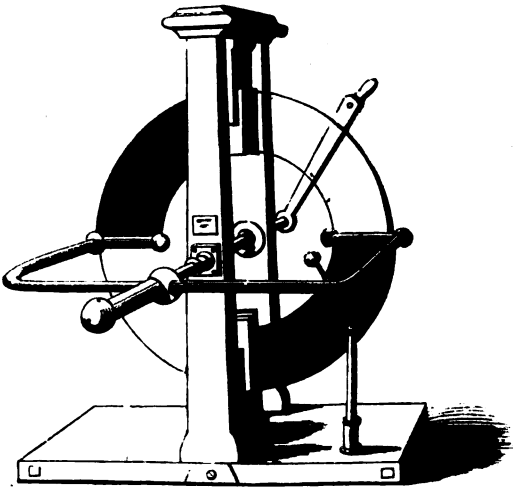


Fig. 804.

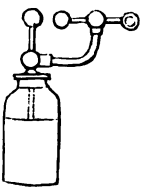


Fig. 813.

Fig. 805.

		Each. £ s. d.	Each. £ s. d.
798	**Electrical Machines**, fitted up with apparatus for medical electricity . £3 3 0 £4 10 0 £7 7 0	8 8 0	16 16 0
799	**Cylinder and Plate Electrical Machines**, with a selection of apparatus, for exhibiting the most popular and interesting experiments in frictional electricity . . .	4 4 0	25 0 0
800	**Volta's Electrophorus**, for obtaining the electric spark, a useful instrument for the laboratory . . from		0 12 0

Fig. 801.

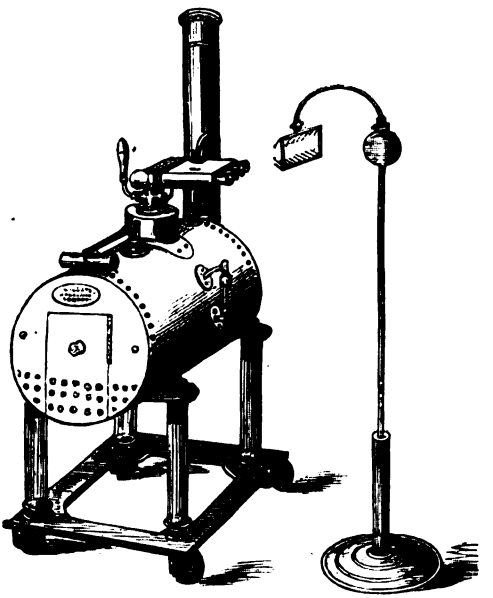
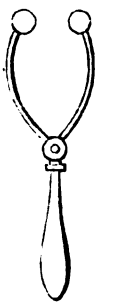


Fig. 806.



Figs. 808 & 808*

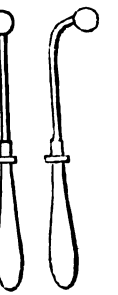


Fig. 812.

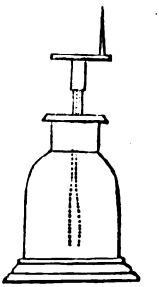


Fig. 814.

FIG. 811.

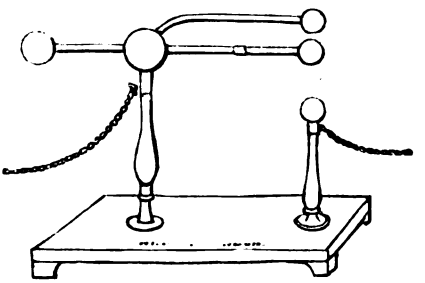
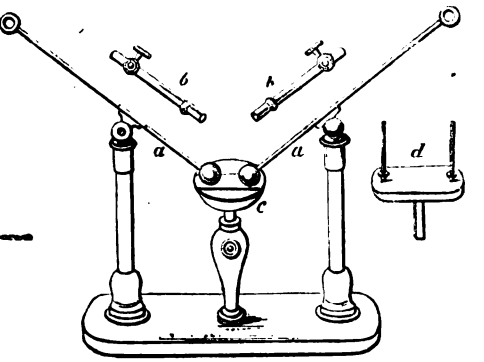


FIG. 810.



		Each. £	s.	d.	£	s.	d.
801	**Armstrong's Hydro-electric Machines** (fig. 801) . .	10	0	0	40	0	0
802	**Leyden Jars**—						
	Contents . ¼-pint. ½-pint. 1-pint. 2-pints. 4-pints.						
	Price . . 2/6 3/6 6/ 8/6 15/						
803	**Electrical Batteries,** consisting of 4, 6, 9, 12, or more Leyden jars, mounted in frames or cases (fig. 803) . .	2	2	0	10	10	0
804	**Medical Leyden Jars,** mounted with Lane's discharging electro-meter, to regulate the intensity of the shock given to a patient (fig. 804)	0	7	6	0	10	6
805	**Leyden Jars,** mounted, to show that the charge is not in the coatings, as those with which it is charged can be removed, and others put in their place, the glass retaining the electricity (fig. 805)				0	14	0
806	**Jointed Dischargers,** with glass handles, for discharging electrical jars, batteries, &c. (fig. 806) . . . 5/,	0	8	0	0	10	0
807	**Small Discharging Rods,** not jointed	0	3	6	0	5	0
808	**Medical Electrical Directors,** with glass handles, for passing a shock through any part of the body (figs. 808 and 808*)				0	3	6

FIG. 816.

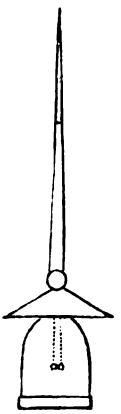


FIG. 817.

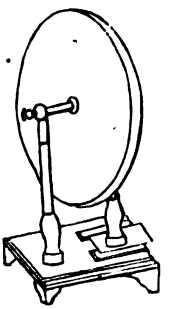


FIG. 822.

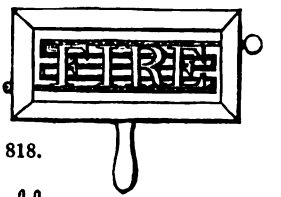


FIG. 818.

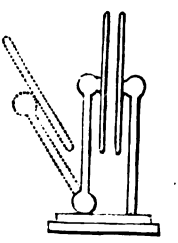
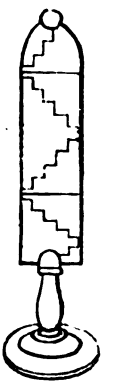


FIG. 832.

FIG. 825.



		Each. £ s. d.	Each. £ s. d.
809	**Henly's Universal Discharger,** with press and table, for deflagrating the metals by electricity, or exposing various substances to electrical action		1 10 0
810	Ditto, with charcoal forceps, &c., adapted for frictional or voltaic electricity (fig. 810)		2 2 0
811	**Cuthbertson's Self-acting Balance or Steelyard Discharger** (fig. 811), for indicating the force or strength of the discharge from an electric battery, by the position of the shifting weight on the graduated balance arm from		2 2 0
812	**Bennett's Gold Leaf Electroscope,** this instrument is used for shewing very minute quantities of electricity (fig. 812)	0 16 0	1 10 0
813	**Henly's Quadrant Electrometer,** with graduated arc, for experiments with accumulated electricity (fig. 813) .	0 5 0	0 7 6
814	**Cavallo's Pith Ball Electroscope,** with stopcock for exhaustion (fig. 814)		1 5 0
815	**Harris's Balance Beam Electrometer,** for estimating in grain weights, the attractive power exerted between two oppositely electrified surfaces		4 4 0
816	**Saussure's Electroscope,** for experiments on atmospheric electricity (fig. 816)		1 5 0
817	**Improved Electrical Condensor and Apparatus,** for experiments upon disguised or paralysed electricity, arranged to connect with a gold leaf electroscope (fig. 817) . .		2 2 0
818	**Electrical Condensor,** consisting of two brass plates, one supported on a glass insulating stem, the other resting upon a conducting stem jointed at the bottom (fig. 818) .		0 15 0
819	**Insulated Stools,** for medical and other purposes where it is required to insulate a body from the ground . .	0 5 6	0 10 6
820	Ditto, with mahogany tops	0 10 6	0 15 0
821	**Magic Picture,** in frame, for giving slight shocks . .		0 7 0
822	**Names or Words,** arranged upon glass, with pieces of tin foil, which may be rendered luminous in the dark by the agency of electricity (fig. 822) 4/6,	0 7 6	0 10 6
823	**Star,** formed of spangles of tin foil, on a flat glass . from		0 4 6
824	**Bird,** formed of spangles of tin foil, on a flat glass . „		0 4 6
825	**Painted Glass Plane,** on stand, in different colours, with devices of tin foil, for shewing the electric light (fig. 825)		0 13 0
826	**Diamond Spotted Jars,** shewing a beautiful light when discharged in a dark room 8/6,	0 15 0	2 10 0
827	**Egg Stand,** for exhibiting eggs, &c, rendered luminous during the passage of electricity (fig. 827)	0 8 6	0 16 0
828	**Image Plates,** brass stand with hook, to connect to prime conductor, for pith figures, illustrating electrical attraction and repulsion (fig. 828)	0 5 6	0 10 6

FIG. 827.

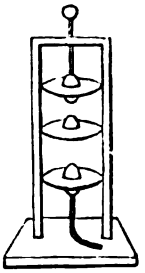


FIG. 828.

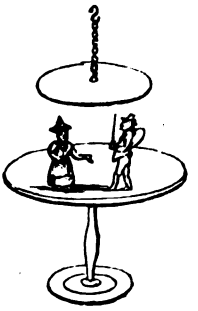


FIG. 829.

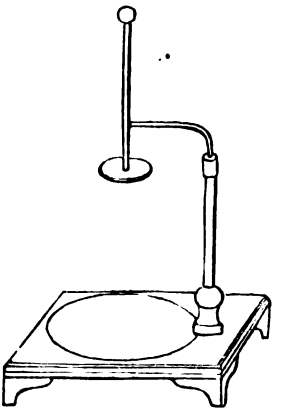
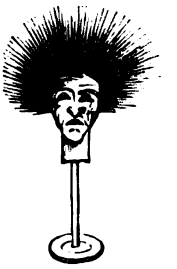


FIG. 835.

FIG. 834.



		Each. £	s.	d.	£	s.	d.
829	**Image Plates,** with insulated glass support for the upper plate; connection being made from the prime conductor, the figures are removed from the attractive influence of the cylinder (fig. 829)	0	12	6	0	15	0
830	**Dancing Figures,** made of elder pith, plain 1/, jointed .	0	2	0	0	3	0
831	**Pith Ball Stand,** another illustration of electrical attraction and repulsion				0	5	0
832	Ditto, with ball and wire (fig. 832)				0	8	0
833	**Pith Balls** . . . . . per dozen	0	1	0	0	1	6
834	**Grotesque Carved Head,** with hair, for illustrating the principle that bodies similarly electrified repel each other (fig. 834)	0	4	0	0	6	6
835	**Electrical Swan,** which, placed on the surface of a vessel of electrified water, will be attracted to any part by presenting the finger to it (fig. 835)				0	2	0
836	**Electrical Spider,** by electrifying which, and presenting a ball, will be attracted, but repelled by a point . . .				0	1	0
837	**Coloured Glass and Paper Plumes,** to exhibit the repulsive action of similarly electrified bodies	0	2	6	0	5	6
838	**Electrical Flask,** with brass cap and valve for exhaustion, to imitate the aurora borealis (fig. 838)				0	6	0
839	**Luminous Conductors,** with valve for exhaustion, to show the passage of electric light through a partial vacuum, on stand (fig. 839)	1	1	0	2	2	0
840	**Apparatus** to exhibit the effect of a falling star . .				1	1	0
841	**Bucket and Syphon** to suspend from the prime conductor; this experiment shows that water, which previous to being electrified only fell in drops, when electrified runs in a stream, and in a dark room is luminous	0	3	0	0	5	6

Fig. 839.

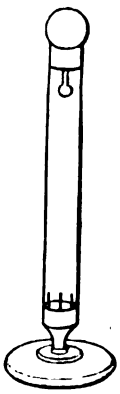


Fig. 842.

Fig. 845.

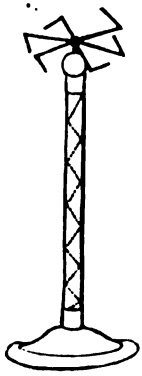


Fig. 846.

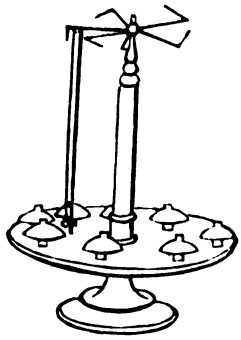


Fig. 855.*

		Each. £ s. d.	Each. £ s. d.
842	**Hand Spiral,** consisting of two glass tubes with brass caps, the inside one covered in a spiral form with spangles of tin foil, shewing, when presented to an excited conductor, a spiral stream of electrical light (fig. 842) . . 3/,	0 4 0	0 5 6
843	**Set of five Spirals,** on mahogany pedestal, with insulated revolving balls in the centre, which by their motion produce a splendid succession of spiral lines of light .		1 10 0
844	**Set of five Spirals,** best, with coloured tubes . . .		2 2 0
845	**Revolving Spiral,** on stand. The electric fly or whirl revolves by the dispersion of electricity from the points, presenting a very beautiful appearance in a dark room (fig. 845)		0 10 0
846	**Gamut of Bells.** This experiment consists of eight bells arranged on a stand, with an electrical fly or whirl carrying a clapper, which in revolving, strikes each of the bells (fig. 846)		1 16 6

Fig. 838.

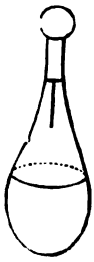


Fig. 849.

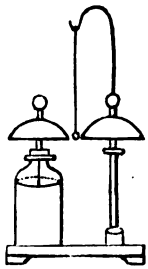


Fig. 852.

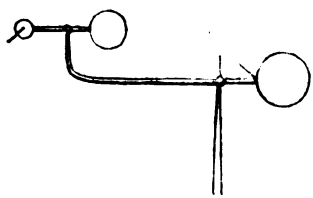


Fig. 855.

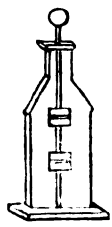


FIG. 854.

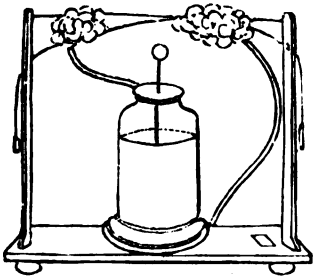


FIG. 850.

FIG. 859.

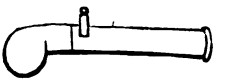
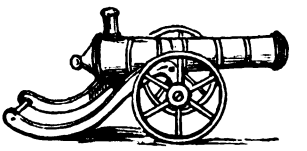


FIG. 858.



		Each. £	s.	d.	Each. £	s.	d.
847	**Set of Two Electrical Bells.** The simplest form of the experiment, one bell communicating with the prime conductor, the other with the ground, and made to ring by the alternate blows of a brass ball suspended between them by a silk cord				0	3	0
848	**Set of Three ditto,** on brass rod, to suspend from the conductor. The action of these is the same as the preceding				0	7	0
849	**French Arrangement** for illustrating the chiming of bells, by electrical action, one bell being connected with the inner, and the other with the outer coating of a Leyden jar (fig. 849)				0	14	0
850	**Electrical Fly or Wheel,** for producing motion by the dispersion of electricity from points (fig. 850) . .	0	3	6	0	7	6
851	Three ditto on one stand				0	8	6
852	**Electrical Orrery or Planitarium,** representing the motions of the sun, earth, and moon (fig. 852)				0	6	0
853	**Electrical Mill,** shewing rotation produced by electricity given off from the points of the vane (fig. 853) . .				0	14	0
854	**Apparatus** for explaining the theory of thunder clouds (fig. 854)				0	15	0
855	**Thunder House,** for shewing the use of lightning conductors (figs. 855 and 855*)	0	7	6	0	12	6

FIG. 853.

FIG. 856.

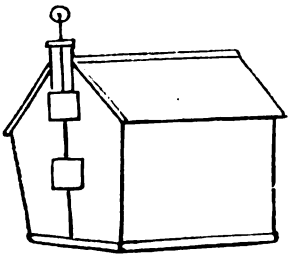
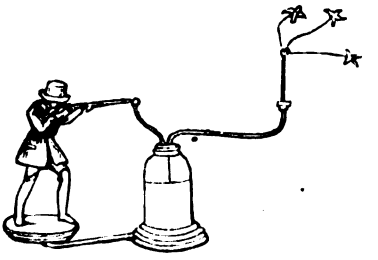
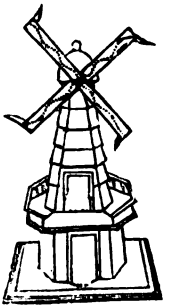


FIG. 863.





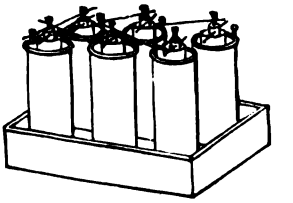
		Each. £	s.	d.	Each. £	s.	d.
856	**Powder House,** for shewing the necessity of a continuous metallic lightning conductor, which, in this experiment, is broken in the centre of a cup containing gunpowder, that explodes by an electrical discharge, and blows down the house (fig. 856)	1	1	0	1	10	0
857	**Sturgeon's Apparatus** for igniting gunpowder, alcohol, æther, &c., by electricity				0	10	6
858	**Electrical Cannons,** for firing a mixture of hydrogen gas and atmospheric air by an electric spark (fig. 858) . 9/,	0	12	0	0	16	0
859	**Electrical Pistol,** for the same experiment (fig. 859) .				0	5	0
860	**Apparatus and Material** for charging ditto with gas .	0	4	6	0	11	0
861	**Electrical Powder Cannon,** for firing gunpowder by discharge of a Leyden jar . . . . . from				0	5	0
862	**Ivory Bomb or Mortar,** for firing explosive compounds by electricity				0	7	6
863	**Electrical Sportsman.** This popular experiment consists of a Leyden jar, and a figure carved to represent a sportsman shooting; two wires are inserted in the jar, at the end of one some pith birds, the other is brought near the point of the gun. A chain from the prime conductor is connected with the wire communicating with the base of the jar, and as soon as the machine is put in action the birds rise, but fall, as if shot, immediately the jar is discharged (fig. 863)	0	16	0	1	6	0
864	**Cylinders,** of shellac or sealing wax, for illustrating resinous excitation	0	2	6	0	5	6
865	**Cylindrical Glass Tubes,** for exhibiting vitreous electrical excitation	0	1	6	0	3	0
866	**Cylinders, Electrical** 2/6, 3/6,	0	4	6	0	6	0
867	**Circular Glass Plates,** for electrical machines, cut and polished:—						
	Diameter . 9-in. 12-in. 15-in. 18-in. 24-in.						
	Price . . 6/ 12/ 21/ 30/ 66/						
868	**Conductors** for electrical machines, black japan . . 3/6,	0	5	0	0	6	0
869	Ditto, brass . . . . . from				0	7	6
870	**Glass Jars,** for coating, ½-pts. 1/ pts. 1/6 qts. 2/ 3 pts.				0	3	0
871	**Glass Handles** 1/3,	0	1	6	0	2	0
872	**Glass Legs or Supports** 1/6,	0	2	0	0	2	6
873	**Glass Rod,** for electrical apparatus, per lb				0	2	6
874	**Gutta Percha ditto**	0	1	6	0	2	6
875	**Brass Balls** . . . . . from /6, /9, 1/,	0	1	6	0	2	0
876	Ditto, with collar and wire, for Leyden jars . . 1/6,	0	2	6	0	3	6
877	**Amalgam,** per box				0	1	0
878	**Brass Chain,** per yard				0	0	6
879	**Strips of Gilt and Silvered Leather,** to illuminate by the electric spark, per yard				0	2	0
880	**Balls of Ivory, Bone, Boxwood and Ebony** . . .	0	0	6	0	2	0

LIGHTNING CONDUCTORS FIXED TO BUILDINGS ON THE MOST APPROVED PRINCIPLES.

VOLTAIC OR GALVANIC APPARATUS.

FIG. 885.

FIG. 889.



		Each. £	s.	d.	Each. £	s.	d.
881	**Volta's Pile of 50 pair of Zinc and Copper Plates,** soldered together, on a mahogany stand	0	15	0	1	5	0
882	**Zinc and Copper Plates,** soldered together . per doz.	0	2	6	0	5	0
883	**Pairs of Silver and Zinc Wires,** soldered together, for *Volta's Couronne de tasse* . . . . . per doz.				0	7	0
884	**Pair of Zinc and Copper Plates,** with glass handles, for shewing the production of electricity by contact . .				0	10	0
885	**Cruikshank's Batteries,** in mahogany troughs, for medical purposes, 25 pairs of plates, 2¼-inch (fig. 885) . .				1	1	0
886	Ditto 50 „ „ 2¼-inch				1	12	0
887	**Wollaston's Battery** of twelve pairs of 4-inch plates, in porcelain trough				2	2	0
888	**Daniell's Sustaining Battery,** consisting of a cylinder of zinc and copper, separated from each other by a porous earthenware tube, and excited by a solution of salt and water in contact with the zinc, and a solution of sulphate of copper in the other cell. Price for single pots . 5/,	0	7	0	0	10	0
889	**Daniell's Battery,** containing six ½-lb. pots of the above, in mahogany tray, which in decomposing water will give off a cubic inch of the mixed gases per minute (fig. 889) .				1	10	0
890	**Daniell's Battery,** containing twelve 1-lb. pots in mahogany tray (fig. 889)				4	4	0

Larger sizes of Daniell's Batteries in single cells or series, to order.

FIG. 892.

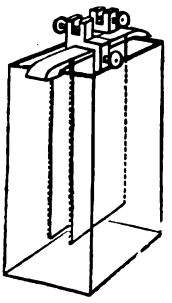
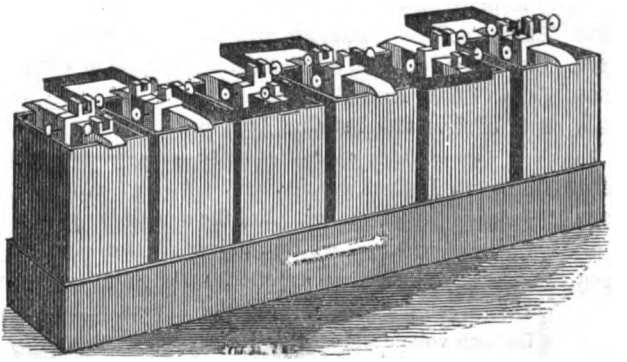


FIG. 896.



		Each. £ s. d.	Each. £ s. d.
891	**Smee's Batteries,** in round stoneware pots, so arranged that the zincs can be easily removed and replaced :— ½-pt. 5/. 1-pt. 8/. 2-pts. 10/6. 3-pts. 12/6.		
892	**Smee's Batteries,** in flat glass cells (fig. 892) . . 10/,	0 12 6	0 15 6
893	**Set of Six half-pint Smee's Batteries,** in round pots, and a mahogany tray		1 16 0
	This set is so arranged, that it can be used for quantity or intensity effects, will show all the leading facts connected with galvanism, decomposing water, deflagrating metals, &c., and is well adapted for the instruction of a small class.		
894	**Set of Six one-pint Smee's Batteries,** in round stoneware cells and mahogany tray	2 12 6	3 0 0
895	**Set of Six two-pint ditto,** in ditto		3 17 0
896	**Set of Six one-pint ditto,** in flat cells, and mahogany tray, with counterpoise weights, or ratchet wheel, for suspending the battery when not in use (fig. 896)	3 3 0	4 10 0

Fig. 898.

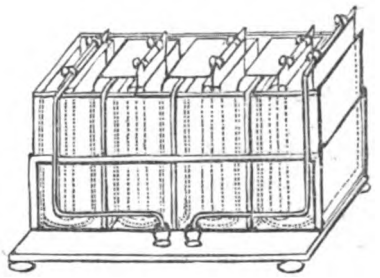


Fig. 901.

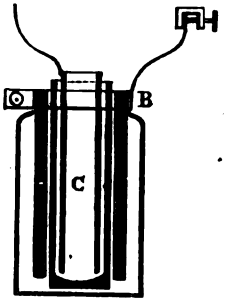
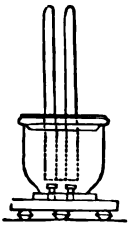


Fig. 909.



897	**Grove's Battery,** single cell	0 10 0
898	**Set of Four ditto,** with suitable metallic connexions, porous cells, and earthenware troughs, in mahogany tray (fig. 898)	2 10 0
899	**Set of Eight Grove's Batteries**	5 0 0
900	**Grove's Gas Battery,** in which the active elements are hydrogen and oxygen gases; set of four gas batteries mounted on a stand	4 4 0
901	**Bunsen's Carbon Battery,** single cell (fig. 901) . .	0 10 0
902	Ditto ditto in a series of ten, arranged in a tray .	5 5 0
903	**Callan's Cast Iron Batteries**	0 7 6
904	**Sets of Five and Ten Cast Iron Batteries,** in a stout tray	2 2 0 / 4 4 0
	A powerful form of galvanic battery for rough manufacturing purposes.	
904*	**Maynooth Batteries** 4/6,	0 6 6 / 0 10 6
905	**Insulated Stand,** for exhibiting the combustion of charcoal, fusing of wire, &c., with the galvanic battery . . .	1 0 0
906	**Insulated Stand,** very superior, with Henly's Universal Discharger and Press, two pairs of forceps, &c., applicable for both voltaic and frictional electricity (see fig. 810) .	2 2 0 / 2 10 0

Fig. 916.

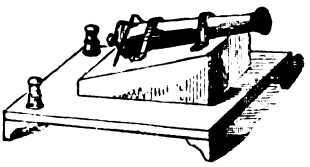


Fig. 914.

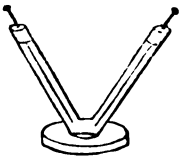


Fig. 912.

Fig. 907.

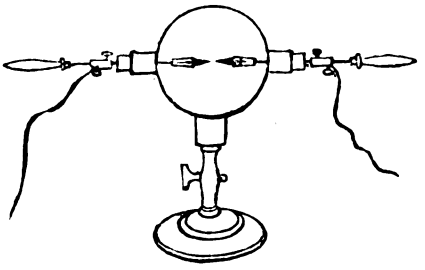
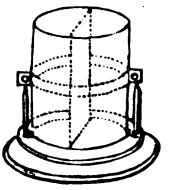


Fig. 913.



		Each. £	s.	d.	£	s.	d.
907	**Glass Globe,** with stopcock, brass caps, sliding forceps and balls, for showing electrical light in vacuo, and decomposing gases by the ignition of charcoal points with the galvanic battery (fig. 907)	1	15	0	2	2	0
908	**Apparatus for Decomposing Water,** with separate tubes for collecting the oxygen and hydrogen gases, small size .	0	7	6	0	15	0
909	Ditto ditto large, suitable for lecture tables or private experiments (fig. 909) . . . . . from				1	1	0
910	**Decomposition Apparatus,** with tubes graduated into 10ths and 100ths of a cubic inch				1	10	0
911	**Decomposition Apparatus,** with single tube, for collecting the gases combined	0	5	0	0	18	0
912	**Decomposition Apparatus,** with graduated tube (fig. 912)	0	18	0	1	4	0
913	**Farraday's Apparatus** for electro-chemical decompositions, consisting of a glass trough divided by a diaphragm (fig. 913)	0	10	0	1	1	0
914	**V Tube** for the decomposition of neutral salts (fig. 914) .	0	5	0	0	10	0
915	**Pieces of Platinum and Silver Wire** soldered together alternately; a strong voltaic current passed through, causes the platinum to become red hot without heating the silver				0	6	6
916	**Model Cannon or Bomb,** mounted on mahogany stand, with binding screws, &c., for firing gunpowder by galvanic battery (fig. 916)				1	0	0
917	**Model of Apparatus for Submarine Explosions** . .	0	10	6	2	2	0
918	**Rectangular Troughs,** of hard glazed porcelain, with porous jars, 6-in. high, 6½-in. wide, 2-in. thick . .				0	4	0
919	Ditto ditto 6-in. high, 4¼-in. wide, 2-in. thick . .				0	3	0
920	Ditto ditto 5-in. high, 3¼-in. wide, 1⅞-in. thick . .				0	2	0

		Each. £ s. d.	Each. £ s. d.
921	**Porcelain Troughs** for Wollaston's batteries . . .		0 15 0
922	**Glass Cells** of various dimensions . . . . from		0 2 0
923	**Gutta Percha Battery Cells and Acid Holders** . .		
924	**Platinum Foil and Wire** of all thicknesses . . .		
925	**Amalgamated Zinc Plates**, cut to various sizes, per lb. .		0 1 6
926	**Galvanic Conducting Wires**, in sets for medical purposes, from		0 2 6
927	**Lignum-vitæ and Boxwood Charcoal** . . per oz.		0 0 6
928	**Charcoal or Graphite Points**, for electric light, per pair	0 0 6	0 1 0
929	**Gold, Silver, Brass, Copper, Zinc, and Steel Wire and Foil**, for combustion		
930	**A Series of Six Smee's Batteries**, in a tray; apparatus for decomposing water into oxygen and hydrogen; V tube for decomposing neutral salts, various metal wires and foils for igniting and deflagrating, and a glass trough fitted for depositing metals by the electrotype process. A very useful set for the use of schoolmasters, for instructing a small class		3 3 0
931	**Larger Series**, suited for lectures	4 10 0	6 6 0

ELECTRO METALLURGICAL APPARATUS.

Fig. 935.

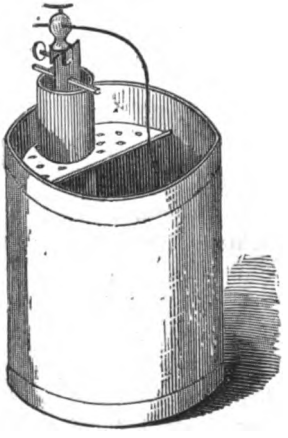
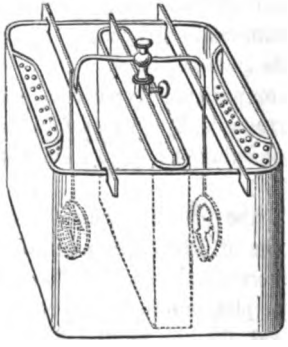


Fig. 936.

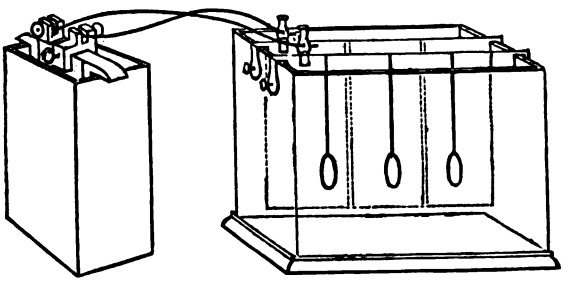


ELECTROTYPE APPARATUS IS NOW EXTENSIVELY USED FOR OBTAINING, BY GALVANISM, EXACT FAC-SIMILIES OF ENGRAVED COPPER-PLATES, WOOD ENGRAVINGS, MEDALS, PLASTER CASTS, ETC.

934	**Electrotype Apparatus**, consisting of earthenware jar, with porous pot, zinc and wire	0 1 6	0 2 6

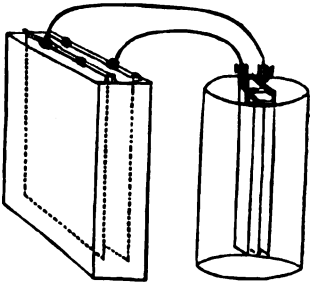
		Each. £ s. d.	Each. £ s. d.
935	**Round Glazed Stoneware Troughs,** not permeable to sulphate of copper, with porous cell, zinc plate, binding screw and wire, suitable for copying medals, seals, plaster casts, &c. (fig. 935) . . . from 3/6, 5/,	0 7 6	0 10 6
	This apparatus is most convenient and simple in its operation, and particularly adapted for those commencing this interesting and useful art.		
936	**Electrotype Trough,** 7 inches square, with flat porous cell, zinc plate and binding screw, and brass bars, on which to place the object to be copied (fig. 936)		0 15 0
937	**Small ditto,** 5 inches square	0 7 6	0 10 0

Fig. 938.



938	**Single Smee's Battery,** with precipitating trough, for making a number of small medals (fig. 938) . from		1 0 0
939	**Larger ditto**		1 15 0
940	**Single Daniell's Battery,** fitted up with precipitating troughs, for electrotype purposes	0 16 0	1 1 0
941	**Vertical Precipitating Trough,** with Smee's battery, for obtaining duplicates of engraved copper, &c. (fig. 941) .	1 16 0	3 10 0

Fig. 941.



942	**Single Cell Apparatus,** for electro-gilding or plating .	0 5 6	0 10 6
943	**Electro-Gilding and Plating Apparatus by the Battery Process,** with glass precipitating trough, and 1 Smee's battery		0 17 6
944	Ditto ditto with 2 Smee's batteries		1 7 6
945	Ditto ditto with 3 Smee's batteries		1 17 6

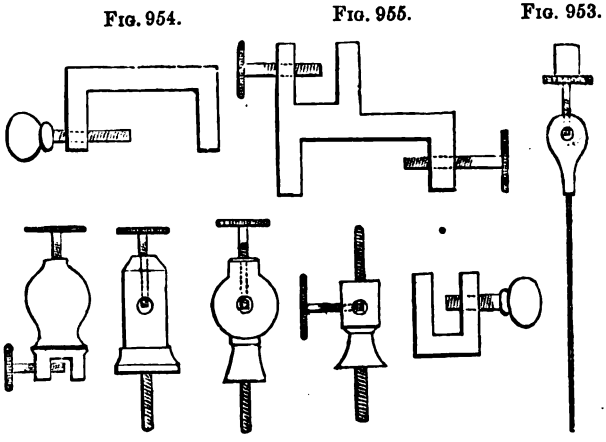


Fig. 954. Fig. 955. Fig. 953.

Figs. 948. 949. 950. 951. 952.

		Each. £ s. d.	Each. £ s. d.
946	**Apparatus** for coating metallic surfaces with alluminum and silicium . . . . . from		0 5 0
947	**Platinized Silver** . . . . . per oz.		0 11 0
	This averages about 3-oz. to the square foot, but can be had of various thicknesses.		
948	**Binding Screws**, of various forms and descriptions :—		
	Fig. 948 949 950 951 952 953 954 955		
	/8 /8 /6 & /8 1/ /8 & 1/ 1/ 1/3 1/6 & 2/		
949	**Gold Wire and Plate** . . . . . per dwt.		0 5 6
949*	**Silver ditto ditto**		0 8 0
950	**Gold or Silver Solution**, ready for use, in 3-oz. bottles .	0 1 9	0 3 0
951	**Sulphate of Copper** . . . . . per lb.		0 0 8
952	**Sulphuric Acid**		0 0 4
953	**Amalgamated Zinc Plates**, of all sizes . . per lb.		0 1 6
954	**Copper Wire and Plate**, of all thicknesses . . .		
955	**Glass Cells**, of all sizes, mounted with sliding bars for electro-gilding and plating . . . . . from		0 7 6
956	**Gutta Percha Precipitating Cells**, of various forms .		
957	**Tin Trays**, for impregnating plaster casts with boiling water, wax, &c. . . . . from		0 2 0
958	**Brushes** for applying plumbago, &c.		0 1 0
959	**Brushes** for polishing and bronzing electrotypes . .		0 0 9
960	**Water of Air Stone**, for cleaning electrotypes . . .		0 1 0
961	**Porous Cells** of superior quality :—		
	Round—		
	Height . 2½-in. 3½-in. 4½-in. 6-in. 12-in. 18-in.		
	Price . . /4 /6 /6 /9 1/6 2/6		
	Flat—		
	Height . 2-in. 4-in. 3½-in. 3½-in. 2½-in. 7-in.		
	Width . 3½-in. 4½-in. 5½-in. 6½-in. 4½-in. 7-in.		
	Price . . /6 /10 1/ 1/3 /10 1/6		
962	**Very superior Plaster of Paris Medallions**, for electrotype purposes . . . . . /3,	0 0 6	0 2 0

MAGNETIC AND ELECTRO-MAGNETIC APPARATUS.

FIG. 963.

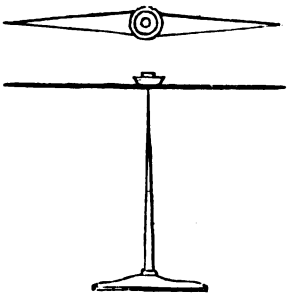


FIG. 965.

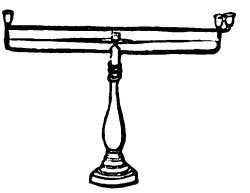


FIG. 967.

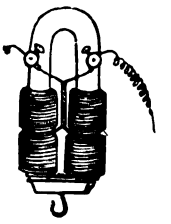
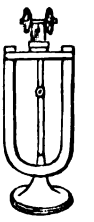


FIG. 970.



		Each. £ s. d.	Each. £ s. d.
963	**Magnetic Needles,** with brass or agate centres (fig. 963) from		0 2 6
964	**Dipping Needles,** with graduated arc	1 10 0	10 10 0
965	**Oersted's Apparatus,** for shewing the deflection of the magnetic needle by an electrical current passing above or below it, best make (fig. 965)	0 10 6	1 10 0
966	Ditto, small . . . . . from		0 5 6
	This apparatus will illustrate the principle of the electric telegraph in its most simple form.		
967	**Soft Iron Electro-Magnets,** consisting of a bar of soft iron, bent the shape of a horse-shoe, and covered with insulated copper wire, forming, when in connection with a galvanic battery, a powerful electro-magnet (fig. 967) 4/6, 14/,	1 1 0	1 10 0
968	**Soft Iron Electro-Magnet,** mounted on a tripod stand, with weight . . . . . from		0 12 6
969	**Soft Iron Electro-Magnet,** on a large scale, for sustaining immense weights		3 3 0
970	**Ritchie's Experiment,** exhibiting the rotation of an electro-magnet between the poles of a horse shoe magnet (fig. 970)		0 12 6
971	**Ritchie's Experiment,** with adjusting screws . . .		0 15 0
972	**Gamut of Bells on Stand,** with Ritchie's experiment rotating in the centre, carrying a clapper which strikes the bells in succession		3 3 0
973	**Galvanometer,** for detecting or measuring very feeble electro-magnetic currents 7/6,	0 10 6	0 18 0
974	**Improved Galvanometer,** superior, with levelling screws and glass shade (fig. 974)	1 1 0	2 2 0
975	**Astatic Needles,** to suspend on a point, or from a silk fibre or hair	0 7 6	1 1 0
976	**Galvanometer,** with astatic needles, index, torsion key, moveable coil, and levelling screws, very delicately balanced		3 3 0
977	**Callan's Primary and Secondary Coils,** on stand from	1 1 0	1 16 0

Fig. 974.

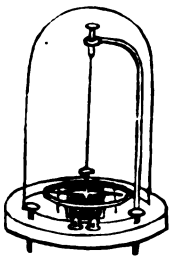


Fig. 981.

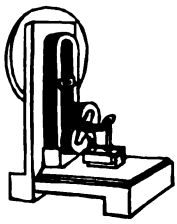


Fig. 992.

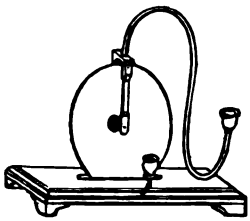
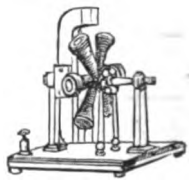


Fig. 1002.



		Each. £	s.	d.	£	s.	d.
978	**Ladd's Modification of Ruhmkorff's Induction Coil,** to give 4-inch spark in air				15	15	0
979	Ditto ditto to give 3-inch sparks				12	12	0
980	Ditto ditto for mining purposes, capable of firing 50 charges simultaneously				15	15	0
981	**Magneto-Electric Machine,** consisting of a combination of highly-charged horse-shoe magnets, mounted on a stand, with multiplying wheel and rotating armatures, for obtaining quantity and intensity effects. The machine is fitted with apparatus for producing magneto-electric light and heat, electro-chemical decompositions, the ignition and deflagration of metals, the rotation of wires, and powerful action upon the human body; in case (fig. 981)	8	8	0	12	12	0
982	**Negretti and Zambra's Improved Magneto-Electric Machine,** a most convenient and portable apparatus for the application of medical galvanism; no acid required, the instrument always ready for use, and the strength of the currents can be regulated from the most feeble to the highest intensity. In mahogany box, with directors				2	10	0
983	Ditto ditto PATENT, with self-acting clockwork movement	3	3	0	5	5	0
984	**Magnetic Toys,** consisting of fishes, ships, swans, &c., to illustrate magnetic attraction and repulsion	0	0	6	0	5	0
985	**Ampere's Apparatus,** for exhibiting the rotation of a cylindrical galvanic battery round the pole of a magnet				0	6	6
986	**Horse-shoe Magnet on brass foot,** for ditto				0	9	6
987	**De la Rive's Floating Battery**				0	4	6
988	**Marsh's Apparatus** for shewing the vibration of a suspended wire, transmitting an electrical current when submitted to the influence of the poles of a magnet				0	7	6
989	**Farraday's Apparatus** for shewing the rotatory motion of a wire, transmitting an electrical current round the pole of a magnet				0	7	6
990	**Farraday's Rotating Needle, and Marsh's Vibrating Wire,** in the same instrument				0	10	6
991	**Terrestrial Rotating Magnet**	0	7	6	0	10	6
992	**Sturgeon's Rotating Disc** (fig. 992)				0	8	6

FIG. 998.

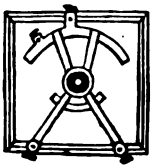


FIG. 999.

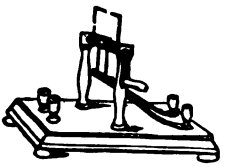
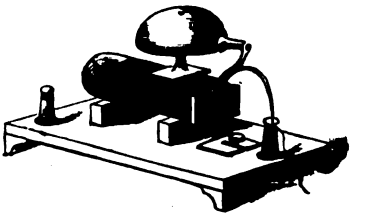


FIG. 1004.



		Each. £	s.	d.	£	Each. s.	d.
993	**Barlow's Stellar-formed Rotating Wheel** . . .				0	5	6
994	**Double Wheel** of the stellar form				0	15	0
995	**Apparatus**, exhibiting a coil of copper wire rotating between the poles of a magnet				0	14	0
996	**Glass Tube**, surrounded by a coil of copper wire, for magnetizing steel needles by induction				0	2	0
997	**Electrepiter**, for reversing the direction of galvanic or electro-magnetic currents				1	6	0
998	**Dr. G. Bird's Inversor**, for ditto (fig. 998) . . .				0	18	0
999	**Bachoffner's Electrepiter**, for ditto (fig. 999) . .				0	18	0
1000	**Model of Saw Mill driven by Electro-Magnetism**, consisting of a powerful electro-magnet on stand, with rotating armature, driving a circular saw				3	3	0
1001	**Model Electro-Magnetic Engine, driving a small Water Pump**				3	3	0
1002	**Electro-Magnetic Motive Engines**, worked by the combination of electro-magnetic forces (fig. 1002) . .	6	6	0	10	10	0
1003	**Model Electro-Magnetic Telegraph**, fitted with reversing break, in a simple form on a stand, suited for lectures or the class room (fig. 1003)				3	3	0
1004	**Model Electro-Magnetic Signal Bell**, to be used in conjunction with above (fig. 1004)				1	12	0
1005	**Compound Electro-Magnetic Apparatus**, consisting of a horse-shoe magnet, on brass foot, with levelling screws and sliding pillar, two rotating armatures, rotating coil, Ampere's bucket, mobile wire frame, helical coil, rotating cylinder, and two flood cups				3	3	0
1006	**Copper Wire**, covered with cotton, superior quality, in long lengths :—						
	Nos. 12 to 14. 15 to 18. 19 to 22. 23 to 26. 30 to 32.						
	Per lb. 3/ 4/ 5/ 6/ 8/6						
1007	**Copper Wire**, covered with silk, to order.						
1008	**Copper Wire**, covered with gutta percha, in lengths of 100 feet and upwards, of various sizes, from, per length .				1	0	0
1009	**Bar Magnets**, single or in sets, round or flat, from 6 inches in length	0	8	6	1	0	0

Fig. 1003.

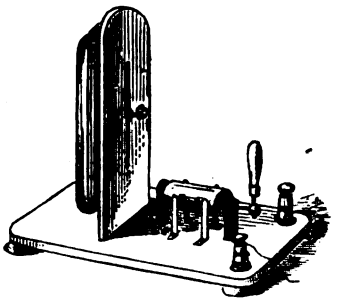


Fig. 1014.

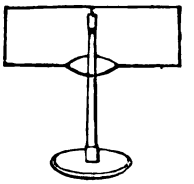


Fig. 1015.

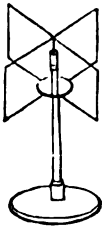
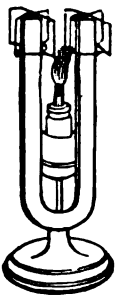


Fig. 1016.



		Each. £	s.	d.	£	s.	d.
1010	**Horse-shoe Magnets**, from 1 to 10 inches in length, /6, 1/	0	2	6	0	5	0
1011	**Compound ditto**, of various sizes	0	10	0	3	0	0
1012	**Natural Magnets or Loadstones**	0	1	6	0	7	6
1013	**An Assortment of Electro-Magnetic Apparatus, packed** in mahogany case to illustrate the first principles of the science	2	2	0	5	5	0

These sets are so arranged as to extend and complete those of Galvanic Apparatus, page 84.

THERMO-ELECTRIC APPARATUS.

1014	**Compound Frames and Wires** of the various metals, for exhibiting thermo-electric rotations (fig. 1014) from				0	5	6
1015	**Rectangular Wire Frames**, with four branches composed of dissimilar metals, with a fine point on the rectangle, for suspending on the pole of a magnet, to show thermo-magnetic rotation (fig. 1015) . . . from				0	5	6
1016	**Thermo-Rotating Compound Rectangular Frames**, composed of platina and silver wires, mounted on a horse-shoe magnet, complete, with spirit lamp (fig. 1016)				1	1	0

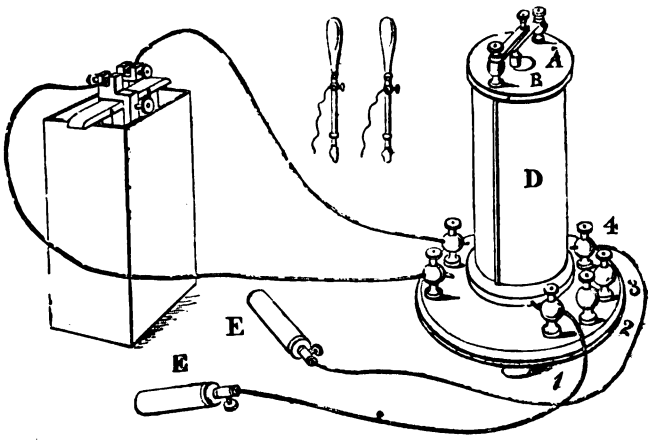


Fig. 1018.

ELECTRO-GALVANIC MACHINES,

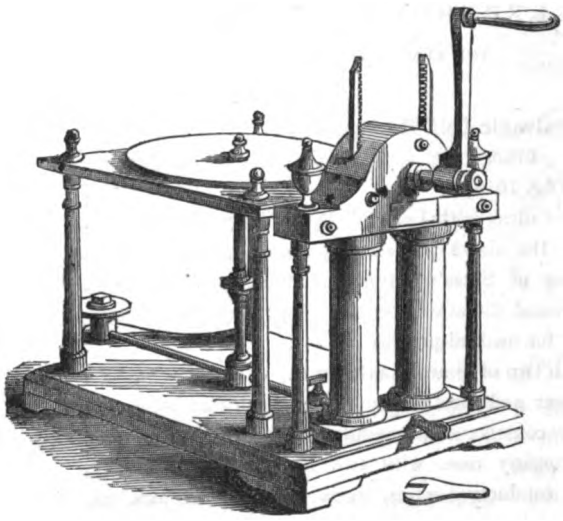
FOR ADMINISTERING MEDICAL GALVANISM.

		Each. £ s. d.	£ s. d.
1017	**Electro-Galvanic Coil Machines** . . . from		1 1 0
1018	Ditto ditto, with four binding screws, to regulate shock (fig. 1018)		1 10 0
1019	Ditto ditto, with Lockey's Water Regulator . .		1 10 0
1020	Either of the above packed in polished mahogany case, with one of Smee's batteries, conducting wires, shock handles, and directors, complete, very portable and convenient for medical practice		3 3 0
1021	Ditto, with two of Smee's batteries		4 0 0
1022	Ditto, larger and most improved form, with a simple and effective contrivance for regulating the shock, complete, in mahogany case, with two large Smee's batteries, flexible conducting wires, shock handles, directors, &c., with directions for use	6 6 0	8 8 0
1023	**Larger Coils and Batteries** of any number of elements fitted to above, for hospital use, to order . . .		
	These instruments can be had of either primary or secondary arrangement, or both combined in one coil.		
	Full directions sent with each apparatus, that will enable patients to use them with the greatest ease and convenience.		
1024	**Sponge Directors** . . . . . from, per pair		0 3 6
1025	**Shock Handles** . . . . . ,,		0 2 6
1026	**Directors** of various forms, suited to the application of galvanism to the eye, teeth, &c. . . . from		0 2 6
1027	**Flexible Conducting Wires**, of various lengths, from per pair		0 3 6
1028	**Amalgamated Zinc Plates**	0 0 9	0 1 6

PNEUMATIC APPARATUS.

1029	**Largest Size Double-Barrel Air Pump**, with Smeaton's single cylinder, on high mahogany stand, barometer guage, gun metal receiver plate, forked key and lever .	58 0 0
1030	**Large Size Double-Barrel Air Pump**, on raised mahogany stand, barometer gauge, gun metal receiver plate, key and lever	16 16 0
1031	**Large Size Double-Barrel Table Air Pump**, with mercurial gauge, raised receiver plate, clamp and key (fig. 1031)	12 10 0
1032	Second size	10 5 0
1033	Third size ditto, with receiver plate, on stand, with gauge .	8 8 0
1034	Ditto ditto without gauge	7 7 0
1035	Fourth size ditto	4 10 0
1036	Small size ditto	3 10 0

Fig. 1031.



		Each. £	s.	d.	£	s.	d.
1037	**Single-Barrel Air Pumps,** with receivers (fig. 1037) .	1	5	0	1	10	0
1038	Ditto ditto with inclined barrel and fountain experiment (fig. 1038)				2	5	0
1039	**Sets of Pneumatic Apparatus,** packed in case, consisting of single or double barrel air pump, open and close receivers, fountain apparatus, pair of hemispheres, sliding wire and collar, syringe and lead weight, bladder, frame and weight, filter cup and glass for mercury, hand glass and fruit stand £5,	10	0	0	21	0	0
1040	**Condensing Pumps**	3	3	0	6	6	0
1041	**Exhausting Syringes**				0	7	0
1042	**Condensing Syringes**				0	7	0
1043	**Condensing and Exhausting Syringes,** both in one instrument				0	12	6
1044	Large ditto				1	1	0
1045	**Single Transferrer** (fig. 1045)				0	16	0
1046	**Double Transferrer**				2	2	0
1047	**Vacuum or Pressure Gauge,** small (see also Gauges, page 35)	0	4	0	0	6	0

Fig. 1048.

Fig. 1037.

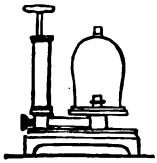


Fig. 1038.

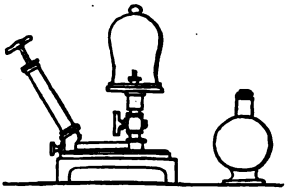


Fig. 1045.

FIG. 1051.

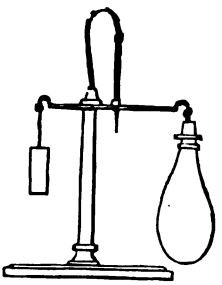


FIG. 1052.

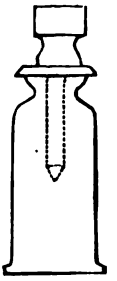


FIG. 1061.

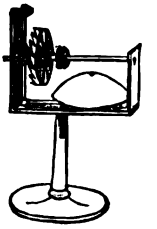


FIG. 1064.

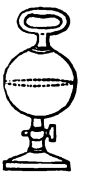
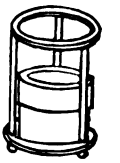


FIG. 1066.



		Each. £	s.	d.	Each. £	s.	d.
1048	**Flat Brass Plate,** ground for open receivers, with collar of leather and sliding wire (fig. 1048)	0	13	0	0	15	0
1049	**Brass Syringe or Pocket Condensor,** for instantaneous light by compression of air within the cylinder . .				0	3	6
1050	**Syringe and Lead Weight,** with ground brass plate for open receiver 7/6,	0	10	0	0	12	0
1051	**Copper Bottle,** scale beam and stand, with balance weight, for weighing air (fig. 1051)				2	15	0
1052	**Filtering Cup,** with ground brass plate, for shewing the porosity of wood (fig. 1052)	0	6	6	0	10	0
1053	**Fruit Stand,** for supporting shrivelled fruit under receiver of air pump				0	4	6
1056	**Fountain in Vacuo**	0	6	6	0	15	0
1057	**Tall Fountain Glasses**	0	6	0	0	9	0
1058	**Bladder Glass**	0	3	0	0	4	0
1059	**Hand Glass**	0	1	6	0	2	6
1060	**Bell Experiment,** illustrating that air is essential to sound	0	7	6	0	10	0
1061	Ditto, best make (fig. 1061)	0	15	0	1	0	0
1062	**Breaking Squares,** to illustrate the pressure and also the expansive power of air				0	1	3
1063	**Wire Cage** for ditto				0	5	0
1064	**Hemispheres** (fig. 1064) for illustrating the pressure of the atmosphere :— Small, 15/. Second size, 18/. Third size, 30/.						
1065	**Lung's Glass,** for illustrating the elasticity of air . .	0	6	0	0	8	6
1066	**Bladder Frame and Lead Weights,** for illustrating the elasticity of air (fig. 1066)	0	10	0	0	12	0
1067	**Torricellian Experiment,** for illustrating the pressure of the atmosphere and construction of the barometer .	0	14	0	1	15	0
1068	**Guinea and Feather Apparatus,** 3 falls . . .				1	4	0
1069	Ditto ditto 2 falls (fig. 1069)				0	16	0
1070	**Tall Glass** for ditto	0	10	6	0	18	0
1071	**Model,** for shewing the principle of the common water pump (fig. 1071)				1	1	0
1072	**Model** for ditto, with glass barrel				1	10	0
1073	**Model of Forcing Pump** (fig. 1073)	2	2	0	2	15	0

Fig. 1069.

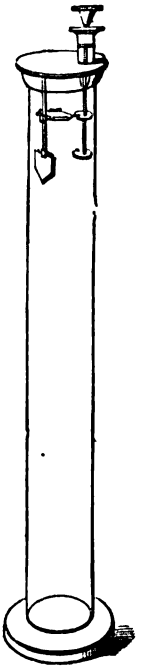


Fig. 1071.

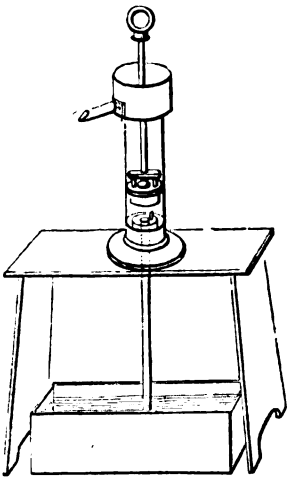
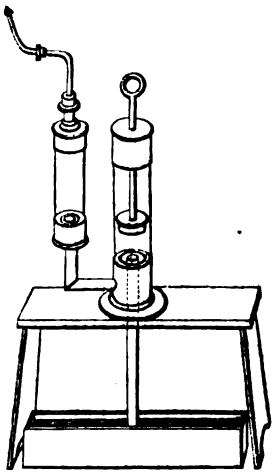


Fig. 1073.



		Each. £ s. d.	£ s. d.
1074	**Models of Lifting and Forcing Pumps,** mounted on a mahogany stand, with water cistern		5 5 0
1075	**Apparatus,** consisting of balance beam on a stand, a ball of cork suspended at one end, and a metal weight at the other, illustrating, that two bodies balanced in the atmosphere, are not so in a vacuum		0 10 0
1076	**Windmills,** of a superior construction, with shifting vanes to show the resistance of air (fig. 1076) . . from		2 2 0
1077	**Open and Close Glass Receivers,** with welted edges accurately ground, of all sizes (fig. 1077) . . .	0 3 0	2 2 0
1078	**Four Barometer Tubes,** for shewing the upward, downward, oblique, and lateral pressure of the atmosphere .		0 10 0
1079	**Leslie's Apparatus for Freezing Water** by evaporation under an exhausted receiver . . . . . A thin film of ice may be formed by this apparatus in the warmest weather.	0 12 0	1 4 0
1080	**Apparatus,** consisting of three glass vessels, for illustrating the mechanical properties of air		0 10 0
1081	**Glass Flask,** mounted with stopcock, for illustrating the influence of diminished pressure in facilitating ebullition		0 7 9
1082	**Philosophical Water Hammer**		0 4 0
1083	**Balloons of Gold Beaters' Skin,** for filling with hydrogen gas . . . . . from		0 1 6
1084	**Fountain Glasses**	0 6 6	0 10 6

FIG. 1076.

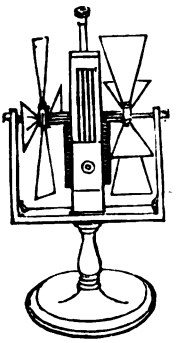


FIG. 1077.

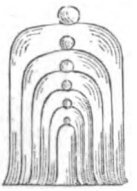
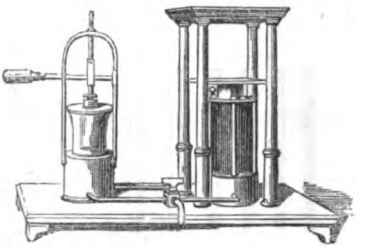


FIG. 1102.

FIG. 1104.



HYDROSTATICS AND HYDRAULICS.

		Each. £ s. d.	Each. £ s. d.
1085	**Hydrostatic Paradox.** An apparatus to prove that a small column of water will support a much larger quantity, and also that fluids will rise and maintain the same level, whatever shape or size the channels through which they flow; in glass or metal . . from	0 2 6	1 1 0
1086	**Hydrostatic Bellows,** to illustrate that fluids press equally in all directions, and the pressure in proportion to the height of the vertical column of fluid	1 10 0	4 4 0
1087	**Artificial Fountains,** by condensed air, consisting of a copper vessel, with condensing pump, and a variety of jets, for fragrant waters, &c., packed in case . from		3 3 0
1088	Extra jets for ditto, illustrating the mechanical forces .		
1089	**Pewter, Copper, and Glass Syphons,** of various forms (see Chemical Section) . . . . . from		0 2 6
1090	**Tantalus Cup,** an illustration of the use of the syphon .		0 10 6
1091	**Apparatus** to explain the theory of intermitting springs .		3 3 0
1092	**Model of Centrifugal Pump,** for raising water by means of centrifugal force, combined with atmospheric pressure		3 3 0
1093	**Model of Appold's Centrifugal Pump**		4 10 0
1094	**Model of Barker's Mill;** by this machine, a rotatory motion is obtained by the centrifugal force of the water employed		3 3 0
1095	**Model of Archimedes' Screw, or Water Snail,** a machine for raising water to small heights requiring little power		4 4 0
1096	**Mongolfier's Water Ram;** this machine, by the momentum acquired from the flow of water through a pipe, forces a small column to a considerable height . .		5 0 0

Fig. 1106.

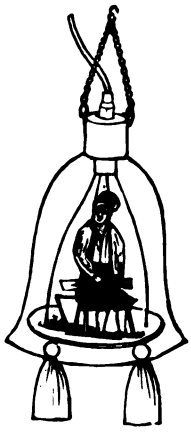


Fig. 1100.

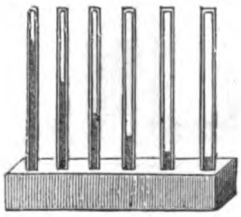
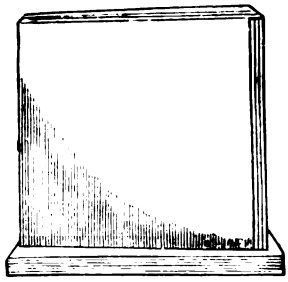


Fig. 1101.



		Each. £	s.	d.	Each. £	s.	d.
1097	**Apparatus** for shewing that more water flows from a short tube than through a simple aperture of equal diameter	0	12	0	1	0	0
1098	**Apparatus** for exhibiting and illustrating the centre of buoyancy, and meta-centre as applied in ship-building .	1	3	6	1	10	0
1099	**Apparatus** for illustrating the laws by which fluids spout through various adjutages	2	9	6	5	0	0
1100	**A Series of Six Glass Tubes,** for shewing capillary attraction (fig. 1100)				0	7	0
1101	**Two Plates of Glass,** arranged for shewing the hyperbolic curve produced by capillary attraction (fig. 1101) .				0	14	0
1102	**Hollow Glass Balloons and Figures, or Cartesian Divers,** for ascending and descending in a tall air-tight vessel of water, as the pressure on the surface is increased or diminished, 2/ each, or in glass vessel complete (fig. 1102)	0	5	6	0	10	0
1103	**Working Model of Bramah's Hydrostatic Press,** raising 400-lbs.	6	6	0	10	10	0
1104	Ditto, brightly finished to scale, with keys and breaking irons complete, 30 cwt. (fig. 1104)				18	0	0
1105	Larger size ditto, 60 cwt.						
1106	**Glass Model of Diving Bell,** with lamp, &c. (fig. 1106)	1	5	0	3	0	0
1107	**Model of Undershot Wheel**	2	0	0	4	4	0
1108	**Model of Overshot Wheel**	2	0	0	4	4	0
1109	**Model of Breast Wheel**	2	0	0	4	4	0
1110	**Canal Lock and Sluice Gates** . . . from				8	8	0
1111	**Current Meters,** for shewing the rate of flow or tide in a stream or river, and the amount of gallons per hour delivered						

HYDROMETERS, SACCHAROMETERS, GRAVIMETERS, ETC., FOR DETERMINING THE SPECIFIC GRAVITY OF FLUIDS AND SOLIDS (SEE PAGE 36.)

OPTICAL INSTRUMENTS.

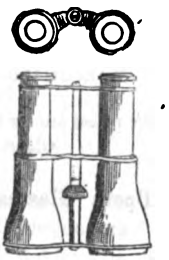
OPERA GLASSES, RACE GLASSES, CAPTAINS' GLASSES, MICROSCOPES, SPECTACLES, TELESCOPES.

FIG. 1117.

FIG. 1112.

FIG. 1113.

FIG. 1118.



SINGLE ACHROMATIC OPERA GLASSES.

		Each. £ s. d.	Each. £ s. d.
1112	**Achromatic Opera or Perspective Glasses,** simple form, black body, with two plated draws, the object glass 1¼-in. diameter (fig. 1112)		0 12 6
1113	**Achromatic Opera Glasses,** pear form, with black body, one gilt draw, the object glass 1⅛-in. diameter, called the "Exhibition Glass" (fig. 1113)	0 10 0	0 12 0
1114	Ditto, with ivory body and gilt draw		0 15 6
1115	**Sydenham Waistcoat-Pocket Glass,** with achromatic combination of six lenses, of extraordinary defining and magnifying power :—		
	Plain japanned metal mounting		1 5 0
	Ditto ditto body covered with leather .		1 7 0
	Ivory body and gilt slide		1 9 0
	Tortoise-shell ditto and ditto		1 13 0
1116	**Tom Thumb Opera Glass for the Watch Chain** . .		0 10 6

DOUBLE ACHROMATIC OPERA GLASSES.

1117 **Double Achromatic Opera Glasses,** with screw adjustment, the object glasses and eye lenses warranted of a superior quality, and cases to each size (fig. 1117):—

Diameter of Object Glasses.		The body and slides all black.	Body black, the slides and adjustments gilt.	The body ivory, with slides and adjustments gilt.	The body and slides all ivory.	The body pearl, with gilt slides.	The body and slides all pearl.
French Lines.	English Inches.						
15	1⅜-in.	£1 14 0	£1 16 0	£2 0 0	£4 10 0	£4 15 0	£5 5 0
17	1½-in.	2 0 0	2 2 0	2 4 0	5 0 0	5 5 0	6 0 0
19	1¾-in.	2 10 0	2 12 0	3 3 0	5 10 0	5 15 0	6 10 0
21	1⅞-in.	3 4 0	3 6 0	3 10 0	6 0 0	6 0 0	7 0 0
24	2⅛-in.	3 16 0	3 18 0	4 4 0	8 0 0	8 10 0	9 0 0
26	2¼-in.	4 4 0	4 6 0	5 10 0	10 0 0	10 0 0	11 0 0

1118 **Achromatic Opera Glasses,** with moveable centres, to change the axis of the lenses so as to suit the width of different eyes (fig. 1118) from 5/ to 15/ each extra on the above prices.

The above prices are for the VERY BEST QUALITY of lenses and mountings; similar sizes of Opera Glasses can be supplied of inferior manufacture at lower rates.

1119 **Opera Glasses** of the best manufacture, with triple achromatic eye pieces and object glasses, or **12-lens combination**:—

French Lines.	Diameter of Object Glasses.	Body and slides all black.	Body black, the slides and adjustments gilt.	Ivory body, gilt slides and adjustments.
17	1½-in.	£3 10 0	£3 15 0	£4 4 0
19	1¾-in.	3 18 0	4 2 0	5 5 0
21	1⅞-in.	4 10 0	4 15 0	6 0 0
24	2⅛-in.	5 10 0	6 0 0	7 0 0

Adjusting Centres to any of the above opera glasses, 10/ to 15/ each, extra.

Messrs. Negretti and Zambra have always in stock an extensive and costly assortment of Achromatic Opera Glasses, in the most elegant and rechêrché mountings, fitted with lenses of the very finest quality.

1120 In solid tortoise-shell, tortoise-shell and gilt, tortoise-shell beautifully inlaid with solid gold of exquisite design, enamelled in various brilliant colours on solid silver or brass, solid silver elaborately chased, silver inlaid with solid gold of the most artistic pattern . . . £10 0 0 £25 0 0

DUCHESSE AND EMPRESS, TWELVE-LENSE OPERA GLASSES.

1121 These elegant little instruments by a novel arrangement of achromatic lenses in the eye tubes and object glasses, combine a large field, high magnifying power, and perfect definition, in the smallest possible size.

			Each. £ s. d.	Each. £ s. d.
Duchesse or Empress 12-lense Opera Glasses:—				
		In plain japanned or bronzed metal mountings	2 10 0	3 0 0
Ditto	ditto	covered with morocco leather .	2 12 0	3 2 0
Ditto	ditto	with ivory body, with gilt slides and adjustments	3 0 0	4 0 0
Ditto	ditto	solid tortoise-shell . . .	5 0 0	5 10 0
Ditto	ditto	ditto, with gilt slides and adjustments	4 0 0	5 0 0
Ditto	ditto	dark or light tortoise-shell, inlaid with gold stars	4 10 0	5 10 0
Ditto	ditto	solid pearl mountings . .	6 0 0	6 10 0
Ditto	ditto	solid pearl with gilt slides and adjustments	5 0 0	5 5 0
Ditto	ditto	enamelled on solid silver, of different colours and designs . .	5 0 0	6 10 0

An elegant velvet or morocco leather folding case given with each of the above.

Duchesse Opera Glasses, 6-lense achromatic combination, in japanned metal mountings .			1 5 0
Ditto	ditto	covered with leather . . .	1 10 0
Ditto	ditto	ivory mountings . . .	2 2 0

RACE AND RECONNOITERING GLASSES.

FIG. 1122.

1122	**Achromatic Race Glass,** with sun shade, in strong metal mountings, japanned, with leather case and strap 2/2/0	3 3 0	4 10 0
1123	**Achromatic Race Glass** of the best quality, in strong metal mountings, bronzed, the body covered with leather, with case and strap 70/,	4 4 0	5 0 0
1124	**Achromatic Race Glass,** mountings the same as above, with adjusting centre to change the axis of the lenses to suit the width of different eyes, with case and strap, 75/,	4 10 0	5 10 0
1125	**Twelve-Lense Achromatic Race Glass** (having triple eye pieces and object lenses), very powerful, with great field of view, with case and strap	6 10 0	7 0 0

		Each. £ s. d.	Each. £ s. d.
1126	**Achromatic Race Glass**, with self-adjusting sun shades, with case and strap		5 10 0
1127	**Binocular Achromatic Deer Stalking Glass**, with double adjusting tubes, giving great additional power and range		6 10 0

THE FIELD GLASS.

1128 Without the bulk and weight of a large race glass, the Field Glass will be found invaluable, its small size admits their being carried by ladies or gentlemen where larger instruments would be inconvenient and annoying. Equally adapted for land or sea, the opera, picture gallery, or public meeting. By an achromatic arrangement of 12 lenses, the highest magnifying power is obtained with the utmost economy of space . . . . . .

	Field Glass in bronzed metal mounting, and the body covered with leather, with convenient pocket case . .	3 0 0	3 10 0
1129	Ditto ditto, with sun shade		4 0 0

NAVAL, MILITARY, CAPTAINS, OR PILOTS' BINOCULAR NIGHT GLASSES.

Fig. 1130.

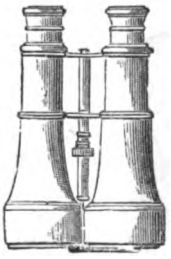
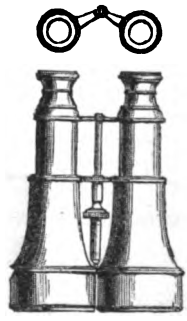


Fig. 1130*.

Fig. 1132.



These instruments having been brought to very high perfection, are now universally used as look-out glasses in the navy and merchant service, also by military officers for reconnoitering, &c.

	Diameter of Object Lenses { Lines / Inches	19 1¾	21 1⅞	24 2⅛	26 2/3-10ths.
1130	**Achromatic Night or Reconnoitering Glass** in japanned metal mountings, with stout leather case and sling strap (figs. 1130 and 1130*) . .	42/	50/ 63/	63/ 70/	80/ 105/
1131	Ditto ditto, body covered with leather, japanned or bronzed metal mountings of superior quality, with sling case . .	65/	80/	90/	110/

		Each. £ s. d.	Each. £ s. d.
1132	**Achromatic Night or Reconnoitering Glass,** with **jointed centre** to adjust the eye pieces to the width between the eyes, lenses and mountings of the very best quality, with sling case (fig. 1132) . . . 80/,	5 5 0	5 10 0
	N. & Z. strongly recommend this instrument for general service.		
1133	**Achromatic Night or Reconnoitering Glass,** with triple eye pieces and object lenses, making a combination of **12 lenses** in the instrument, giving very high magnifying power, combined with extended field and range; in japanned metal mountings, with sling case . . .	5 5 0	5 10 0
1134	Ditto ditto body covered with leather, and bronzed metal mountings with sling case	5 10 0	6 10 0
1135	**Achromatic Night or Reconnoitering Glass, with double adjusting tubes,** giving extended range and field; a superior and powerful instrument, with sling case	6 10 0	8 8 0

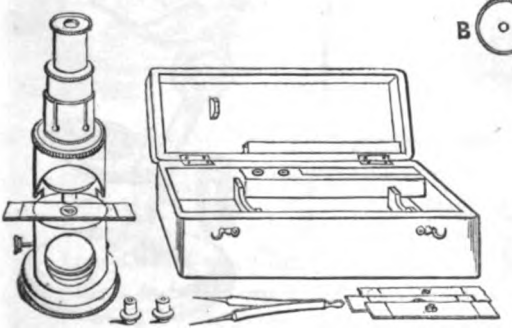
MICROSCOPES.

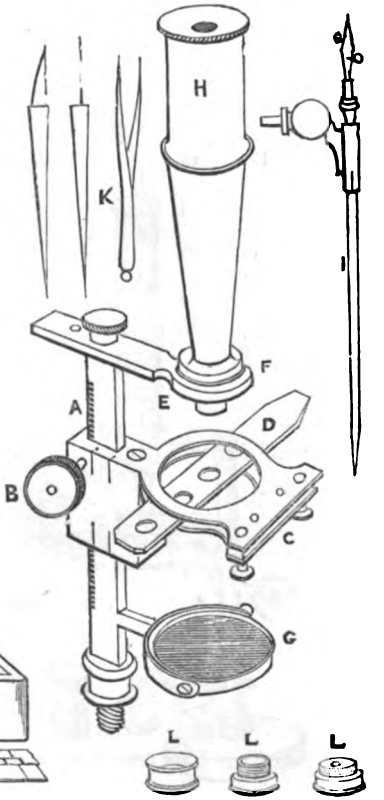
SINGLE AND COMPOUND MICROSCOPES.

FIG. 1142.

FIG. 1139.

FIG. 1138.





		Each. £ s. d.	Each. £ s. d.
1136	**Single Botanic or Dissecting Microscopes,** in a variety of forms, with pillar to screw into the top of the box containing the whole apparatus . . . 11/6 16/-	0 17 0	1 10 0
1137	**Compound Microscope,** with sliding tube adjustment, mirror, eye-piece and magnifying power, forceps, and one microscopic object, in a mahogany box . . .		0 10 0
1138	**Compound Microscope** with three magnifying powers and two objects and stage glass for holding water, &c. (fig. 1138)		0 18 0
1139	**Compound Microscope** with three magnifying powers, a mounted lens for condensing the light on an opaque object, and apparatus in mahogany box (fig. 1139) .		1 1 0
1140	**Larger Compound Microscopes** of the above form . .	1 18 0	2 10 0
1141	**Gould's Compound Microscope,** in case, with apparatus, complete		1 12 0
1142	**Improved Gould's Microscope,** in case, with objects, apparatus, &c. complete (fig. 1142)	1 16 0	2 2 0
1143	**Large Improved Martin's Compound Microscope,** with rack-work adjustment, mirror, six powers, objects, forceps, water trough, insect box, &c.	2 10 0	3 10 0

ACHROMATIC MICROSCOPES.

Fig. 1145.

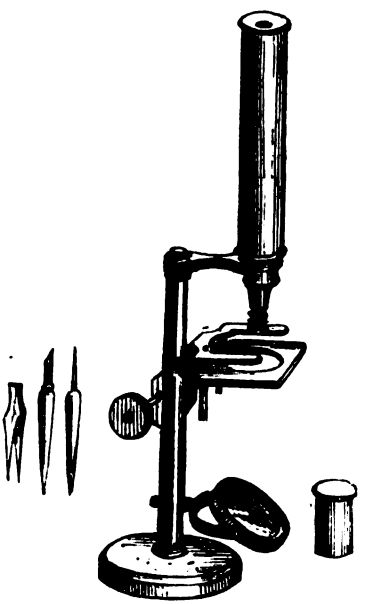
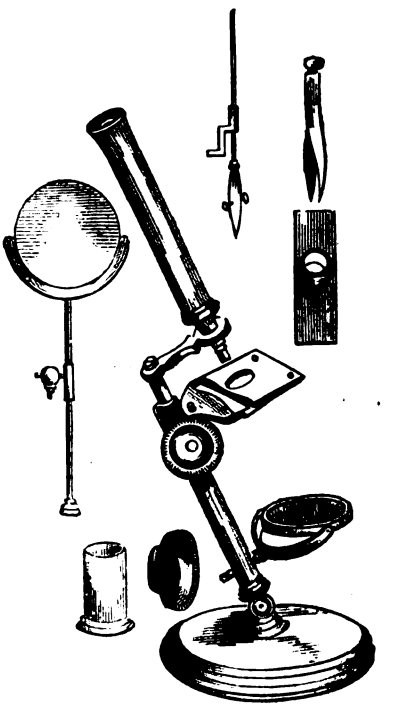


Fig. 1147.



The Microscope has, by the application of achromatic lenses, become a standard instrument for investigation; that it is deservedly so, the results obtained by it in science and useful arts, and the daily increasing discoveries in the animal and vegetable world fully confirm.

		Each. £ s. d.	Each. £ s. d.
1144	**Achromatic Microscopes** on upright pillar and firm circular stand, with plain sliding body and fine adjustment, 2 achromatic powers; in mahogany box . .		2 2 0
1145	**Achromatic Microscope,** with rackwork adjustment to body, with two achromatic powers, in mahogany box (fig. 1145)	3 3 0	4 4 0
1146	**Achromatic Microscope,** with jointed pillar and tripod foot, plain sliding body and fine adjustment, diapraghm plate on stage, 3 achromatic powers, brass forceps, objects, stage glasses; in mahogany box		3 3 0
1147	**Achromatic Microscope,** with jointed pillar, and firm circular foot, rackwork adjustment to the body, sliding clamp for objects on the stage, with a set of achromatic lenses, brass forceps, &c.; in mahogany case (fig. 1147) .		5 5 0

FIG. 1153.

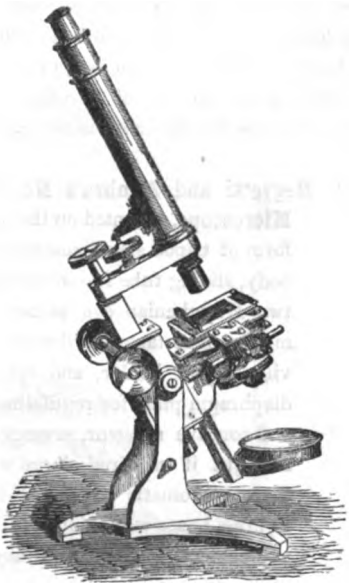
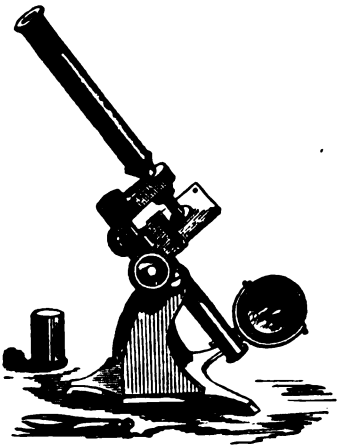


FIG. 1148



1148 **Negretti and Zambras' No. 1 Students' Microscope,** on firm tripod stand, with trunion joint to incline the instrument at any angle, quick and slow adjustments to the body, sliding holder and diaphragm plate on the stage, brass forceps, stand condenser, and set of achromatic powers, in brass box; fitted in mahogany cabinet with lock and key (fig. 1148) 6 0 0

		Each. £ s. d.	Each. £ s. d.
1149	**Negretti and Zambra's No. 2 Students' Microscope,** of similar form to No. 1, but of larger size, with coarse and fine adjustments and lengthening tube to the body, lever stage with sliding holder and diaphragm plate, flat and concave mirror, stand condenser, brass forceps, and 1-inch and ½-inch achromatic powers, in brass boxes; fitted in mahogany cabinet, with lock and key	8 8 0	10 10 0
1150	**Negretti and Zambra's No. 3 Students' Microscope,** on highly finished brass tripod stand, quick and slow motion on the body, lengthening tube, two Huyghenian eye pieces, mechanical stage having adjustments in two directions, revolving object plate and diaphragm plate, flat and concave mirror, stand condenser, brass forceps, with 1-inch, ½-inch, and ¼-inch achromatic powers, &c.; fitted in mahogany cabinet with lock and key . .	10 10 0	12 12 0
1151	**Negretti and Zambra's No. 4 Students' Microscope,** similar to No. 3, and fitted with polarising apparatus .	15 15 0	18 18 0

The above microscopes have been constructed to supply instruments of moderate price, but with such first-rate workmanship, and so solid in the mechanical arrangements, that higher power lenses (such as $\frac{1}{8}$th or $\frac{1}{16}$th), with polarising apparatus, achromatic condenser, Shadbolt's prism, &c., can at any time be fitted, and the instrument may be said to form the nucleus of a complete microscope; the purchaser adding any of the above adjuncts, whenever his means permit or his wants require them.

1152	**Negretti and Zambra's No. 5 large size Achromatic Microscope,** mounted on the most complete and improved form of tripod stand, coarse and fine adjustment on the body, sliding tube for increasing the magnifying power, two Huyghenian eye pieces, mechanical stage, having motion in rectangular directions, with sliding and revolving object holder, and spring clamp slide, revolving diaphragm plate for regulating the amount of light, plain and concave reflector, arranged to give an oblique pencil of light if required, large stand condenser, &c., with three achromatic powers (1 inch, ½ inch and ¼ inch), in brass boxes with adapters; fitted in handsome mahogany cabinet, with lock and key	21 0 0	25 0 0
1153	**Negretti and Zambra's No. 6 Achromatic Microscope,** similar in size to No. 5, with the same adjustments, powers, &c., and the addition of secondary stage with adjustments, polarising apparatus and achromatic condensor (fig. 1153)	30 0 0	35 0 0
1154	**Achromatic Microscopes,** of the largest size, fitted with all the most recent improvements, complete in handsome mahogany cabinets	50 0 0	80 0 0

ACHROMATIC OBJECT GLASSES,

FOR MICROSCOPES.

Focal Length.	Angular Aperture.	Magnifying Power with various eye pieces.	Price.
		DIAMETERS.	
2-inches	12 degrees	20 to 60	£2 0 0
2-inches	15 degrees	20 to 60	3 0 0
1-inch	16 degrees	60 to 120	2 0 0
1-inch	25 degrees	60 to 120	2 10 0
½-inch	30 degrees	100 to 220	3 10 0
*½-inch	65 degrees	100 to 220	4 0 0
¼-inch	75 degrees	220 to 620	4 10 0
*¼-inch	95 degrees	220 to 620	5 5 0
*⅛-inch	150 degrees	620 to 1200	10 10 0

Those marked (*) have adjustments for covered and uncovered objects.

These Object Lenses are of the finest **English** manufacture, and for penetrating and defining power cannot be surpassed.

		Each. £ s. d.	Each. £ s. d.
1155	**Triple Sets of Achromatic Object Lenses,** of the very best **French** or **German** manufacture, combined focus, 1-inch	1 8 0	1 10 0
1156	Ditto ditto, ½-inch	1 10 0	1 15 0
1157	Ditto ditto, ¼-inch	1 15 0	2 2 0

APPARATUS, ETC., FOR MICROSCOPES.

FIG. 1158. FIG. 1158*.

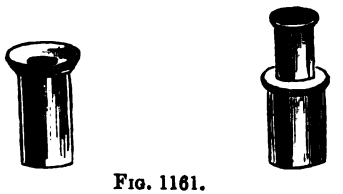


FIG. 1161.

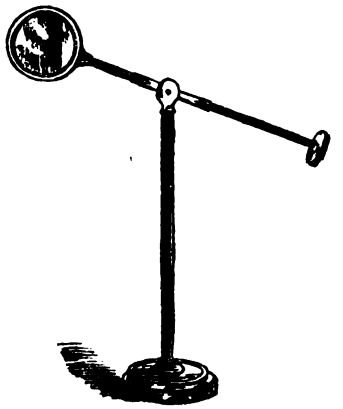
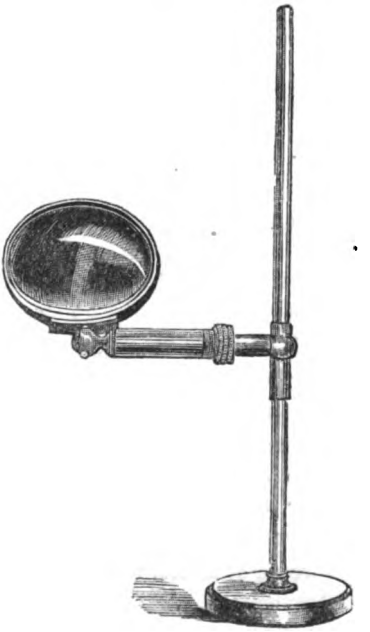


FIG. 1162.



		Each. £	s.	d.	£	s.	d.
1158	**Eye Pieces,** Huyghenian (figs. 1158 and 1158*) . 10/,	0	15	0	1	0	0
1159	Ditto, erecting for dissecting, with compound microscope .				0	15	0
1160	**Condensers,** or side illuminators for stage . . 7/6,	0	12	0	1	0	0
1161	**Stand Condensers,** small (fig. 1161)	0	10	6	0	16	0
1162	Ditto ditto with large lens and convenient adjustments (fig. 1162) 22/,	1	10	0	1	16	0
1163	**Shadbolt's Parabolic Condenser,** in brass mountings .				2	13	0
1164	**Achromatic Condenser,** complete, with diaphragm plate, and one, two, or three achromatic powers . £3 12 6	4	10	0	6	0	0
1165	**Lieberkuhn, or Cup Reflector**	0	10	0	0	16	0

Fig. 1166.

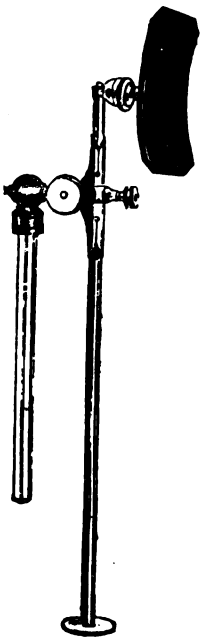


Fig. 1168.

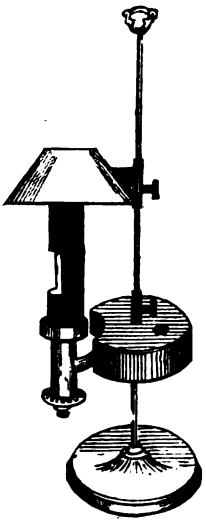


Fig. 1171.

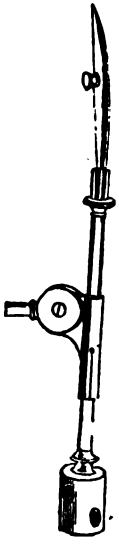


Fig. 1178.

1166	**Side Speculum Reflector,** mounted on jointed arm (fig. 1166)	1	1	0	1	12	0
1167	**Dark Wells or Stops,** three sizes on jointed holder . .				0	12	0
1168	**Improved Argand Lamp,** adapted for microscopic purposes (fig. 1168)	0	16	0	1	4	6
1169	**Microscopic Argand Lamp,** with improved illuminating lens and chimney, and the stand conveniently arranged for various purposes connected with preparing and mounting microscopic objects	2	0	0	2	10	0
1170	**Forceps** of several forms, for taking up small objects, dissections, &c. 2/6,	0	3	6	0	5	0

		Each. £	s.	d.	£	s.	d.
1171	**Stage Forceps,** with jointed arm, very useful for holding objects while under examination in the microscope (fig. 1171)	0	10	6	0	12	6
1172	**Dissecting Needles**				0	1	0
1173	**Dissecting Scissors**	0	2	0	0	2	6
1174	**Dissecting Knives**	0	2	0	0	3	0
1175	**Valentine's Dissecting Knife,** for cutting thin sections of soft animal substances, &c.				1	1	0
1176	**Microscopic Dissecting Instruments,** in neat mahogany box	1	0	0	2	10	0
1177	**Glass Trough** for holding fluids, viewing circulation in plants, polyps, &c.				0	3	0
1178	**Animalculæ Cage, or Live Box,** for conveniently examining water containing animalculæ, &c. (fig. 1178) 6/,	0	7	6	0	12	0
1179	**Compressorium,** for similar purposes, where the object requires greater pressure	0	15	0	1	1	0
1180	**Frog Plate,** for holding frogs, fish, &c., to exhibit the circulation of the blood	0	5	6	0	10	6
1181	**Micrometer for Stage,** divided on glass, $\frac{1}{100}$ and $\frac{1}{1000}$ of an inch 4/6,	0	6	0	0	10	0
1182	**Micrometer for Eye Piece,** mounted in brass	0	10	0	1	1	0
1182*	**Noberts' System of Test Lines**				1	5	0
1183	**Polarising Apparatus** fitted to microscope	2	10	0	3	3	0
1184	**Tourmalines,** mounted to fit eye tube, price according to quality . from				0	5	6
1185	**Selenite,** mounted for stage	0	2	0	0	2	6
1186	**Camera Lucida,** Woolaston's, for drawing magnified image, mounted to fit microscope	0	18	6	1	5	0
1187	Ditto ditto with additional lenses				1	11	0
1188	**Glass Slides** with ground edges for mounting objects, of the best quality, 3-in. by 1-in. per doz.				0	1	0
1189	**Thin Microscopic Glass,** cut in squares per oz.				0	3	6
1190	Ditto ditto cut in circles	0	6	0	0	10	0
1191	**Plato Glass Stage Plates,** with polished oval or round cells per doz.				0	3	6
1192	**Animalculæ Tubes,** fitted with corks, for collecting specimens per doz.				0	4	6
1193	Ditto ditto in sets and pocket cases	0	6	0	0	15	0
1193*	**Sets of 3 Animalculæ Fishing Tubes,** in case				0	1	6
1194	**Glass Rings, Cells, Circles, Squares, &c.,** of various sizes and thicknesses, for mounting injections, &c., from per doz.				0	3	0
1195	**Ornamental Coloured Paper Mountings for Slides,** per doz.	0	1	0	0	2	0
1196	**Writing Diamonds** 5/,	0	7	0	0	10	0
1197	**Cutting ditto** 10/6,	1	1	0	1	10	0

			Each. £	s.	d.	Each. £	s.	d.
1198	**Section Cutters,** for wood, bone, &c. . . .	12/6,	1	10	0	2	0	0
1199	**Air Pump** for preparing objects		1	0	0	1	10	0
1200	**Injecting Syringe** for ditto		0	10	6	1	10	0
1201	**Apparatus** for making circular gold size cells .	from				0	6	0
1202	**Canada Balsam**	per bottle	0	0	6	0	1	0
1203	**Gold Size**	„				0	1	0
1204	**Asphalte**	„				0	1	0

MICROSCOPIC OBJECTS.

1205	**A variety of interesting Microscopic Objects,** dry mounted, and named	per doz.	0	2	0	0	3	0
1206	**A Set of Forty Microscopic Objects,** transparent and opaque, in a neat box		0	7	6	0	9	0
1207	**A Series of Six Double Glass Slides,** containing 18 sections of the following woods—oak, ash, elm, willow, beech, and horse-chesnut, in neat case					0	10	6
1208	**A Series of Twelve ditto,** with 36 sections, each slide containing three different cuttings					1	0	0
	These sections are cut so thin, that they readily transmit the light through them, and show the form and disposition of the woody fibre, vascular tissue, medullary rays, glands, pith, &c.							
1209	**Test Objects**—Podura, hair of mouse and bat, navicula hippocampus, &c.		0	1	6	0	2	0
1210	**Preparations of various Insects in Canada Balsam,** shewing the respiratory, digestive and nervous systems, and the modifications for terrestrial and aquatic habits, 1/,		0	1	6	0	2	0
1211	**Preparations,** shewing spiral vessels, ducts, tissues, raphides, &c., in plants		0	1	6	0	2	0
1212	**Polarising Objects,** consisting of crystalline salts, hoofs, horn, skin, tendon, fish scales and vegetable substances .		0	1	6	0	2	0
1213	**Anatomical Injected Preparations, &c.,** various . .		0	2	0	0	2	6
1214	**Sections of Fossil Woods,** exoginous, cut in three directions					0	10	6
1215	Ditto ditto endoginous, cut in two directions . .					0	7	6
1216	**Sections of Limestone, Oolite, &c.**		0	2	0	0	3	6
1217	Ditto of **Flint,** containing sponge, fish scales, and fossil infusoria		0	2	6	0	4	0
1218	**Longitudinal and Traverse Sections** of recent and fossil bones							
1219	Ditto ditto fossil and recent teeth		0	2	0	0	3	0
1220	**Sections of Flint,** containing xanthidium . . .		0	2	0	0	3	0

		Each. £	s.	d.	£	s.	d.
1221	**An extensive assortment of Balsam mounted Microscopic Objects,** of English and French mounting . .	0	1	0	0	1	6
	These objects consist of insects, part of insects, such as wings and wing-cases, stings, tongues, eyes, dissections of the trachea, and bronchial tubes, antennæ, legs, the scales of butterflies and moths, zoophites, ferns, fuci, mosses, madrepore, sections of recent woods, leaves, petals and farina of plants, feathers, the exuviæ of spiders and aquatic insects, &c.						
1222	**Cases and Cabinets** for containing microscopic objects 10/,	3	0	0	6	6	0

POCKET MICROSCOPES AND MAGNIFIERS.

FIG. 1223.

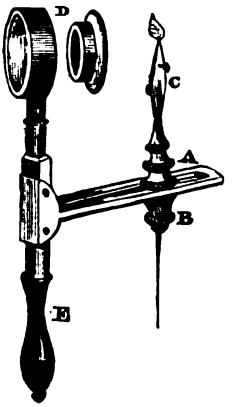


FIG. 1227.

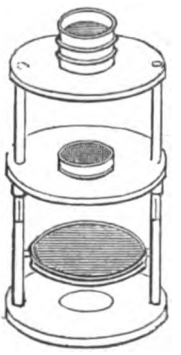


FIG. 1228.

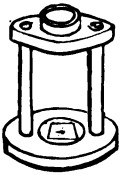


FIG. 1224.

FIG. 1230.*

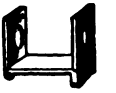


FIG. 1236.*

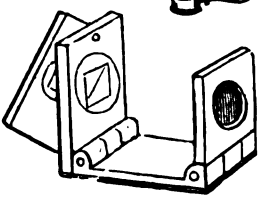


FIG. 1230.

FIG. 1236.

1223	**Flower Microscopes** folding up into convenient size, with neat cases for the pocket (fig. 1223) . . . 3/6,	0	5	0	0	6	6
1224	**Gardeners' Microscope** in case (fig. 1224) . . .	0	3	6	0	5	0
1225	**Seed Microscopes,** with glass body, in case . . 2/,	0	4	6	0	7	6
1226	**Beetle or Insect Microscope,** convenient for examining live insects 3/6,	0	4	6	0	7	6
1227	**Botanical Microscopes,** with three powers, mirror, &c., in pocket case (fig. 1227)	0	15	0	1	0	0
1228	**Cloth Microscopes or Linen Provers,** for ascertaining the number of threads in a given space of linen, cloth, &c., in round case (fig. 1228)	0	2	0	0	2	6
1229	Ditto ditto for coarse goods				0	5	6
1230	Ditto ditto folding for pocket (figs. 1230 & 1230*) 2/6,	0	3	0	0	5	6
1231	**Watchmakers' and Engravers' Magnifiers** . . 1/,	0	1	6	0	2	6
1232	**Pocket Magnifiers,** in horn mountings (fig. 1232) . .	0	2	0	0	2	6
1233	Ditto ditto, two lenses (fig. 1233)	0	3	6	0	4	6
1234	Ditto ditto, three ditto (fig. 1234)	0	4	0	0	5	0

Figs. 1234. 1235. 1233. 1235. 1232.

		Each. £ s. d.	Each. £ s. d.
1235	**Pocket Magnifiers,** one, two, or three lenses, in tortoise-shell, tortoise-shell and gold, pearl, and pearl with silver mountings, prices various (figs. 1235)		
1236	**Stanhope Lenses,** in German silver mountings (figs. 1236 1236*) 2/6	0 3 6	0 5 0
1237	Ditto ditto, in silver ditto	0 6 0	0 10 6
	This powerful and convenient lens is the invention of Lord Stanhope. The portability, low price, and the facility with which it can be used, recommend it strongly. With it may be seen the animalculæ in water, eels in paste and vinegar, farina of flowers, the down of moths, &c.; and if a drop of solution of salt be spread lightly over the end of the lens, and viewed without delay, the formation of crystals will be beautifully seen.		
1238	**Stanhope Lens,** mounted with shade for the eye, and tube for improving the definition, magnifying power 180 diameters		0 8 6
1239	**Coddington's Spherical Lens,** in German silver mounting	0 3 6	0 5 0
1240	Ditto ditto, in pocket case	0 10 6	0 15 0
1241	Ditto ditto ditto in silver	0 15 0	1 2 0
1242	**Pocket Magnifier,** with two plano-convex lenses, diaphragm, and a Stanhope or Coddington lens, in tortoise-shell mountings 12/6	0 16 6	1 5 0
	The most useful pocket magnifier or microscope introduced, magnifying power, 10 to 80 diameters.		

VARIOUS OPTICAL INSTRUMENTS.

1243	**Concave and Convex Mirrors,** in turned wood frames 7/6, 16/,	2 2 0	5 0 0
1244	**Cylindrical and Conical Distorting Mirrors** . .	0 15 0	1 10 0
1245	**Multiplying Mirrors**	0 10 6	1 5 0
1246	**Black Mirrors,** for artists	0 7 6	0 16 0
1247	**Burning Glasses,** in horn mountings . . . 2/,	0 2 6	0 5 0
1248	**Lenses** of all kinds made to order.		
1249	**Glass Prisms,** for shewing decomposition of light, 2/, 2/6,	0 5 0	1 0 0
1250	**Prism Compound** of flint, crown and plate glass . .	0 15 0	1 0 0
1251	**Hollow Glass Prism,** for experiments on the refraction of fluids	1 0 0	1 10 0
1252	**Multiplying Lenses** in frame	0 1 6	0 5 0
1253	**Claude Lorraine Glasses,** for studying the effect of colour upon landscapes, &c.	0 2 6	0 18 0

		Each. £	s.	d.	Each. £	s.	d.
1254	**Colour Tops,** a simple contrivance for exhibiting the re-composition of white light from colours . . .				0	10	6
1254*	**Dr. Gorham's Kaleidoscopic Colour Top,** with perforated discs and coloured diagrams, complete; in box . .				1	1	0
1255	**Print Lenses,** of various sizes and mountings, for viewing maps, engravings, photographs, &c. . . 5/, 10/6,	1	0	0	2	5	0
1256	**Concave Lenses,** for viewing engravings, &c. . . .	0	10	6	2	0	0
1257	**Diagonal Print Machines,** for viewing prints, &c. .	1	0	0	2	2	0
1258	**Cosmoramic Frames and Glasses**	0	15	0	2	2	0
1259	**Cylindrical Lenses,** in German silver mountings, 7/6, 10/6,	1	0	0	1	15	0

FIG. 1263.

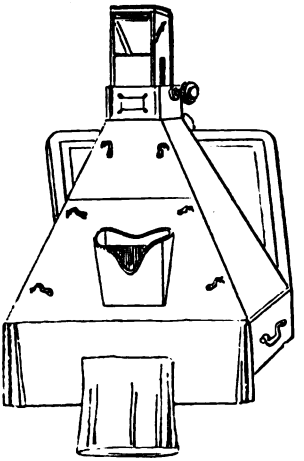


FIG. 1260.

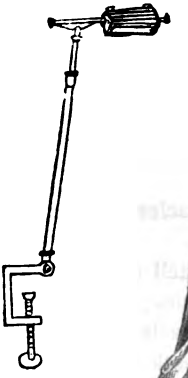


FIG. 1264.

1260	**Camera Lucida,** for drawing in true perspective, in case (fig. 1260)	1	10	0	3	3	0
1261	**Portable Stand** for ditto	1	1	0	2	2	0
1262	**Draughtsman's Camera Obscura,** for sketching . 7/6,	0	10	6	3	3	0
1263	Ditto ditto improved portable (fig. 1263) . .	3	3	0	6	6	0
1264	**Cosmorama, or Camera Obscura,** for gardens, &c., fitted up to order (fig. 1264)						
1265	**Kaleidoscopes,** with two or three reflecting planes . 2/,	0	5	6	2	10	0
1266	**Photometers**—Leslie's, Ritchie's, and Wheatstone's . 21/,	1	5	0	3	3	0
1267	**Goniometer, Wollaston's,** for measuring angles of crystals				5	0	0
1268	**Anorthoscope,** with twelve diagrams				1	10	0
1269	**Polemiscope,** by means of which any object may be seen, though an opaque body be placed before it . . .	0	12	0	1	10	0
1270	**Phantascope,** for exhibiting the illusion effected by a concave mirror, projecting figures in air . . .				2	8	0
1271	**Polyorama,** with six views, so constructed that day and night effects are produced by means of reflected and transmitted light 12/6,	1	0	0	1	12	0
1272	**Extra Sets of Views** for ditto 6/6,	0	10	0	0	17	0

SPECTACLES.

FIG. 1276.

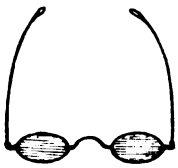
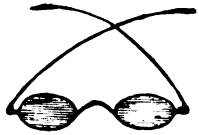


FIG. 1276*



READING AND EYE GLASSES, EYE PRESERVERS, ETC., TO SUIT ALL AGES AND SIGHTS, GLAZED WITH THE FINEST BRAZILIAN PEBBLES, OR BEST OPTICAL FLINT GLASS.

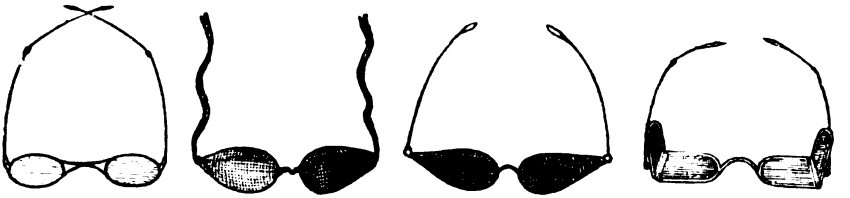
The greatest care taken that the Pebbles, or Glasses, are correctly worked and polished, as well as suited to the sight of the Purchasers, and also that the Frames are formed to fit the face.

		Each. £	s.	d.	Each. £	s.	d.
1273	**Common Spectacles,** in horn, iron, or German silver mountings . . . . . from 2/, 2/6,	0	3	0	0	4	6
1274	**Best Tortoise-shell ditto,** with Brazil pebbles . .				0	16	0
1275	Ditto ditto, with glasses				0	9	0
1276	**Blue Steel Spectacles,** with single, or turn-over sides, suited for ladies or gentlemen, a strong serviceable article, with best quality convex lenses for aged or long sight (figs. 1276 and 1276*) 5/,	0	6	0	0	7	6
1277	Ditto ditto, with best concave lens, for short or near sight 5/6,	0	7	0	0	8	0
1278	**Best Elastic Blue or Bronzed Steel Spectacles,** very light and strong, for ladies or gentlemen, best lenses to suit any sight	0	10	6	0	12	6
1279	Ditto ditto, with finest Brazil pebbles	0	16	6	0	18	6
1280	**Perlivision or Invisible Spectacles of Blue or Bronzed Steel,** in which the lenses are grooved to receive the frame, that is, made so extremely light, as to be scarcely visible; these spectacles are especially adapted for the concave lenses worn by short sighted persons, mounted with best lenses	0	10	6	0	15	0
1281	Ditto ditto, finest pebbles	0	18	0	1	2	0
1282	**Gold Spectacles,** for ladies or gentlemen, with best lenses to suit any sight 22/, 30/,	1	15	0	2	0	0
1283	**Finest Gold Spectacles,** for ladies or gentlemen, with best Brazil pebbles, to suit any sight 42/,	3	3	0	4	4	0
1284	**Finest Gold Invisible Spectacles,** nearly as light and elastic as steel, with best lenses, for any sight . .	2	2	0	2	10	0
1285	Ditto ditto, best Brazil pebbles	2	10	0	3	0	0

		Each. £	s.	d.	Each. £	s.	d.
1286	**Silver Spectacles** of standard quality, for ladies or gentlemen, with best lenses for any sight	0	12	0	0	16	0
1287	Ditto ditto, best Brazil pebbles	0	18	0	1	5	0

Gold and silver spectacles are strongly recommended to persons residing in tropical climates, or at the sea side, as they resist the action of the moist atmosphere which rapidly destroys steel frames.

FIG. 1288. FIG. 1294. FIG. 1294*. FIG. 1296.



1288	**French Pattern Spectacles,** in gold, silver, blue steel and tortoise-shell (fig. 1288) . . . . . from				0	10	6
1289	**Patent Spectacles, adapted for a failing or aged sight.** The peculiar form and arrangement of these spectacles enables the wearer to read or work with comfort, and at the same time distant objects can be seen without the frame being removed or pushed inconveniently low down upon the face :—						
1290	**Patent Spectacles** in light blue steel, for ladies or gentlemen, with the best lenses	0	6	0	0	10	6
1291	Ditto ditto, with best Brazil pebbles	0	15	6	1	1	0
1292	Ditto ditto, in solid gold with best Brazil pebbles 42/,	2	10	0	4	0	0
1293	Ditto ditto, in solid silver, with ditto	1	1	0	1	8	0
1294	**Wire Gauze Eye Protectors,** for railroad travelling, or preserving the eyes from dust (figs. 1294 and 1294*) 3/6, 4/6,	0	5	6	0	7	6
1295	**Eye Protectors,** with neutral tint or smoke-coloured glasses, of the very best quality, particularly adapted for travellers by the Overland Route, India, Australia, &c. .	0	12	0	0	15	0
1296	**Best double-jointed horse-shoe form Spectacles,** and turn-down sides, with green blue, grey, neutral tint or white glasses (fig. 1296) 8/,	0	12	0	1	4	0
1297	Ditto ditto single-jointed 7/6,	0	9	6	1	1	0
1298	Ditto ditto best make, with fine wire gauze, either flat or cup-shaped eyes 15/,	1	1	0	1	10	0
1299	**Blue Steel Spectacles,** with single or turn-over sides, of the ordinary shape, mounted with neutral tint, grey or smoke-coloured glasses, for protecting the eyes from excessive glare of sunshine, snow, &c., and when mounted with a peculiar neutral tinted glass, for correcting the unpleasant effects of strong gas light . . . 4/,	0	5	6	0	6	6
1300	**Cataract Spectacles,** in various mountings . . .						

Fig. 1302. Fig. 1302*.

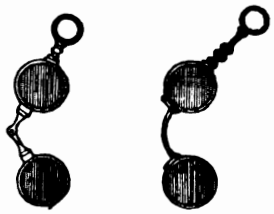
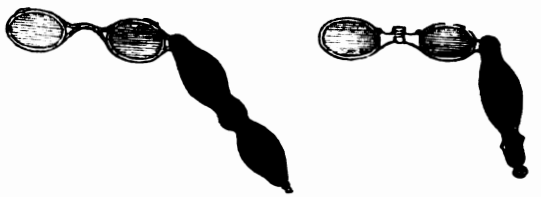


Fig. 1306. Fig. 1306*.



			Each. £ s. d.	Each. £ s. d.
1301	**Spectacles** with Periscopic, Meniscus, or Neutral Tinted lenses			

HAND AND CLIP NOSE SPECTACLES.

1302	**Folding Hand Spectacles,** to wear round the neck (figs. 1302 and 1302*) solid fine gold	2 10 0	4 10 0
1303	Ditto ditto plated and electro-gilt	1 10 0	2 10 0
1304	Ditto ditto solid standard silver	1 1 0	2 2 0
1305	Ditto ditto blue steel, various forms . . 7/,	0 9 0	0 15 0
1306	**Fine Gold Hand Spectacles,** mounted in pearl cases (figs. 1306 and 1306*)	3 3 0	6 6 0
1307	Ditto ditto in tortoise-shell ditto	2 10 0	5 5 0
1308	**Solid Silver Hand Spectacles** in pearl cases	1 10 0	2 2 0
1309	Ditto ditto. in tortoise-shell ditto	1 1 0	2 0 0
1310	**Solid Tortoise-shell Hand Folders,** with finest Brazil pebbles		0 18 0
1311	**Tortoise-shell Hand Folders** 5/6,	0 6 0	0 10 6
1312	**Buffalo Horn ditto**	0 2 6	0 4 6

Any of the above **Hand Spectacles** to open with springs, at a slight increase in price; a variety kept in stock.

1313	**Clip-Nose Folding Spectacles,** very convenient for occasional use, oval or round shapes, with variously contrived springs to suit different forms of face		
1314	**Solid Gold Clip-Nose Folding Spectacles** . . 40/,	2 10 0	3 3 0
1315	Ditto ditto **solid silver**	1 1 0	2 0 0
1316	Ditto ditto **gold plated** 25/,	1 10 0	3 0 0
1317	Ditto ditto **tortoise-shell, with solid gold bridge**	1 4 0	1 18 0
1318	Ditto ditto ditto, with blue steel bridge	0 12 6	0 18 0
1319	Ditto ditto **blue or bronzed steel**	0 7 6	0 12 0
1320	Ditto ditto **tortoise-shell** 8/,	0 10 0	0 15 0

EYE GLASSES.

1321	**Fine Solid Gold Single Eye Glasses** . . . 30/,	2 15 0	5 5 0
1322	**Solid Standard Silver** ditto	0 7 6	1 10 0
1323	**Best Plated and Electro-gilt Eye Glasses,** of various forms, as figs. 1323 to 1323*	0 8 6	0 16 0
1324	**Eye Glasses,** in blue or bronzed steel	0 2 6	0 5 0
1324*	**Eye Glasses,** without frame		

FIGS. 1323 TO 1323*.

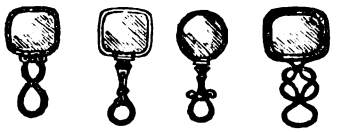


FIG. 1329.

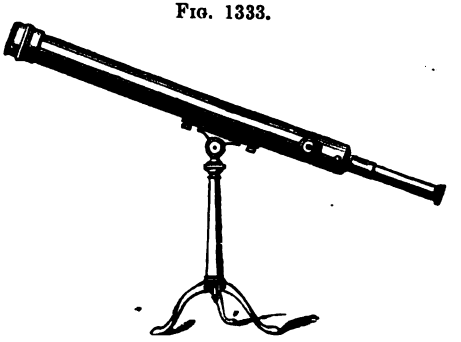
		Each. £	s.	d.	Each. £	s.	d.
1325	**Eye Glasses,** tortoise-shell 2/6,	0	4	6	0	5	6
1326	Ditto ditto buffalo horn	0	1	6	0	2	6
1327	**Spectacle Cases**				0	0	6
1328	Ditto, in various ornamental mountings	0	5	0	1	10	0
1329	**Oval and Round Reading Glasses,** in horn cases (fig. 1329) 2/6,	0	5	0	0	7	6
1330	Ditto ditto in pearl or tortoise-shell cases . .				1	1	0
1331	Ditto ditto with silver mountings (fig. 1331) . .	1	0	0	2	2	0
1332	**Large Reading Glasses,** mounted in turned hard wood handles 7/6,	0	10	6	0	15	0

Spectacles made to order of any shape or material, and fitted with lenses worked to any particular form. Spectacles of all forms repaired with the utmost care and dispatch. Pebbles altered to suit the sight.

TELESCOPES.

ASTRONOMICAL TELESCOPES.

FIG. 1333.



1333 **Achromatic, Astronomical and Terrestrial Telescopes,** with body of brass, supported by a brass table-stand having horizontal and vertical motion, the eye-piece tube worked by rack and pinion, and the whole instrument enclosed in a strong mahogany box with lock and key (fig. 1333):—

Total Length.	Diameter of Object Glass.	Terrestrial Eye-pieces.	Celestial Eye-pieces.			
24-in.	$1\frac{7}{16}$-in.	1	1	6	0	0
30-in.	$1\frac{3}{4}$-in.	1	1	8	0	0
36-in.	2-in.	1	1	11	0	0
48-in.	$2\frac{3}{8}$-in.	1	1	14	0	0

1334 The above with rack motion and finder, extra . . . 2 2 0 3 3 0

FIG. 1335.

		Each. £ s. d.	Each. £ s. d.
1335	**Achromatic Astronomical Telescope,** on handsome brass table stand, with rackwork adjustments to telescope, and steadying rod, achromatic finder, object glass, 3¼-in. diameter, 1 terrestrial and three astronomical powers, in stout mahogany box (fig. 1335)		25 0 0
1335*	**Achromatic Astronomical Telescope,** the same as No. 1335, with tangent screw, and Hook's universal joint for horizontal adjustment	30 0 0	36 0 0

1336 **Achromatic Astronomical Telescopes,** the body of brass with rack and pinion adjustments, mounted on a stand of wood with three double legs and brass-fitted adjustments to centre, so as to give horizontal and vertical movements; the telescope capable of being raised or lowered, and so arranged that the observer may either sit or stand; the body of the telescope and eye-pieces fitted into a mahogany box, with lock and key :—

Length of Body.	Diameter of Object Glass.	Terrestrial Eye-pieces.	Celestial Eye-pieces.	
60-in.	3-in.	1	1	30 0 0
66-in.	3⅜-in.	1	1	37 10 0
66-in.	3¾-in.	2	2	50 0 0

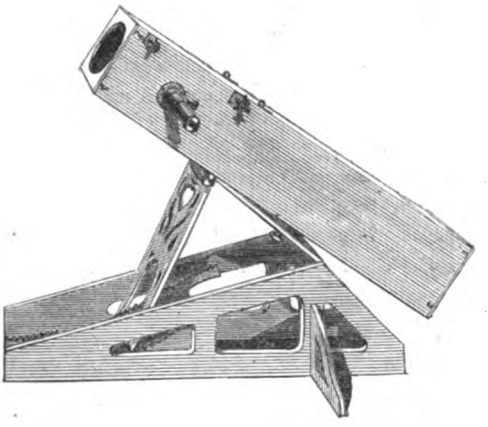
1337 **Achromatic Astronomical Telescope,** 4½-in object-glass, 5-ft. focus, with three terrestrial and five astronomical eye-pieces, with brass body, rackwork movement, and finder, mounted on a firm and steady mahogany stand, with wheel and chain adjustment, adapted for observations either near the horizon or at the zenith, telescope and eye-pieces fitted into a case with lock and key . . 84 0 0

		Each. £	s.	d.	£	Each. s.	d.
1338	**Large Astronomical Telescopes,** with all recent improvements . . . . . from				100	0	0
1339	**Object Glasses** of first-rate quality, for telescopes:—						

Length of Telescope	14in.	16in.	24in.	30in.	36in.	48in.	48in.	54in.	60in.	60in.	66in.	66in.
Diameter	1in.	1¼in.	1-7/16	1¾in.	2in.	2½in.	2¾in.	2-11/16	3in.	3-3/16	3¼in.	3¾in.
Focus, about	9in.	10in.	15in.	20in.	27in.	34in.	34in.	40in.	46in.	46in.	52in.	52in.
Price	5/	6/	8/	12/	18/	30/	40/	60/	100/	120/	160/	300/

1340	**Two-feet Transit Instrument,** with portable brass stand				26	5	0
1341	Two-and-a-half-feet ditto, with iron stand, improved make				47	5	0
1342	**12-inch Improved Altitude and Azimuth Instrument,** divided on silver, the azimuth circle reading by verniers, and the altitude by micrometers . . . . from				105	0	0
1343	**Annular Micrometer,** with eye-piece				1	5	0
1344	**Micrometers** on glass, and divided to parts of an inch or millimetre, mounted in brass; to measure the magnifying power of telescopes, with instructions				0	12	0
1345	**Position Micrometer** of the best form				12	12	0
1346	**Illuminating Apparatus**				12	12	0
1347	**Telescope Stands,** of wood, with three double legs, socket fitting so that a telescope can be raised to any required height, with joint for horizontal and vertical motions .				2	10	0
1348	**Telescope Stand** with three double wooden legs with brass fittings, giving the horizontal and vertical motions easily; with chain adjustment to the centre, so as to raise or depress the top; and the whole so arranged that the observer can either sit or stand				15	0	0
1349	Ditto ditto with endless-screw movements to both horizontal and vertical motions				25	0	0
1350	**Varley's Telescope Stand,** mahogany and brass fittings .				12	12	0

FIG. 1351.

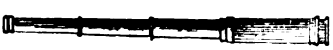


FOUCAULT'S REFLECTING TELESCOPE.

		Each. £ s. d.	Each. £ s. d.
1351	**Foucault's Reflecting Telescope,** for terrestrial and astronomical observations. The novelty and improvements of this telescope, are principally in the use of a new reflecting surface for the large speculum, glass worked of a suitable curve, and coated upon the surface with perfectly pure silver. The eye piece or power is an achromatic microscopic arrangement of lenses mounted on the side of the body of the telescope, the image being received from the large speculum by a prism, and the reflected image examined by the microscopic eye piece, which is fitted with a fine rack work adjustment. With these arrangements, high magnifying powers can be used, and large field of view, combined with full body of light, is obtained at a considerably lower price than the old expensive form of reflecting telescopes with metal speculum. The telescope is mounted on a light but firm table stand of polished walnut wood, having simple and convenient adjustments (fig. 1351)		15 0 0
	With simple instructions for re-silvering the speculum.		
	Gregorian and Newtonian Reflecting Telescopes of various sizes.		

POCKET, NAVY AND PILOT TELESCOPES.

FIG. 1355. FIG. 1355*.

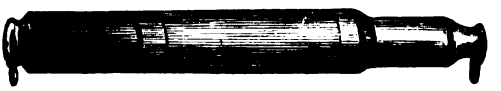


1351*	**Perspective,** with mahogany or japanned body, and one draw		0 1 6
1352	Ditto, two draws		0 2 6
1353	Ditto, three draws		0 3 6
1354	Ditto, two draws, and covered ends		0 5 0
1355	**Pocket Achromatic Telescopes,** with achromatic object glasses, brass tubes, body straight and covered with mahogany, in cases (figs. 1355 and 1355*) :—		
	No. of Draws. / Total Length. / Length when shut. / Diameter of Object Glass.		
	3 / 17-in. / 6-in. / 1-in. (fig. 1355)	0 10 0	0 12 0
	3 / 17-in. / 7-in. / 1⅛-in. (fig. 1355*)	0 12 0	0 14 0
	Ditto with sun-shade		0 15 6
1356	**Pocket Achromatic Telescope—**		
	3 draws 24-in., length 8½-in. 1⅜-in. . . .	0 19 0	1 16 0
	Ditto with sun-shade	1 1 0	2 0 0
1357	**Pocket Achromatic Telescope—**		
	3 draws 30-in., length 10-in. 1⅝-in. . . .	1 7 0	2 10 0

		Each. £ s. d.	Each. £ s. d.
1358	**Small Achromatic Telescope,** with leather body, caps, and sling strap		1 1 0
1359	Ditto ditto with sun shade		1 3 0
1360	**Pocket Achromatic Telescopes,** with mahogany or rose-wood body:—		
	2, 3 or 4-draw brass telescope, with lenses and mountings of the VERY FINEST QUALITY—		
	12-inch		1 11 0
	18-inch ditto ditto		2 4 0
	24-inch ditto ditto		3 0 0
	30-inch ditto ditto		4 4 0
	36-inch ditto 5-draw, extra large object lens		6 6 0
	42-inch ditto ditto ditto		7 10 0
1361	**Pocket Telescopes—24-inch three-draw best quality achromatic telescope, solid German silver mountings**		4 4 0
	30-inch ditto ditto		5 10 0
1362	**Leather Cases and Sling Straps** for any of above, from each, extra		0 10 6

Telescopes can be had with the bodies covered with whalebone or cord, and the draw-tubes electro-silvered, at a slight advance on the above prices.

FIG. 1363.



1363	**Marine or Day and Night Telescopes,** yielding a large field and full body of light (fig. 1363) . . . 40/,	2 10 0	3 0 0
1364	**Marine Achromatic Telescope,** adapted for the sea-side, **on brass table stand,** with jointed clip for easy removal of the telescope when required for use without stand; in mahogany box		6 6 0

FIG. 1366.

1365	**Day or Night Achromatic Pilot Telescope,** with one, two, or three drawers	0 18 0	3 3 0
1366	Ditto ditto with shade tube, best make (fig. 1366)		3 3 0
1367	**Erect Night Telescope,** with one draw and shade tube, best make		3 3 0
1368	Ditto ditto lenses of large diameter and best quality		4 4 0
1369	**Large Inverting Night Telescopes**	3 0 0	5 5 0
1370	**Navy Telescopes, taper body,** covered with leather, with one or two draws, with spray shade (fig. 1370):—		
	12-inch	1 8 0	2 0 0
	18-inch	1 12 0	2 5 0
	24-inch	2 2 0	3 5 0
	30-inch	3 0 0	4 4 0
	36-inch	3 0 0	5 5 0

FIG. 1370.

		Each. £ s. d.	Each. £ s. d.
1371	**Midshipman's Telescope,** 18-inch taper leather body, with or without navy signals inserted, and sling strap	1 15 0	2 4 0

FIG. 1372.

1372 **Deck Telescopes** (fig. 1372)

No. of Draws.	Length.	Diameter of Object Glass.	Body covered with Leather.	Body covered with mahogany.
1	33-inch.	$1\frac{3}{4}$-inch.	£2 18 0	£2 14 0
2	32-inch.	$1\frac{3}{4}$-inch.	2 18 0	2 14 0
1	40-inch.	2-inch.	4 0 0	3 15 0

1373	**Marryat's Code of Signals** fitted to telescope		0 6 6
1374	**Navy Code of Signals** to ditto		0 8 6
1375	**Straps and Slings** to ditto	0 3 6	0 8 0

FIG. 1376.

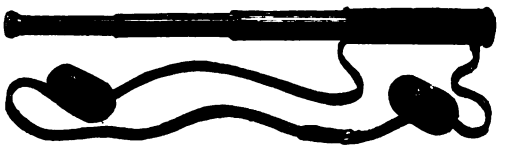
1376 **Negretti and Zambra's Binocular Telescope.**
This instrument consists of a pair of telescopes made exactly the same in the optical arrangement, and the tubes conveniently placed to allow both eyes being used; a rackwork or adjusting screw is fitted between the tubes, moving both eye-pieces, at one time, enabling the user to adjust the telescope for perfect vision with the greatest ease and facility. In size, the **Binocular Telescope** very little exceeds the ordinary race glasses, but very far surpasses them in magnifying power and range; in leather case and sling strap (fig. 1376) . 5 15 0 8 8 0

MILITARY RECONNOITRING, YACHTING, DEER-STALKING, OR TOURISTS' ACHROMATIC TELESCOPES.

FIG. 1377.

		Each. £ s. d.	Each. £ s. d.
1377	**12-inch Pocket Military Reconnoitring Telescopes,** best quality, six draws, closing to four inches, brass tubes, whalebone body (fig. 1377)		1 10 0
1378	Ditto ditto German silver tubes		2 0 0
1379	18-in. ditto six-draw brass tubes		2 0 0
1380	24-in. ditto seven-draw ditto		3 0 0
1381	30-in. ditto eight-draw ditto		4 0 0

FIG 1382.



1382	**Negretti & Zambra's Improved Achromatic Military Reconnoitring Telescope,** with sun shade, bronzed tubes, and mounted in strong leather body or case, with sling strap (fig. 1382) :—		
	No. 1		2 2 0
	No. 2		3 3 0
	No. 3	4 16 0	6 6 0

The lenses of these telescopes are of the very best quality, of high magnifying power, combined with large field of view; the mountings of strong material, and best workmanship. These telescopes can be confidently recommended by Messrs. N. and Z., for military purposes, yachting, deer stalking, or for the tourist.

1383 **Signal Station Telescopes,** for telegraphic and look-out purposes, with one draw, the body covered with mahogany, and rackwork adjustment to eye-piece :—

Total length . .	30in.	36in.	48in.	54in.	60in.
Diameter of Object Glasses.	1¾in.	2in.	2¾in.	2-11/16	3in.
Price . .	30/	45/	73/6	110/	168/

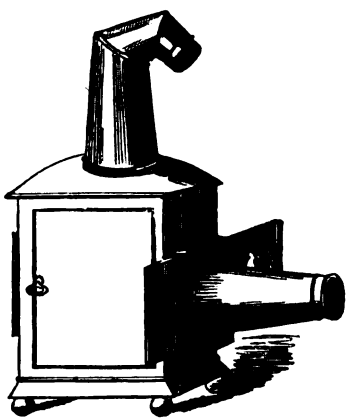
1384	**Pancratic Eye Tubes** fitted to any of the above telescopes	0 12 6	1 0 0
1385	**Compass** fitted in the cap of telescope	0 5 0	0 16 0
1386	**Captains' or Pilots' Binocular Night or Look-out Glasses** (see page 100).		

MAGIC AND PHANTASMAGORIA LANTERNS,

LUCERNAL MICROSCOPES,

APPARATUS FOR EXHIBITING THE DISSOLVING VIEWS, &c.

FIG. 1391.



		Each. £ s. d.	Each. £ s. d.
1387	**Magic Lanterns,** for exhibiting comic, humorous, and astronomical subjects :—		
	No. 1. 4/6 — No. 2. 7/6 — No. 3. 12/6 — No. 4. 16/ — No. 5. 21/		
1388	**Comic Sliders,** in boxes containing one dozen, with about fifty figures :—		
	No. 1. 4/6 — No. 2. 6/ — No. 3. 12/ — No. 4. 15/ — No. 5. 21/		
1389	**Astronomical Sliders,** with book of description :—		
	No. 2. 7/6 — No. 3. 18/ — No. 4. 23/ — No. 5. 40/		
1390	**Phantasmagoria Lanterns,** with Argand lamp, the condensing lenses $2\frac{3}{4}$-in. diameter		2 10 0
1391	**Very superior Magic or Phantasmagoria Lantern,** with two condensing lenses, $3\frac{1}{4}$-in. diameter, mounted in brass cells, sliding brass tubes for adjusting the focus, improved fountain Argand lamp and reflector, &c., complete ; will give a magnified image of a painting $2\frac{1}{2}$-in. diameter, on a disc of 10-ft. diameter (fig. 1391)		3 10 0

		Each. £ s. d.	Each. £ s. d.
1392	**Very superior large-sized Magic or Phantasmagoria Lantern,** with 3½-in. condensing lenses, rackwork adjustment to front, for correcting the focus, improved fountain Argand lamp with reflector complete, of the very best construction, to show a 3-in. painting on a disc of 12-ft. diameter		4 10 0
1393	**Magic or Phantasmagoria Lantern,** with Argand lamp, and a microscope to attach to front, with six sliders, containing various microscopic objects, aquatic trough and mirror, complete; in case, with lock and key . .		5 5 0

These Lanterns are so much improved, and used with such increased facility, that they may be recommended with the greatest confidence, giving a perfectly-defined figure, with a well-illuminated field of view, from 6 to 10-ft. in diameter. Combined with the astronomical sliders, they present a novel and delightful mode of instruction and amusement. To infant schools, public seminaries, mechanics' institutes, &c., they offer peculiar advantages, and are extensively used by the conductors of these institutions, in aiding the progress of education. The natural history and astronomical diagrams are painted in the very best style, and can be depended upon for accuracy and fidelity.

THE OXY-CALCIUM LIGHT.

Messrs. Negretti and Zambra would call especial attention to the **New Oxy-Calcium** Light, which, at a very trifling advance on the expense of the best Argand oil lamps, gives a light very nearly equal to the oxy-hydrogen light. It is perfectly safe, easily managed, and occupies small space; very cleanly in use, all grease and smoke being avoided.

1394	**A best Phantasmagoria Lantern,** with 3¼-in. condensing lenses, fitted with the **Oxy-Calcium Light,** apparatus for making the oxygen gas, gas bag and pressure board, conducting tube, lime balls, &c., complete; in box .		9 9 0
1395	A ditto ditto with 4-in. condensing lenses, &c., complete; in box		11 11 0
1396	**A Microscope** adapted to the above Lanterns, at £2 2*s.* additional; will shew small objects brilliantly on a disc 4-ft. diameter.		

SLIDES FOR MAGIC LANTERNS.

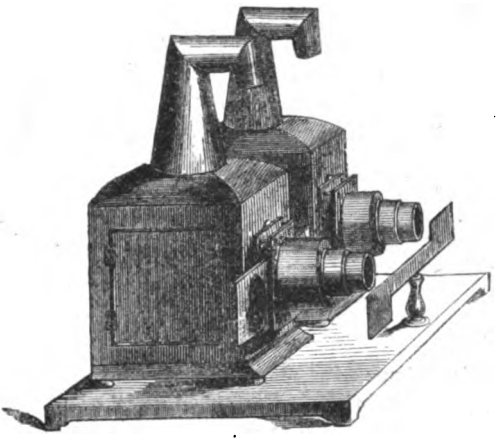
1397	**Large size best Slides,** comic and humorous subjects; in box . . . . . per doz.	3 3 0	4 4 0
1398	17-inch ditto ditto		2 10 0
1399	14-inch ditto ditto		1 17 6
1400	12-inch ditto ditto		1 4 0
1401	**A Set of Astronomical Sliders,** with diagrams and telescopic views of the moon, planets, comets, &c., for illustrating on an enlarged scale, various phenomena of astronomy, with book of description.		
	For the small size phantasmagoria lantern . . .		2 10 0
1402	Ditto ditto for the second size		3 3 0
1403	Ditto ditto for the large size		4 4 0

		Each. £	s.	d.	Each. £	s.	d.
1404	**A Series of Ten finely painted Astronomical Diagrams,** with rack and pinion movement, by which the images produced are made to revolve, so as to illustrate the theory of the tides, day and night, eclipses, the rotundity of the earth, &c., &c.; in mahogany case complete, for the smallest phantasmagoria lantern . .				4	4	0
1405	Ditto, for the middle size phantasmagoria lantern . .				5	15	6
1406	Ditto, for the large size ditto				8	8	0
1407	**Sets of Natural History Slides,** consisting of correct diagrams of mammalia, birds, fishes, reptiles, insects, &c. 42/,	3	3	0	4	4	0
1408	**Geological Slides,** shewing the earth's strata, with figures of fossil animals and plants	3	3	0	4	4	0
1409	**Set of Slides of the Kings and Queens of England,** from William the First to Victoria	3	3	0	4	4	0
1410	**Series of Slides of Ancient and Modern History** .				4	4	0
1411	Ditto ditto Scripture history	3	3	0	4	4	0
1412	Ditto ditto illustrating Scripture zoology and botany				3	3	0
1413	Ditto ditto views of places and mountains mentioned in the Bible				4	4	0
1414	Ditto ditto manners and customs of the Chinese .				3	3	0
1415	Ditto ditto conchology and botany . . .				3	3	0
1416	**Portraits of Celebrated Individuals** . . . from				0	10	0
1417	**Correct Portraits of Eminent Persons,** from authentic photographs, &c. . . . . from				1	1	0
1418	**A variety of Views in Italy, France, India, China, England,** &c. . . . . from				0	6	0
1419	**A great variety of Moveable and Shifting Glass Slides,** with a diversity of comic subjects, by which the magnified images on the screen appear to have life and motion .	0	3	6	0	5	0
1420	**Lever Slides,** representing the movements of animals, birds, &c., such as a swan or stag drinking . . .				0	10	6
1421	**Landscapes and Marine Views,** with moveable figures, shipping, &c. . . . . from				0	10	6
1422	**Artificial or Chinese Fireworks** . . . per set				1	10	0
1423	**Chromatropes,** in a variety of beautiful designs from				0	16	0
1424	Ditto, small	0	12	0	0	14	0
1425	**Rackwork Slides,** to represent wind and water mills in motion on the screen, best paintings				0	16	0
1426	**A Rackwork Slide,** with a view in the Polar regions, to shew the aurora borealis . . . . with view				1	12	0
1427	**A Rackwork Slide,** with a view shewing the appearance of a rainbow . . . . . from				0	16	0
1428	**Mechanical Slide,** to represent the effects of a snow storm				0	13	0
1429	**Improved Oxydating Lamp Glasses** . . per doz.				0	9	0

SLIDES CAREFULLY PAINTED FROM DRAWINGS, ETC., TO ORDER.

IMPROVED APPARATUS FOR EXHIBITING THE DISSOLVING VIEWS.

FIG. 1430.



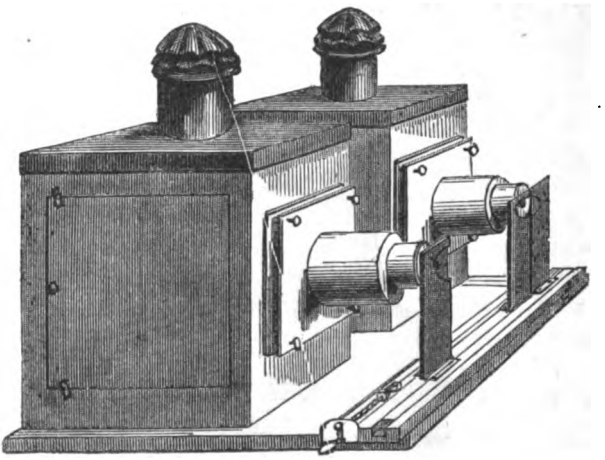
The enchanting optical effect termed Dissolving Views, is produced by means of two phantasmagoria lanterns, so arranged on a stand that the centre of the discs or pictures projected by each are coincident, and the dissolving or blending of the pictures is effected by a contrivance in front of the two lanterns, which gradually shuts off the image thrown from one lantern, whilst the other becomes gradually clearer, until a perfect picture is seen on the disc; a fresh picture being put into the darkened lantern, the action is reversed.

		Each. £ s. d.	£ s. d.
1430	**Dissolving View Apparatus,** adapted for parlour use, consisting of two lanterns, of the form of fig. 1430, with rackwork adjustment, mounted on a stand, with dissolving apparatus. In this arrangement, the views are exhibited with clearness and brilliancy on an opaque or transparent screen, 10-feet diameter, by improved fountain and Argand lamps and reflectors. It is simple in use, and well adapted for private exhibition . . £5 5s.	8 8 0	10 10 0

Messrs. Negretti and Zambra can confidently recommend the Apparatus at £10 : 10s., as being of the most improved construction, and particularly adapted for the purposes of instruction or amusement, where the expense of the oxy-hydrogen or oxy-calcium cannot be undertaken.

1431	**Dissolving View Apparatus,** fitted with **Oxy-Calcium light,** condensing lenses 3¼-in. diameter, complete, with apparatus	17 10 0
1432	**Dissolving View Apparatus,** fitted with **Oxy-Calcium light,** condensing lenses 3½-in. diameter, complete, with apparatus	23 10 0

FIG. 1433.



		Each. £ s. d.	Each. £ s. d.
1433	**Dissolving View Apparatus,** illuminated by the **Oxy-Hydrogen Lime Light,** giving a distinct image on the disc, 20-feet diameter; consists of two mahogany lanterns, with best condensing lenses, 4-inches diameter, japanned tops, brass fronts, with adjusting tubes and slide holders, mounted on stand, with tripod legs, and dissolving apparatus—two improved safety oxy-hydrogen jets and lime holders, flexible connecting tubes, with stop-cocks, unions and ferrules; two caoutchouc gas bags, with pressure boards and weights; hydrogen generator and purifier; copper retort and conducting tubes, &c., complete (fig. 1433)		40 0 0
1434	Ditto ditto with 6-inch condensers . . .		60 0 0
1435	Ditto ditto with 9-inch condensers, and clock-work movement to lime holder		85 0 0

SLIDES FOR DISSOLVING VIEW APPARATUS.

1436	**An extensive Stock of Transparent and Dioramic Scenes,** adapted for the dissolving view apparatus:—views in the Holy Land, Egypt, China, Europe, England, &c.; public buildings, interior and exterior; summer, winter, day, night, or moonlight effects, and an endless variety of subjects 8/,	0 10 0	1 5 0

These paintings differ materially from the common magic lantern slides, requiring first-rate artistic talent to make them effective, as, owing to the intensity of the light, the slightest defect is developed. They therefore require the most scrupulous care with regard to the minutest details. Subjects may be painted to suit the taste or view of the purchaser, and consist of landscape scenes, interior and exterior of public buildings, &c., varying in price according to the subject and size of the painting. The dioramic effects are produced by a series of paintings, two to six in a series. The effect of these is exceedingly pleasing, such as exhibiting the interior of a cathedral by moonlight; morning gradually dawns, shewing the aisles filled with a congregation. Also, a summer landscape changing to a storm, with rain and lightning; this clears away, developing a rainbow, and terminates by winter, with its usual accompaniments of snow, &c.

		Each. £ s. d.	Each. £ s. d.
1437	**Transparent Photographic Views of various Places,** for either magic lanterns or dissolving views . . from		0 5 0

This beautiful adaptation of photography to the magic lantern is one of the wonders of the present day. However minute the picture, and however intricate in detail, they will bear the utmost magnifying power that can be used, without diminishing in beauty, as is the case with all the painter's productions, which, although beautiful, suffer in comparison with these sun paintings.

Messrs. Negretti and Zambra would refer to their Series of Photographic Views of the Holy Land and Egypt, as eminently adapted for illustrating lectures.

1438 **Opaque Screens of Oil Cloth,** from 3 to 9 yards square .

1439 **Transparent Screens of all sizes,** by means of which a a much brighter and clearer image is obtained—
8-ft. square, 16/. 12-ft. square, 23/. 20-ft. square, 80/.

OXY-HYDROGEN GAS MICROSCOPES, POLARISING APPARATUS, &c.

1440 **Improved Portable Hydro-oxygen Gas Microscope** (fig. 1440). This form of the instrument has removed many serious imperfections of previous constructions, viz., unwieldly bulk and weight, deficiency of light and definition in the high magnifying powers, want of uniformity of light on the disc, insecurity in the blowpipe, inconvenient and dangerous position of the gas bags, rendering them liable to communicate and explode. These are removed beyond the possibility of commixture, or may be placed under lock and key in a separate room, during the exhibition of the instrument. The microscope is furnished with one low power for showing full-sized objects, such as entire butterflies; a second magnifying power for living aquatic insects, such as the skeleton larva, globe insect; and a third high power for smaller objects, such as the dust of moths' wings, &c. The whole apparatus complete with every requisite for preparing, purifying and retaining the gases . . . 35 0 0

This microscope is capable of showing objects, magnified on a disc, from two thousand to two million times.

1441 The microscope only, exclusive of other apparatus, small size 15 0 0 21 0 0

1442 **Oxy-hydrogen Microscopes,** fitted on a larger scale, with clock work motion to the lime holders 50 0 0 100 0 0

1443 **Microscopes** fitted to the dissolving view apparatus, from 15 0 0

1444 **Polariscope,** to attach to condensing lenses of the oxy-hydrogen microscope (fig. 1444). The polariscope has a moveable cap, which gives great facility both for adjusting and cleaning the thin polarising glass plates. The analysing plates of glass are easily removed, and have perfect freedom of motion, horizontally and vertically, and the object holder has a fine rack-work adjustment 8 8 0 12 12 0

Fig. 1440.

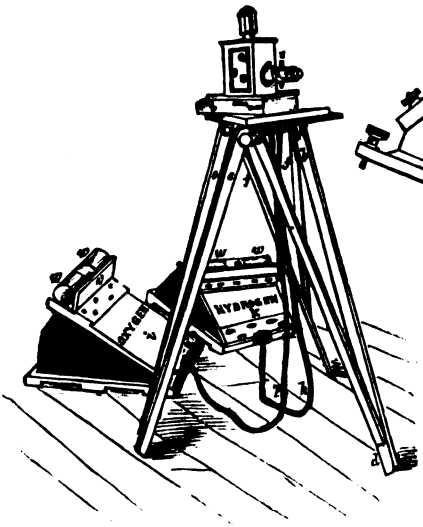
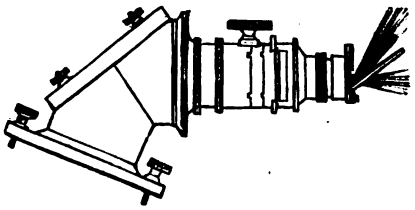


Fig. 1444.



		Each. £	s.	d.	Each. £	s.	d.
1445	**Extensive assortment of Large Objects,** prepared in Canada balsam for the gas microscope	0	2	6	0	10	0
1446	**Lime Balls** for oxy-calcium light, in bottles . per doz.				0	2	0
1447	**Lime Cylinders,** best quality, in bottles . . „	0	3	6	0	5	0
1448	**India Rubber or Caoutchouc Cloth Gas Bags,** for containing the gases, with stop-cock and union joints . from				2	2	0
1449	**Pressure Boards,** with stout hinges and folding flap, for holding the weights that force the gas from the bag, from				1	10	0
1450	**Improved Hydrogen Generator and Purifier.** A convenient apparatus for the making hydrogen gas . from				2	2	0
1451	**Copper or Iron Retort,** with brass union joint, and flexible tube to connect with the gas bag	1	1	0	1	5	0
1452	**Glass Water Troughs,** with parallel sides for exhibiting living animalculæ, also the decomposition of water by voltaic action, &c.				0	5	0
1453	**Apparatus** for showing the formation of magnetic curves by iron filings on the poles of a horse-shoe magnet .				0	10	0
1454	**Clockwork Movement** adapted to the lime holder, for keeping the lime cylinder slowly revolving, and exposing a fresh surface to the action of the gases . . .	5	5	0	6	6	0
1455	**Black Oxide of Manganese** . . . . . per lb.				0	0	3
1456	**Chlorate of Potash** . . . . . „				0	2	6
1457	**Sulphuric Acid** . . . . . „				0	0	4
1458	**Granulated Zinc** . . . . . „				0	0	8

POLARISCOPES AND POLARISING APPARATUS.

		Each. £ s. d.	Each. £ s. d.
1459	**Tourmaline Polariscope,** elementary form—two plates of tourmaline arranged in spring wire forceps for holding any object to be examined between them	0 10 0	1 0 0
1460	**Reflecting Polariscope,** with polarising and analysing bundles of crown glass, mounted in convenient and firm brass stand, with revolving object holder or stage . .		2 0 0
1461	Ditto ditto complete with tourmaline, plate of selenite of uniform thickness, double image prism, brass frame for showing polarising structure produced by unequal pressure in a piece of annealed glass, with diaphragm of greyed glass, &c.		5 5 0
1462	**Biot's Black Mirror Polariscope,** with graduated horizontal circle and spring stage		2 10 0
1463	**Dubosc Soleil's Polariscope,** for estimating the value of saccharine fluids, &c.		14 0 0
1464	**Le Count's Mirror Polariscope,** with dispersing plate, spring fastening and best flint glass	1 0 0	1 10 0
1465	**Improved Tourmaline Polariscope,** mounted in a frame, with a revolving wheel carrying a series of crystals, which may be successively brought between the tourmalines; each of the latter can be made to revolve in its own plane, and thus place their axes parallel or perpendicular to each other at pleasure, and vary the phenomena of each crystal	3 3 0	4 4 0
1466	**Double Image Prism,** selenite disc of equal thickness, and three-hole slider for ditto, for showing the production of white light by the union of the complimentary colours .		0 9 0
1467	**Brass Frame,** for showing the transient polarizing structure communicated by pressure to a piece of annealed glass		0 5 0
1468	**Apparatus** for showing the same effect by the unequal application of heat		0 5 0
1469	**Polarizing Eye-piece** of thin plates of glass, in brass cases 3/,	0 4 0	0 5 0
1470	**Nicol's Single Image Calc Spar Prism** . 12/, 15/,	1 5 0	1 10 0
1471	**Nicol's Double Image Prism of Calc Spar** . . .		0 17 6
1472	**Tourmalines** of various sizes and colours . . 5/,	0 8 0	1 10 0
1473	**Artificial Tourmalines** 2/6,	0 15 0	1 1 0
1474	**Unannealed Glass** of various shapes, for showing the permanent polarizing structure of glass that has been uniformly heated and suddenly cooled		0 4 6
1475	**Thin Selenite Plate** of equal thickness, developing uniform colour		0 4 0

FIGS. 1477 TO 1477.*


		Each. £ s. d.	£ s. d.
1476	**Thin Selenite Plate** of unequal thickness, developing various colours		0 4 0
1477	**Selenite Designs,** formed of pieces of selenite different in thickness, arranged in a variety of forms, such as cubes, stars, rosettes, flowers, figures, circles, &c., for showing the beautiful colours produced by the varying thickness of the film of selenite (figs. 1477 to 1477*) . . .	0 10 0	1 5 0
1478	**Selenite Designs,** of very elaborate and curiously arranged figures, such as a Gothic church window, figure of a harlequin, &c.	1 16 0	3 0 0
1479	**Circular Plate of Selenite,** ground concave, to develope the colours in rings		0 10 6
1480	**Rhombs of Iceland Spar,** to shew the multiplication of images afforded by peculiar structure of the crystal .	0 5 0	1 10 0
1481	**Plates** of quartz, arragonite, amethyst, topaz, calc spar, borax, nitre, beryl, Rochelle salts, sugar, bi-chromate of potass, sulphate of iron, cut at right angles to their axis, for exhibiting coloured rings, &c.		0 6 0
1482	**Plates** of quartz, arragonite, and calc spar, cut at right angles, for shewing various compound figures of rings, bars and cross bars, screws, and crosses	0 10 0	2 0 0
1483	**Sliders,** with fish fins and scales, laminæ of human cuticle, sections of teeth, bones, hoofs, horns and tendons, various chemical salts and vegetable productions, &c., preserved in Canada balsam, to exhibit their polarizing structure; adapted for the table or oxy-hydrogen polariscope .	0 1 6	0 2 6

EVERY DESCRIPTION OF APPARATUS AND OBJECTS PREPARED FOR EXPERIMENTS WITH POLARIZED LIGHT.

Polarizing Apparatus fitted to Table and Oxy-hydrogen Microscopes.

SURVEYING INSTRUMENTS,

THEODOLITES, LEVELS, CIRCUMFERENTERS,

COMPASSES, ETC.

FIG. 1490.

FIG. 1492.

THEODOLITES.

		Each. £	s.	d.	Each. £	s.	d.
1484	**4-inch plain Military Portable Theodolite,** with telescope and staff complete, divided on brass . . .				13	10	0
1485	5-inch ditto ditto				16	10	0
1486	6-inch ditto ditto				18	10	0
1487	**5-inch best Theodolite,** with tangent screw adjustments, &c., divided on brass, complete				20	10	0
1488	6-inch ditto ditto				24	0	0
1489	**4-inch best Theodolite,** with three tangent screws, rack-work adjustment to telescope, tripod staff, &c., **divided on silver**				20	0	0
1490	5-inch ditto ditto (fig. 1490)				24	0	0
1491	6-inch ditto ditto				27	10	0
1492	**6-inch best Transit Theodolite,** divided on silver (fig. 1492)				34	0	0
1493	7-inch ditto ditto				38	10	0
1494	7-inch ditto ditto with two telescopes . . .				44	10	0
1495	**Everest's Theodolites.** 4-inch				21	0	0
1496	Ditto ditto 5-inch				25	0	0

LEVELS.

Fig. 1501.

		Each. £ s. d.	Each. £ s. d.
1497	**Drainage Level,** of brass, with sight and adjusting screw, ball-and-socket joint		1 5 0
1498	**8-inch Spirit Level,** mounted in brass frame, with cross hair sights and graduated arc; a useful instrument for determining the inclination of strata or drains . .		2 10 0
1499	Ditto ditto .with rack and pinion motion . .	3 16 0	5 5 0
1500	**12-inch Plain Level,** without compass, in case, with jointed staff		8 8 0
1501	**10-inch best Dumpy or Gravatt's Level,** with achromatic telescope and rack-work adjustment, magnetic compass, mounted upon strong brass parallel plates, with tripod mahogany staff, case, &c. (fig. 1501)		12 12 0
1502	14-inch ditto ditto		16 10 0
1503	18-inch ditto ditto		18 10 0
1504	**Best Y Level,** with 12-inch achromatic telescope and rack-work adjustment, magnetic compass, tangent screw adjustment, brass parallel plates, and stout tripod staff; in case, &c.		12 12 0
1505	Ditto ditto with 18-inch telescope . . .		16 16 0
1506	Ditto ditto with 24-inch telescope . . .		21 0 0
1507	**Standard Levelling Instrument**		42 0 0

HAND LEVELS, FOR BUILDERS, ENGINEERS, ETC.

1508 **Spirit Levels,** mounted in polished mahogany frames, with brass top:—

Length—inches .	4.	5.	6.	7.	8.	9.	10.	12.
Price .	2/8	3/3	3/6	4/	4/6	5/	5/6	6/

1508* **Spirit Levels,** mountings all of brass, with ground-level tubes:—

Length—inches .	4½.	6.	7½.	9½.	11½.	13½.	15½.
Price .	4/6	6/	7/6	9/6	11/6	13/6	15/6

1509	**Spirit Level Tubes,** warranted, plain . . per inch	0 0 3
1509*	Ditto ditto ditto ground . . . „	0 0 6

CIRCUMFERENTERS, CROSS SIGHTS, ETC.

		Each. £	s.	d.	Each. £	s.	d.
1510	**Best Circumferenter,** with rack-work adjustment, double sights, divided cover into three minutes, in case, with tripod staff, and ball-and-socket joint . . 7/7/0,	10	10	0	12	12	0
1511	**Circumferenters,** 4-inch, 5-inch, and 6-inch . . .	3	10	0	5	5	0
1512	**Miner's Compass,** 4-inch, with sights, in mahogany case .	1	10	0	2	10	0
1513	Ditto ditto in plain mahogany boxes . . 3/6,	0	4	6	0	5	6
1514	**Surveyor's Cross,** octagonal form	0	10	6	0	12	6
1515	Ditto ditto with compass, of the best construction .				1	0	0
1516	Ditto ditto with moveable head and divided circle .				2	10	0
1517	Ditto ditto with ball-and-socket joint . . .				3	0	0
1518	**Optical Squares,** for shewing right angles . . .	1	1	0	1	10	0

PRISMATIC MILITARY COMPASSES.

FIG. 1519.

1519	**Prismatic Compass,** principally used for military purposes, 2¾-in. diameter (fig. 1519)	3	3	0	3	10	0
1520	Ditto ditto 4-inch, with shades				4	4	0
1521	Ditto ditto best, divided on metal ring, with shades and azimuth glass				5	5	0
1522	Leather case and strap for ditto				0	10	6
1523	Stand for ditto, with ball-and-socket joint . . .				1	15	0
1524	Ditto ditto plain				1	5	0

FIG. 1525*a*.

FIG. 1525*b*.

1525 **Improved Prismatic Compass,** for miners, surveyors, and engineers. By it, both vertical and horizontal angles can be taken with speed and accuracy. Inside the compass box is a silver ring, divided to 30′; this gives the magnetic bearing, even when the instrument is held in the hand. When placed on its tripod stand (as in fig. 1525*a*), the spirit level is used to level the instrument, and horizontal angles can be taken and repeated, independently of the magnetic needle; this is of great importance in districts abounding with iron. To measure vertical angles, the compass is to be turned sideways (as in fig. 1525*b*), without removing it from its stand; the level then shews the horizontal line, and all angles can be taken from the zenith round, and all observations can be verified by reversing the compass in azimuth and altitude.

Price £9 9 0 *and* £12 12 0

LAND CHAINS, TAPE MEASURES, ETC.

		Each. £ s. d.	Each. £ s. d.
1526	**Gunter's Iron Measuring Chain,** sixty-six feet, or four poles in length 10/,	0 15 0	1 5 0
1527	**Arrows, set of Ten Pointed and Numbered for ditto** .		0 3 0
1528	**Standard Chain,** 100-feet		10 0 0
1529	Ditto ditto 50-feet		5 5 0
1530	Ditto ditto 66-feet		7 7 0
1531	**Levelling or Station Staves,** of common form and portable, without level		1 10 0
1532	Ditto ditto improved with level		2 10 0
1533	**Sopwith's Station Staves,** on an improved principle .		2 17 0
1533*	Ditto ditto painted		4 0 0
1534	**Papers for Level Staves** . . . . . per foot		0 0 2

1535 **Measuring Tapes,** common, in leather cases, with folding handles:—

Length .	33-feet.	50-feet.	66-feet.	100-feet.
Price . .	4/	5/6	7/	10/6

		Each. £	s.	d.	Each. £	s.	d.
1536	**Patent Pocket Spring Measuring Tapes,** in brass case, 3-feet 2/6,	0	3	6	0	4	6
	6-feet 5/6,	0	7	0	0	9	0
1537	Ditto ditto in German silver, pearl, or fancy cases, 5/6,	0	7	6	1	1	0

1538 **Measuring Tapes,** in japanned leather case, with folding handle, rollers, &c.:—

Length .	33-ft.	40-ft.	50-ft.	66-ft.	80-ft.	100-ft.
Price . .	5/6	6/	6/6	8/	9/	14/6

1539 **Improved best Multiplying Tapes,** in patent black or brown leather case, folding handles, rollers, &c.:—

Length	33-ft.	40-ft.	50-ft.	66-ft.	80-ft.	100-ft.
Price . .	8/6	9/6	11/6	12/6	14/6	21/

1539*	**Patent Elastic Steel Tapes,** leather case, flush handles, marked with links at the back—33-feet, or 2 poles .				1	3	0
	66-feet, or 4 poles .				2	0	0
1540	**Perambulators,** for measuring roads, streets, &c. . .				9	9	0
1541	Ditto ditto on metal frame, for foreign service .				12	12	0

NAUTICAL INSTRUMENTS.

FIG. 1543.

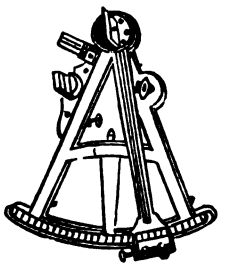


FIG. 1545.

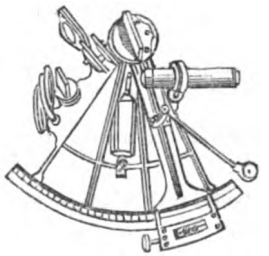
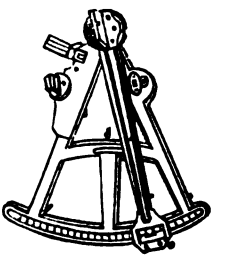


FIG. 1552.



QUADRANTS.

1542	**Ebony Quadrant,** in oak case				1	10	0
1543	Ditto ditto with tangent screw to index (fig. 1543)				2	5	0
1544	Ditto ditto with two tangent screws . . .				2	15	0
1545	Ditto ditto with bar to index and vertical screw (fig. 1545)				2	18	0
1546	Ditto ditto with six shades				3	3	0
1547	**Telescope** to above, extra				0	6	0

		Each. £ s. d.	Each. £ s. d.
1548	**Handle Ebony Quadrant,** with two telescopes, divided to 30 seconds, long centre and seven shades, in mahogany box; best quality		4 10 0
1549	**Metal Quadrant,** divided on silver, with achromatic telescopes, long centre, seven shades, and index magnifier, in mahogany box; best quality		6 6 0

SEXTANTS.

1551	**Ebony Sextant,** best quality, with brass arch achromatic telescope, &c.; in mahogany case		7 7 0
1552	**Metal Sextant,** edge bar pattern, bronzed limb divided on silver to ten seconds; in mahogany box (fig. 1552) .		6 6 0
1553	**Metal Sextant,** oval pattern, bronzed limb divided on silver to ten seconds, and glass reflector to vernier .		10 10 0
1554	Ditto ditto superior oval pattern, bright or bronzed limb, with extra power for telescopes		11 11 0
1555	**Metal Sextant,** best bridge handle, oval pattern, bright or bronzed limb of the most accurate finish, with all recent improvements; in polished mahogany case . .		12 12 0
1556	**Pillar or Double-Plated Sextant,** divided to ten seconds, with additional power to telescope, and reflectors to verniers, &c., of the very best quality; in mahogany case		16 16 0
1557	**Gold or Platinum Arch** to either of above . . .		2 2 0

POCKET SEXTANTS.

1558	**Pocket or Box Sextant,** divided on silver, with rack-work adjustment	3 10 0	4 4 0
1559	**Pocket Sextant,** best quality, with telescope and tangent screw, &c.		5 5 0
1560	**Leather Case and Strap** for above		0 12 0

ARTIFICIAL HORIZONS.

1561	**Black Glass Plane, or Artificial Horizon,** in case, with level		1 16 0
1562	**Artificial Horizon,** with two troughs, mercury and bottle, complete		4 4 0

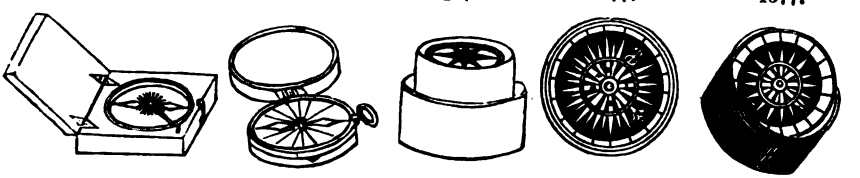
QUADRANT AND SEXTANT GLASSES.

		Each. £ s. d.	Each. £ s. d.
1563	**Horizon Glasses,** for sextants and quadrants . per doz.		1 10 0
1564	**Index Glasses** . . . . . „		3 2 0
1565	**Coloured Shades** . . . . . „		1 0 0

Quadrants and Sextants can be supplied of an inferior quality, at slightly lower prices, but they cannot be recommended as correct.

MARINERS' COMPASSES.

FIGS. 1566. 1568. 1576. 1577. 1577.



1566	**Pocket Compasses,** in square mahogany cases, with stops, (fig. 1566) 3/6,	0 4 6	0 5 6
1567	Ditto ditto mounted with agate centres . . .	0 4 6	0 10 6
1568	**Brass and Gilt Pocket Compasses,** in leather cases (fig. 1568) 8/6, 10/6,	0 12 0	1 1 0
1569	**Small Pocket Compasses,** in great variety 1/, 2/, 2/6,	0 3 6	0 15 0
1570	**Trinket Compasses** 1/,	0 1 6	0 5 0
1571	Ditto ditto silver and gold cases, various . 4/,	0 10 6	1 10 0
1572	**Pocket Compasses,** in circular brass boxes, with the magnetic needle on floating card 5/,	0 6 0	0 7 0
1573	Ditto ditto mounted on agate centres, with stop, from	0 5 0	0 6 0
1574	**Watch Compasses,** in silver hunting cases . . .	2 2 0	3 3 0
1575	Ditto ditto German silver 15/,	1 0 0	1 10 0

BOAT AND SHIPS' COMPASSES.

1576	**Brass Cone Boat Compass,** in wood case (fig. 1576) .	0 14 0
1577	**Brass Box Boat Compass,** in gimbals (fig. 1577) . .	0 16 0

1578 **Steering Compasses,** in box :—

Inches .	7.	8.	9.	10.	11.	12.
Price .	7/	8/	9/	10/	11/	12/

1579 **Steering Compasses,** with brass bowls :—

Inches .	7.	8.	9.	10.	11.	12.
Price .	16/	17/	18/	20/	22/	24/

		Each. £ s. d.	Each. £ s. d.
1580	**Storm Compasses,** 10-inch		1 10 0
1581	Ditto ditto 11-inch		1 14 0
1582	**Storm Compasses, double,** 10-inch		2 6 0
1583	Ditto ditto „ 11-inch		2 13 0
1584	**Amplitude Compass,** with sights and agate centres, 11-in.		1 16 0
1585	Ditto ditto 10-in.		1 10 0
1586	**Hanging or Cabin Compass**—japanned brass . . .		1 10 0
1587	Ditto ditto bright brass		1 8 0
1588	Ditto ditto brass and transparent card . . 30/,	2 0 0	2 10 0
1589	Ditto ditto brass ditto with dipping needles	2 10 0	3 3 0
1590	**Azimuth Compass,** plain mounting	3 0 0	3 10 0
1591	Ditto ditto with divided metal ring and folding sights; in mahogany box	4 10 0	5 15 0
1592	**Best Prismatic Azimuth Compass,** with shades . .	6 6 0	8 8 0
1593	**Stands** for above	0 18 0	1 1 0
1594	**Ships' Binnacles,** in wood and metal, of various forms and sizes		
1595	**Massey's Patent Log**	3 10 0	4 5 0
1596	**Massey's Patent Sounding Machine**	3 10 0	5 10 0
1597	**Friend's Patent Log**		
1598	**Friend's Patent Sounding Machine**		

SUN DIALS.

FIG. 1599.

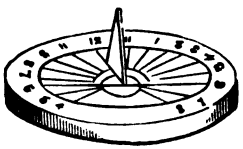
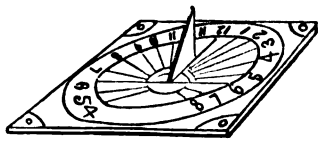


FIG. 1601.

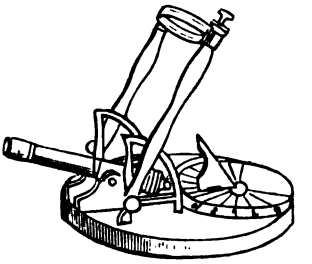


1599	**Sun Dials,** with brass slab and style (fig. 1599):—						
	Diameter . .	6-in.	7-in.	8-in.	10-in.	11-in.	12½-in.
	Price .	35/	42/	48/	55/	63/	84/
1600	**Sun Dials,** with divisions, figures, and a table of the equation of time, in black enamel, on slate, the style of brass; 14-in. diameter						1 15 0
1601	Best ditto, 12-inch, divided to two minutes, with equation table (fig. 1601)						6 6 0
1602	Best ditto, 15-inch, divided to one minute, with ditto .						8 8 0
1603	**Universal Joint Sun Dial and Compass,** with divided arc, in cases, 2½-inches						1 17 6 / 2 15 0
1604	Ditto ditto 3½-inches						2 10 0 / 3 10 0
1605	Ditto ditto 4½-inches						4 0 0 / 6 0 0

Fig. 1606.

1606 **Sun Dial,** with burning lens so arranged that the sun's rays are thrown on the priming of a small loaded cannon, and cause it to be fired at noon precisely. The mounting of the lens has a scale corresponding to the sun's declination for every week in the year (fig. 1606).

Price £1 16 0



SHIPS' OR POCKET COMPASSES REPAIRED AND ADJUSTED.

MATHEMATICAL DRAWING INSTRUMENTS.

Fig. 1608.

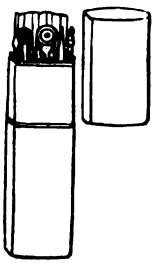


Fig. 1610.

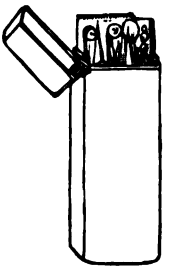
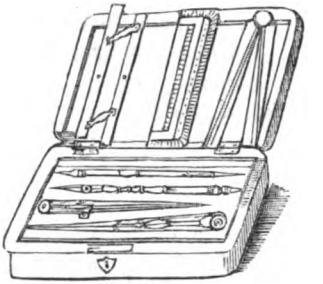


Fig. 1612.



SETS OF DRAWING INSTRUMENTS, IN CASES.

		Each. £	s.	d.	Each. £	s.	d.
1607	**Small or Half-set of Steel-jointed Drawing Instruments,** consisting of compasses with pen and pencil points, feeder and boxwood scale; in pull-off case . .	0	4	0	0	5	0
1608	**Steel-jointed Drawing Instruments,** consisting of large compasses, pen and pencil points, plain dividers, feeder and box scale; in pull-off case (fig. 1608) . . .	0	5	0	0	7	6
1609	**Steel-jointed Drawing Instruments,** consisting of dividers, compasses with pen and pencil points, ruling pen, bow pen, feeder, ebony parallel rule, box sector, and brass protractor; in fish-skin case	0	12	6	0	16	0
1610	**Best turned cheek Steel-jointed Drawing Instruments,** consisting of fine dividers, compasses with slip, pen and pencil points, ruling and bow pens, feeder, best ebony parallel rule, boxwood sector and scale; in fish-skin or leather cases (fig. 1610)	1	0	0	1	7	0
1611	**Similar Sets of Drawing Instruments** to Nos. 1607 to 1610, in convenient flat mahogany and rosewood boxes, adapted to elementary or school purposes, 3/6, 5/, 7/6, 8/,	0	10	6	1	10	0

Fig. 1615.

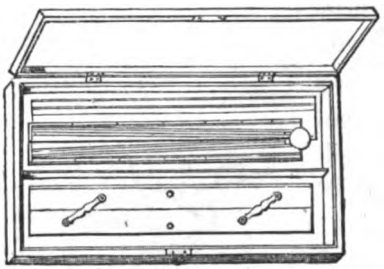
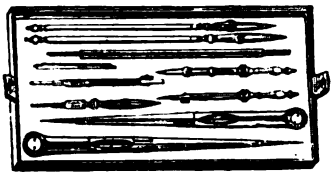


Fig. 1615.



		Each £ s. d.	Each. £ s. d.
1612	**Set of Drawing Instruments,** consisting of sector-jointed compasses, with pen and pencil points, dividers, drawing pen, bow pen, feeder, pencil, boxwood sector and protractor, and ebony parallel rule; in mahogany case (fig. 1612)		1 11 0
1613	**Set of Drawing Instruments,** consisting of sector-jointed compasses, with pen and pencil points, dividers, bow pen, drawing pen, lengthening bar, feeder and pencil, boxwood protractor and sector, and ebony parallel rule; in mahogany case		1 15 0
1614	**Set of Drawing Instruments,** similar to No. 1613, with ivory scales and rule; in mahogany or rosewood case .		2 2 0
1615	**Set of Drawing Instruments,** similar to No. 1614, with bow pen and bow pencil, lengthening bar, ivory rule and scales; in mahogany or rosewood case (fig. 1615) .	2 7 0	2 12 0
1616	**Set of Drawing Instruments,** similar to No. 1614, with fine hair dividers, ivory scales and rule; in rosewood case	2 15 0	3 3 0
1617	**Set of best Sector-jointed Mathematical Drawing Instruments,** consisting of compasses with extra joint, pen and pencil joint, fine hair dividers, bow pencil and bow pen with extra joints, lengthening bar, two drawing pens, needle holder, feeder and pencil, full divided ivory protractor and sector, and ivory parallel rule; in rosewood or mahogany case		4 0 0
1618	**Set of best Sector-jointed Mathematical Drawing Instruments,** similar to No. 1617, with jointed lengthening bar, and dotting pen with wheels; in mahogany or rosewood case		6 0 0
1619	**Set of best Mathematical Drawing Instruments,** similar to No. 1618, with fine spring pen, pencil, and dividers		7 0 0
1620	**Sets of German Silver Mathematical Drawing Instruments,** similar to Nos. 1612 to 1619 :— 2/14/0, 3/0/0, 3/12/0, 4/0/0, 5/10/0,	7 0 0	8 8 0

German silver is recommended as best adapted for warm, damp climates, where the moisture soon injures and destroys the ordinary brass instruments.

		Each. £ s. d.	Each. £ s. d.
1621	**Addiscombe Cadets' Set of Mathematical Drawing Instruments,** consisting of best sector-jointed compasses, pen and pencil points, fine hair dividers, bow pen and pencil, lengthening bar, drawing pen, feeder and pencil, ivory red-line protractor, sector and parallel rule, boxwood marquoise scales, and angle; in mahogany case with lock and key		3 3 0
1622	Ditto ditto in German silver		4 10 0
1623	**Set of Mathematical Drawing Instruments,** as used at the Royal Military College, Woolwich		2 12 6
1624	**Set of Mathematical Drawing Instruments,** as used at King's College and College of Civil Engineers . .	2 15 0	3 10 0
1625	**Magazine Cases of Mathematical and Engineering Drawing Instruments,** of the very finest manufacture, in Brass, German Silver, Electro-Plated or Solid Silver. These sets contain proportional compasses, beam compasses, various sizes of drawing pens, dividers, bow pens and pencils, complete sets of architects' scales, plotting or chain scales and off-set scales, curves and angles, sets of the very best water colours, brushes, palettes and saucers, &c.; conveniently arranged in brass-bound polished mahogany or rosewood cabinet, with superior lock and key. *Price* £10 0 0 *and* £40 0 0		

DIVIDERS, COMPASSES, DRAWING PENS, SPRING BOW PENS, ETC.

FIG. 1627.

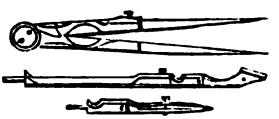
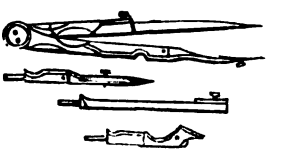


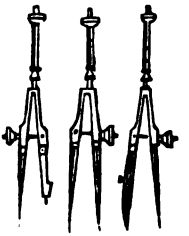
FIG. 1629.



1626	**Brass-jointed Dividers,** 4, 6, and 8-inch . from, per doz.		0 8 0
1627	Ditto ditto with pen and pencil joint, with lengthening bar (fig. 1627)		0 2 6
1628	**Steel-jointed Dividers**	0 1 6	0 2 0
1629	Ditto ditto with pen and pencil joint with lengthening bar (fig. 1629)		0 3 6
1630	**Five and Six-inch best Sector-joint Dividers** . .	0 3 6	0 5 6
1631	**Five and Six-inch Hair Dividers**	0 7 6	0 10 6
1632	**Spring Dividers,** with adjusting screw	0 5 6	0 7 6
1633	**Pocket Dividers,** with sheath	0 7 6	0 10 0

1634	**Bow Pens**, common	2/,	2/6,	3/
1635	Ditto ditto, best			4/6
1636	Ditto ditto, with extra joints . .			8/
1637	**Pencil Bows**, common . . .	2/,	2/6,	3/
1638	Ditto ditto, best			4/6
1639	Ditto ditto, with extra joints . .			8/
1640	**Steel Spring Bow Pens** (fig. 1640) .		5/,	7/6
1641	Ditto ditto **Pencils** (fig. 1641) . .		5/,	7/6
1642	Ditto ditto **Dividers** (fig. 1642) . .		5/,	7/6

Fig. 1641. 42. 40.



		Each. £	s.	d.	Each. £	s.	d.
1643	**Set of best Spring Bow Dividers**, pen and pencil, in case				1	1	0
1644	Ditto ditto for needle points				1	15	0
1645	**Double-jointed Bow Pen**, with turn-over pen, pencil, and point, in case				0	18	0

Fig. 1648.

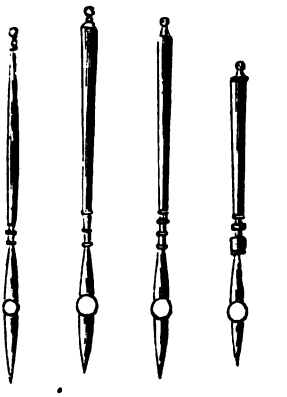
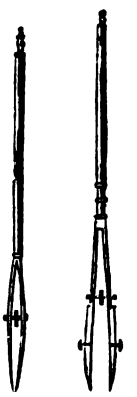


Fig. 1653.



1646	**Plain Drawing Pen**, with brass handle and protracting pin . . . . . from				0	2	6
1647	Ditto ditto all steel				0	3	6
1648	**Drawing Pens**, with ivory handle (fig. 1648) . .	0	3	6	0	4	6
1649	Ditto ditto with lift brass joints to the blades, and ivory handle	0	5	6	0	7	6
1650	Ditto ditto with electrum joints	0	6	6	0	7	6
1651	**Dotting Pens**, with ivory handles and wheels . . .	0	6	0	0	10	6
1652	Ditto ditto common, with brass handle				0	5	6
1653	**Road Pens**, best make (fig. 1653)				0	15	0
1654	**Needle Holder**, or pricking point				0	3	6
1655	**Triangular Compasses**, brass	0	10	0	1	1	0
1656	Ditto ditto German silver, with shifting leg . .	0	15	0	1	10	0
1657	**Elliptical Compasses**	2	10	0	4	4	0
1658	**Proportional Compasses**	0	15	0	1	0	0
1658*	Ditto ditto full divided (fig. 1658) . . .	1	11	6	2	0	0
1659	Ditto ditto full divided, best make, tangent screw, screw adjustment	2	0	0	2	10	0

FIG. 1658.

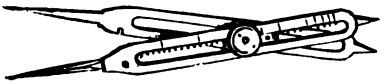


FIG. 1667.

		Each. £	s.	d.	Each. £	s.	d.
1660	**Whole and Half Compasses**	0	17	6	1	4	0
1661	**Plain Beam Compasses**, with steel points and mahogany bar	1	1	0	2	10	0
1662	**Best** ditto ditto with pen, pencil, steel points, and tangent screw adjustment, 3-feet long	3	10	0	4	10	0
1663	**Tube Beam Compasses**	2	0	0	2	13	0
1664	**Beam Compass Fittings**, to fit any bar				0	18	0
1665	Ditto ditto with tangent screw and steel points	1	5	0	1	10	0
1666	**Napier's Pocket Compasses**	1	8	0	2	0	0
1667	**Pillar Compasses**, in brass (fig. 1667) from				1	0	0
1668	Ditto ditto in German silver „				1	5	0
1669	Ditto ditto with lengthening bar				2	15	0
1670	**Tube Compasses**, with case and scale				2	2	0
1671	Ditto ditto best sector-jointed, in case				2	10	6
1672	**Callipers, Proportional**, 12-inch	2	0	0	2	12	6
1673	Ditto ditto 9-inch	1	14	0	2	2	0
1674	**Pentagraphs**, in brass, of the best construction, for reducing or enlarging plans to any proportion :—						
	18-inches from				4	14	6
	24-inches				5	10	0
	30-inches				6	10	0
	36-inches				7	7	0
	48-inches				10	10	0
1675	**Pentagraphs**, in wood from				4	0	0
1676	**Centrilineal**, for drawing buildings, &c., in perspective, the instrument giving the line of direction of the vanishing point	1	10	0	2	0	0
1677	**Elipsographs**, for striking ovals						

SCALES, RULES, &c.

1678 **Ebony Parallel Rules** :—

6-in.	9-in.	12-in.	15-in.	18-in.	24-in.
1/	2/	3/	4/	5/	8/6

1679	**Ivory Parallel Rules**, 6-inch	0	3	0	0	4	0
1680	Ditto ditto German silver mounts	0	4	0	0	5	0

1681 **Rolling Parallel Rules, Ebony** :—

Plain—

6-in.	9-in.	12-in.	15-in.
7/6	8/	10/6	14/

1681* Ditto ditto **with Ivory Edges and Rollers**—

6-in.	9-in.	12-in.	15-in.
10/6	12/	16/	20/

		Each. £	s.	d.	Each. £	s.	d.
1682	**Twelve-inch Ivory Architects' Scales**	0	8	6	0	10	0
1683	**Six-inch** ditto ditto				0	4	6
1684	**Twelve-inch Ivory Architects' Scales,** full divided, from ⅛ to 3-inches, containing 16 scales				0	16	0
1685	**Six-inch** ditto ditto				0	7	0
1686	**Twelve-inch Ivory Chain or Plotting Scales,** 10 to 60 chains to the inch, best				0	10	0
1687	**Six-inch** ditto ditto best	0	3	6	0	4	6
1688	**Ivory Off-set Scales,** 10 to 60 from				0	2	6
1689	**Twelve-inch Chain or Plotting Scales,** in boxwood, 10 to 60				0	3	0
1690	**Six-inch** ditto ditto				0	2	0
1691	**Twelve-inch Chain or Plotting Scales,** 80 to 100	0	17	6	1	1	0
1692	**Two-inch Off-sets** for ditto	0	4	6	0	5	6
1693	**Six-inch Ivory Parallel Rules**	0	4	0	0	5	6
1694	**Six-inch Ivory Sector Scales**	0	5	0	0	7	0
1695	**Six-inch Boxwood ditto**	0	2	0	0	3	6
1696	**Six-inch Ivory Protractors**	0	4	0	0	6	0
1697	**Six-inch Boxwood ditto**	0	1	6	0	2	6
1698	**Twelve-inch Ivory Protractor**				1	10	0
1699	**Red Line Protractor,** for military drawing				0	5	6
1700	Ditto ditto with scale of feet				0	7	0
1701	**Six-inch Ivory Navigation Scales,** full divided				0	9	0
1702	**Six-inch Military Scales**				0	7	0
1703	**One-foot Gunter's Scales,** best				0	2	6
1704	**Two-feet** ditto ditto				0	3	0
1705	**Two-feet Sliding Gunter's Scales**	0	8	6	0	16	0
1706	**Marquois Scales,** in case complete				0	13	0
1707	Ditto ditto without case				0	12	0
1708	Ditto ditto ivory				2	10	0
1709	Ditto ditto metal	3	10	0	4	4	0
1710	**Gunners' Rules**	0	3	0	0	10	6
1711	**Brass Protractors**	0	1	0	0	1	6
1712	**Protractors,** in horn, semi-circular, transparent, and very convenient for measuring angles on paper, &c. :—						

Divided into degrees—3-in.	3½-in.	4-in.	5-in.	6-in.
/4	/6	/9	1/	1/6

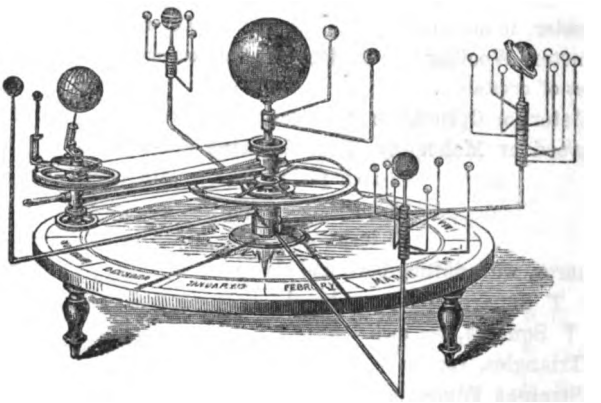
Divided into half-degrees—5-in.	6-in.	7-in.	8-in.
1/3	1/9	3/6	5/6

1713	**Card Protractors**				0	2	6
1714	**Brass Semicircle Protractors,** divided to ten minutes	1	0	0	1	10	0
1715	**Brass Circular Protractors,** plain	0	7	6	1	0	0

		Each. £	s.	d.	£	Each. s.	d.
1716	**Circular Protractors,** best 6-inch, with tangent screw adjustment to vernier				4	10	6
1717	Ditto ditto divided on silver, 6-inch				5	10	0
1718	Ditto ditto . . . 7-inch, £6 10*s.* 8-inch				7	15	0
1719	**Clynometer,** to measure the inclination of hills or roads				1	16	0
1719*	**Goniometer, Woollaston's Reflecting,** for measuring the angles of crystals	4	4	0	5	5	0
1720	**Map Meter, or Opisometer,** for measuring curved lines	0	3	6	0	4	6
1721	**Lancewood or Mahogany T or Drawing Squares:—**						
	12-inch plain 2/6, with bevel				0	4	0
	18-inch „ 3/6, „				0	5	0
	24-inch „ 4/6, „				0	6	0
1722	**T Squares,** with shifting bevil and clamp	0	6	0	0	15	0
1723	**Ebony T Squares,** plain and bevel	0	5	6	0	10	0
1724	**Steel T Squares,** per inch				0	0	8
1725	**Steel Triangles,** various						
1726	**Steel Straight Edges,** per foot				0	5	0
1727	**Ivory, Ebony, and Boxwood Acute, Obtuse, and Right Angles**	0	2	0	0	7	6
1728	**Ship Curves** 1/6,	0	1	9	0	2	0
1729	**Set of Radii Curves**	1	1	0	5	0	0
1730	**Metford's Double Set of Ivory Pocket Scales,** arranged for engineers, architects, and surveyors. The length of each scale, six inches; the form of a single scale, a right-angle triangle, two making a square or set; the two sets are packed in a neat leather case, and the ends of each scale stamped with its value. The triangular form enables all the scales being conveniently placed on the edges. The scales are seventeen in number, fully divided, viz., 2, 3, 4, 6, 8, and 10 chains to the inch; 66 feet and 6 inches to the mile; $\frac{1}{16}$, $\frac{1}{8}$, $\frac{1}{10}$, $\frac{1}{3}$, $\frac{1}{4}$, $\frac{1}{2}$, $\frac{3}{4}$-inch, and French metre; the new Ordnance scale, 1·2500·0004, and a line of chords; a number of constants carefully worked out, are placed on the faces of each scale. Price for complete set, in case				3	0	0
1731	**Improved Engineers' Rule,** in boxwood and ivory, with book of instructions 7/6,	0	10	6	1	4	0
1732	**2-feet and 3-feet Folding Rules,** boxwood and ivory, with brass or German silver mounts, various						
1733	**Folding Box and Ivory Rules for the Pocket,** 1-ft.	0	1	6	0	6	0
1734	**Twelve-inch Folding Ivory Pocket Rule,** with English, French, Spanish, and Rhineland scales				0	7	6
1735	**Horn Centre Pieces** . . . . . per doz.				0	2	0
1736	**Drawing Pins** . . . . . „ /6,	0	1	0	0	1	6
1737	**Crayon Holders** . . . . . from				0	1	6
1738	**Small Pencils for Mathematical Instruments**	0	0	6	0	1	0
1739	**Prepared Water Colours,** in boxes, by the most approved makers						
1740	**Drawing Boards** 5/6,	1	1	0	3	0	0
1741	**Tracing Paper** . . . . . per sheet, /3, /4,	0	0	6	0	1	0

GLOBES AND ORRERIES.

FIG. 1753.



		Each. £ s. d.	Each. £ s. d.
1742	**Pocket Globes,** 3-in. diameter, in hinged case (fig. 1742)	0 10 6	0 16 0

1743 **Pedestal Globes,** mahogany base, with semi-circular brass meridian and quadrant of altitude (figs. 1743 and 1743*) :—

Diameter	9-inch.	6-inch.	4½-inch.	3-inch.
Each	21/, 24/	9/, 10/6	6/, 7/	4/, 5/

FIGS. 1743 AND 1743.*

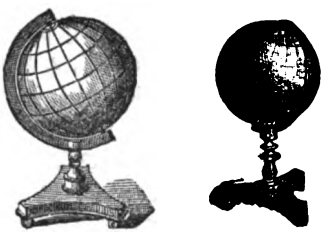


FIG. 1742.

FIG. 1744.

1744 **Table Globes,** black stained wood frames, with brass meridian and quadrant of altitude (fig. 1744) :—

Diameter	15-inch.	12-inch.	9-inch.
Per Pair	£6 6 0	£4 4 0	£3 3 0

1745 **Table Globes,** mahogany frame, with brass meridian and quadrant of altitude (fig. 1744) :—

Diameter	20-inch.	15-inch.	12-inch.	9-inch.	6-inch.
Per Pair	£10 10 0	£6 10 0	£4 10 0	£3 10 0	£2 2 0

1746 **Globes, mounted Chair-high,** plain pillar and claw, with compasses and quadrant of altitude (fig. 1746) :—

Diameter	25-inch.	20-inch.	15-inch.	12-inch.
Per Pair	£25 0 0	£13 13 0	£8 8 0	£5 10 0

1747 **Globes, mounted Chair-high,** superior carved and polished pillar and claw frames, with compasses, quadrant of altitude, and double hour circles (fig. 1747) :—

Diameter	25-inch.	20-inch.	15-inch.	12-inch.
Per Pair	£31 10 0	£15 15 0	£10 10 0	£6 16 6

FIGS. 1746 TO 1746.*

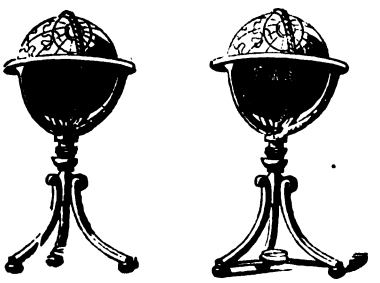


FIG. 1747.

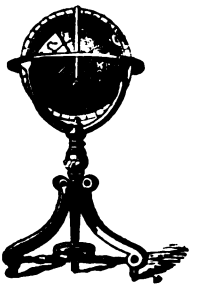
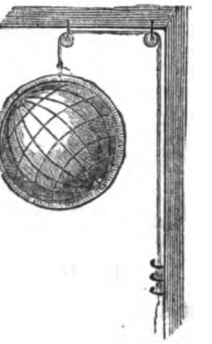


FIG. 1748.

1748 **Globes, mounted Chair-high,** on highly finished and carved tripod frames, of polished Spanish mahogany, with compasses, quadrant of altitude, and double hour circle (fig. 1748) :—

Diameter	25-inch.	20-inch.	15-inch.	12-inch.
Per Pair	36/15/0	18/18/0	12/12/0	7/10/0

FIG. 1749.



1749 **School Globes,** mounted to suspend from the ceiling, with quadrant of altitude (fig. 1749) :—

Diameter—25-inch.	20-inch.	15-inch.	12-inch.
Each £7 7 0	£3 10 0	£1 15 0	£1 0 0

Globes, mounted in rosewood, walnut-wood, satin-wood, &c., at 10 to 20 per cent. increase on the above prices. Any particular style of frame made to order.

1750 **Covers for Globes,** of soft moleskin lined :—

For 25-inch Globe.	20-inch Globe.	15-inch Globe.	12-inch Globe.
40/	26/	16/	10/6

1751 **Quadrants of Altitude** :—

For 25-in. Globe.	20-in. Globe.	15-in. Globe.	12-in. Globe.	9-in. Globe.	6-in. Globe.	3-in. Globe.
10/6	6/	4/6	3/6	3/	2/	1/6

Old Globes repaired and re-covered with modern maps, and the brass mountings cleaned and re-lacquered, rendering them equal to new.

		Each. £	s.	d.	Each. £	s.	d.
1752	**Manual Planitariums, or Tellurians,** showing the relative positions of the planets and their satellites, &c. . 30/,	2	12	0	5	5	0
1753	**Orrery,** exhibiting the relative positions of all the principal planets and their satellites; the diurnal and annual motion of the earth; the moon's phases and nodes, &c.; to move with a train of wheel work and winch handles (fig. 1753)	10	0	0	16	0	0
1754	**Orrery,** with plain mounting, to move by the hand . .	4	0	0	5	0	0
1755	**Complete Orreries,** representing the motions of all the planets and their satellites; the various movements of the earth and moon; the sun rotating on its axis, &c.; arranged with very superior clock-work motion, in a mahogany and brass frame . . . . from				50	0	0
1756	**Diagrams, illustrating the Sciences of Astronomy, Geography, Geology, &c., &c.,** for class teaching, or suited to lecturers						

MECHANICS AND DYNAMICS.

Fig. 1782.

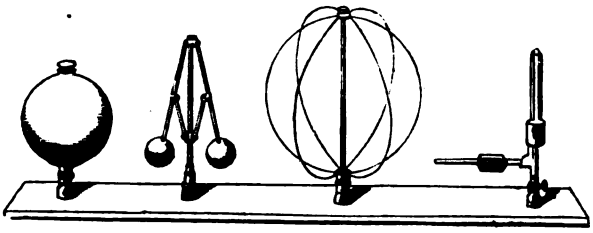


Fig. 1767.

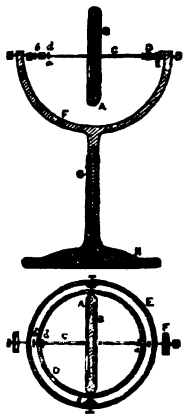


Fig. 1782.

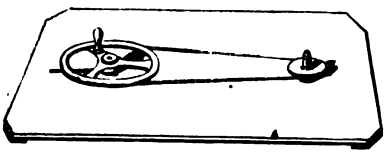
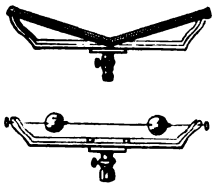


Fig. 1782.



The Models, &c., detailed in this section will be found valuable aids to the teacher and student in studying the laws of motion and the science of mechanics.

		Each. £	s.	d.	£	s.	d.
1757	**Model Apparatus for exhibiting the Mechanical Powers,** viz., levers, simple and compound, pulleys of different kinds, wheel and axle, inclined plane, screws of various sizes and pitch, wedges, capstan, &c., in mahogany and boxwood; in case, with weights complete, £3 3 0	5	5	0	7	7	0
1758	Ditto ditto more highly finished, and complete with brass, pulleys, &c.	10	10	0	20	0	0
1759	**Sets of Levers,** comprising the three orders, and the bent form 10/,	0	15	0	1	1	0
1760	Ditto ditto in brass	4	4	0	5	5	0
1761	**Systems of Pulleys,** simple and compound . . 15/,	1	1	0	1	10	0
1762	**Inclined Plane,** with carriage and weights . . .	0	10	0	0	15	0
1763	**Models,** to show the formation of the screw and nut, to illustrate the action of screws of different degrees of inclination, the endless screw and compound screws, 10/6,	0	15	0	1	5	0
1764	**Adhesion Plates,** of glass, with handles	0	10	0	0	15	0
1765	**Inertia Apparatus,** with brass ball, mounted on a stand	0	10	0	0	15	0
1766	**Apparatus** for showing the impenetrability of matter .	0	3	6	0	5	0
1767	**Gyroscope, or Foucault's Apparatus,** to demonstrate the inertia, or that property of matter which resists any change of state, either of motion or rest; also to illustrate the precession of the equinox (fig. 1767) .	1	5	0	2	10	0
1767*	**Gyroscope,** in mahogany box				3	0	0

		Each. £	s.	d.	£	s.	d.
1768	**Apparatus** for determining the centre of gravity of variously shaped bodies	0	15	0	1	5	0
1769	**Apparatus** illustrating that the stability of a body depends upon the centre of gravity	0	5	0	0	10	0
1770	**Double Cone and Inclined Plane,** to show the descent of the centre of gravity, although the cone apparently moves upwards	0	7	6	0	10	6
1771	**Apparatus** for illustrating the parallelogram of forces, with weights, &c., complete				5	0	0
1772	**Attwood's Machine** for demonstrating the laws of falling bodies, with pendulum beating seconds, weights, &c.; complete on stand				21	0	0
1773	Ditto ditto simple form				6	6	0
1774	**Apparatus** to show that a body takes the same time to descend the diameter or chord of a circle, whatever the length of that chord may be	1	5	0	2	2	0
1775	**Apparatus** to illustrate that the time required for the descent of bodies down an inclined plane, is proportionate to its length	1	1	0	1	15	0
1776	**Apparatus** to demonstrate that the time required for a falling body to reach the ground is the same, whatever be the force of projection	2	2	0	3	3	0
1777	**Apparatus** to illustrate the curve of quickest descent .	1	8	0	2	2	0
1778	**Apparatus** to show the parabolic curve described by a projectile	1	5	0	2	2	0
1779	**Apparatus** to illustrate the laws of collision, with divided arc and ivory balls				2	10	0
1780	**Apparatus** to illustrate the composition of force . .	2	2	0	3	3	0
1781	**Apparatus** to illustrate the equilibrium of forces, complete				6	0	0
1782	**Whirling Table and Apparatus complete,** for illustrating the laws of central forces (figs. 1782) . . .				20	0	0
1783	**Model** to illustrate the construction and properties of an arch	0	5	0	2	2	0
1784	**Model** to show the properties of crown, spur, and bevil wheels, wheel and pinion, and rack and pinion . .				6	0	0
1785	**Model** to demonstrate the properties of steelyard and balance	0	15	0	2	2	0
1786	**Model of Capstan or Windlass**	1	0	0	2	0	0
1787	**Glass Models,** for teaching geometry and crystallography				2	2	0
1788	**Small Sets of Geometrical Solids and Planes** . .				0	6	6
1789	**Larger Sets of ditto,** with sections of the cylinder, cone, and sphere 10/6,	0	18	0	1	10	0

MODELS

TO ILLUSTRATE THE STEAM ENGINE AND VARIOUS OTHER MACHINES AND ENGINES.

Fig. 1800.

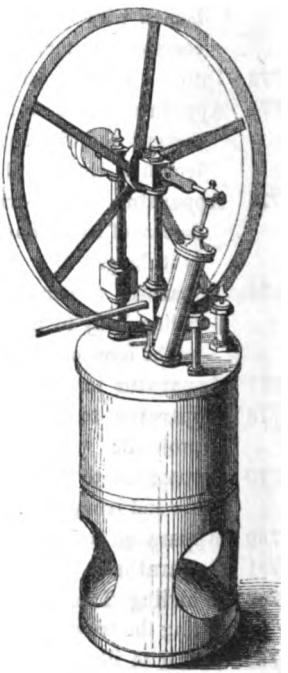


Fig. 1792.

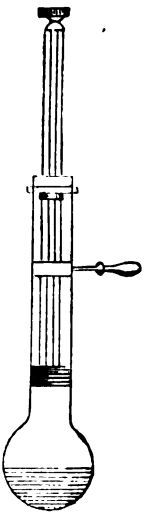


Fig. 1793.

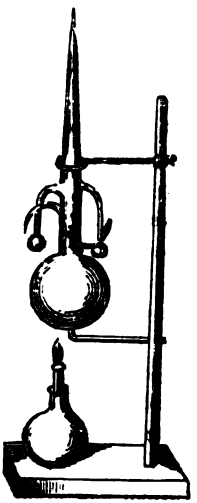
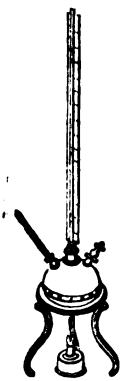


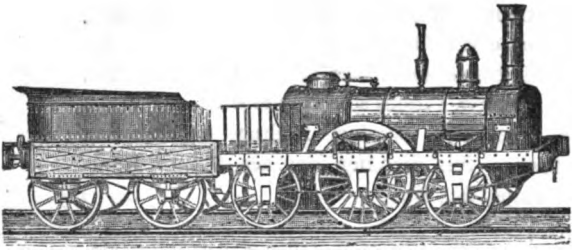
Fig. 1790.



		Each. £ s. d.	Each. £ s. d.
1790	**Marcet's Apparatus,** with barometer, thermometer, stop-cock, and jet attached, for shewing the temperature and elastic force of high pressure steam, and the most important facts connected with latent caloric (fig. 1790) .	3 3 0	4 0 0
1791	**Dr. Ure's Steam Apparatus,** for demonstrating the same facts as Marcet's		3 14 0
1792	**Dr. Woollaston's Apparatus,** showing the production of motion by the generation and condensation of steam (fig. 1792)		0 7 6
1793	**Glass Models of Hero's Steam Engine,** mounted on stand, with spirit lamp (fig. 1793)	0 5 0	0 10 0
1794	**Working Model of Hero's Rotatory Engine** . .		3 0 0

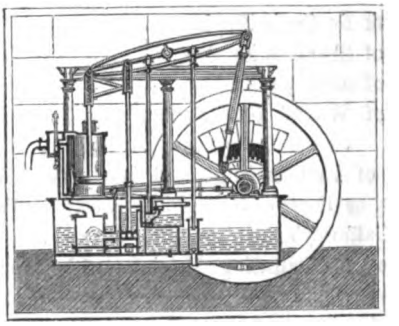
		Each. £ s. d.	£ s. d.
1795	**Working Model of De Cau's Engine**		4 4 0
1796	**Working Model of Branca's Engine**		6 6 0
1797	**Working Model of Savory's Engine**		7 10 0
1798	**Working Model of Watts' Low Pressure or Condensing Engine**		20 0 0
1799	**Working Models of various High and Low Pressure Steam Engines,** as Papin's, Newcomen's, Cartwright's, Hornblower's, Galloway's, &c.		
1800	**Working Models of Oscillating Engine,** with boiler and lamp attached (fig. 1800) 21/,	1 10 0	2 10 0
1801	Ditto ditto larger, on table stand	5 0 0	10 0 0
1802	**Working Model of a Four-Wheel Locomotive Steam Engine,** made to scale		25 0 0

Fig. 1803.



1803	**Working Model of a Six-Wheel Locomotive Steam Engine,** such as are now employed on most railroads (fig. 1803) made to scale	45 0 0
1804	**Model Railroads,** with chairs and rails, for the above .	
1805	**Models of Railway Trains,** consisting of tender, mail, first, second, and third-class carriages, luggage and cattle waggons, and trucks . . . . from	2 2 0
1806	**Small Working Model of Locomotive, with Circular Railway,** 3-ft in diameter	10 0 0
1807	**Working Model of a Marine Beam Engine,** with paddle-wheels, &c., as employed in most sea-going steamers . . . . . from	30 0 0
1808	**Working Model of Penn's Vibrating Engine.** These engines being simple and compact, are extensively employed in the Thames steam-boats . . from	20 0 0
1809	**Model Steam-Boats,** fitted with working engines and paddle-wheels, or screw propeller 10 0 0	15 0 0
1810	**Model of Perkins's Steam Gun,** for projecting bullets, with a strong boiler, generating steam at a pressure of 200-lbs. per square inch	10 0 0

FIG. 1812.



		Each. £ s. d.	Each. £ s. d.
1811	**Painted Wooden Sectional Models,** of high and low pressure engines and locomotives, of various constructions, showing the exterior of the engine, and the working of the parts, such as the cylinder, condenser, piston, valves, &c. . . . . from		6 6 0
1812	**Small Sectional Working Model of Condensing Engine,** made of cardboard and metal (fig. 1812) .		1 10 0
1813	**Sectional Diagrams and Plans of Steam Engine, &c.,** suited for lectures, various according to size . . .		
1814	**Working Models of Sawing, Rolling, or Grinding Mills, Cranes, Pile Driving Engines, Steam Hammers, Pumps, &c., &c.**		

GUN METAL FITTINGS FOR MARINE, LOCOMOTIVE, AND OTHER STEAM ENGINES AND BOILERS.

FIG. 1815.

FIG. 1816.

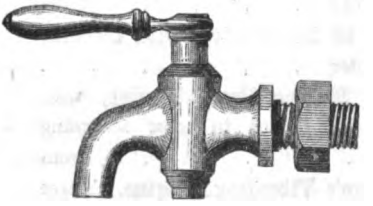
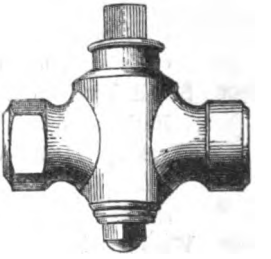


FIG. 1817.

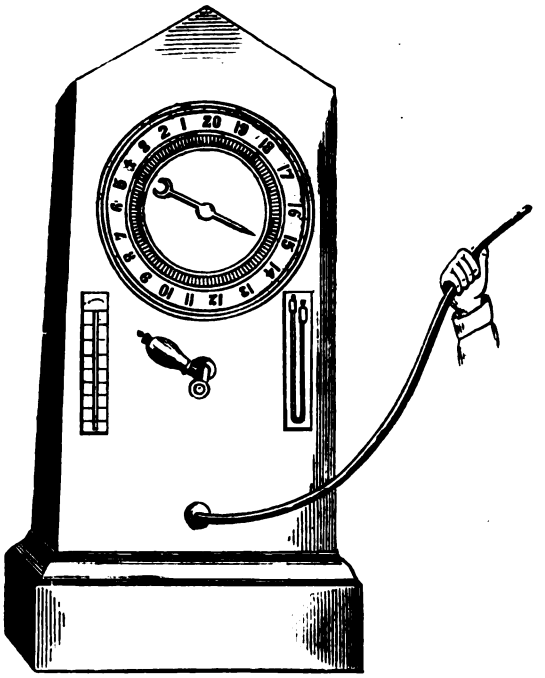


1815	**Steam Whistles,** in gun metal (fig. 1815) .	10/6, 21/,	1 15 0	2 5 0
1816	**Gauge Taps,** in gun metal (fig. 1816) . . .			
1817	**Steam Taps,** various sizes and patterns, with union joints, and inside or outside screws (fig. 1817) . . .			

Portable Steam Engines and Boilers, of any size, made and fitted up to order.

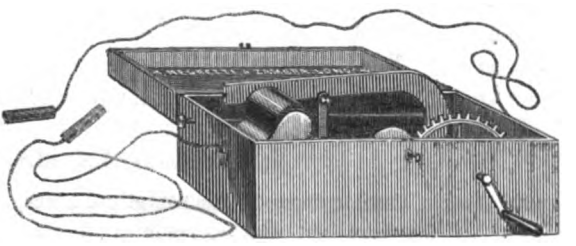
SURGICAL AND ACOUSTIC INSTRUMENTS, ETC.

FIG. 1818.*



		Each. £ s. d.	Each. £ s. d.
1818	**Hutchinson's Spirometer,** for measuring the vital capacity of the lungs		5 5 0
1818*	Ditto ditto improved (fig. 1818*)		7 7 0
1819	**Measuring and Weighing Machine,** for use with the Spirometer		8 0 0
1820	**Negretti & Zambra's Improved Magneto-Electric Machine** (fig. 1820), the most convenient and portable apparatus for administering medical galvanism; for description, see page 88, No. 982.		

FIG. 1820.



Enema Apparatus. Breast Pumps, Stomach Pumps, Injecting Apparatus. Cupping Instruments. Gas Inhalers, Respirators. Hearing Trumpets, Voice Conductors or Conversation Tubes. Gas Table Furnaces, and Enamelled Iron Evaporating Dishes, for Pharmaceutical purposes.

PHOTOGRAPHIC APPARATUS,

MANUFACTURED AND SOLD BY

H. NEGRETTI & ZAMBRA,

PHOTOGRAPHERS TO THE CRYSTAL PALACE COMPANY.

Messrs. Negretti and Zambra, in submitting the annexed Descriptive Catalogue of Cameras, Lenses, and General Apparatus for Photographic purposes, beg to state, that being extensively engaged as Photographers to the Crystal Palace Company, in taking portraits and views in that building, they are enabled, from their great practical experience, to supply such Apparatus as will really be of service to a Photographer; and as the greater part of the articles enumerated are made under their own immediate superintendence, and finished with all the most recent and really serviceable improvements, they will be found to work so as to present the least possible chance of failure, as far as the instruments are concerned.

Cameras, and other Photographic Cabinet work intended for use in India, or any hot climates, should be made of the very best seasoned Spanish mahogany, and clamped with brass, to ensure durability.

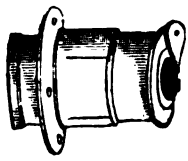
PHOTOGRAPHIC LENSES.

LANDSCAPE LENSES.

1821 **Single Achromatic Lenses,** of the best quality, mounted in brass, with rack and pinion adjustment, for taking views, copying inanimate objects, statues, prints, &c., where time is not important, but sharpness of detail absolutely necessary; **the chemical and optical rays perfectly coincident** (fig. 1821):—

	Size of Picture.	£	s.	d.
No. 1	6-in. by 5-in. . .	1	5	0
No. 2	7-in. by 6-in. . .	2	2	0
No. 3	9-in. by 7-in. . .	3	3	0
No. 4	10-in. by 8-in. . .	4	4	0
No. 5	12-in. by 10-in. . .	5	5	0
No. 6	16-in. by 12-in. . .	10	10	0

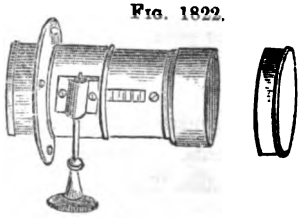
FIG. 1821.



PORTRAIT LENSES.

1822 **Double Combination of Achromatic Lenses,** of the very best quality, mounted in brass fittings, with rack-and-pinion adjustment; **the chemical and optical rays perfectly coincident;** the picture produced is distinct to the edges, and the time necessary for its production very short (fig. 1822):—

FIG. 1822.



		Each. £	s.	d.	Each. £	s.	d.
No. 1	4-in. by 3-in.				1	15	0
No. 2	5-in. by 4-in.				3	10	0
No. 3	8-in. by 6-in.	7	7	0	10	10	0
No. 4	10-in. by 8-in.				16	16	0

1823 **Stereoscopic Single Combination Lenses, for Views,** in brass mountings, with rack-work adjustment; to take pictures of the usual stereoscopic size . . per pair 2 10 0

1824 **Stereoscopic Double Combination Lenses, for Portraits or Views,** in brass mountings, with rack-work adjustment; to take usual size stereoscopic portraits, &c., per pair 3 10 0

Messrs. Negretti and Zambra, in quoting the prices of their Lenses, guarantee them to possess the essential qualities for producing perfect pictures—the chemical and optical rays perfectly coincident—flatness of field—rapidity of action. They will be found as moderate as possible in price. Negretti and Zambra distinctly state that they will not, on any account, supply these lenses of an inferior quality. A specimen photograph may be had from each lens, if required, without any extra charge.

VOIGTLANDER AND VIENNA LENSES.

1825 **German Double Combination of Achromatic Lenses,** mounted in brass with rack-work adjustment:—

	Diameter.	Focus.	Size of Picture.				With Central Stops.		
No. 1	1⅝-in.	5¾-in.	4-in. by 3-in. .	5	0	0	5	15	0
No. 2	2⅛-in.	7½-in.	6½-in. by 4¾-in. .	7	15	0	8	10	0
No. 3	3⅛-in.	11½-in.	8-in. by 6-in. .	14	14	0	15	15	0

Lenses of larger size at . £22, £28, £35, £45.

1826 **Voigtlander's Orthoscopic View Lenses:—**

	Focus.	Size of Picture.	Price complete.		
No. 1	11½-in.	8-in. to 10-in. . .	4	10	0
No. 2	15-in.	11-in. to 15-in. . .	6	10	0
No. 3	24-in.	15-in. to 21-in. . .	11	11	0
No. 4	32½-in.	21-in. to 26-in. . .	21	10	0
No. 5	40-in.	26-in. to 33-in. . .	21	10	0
No. 6	50-in.	33-in. to 42-in. . .	33	0	0

1827 **Voigtlander's Orthoscopic Lenses for Stereographs** . 3 10 0

1828 **French Double Combination Achromatic Lenses,** of common manufacture, not warranted:—

¼-plate, 20/. ½-plate, 45/. whole plate 5 10 0

CAMERAS.

Fig. 1829.

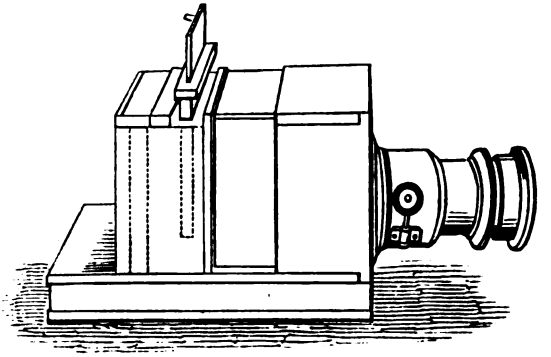
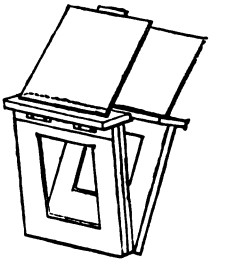


Fig. 1829.



1829 **Horizontal or Vertical Shifting Body Cameras,** one body sliding in the other; of French polished mahogany, with one single back and two frames for glass or plates, and focus glass (figs. 1829 and 1829*) :—

Size of Picture.	Each. £ s. d.	Each. £ s. d.
No. 1 4¼-in. by 3¼-in.		1 4 0
No. 2 5-in. by 4-in.		1 10 0
No. 3 6½-in. by 4¾-in.		1 18 0
No. 4 8-in. by 6-in.		3 6 0
No. 5 8½-in. by 6½-in.		3 15 0
No. 6 10-in. by 8-in.		4 15 0
No. 7 12-in. by 10-in.		6 5 0
No. 8 15-in. by 12-in.		8 10 0
No. 9 16-in. by 13-in.		9 15 0
No. 10 18-in. by 16-in.		14 5 0

Fig. 1829*.

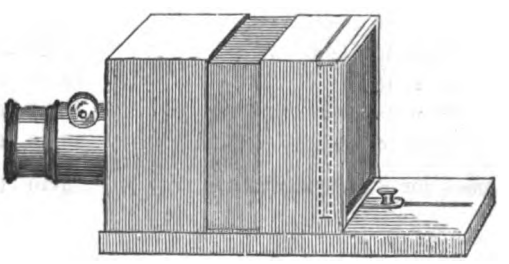
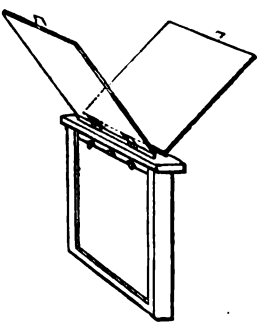


Fig. 1829*.

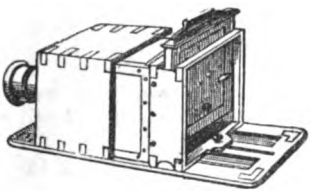


The Cameras from No. 4 have vertical and horizontal adjusting fronts.

Additional Openings to any of the above, from 5/ to 15/ extra.

1830 **Improved Shifting Body Cameras,** of superior manufacture, and the best polished mahogany, with one single back and two frames for collodion, focus glass, &c. The camera and backs with or without brass binding (fig. 1830) :—

FIG. 1830.



No.	Size of Picture.	With Brass Screwed Joints. Each. £	s.	d.	With Brass Binding. Each. £	s.	d.
1	5-in. by 4-in.	1	12	0	2	7	6
2	6½-in. by 4¾-in.	2	5	0	3	5	0
3	7-in. by 6-in.	2	15	0	4	0	0
4	8½-in. by 6½-in.	3	18	0	5	5	0
5	9-in. by 7-in.	4	10	0	5	15	0
6	10-in. by 8-in.	5	5	0	6	15	0
7	12-in. by 10-in.	7	5	0	9	10	0
8	15-in. by 12-in.	9	10	0	13	5	0
9	16-in. by 13-in.	11	15	0	14	15	0
10	18-in. by 16-in.	16	5	0	20	0	0

The Cameras from No. 4 have horizontal and vertical adjusting fronts.

Additional Openings in the Camera, from 5/ to 15/ extra.

Fine Screw or Rackwork Adjustment for focussing at back of camera, 18/ to 50/ additional.

1831 **Portrait Room Cameras,** with adjusting or swinging backs, for altering the angle at which the picture is taken, screw adjustment for correcting the focus, &c.; of various sizes made to order.

1831* **Copying Cameras,** for enlarging pictures, to order.

1832 **Microscopic Copying Cameras,** adapted to table microscopes.

1832* **Micro-Photograph Apparatus,** complete with achromatic lenses 6 6 0 10 10 0

FOLDING CAMERAS.

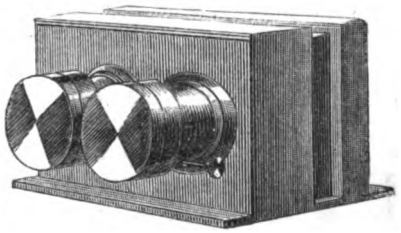
1833 **Negretti and Zambra's Sliding and Folding Camera,** adapted for either landscapes or portraits, and can be closed up into a most convenient and portable form for travelling. They are made of the best well seasoned mahogany, French polished, with a horizontal and vertical sliding front, for adjusting the foreground and sky, one double back for paper, and one single ditto with two frames for collodion and focus-glass :—

	Size of Picture.	£	s.	d.	With Brass Binding. £	s.	d.
No. 1	7-in. by 6-in.	4	10	0	5	15	0
No. 2	9-in. by 7-in.	5	10	0	6	17	6
No. 3	10-in. by 8-in.	6	15	0	8	5	0
No. 4	12-in. by 10-in.	9	0	0	10	15	0
No. 5	15-in. by 12-in.	12	15	0	15	0	0
No. 6	16-in. by 13-in.	14	5	0	16	10	0
No. 7	18-in. by 16-in.	19	0	0	22	0	0
No. 8	22-in. by 20-in.	22	0	0	25	10	0

Fine rack-work adjustment to the above, to enable the operator to focus at the back of the Camera, from 18/ to 50/ extra.

STEREOSCOPIC CAMERAS.

FIG. 1835.



		Each. £ s. d.	Each. £ s. d.
1834	**Stereoscopic Camera,** arranged on parallel laths and base board, L. Clark's arrangement . . . from		2 15 0
1835	**Stereoscopic Cameras,** arranged for two lenses, to take both pictures at the same instant; with adjustment to alter the width between the lenses (fig. 1835) from		2 15 0

CAMERA SLIDES AND PLATE FRAMES.

1836 **Double Backs or Dark Slides for the Camera,** to hold two sheets of sensitive paper, of superior construction :—

Pictures, inches—7 by 6	8½ by 6½	9 by 7	10 by 8	12 by 10	15 by 12	16 by 13	18 by 16	22 by 20
1/1/0	1/3/0	1/4/0	1/6/0	1/15/0	2/10/0	2/15/0	3/0/0	3/10/0

1837 **Single Backs, or Dark Slides for the Camera,** with frames for two sizes of of glass or metal plates:—

Pictures, inches—7 by 6	8½ by 6½	9 by 7	10 by 8	12 by 10	15 by 12	16 by 13	18 by 16	22 by 20
18/0	1/0/0	1/1/0	1/3/0	1/8/0	1/15/0	1/18/0	2/5/0	2/15/0

1838 **Double and Single Backs, or Dark Slides,** with brass bindings extra—

4/ 4/6 5/ 5/6 6/ 6/6 7/

1839 **Dark Slides for Stereoscopic Cameras,** 12/6.

1840 Ditto ditto **brass-bound,** for India, 17/.

1841 **Mahogany Frames,** with silver corners for holding glass or metal plates in double or single camera slides.

	OUTSIDE SIZE OF FRAMES.								
Inches	5 by 4 and under.	6 by 5 and 7 by 6	8½ by 6½ and 10 by 8	11 by 9 and 12 by 10	15 by 12 and 16 by 15	18 by 16	22 by 20	24 by 22	26 by 24
	1/3	1/6	2/0	2/6	3/6	4/6	5/0	5/6	6/0

1842 **Negretti and Zambra's Improved Dark Box.**
For holding prepared plates, enabling the operator to change them in the open air, without exposure to light; adapted to stereoscopic and every description of camera.

1843	**Dark Box and Back for Stereoscopic Camera** . .			3 0 0
1844	Ditto ditto	for pictures 9-in. by 7-in. . .		3 15 0
1845	Ditto ditto	„ 10-in. by 8-in. . .		4 10 0
1846	Ditto ditto	„ 12-in. by 10-in. . .		5 10 0

CAMERA STANDS.

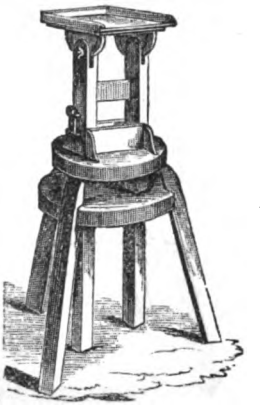
For the out-door practice of Photography, a perfectly firm and portable Camera Stand is essential. The following description and prices of Camera Stands are for those forms which have been found in practice the best.

FIG. 1852.

FIG. 1849.

FIG. 1848.

FIG. 1855.



		Each. £	s.	d.	Each. £	s.	d.
1847	**Small Tripod Camera Stand,** of ash, with mahogany top				0	7	6
1848	Ditto ditto with circular brass top (fig. 1848) .				0	14	0
1849	Ditto ditto with brass triangle top (fig. 1849) .				0	18	6
1850	Ditto ditto stouter with ditto				1	1	0
1851	Ditto ditto very strong of superior construction .				1	10	0
1852	**Ash Tripod Camera Stand,** with jointed legs, best make (fig. 1852)				1	12	0
1853	Ditto ditto with triangular top of mahogany, adapted for the support of large cameras				2	10	0
1854	**Table Stand,** with adjustments . . . . . from				1	10	0
1855	**Large Camera Stands,** with rack-and-pinion adjustment, and handsome brass mountings, suited for in-door use, with every adjustment for portraiture (fig. 1855) from £5,	8	0	0	10	0	0

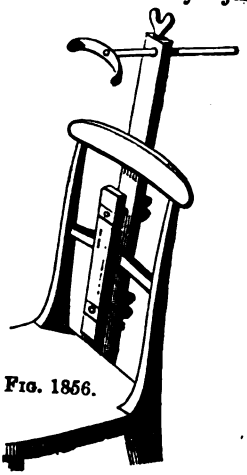


FIG. 1856.

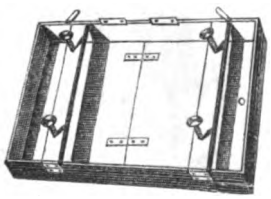
HEAD RESTS.

1856	**Head Rests,** to attach to the back of a chair, for steadying the head whilst taking portraits, common form				0	3	6
1857	**Head Rest,** of superior manufacture (fig. 1856) . .	0	7	6	0	9	6
1858	**Improved Head Rest,** of mahogany, French polished, with brass mountings, of the very best make	0	18	0	1	1	0
1859	**Standard Head Rest,** mounted on massive iron foot, with adjusting tube, &c., suited for professional purposes . .	2	2	0	3	10	0

PRESSURE FRAMES.

1860 **Pressure or Copying Frames,** adapted for producing positive pictures from paper or glass negatives. The back board is hinged, to allow the progress of the picture to be examined without disturbing the negative (fig. 1860):—

FIG. 1860.



To copy Pictures.	Each. In oak. £ s. d.	Each. In mahogany. £ s. d.
7-in. by 6-in.	0 9 6	0 11 0
9-in. by 7-in.	0 10 6	0 12 6
10-in. by 8-in.	0 12 0	0 14 6
11-in. by 9-in.	0 13 6	0 16 0
12-in. by 10-in.	0 15 0	0 18 0
13-in. by 11-in.	0 17 0	1 0 0
14-in. by 12-in.	0 19 0	1 3 0
16-in. by 13-in.	1 2 0	1 8 0
19-in. by 17-in.	1 6 0	1 14 0
23-in. by 21-in.	1 12 0	2 0 0
25-in. by 23-in	2 0 0	2 10 0
27-in. by 25-in.	2 10 0	3 0 0

1861 **Stereoscopic Size Copying Frames** 0 7 6 0 10 6

PORTABLE TENTS.

Portable Tents to enable the photographer to construct temporarily a photographic dark room, in a field or road, &c.

1862 **Portable Tent,** consisting of a light wood frame, forming when put together, the skeleton of a triangular pyramid, about seven feet high, with table. Covered with black calico, lined with yellow 3 10 0

1863 Ditto, covered with yellow water-proof cloth . . . 4 10 0

1864 **Large Portable Tent,** superior make, with jointed legs, covered with black calico, lined with yellow . . . 6 0 0

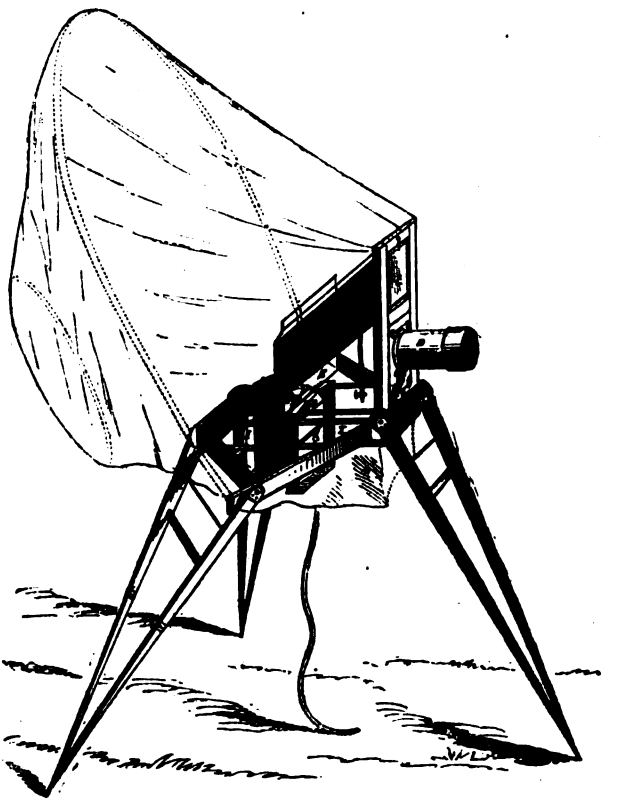
1865 Ditto, with yellow water-proof covering, lined with black 7 10 0

1866 **Black Water-proof Case** to contain the tents . . . 1 15 0

MOGINIE'S PHOTOGRAPHIC CAMERA AND DARK TENT COMBINED,

Registered June 14th, 1859

For full particulars, vide "The Photographic Journal," July 1, 1859, pp. 160 and 161.



The above apparatus is constructed to enable photographers to work the wet collodion process in the open air, without requiring a darkened room. It differs from the usual apparatus employed for the purpose, inasmuch as the whole of the process is conducted in one enclosed space, instead of using a camera and tent, thus reducing the bulk of a travelling apparatus at least one-half, and dispensing altogether with one tripod stand. When erected, the working space measures 3-ft. by 2-ft. 6-in. by 3-ft. in height. When packed for travelling, there are two cases, each measuring 15-in. in length, 4-in. in width, and 9-in. in depth. Pictures can be taken with combination, single, or stereoscopic lenses of any range of focus, from 3-in. to 17-in., by altering the position of the frame B, in the open space I. The lens D can be placed in four different positions by moving the front G, and the plate holder B is provided with the necessary adjustments for focussing. Frames and shutters are not required, thus avoid-

ing many difficulties often experienced by photographers, such for instance as finding the plates too large or too small for the inner carriers. The cistern F contains water sufficient to wash a dozen plates. The glass E is held in its place by a strong spring, while focussing with the fine screw H; the prepared plate occupying exactly the same position when the ground glass is removed, must of necessity be in perfect focus. The bath A contains the nitrate of silver solution. Light and ventilation are obtained from the window C. This apparatus is the most portable yet offered to tourists, and particularly adapted for travelling. The advantages of this apparatus are :—The plate is coated, excited, exposed, developed, washed, and fixed, in any place where the apparatus can be set up.

The price of the whole apparatus, complete with every requisite, including lens, chemicals, &c., and tripod stand, varies from 10 to 15 guineas, according to the size of the plate it is constructed to work with. Full instructions sent with each apparatus.

EXCITING BATHS FOR COLLODION PROCESS.

FIG. 1867.

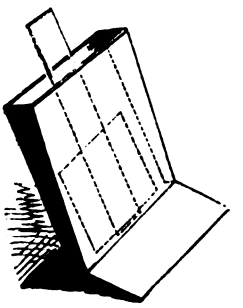
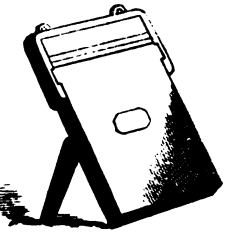


FIG. 1867*.

FIG. 1868.



1867 **Plain Exciting Baths,** of the best manufacture :—

For Plates.	Gutta Percha. (FIGS. 1867 and 1867*.)	Glass. Each. £ s. d.	Porcelain. Each. £ s. d.
4-in. by 3-in. . . .	2/3	0 2 6	0 2 3
5-in. by 4-in. . . .	2/9	0 2 6	0 3 0
6-in. by 5-in. . . .	4/6	0 4 0	0 3 6
8½-in. by 6½-in. . . .	6/9	0 11 6	0 4 6
10-in. by 8-in. . . .	8/3	0 14 6	0 10 0
12-in. by 10-in. . . .	9/6		
15-in. by 12-in. . . .	14/6		

1868 **Exciting Bath,** with water-tight cover, of the best manufacture :—

For Glass Plates.	Gutta Percha.	Gutta Percha or Glass, in mahogany case, FIG. 1868. Each. £ s. d.	Brass screwed case. £ s. d.
4-in. by 3-in. . . .	7/	0 10 6	0 14 6
5-in. by 4-in. . . .	/6	0 11 6	0 16 0

Exciting Baths—

6-in. by 5-in.	. . .	10/6	0	13	6	1	0 0
8½-in. by 6½-in.	. . .	13/	0	18	6	1	6 0
10-in. by 8-in.	. . .	15/	1	5	6	1	10 0
12-in. by 10-in.	. . .	17/6	1	16	0	2	0 0
15-in. by 12-in.	. . .	23/6	2	2	0	2	10 0

1869 **Gutta Percha Dippers** . . . . . /6, /8, 0 1 0 0 1 6

1870 **Glass ditto** . . . . . /8, 10/, 0 1 0 0 1 6

LEVELLING OR DEVELOPING STANDS.

Fig. 1871.

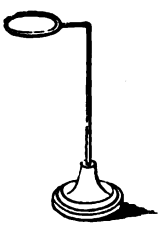


Fig. 1873.

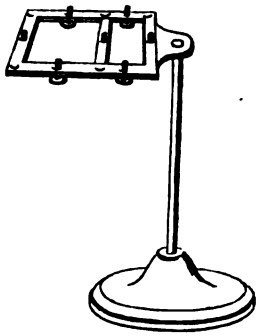
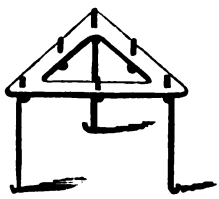


Fig. 1874.



1871 **Plain Fixing Stand** (fig. 1871) 0 2 6

1872 Ditto ditto with adjusting screws 0 5 6

1873 **Developing or Fixing Stand** (fig. 1873), to take all sizes of plates 0 10 6

1874 **Developing or Fixing Stand, Triangular Form** (fig. 1874):—

¼-plate.	½-plate.	Whole plate.
3/6	5/6	7/6 and 10/6.

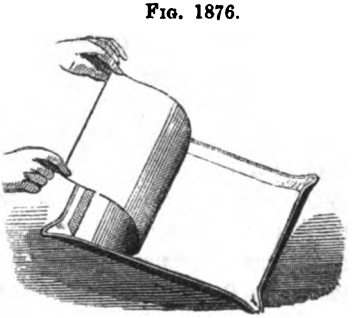
1875 **Glass Levelling Stand, Triangular Form** . . . 0 2 0

WASHING AND EXCITING DISHES.

1876 **Porcelain Dishes,** with perfectly flat bottoms, for preparing photographic papers, manufactured of the finest porcelain, very carefully glazed (fig. 1876):—

Size.	Price.
5-in. by 4-in. . .	/10
6½-in. by 4½-in. . .	1/
7-in. by 5-in. . .	1/4
8-in. by 6-in. . .	1/6
10-in. by 8-in. . .	1/9
12-in. by 10-in. . .	3/
14-in. by 12-in. . .	5/6
16-in. by 14-in. . .	6/6
17-in. by 13-in. . .	7/6
19-in. by 15-in. . .	10/6

Fig. 1876.



1877 **Porcelain Dishes,** deep, suited for washing papers, &c.:—

Size	3-in. by 4-in.	9-in. by 7-in.	12-in. by 10-in.	15-in. by 9-in.
Price	1/.	2/.	5/6.	8/.

1878 **Glass Dishes,** with ground and polished bottoms, for exciting photographic papers, &c.:—

Size	7½-in. by 5½-in.	9½-in. by 7½-in.	10½-in. by 8½-in.	2½-in. by 10½-in.
Price	5/ to 6/	8/ to 11/	12/6 to 16/	16/ to 21/

		£	s.	d. (Each.)	£	s.	d. (Each.)
1879	**Gutta Percha Washing Trays,** with turned over edges, in sets of four . . . . . per set	0	16	0	1	1	0
1880	Ditto ditto made of sheet gutta percha, set of three, smallest size, 10-in. by 8-in.				0	12	0
1881	**Gutta Percha Trays,** 8-in. by 6-in.				0	2	0
1882	Ditto ditto 9½-in. by 7½-in.				0	2	9
1883	**Gutta Percha Trays,** made of sheet, to any size required						
1884	**Plate Glass Slabs,** various sizes . . . 1/, 2/,	0	3	0	0	5	0
1885	**Glass Graduated Measures,** cylindrical form, shewing ounces and drachms:—						

1-oz.	2-oz.	4-oz.	6-oz.	10-oz.	20-oz.
1/2	1/4	2/	2/3	3/	4/6

1886 **Glass Graduated Measures,** conical form:—

1-oz.	2-oz.	4-oz.	6-oz.	10-oz.	20-oz.
1/3	1/4	2/	2/3	3/6	5/

1887	**One or Two-drachm Graduated Measures** . . .				0	1	0
1888	**Glass Funnels:**—						

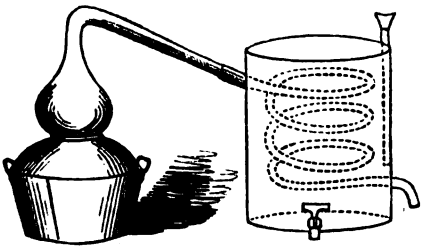
Diameter.—1¼-in.	1½-in.	2-in.	2½-in.	3-in.	4-in.	5-in.	6-in.
/3	/3	/4	/5	/6	/8	1/	1/6

1889	**Glass Rod,** for applying solutions to paper, &c. . .				0	1	0
1890	**Pipettes, or Dropping Tubes**	0	0	3	0	0	6
1891	**Glass Stirring Rods**	0	0	2	0	0	3
1892	**Bottles, white glass,** best London stoppered, per doz.:—						

Contents.—1oz.	2-oz.	3-oz.	4-oz.	6-oz.	8-oz.	1 pint.
5/	7/	8/	8/6	9/6	10/6	15/

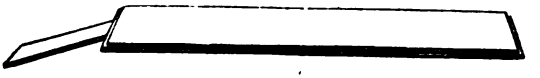
1893	Ditto, **yellow glass,** various						
1894	**Glass Spirit Lamps** 1/6, 2/,	0	2	6	0	5	6
1895	**Dark Lanterns,** with yellow glass shade	0	5	0	0	12	0
1896	**Oil Lamp,** plain, with ditto				0	3	6
1897	**Argentometer,** for testing nitrate of silver solution .				0	2	6
1898	**Portable Still,** with worm and tub, for the distillation of water on common fire . . . . . ½ gallon				0	17	6
1899	Ditto ditto (fig. 1899) . . . . . 1 gallon				1	1	0
1900	Ditto ditto best make . . . . . „				1	5	0
1901	Ditto ditto best make . . . . . 2 gallons				2	0	0
1902	Ditto ditto copper	1	10	0	2	2	0
1903	**One Quart Stoneware Filter**				0	10	6

FIG. 1899.



		Each. £	s.	d.	Each. £	s.	d.
1904	**Half-Gallon Stone Barrel,** with tap, for holding distilled water	0	6	0	0	10	6
1905	**Polishing Buffs,** for glass or metal plates	0	2	0	0	3	6
1906	Ditto ditto with handle (fig. 1906)	0	5	0	0	7	6

FIG. 1906.



1907	**Pneumatic Plate Holders**	0	3	6	0	5	6
1908	**Focussing Glasses,** for adjusting the focus screen of cameras	0	10	0	0	14	0
1909	**Focussing Glass,** in plain tin mounting				0	2	6
1910	**Horn Forceps,** for manipulating with photographic paper				0	1	3
1911	**Improved Camel's Hair Brushes,** prepared expressly for photographic purposes, round				0	1	0
1912	Ditto ditto flat				0	1	6
1913	Ditto ditto larger sizes	0	2	6	0	3	6
1914	**Buckle's Cotton Wool Brush,** with silver wire				0	2	6
1915	**Scales and Weights,** common 2/6, 3/6,	0	4	6	0	7	6
1916	Ditto ditto best make, with glass pans	0	6	6	0	12	0
1917	**Stewart's Apparatus for preparing Paper in Vacuo**	1	1	0	1	10	0
1918	**Collodion Bottles**	0	1	6	0	3	0
1919	Ditto ditto, graduated	0	2	0	0	4	0
1920	**Pouring Glasses,** for developing solutions				0	4	0

Glass Retorts, Receivers, Flasks, Mortars and Pestles, Retort Stands, and other Chemical Apparatus, see Chemical Section of Catalogue, page 40 to 72.

PLATE BOXES.

FIG. 1921.

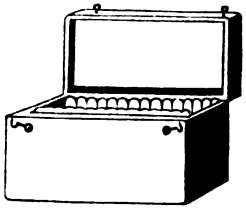
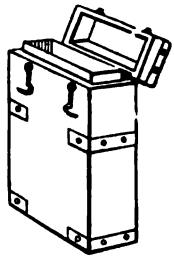


FIG. 1923.



1921 **Boxes,** to hold one or two dozen glass or silver plates, in white wood or mahogany (fig. 1921) :—

Size of Plate.	White Wood. 1 dozen.	White Wood. 2 dozen.	Mahogany, polished. 1 dozen.	Mahogany, polished. 2 dozen.
	£ s. d.	£ s. d.	£ s. d.	£ s. d.
3¼-in. by 2¾-in. .	0 1 6	0 2 9	0 3 0	0 4 0
4¼-in. 3¼-in. .	0 2 3	0 3 3	0 3 6	0 4 6
5-in. 4-in. .	0 2 9	0 3 6	0 3 9	0 4 6
6½-in. 4¾-in. .	0 3 3	0 4 0	0 4 3	0 5 0
8½-in. 6½-in. .	0 4 0	0 5 0	0 5 0	0 6 0
10-in. 8-in. .	0 4 9	0 6 0	0 6 6	0 8 0
12-in. 10-in. .	0 6 3	0 7 9	0 8 6	0 11 0
15-in. 12-in. .	0 8 0	0 11 0	0 13 0	0 16 0
1921* **Plate Boxes,** Stereoscopic size	0 3 0	0 4 0	0 6 0	0 7 0

		Each.	Each.
		£ s. d.	£ s. d.
1922	**Locks and Brass Handles** to the above . extra, from	0 2 0	0 4 0
1923	**Brass-screwed for India** (fig. 1923) . „ „	0 1 0	0 5 0
1924	**Leather Sling Cases for Lenses —**		
	For a lens 2-in. diameter		0 10 0
	„ 3-in. „		0 13 0
	„ 4-in. „		0 16 0

SOLID LEATHER CASES, FOR FOLDING CAMERAS.

1925 **Stout Leather Case with Straps,** for holding cameras and backs for travelling :—

Camera, 7-in. by 6-in.	9-in. by 7-in.	10-in. by 8-in.	11-in. by 9-in.	12-in. by 10-in.	15-in. by 12-in.
£1 10 0	£1 14 0	£1 16 0	£2 4 0	£2 12 0	£3 15 0

1926 **Stained Wood Boxes,** with fittings, for folding cameras, with lock and key, handles, &c. :—

For a Camera, 7-in. by 6-in.	9-in. by 7-in.	10-in. by 8-in.	12-in. by 10-in.	15-in. by 12 in.
12/	14/	17/	20/	25/

1927 **Stained Wood Boxes,** for shifting body cameras, various, according to size.

PHOTOGRAPHIC GLASS.

	Polished Flated Crown.	Colourless Sheet Glass.	Patent Plate.	Purple Polished Sheet.	Opal Glass.	Purple Plate.	Colourless Patent Plate.
	s. d.	s. d.	s. d.	s. d.	s. d.	s. d.	s. d.
2½-in. by 2-in.	3 0	3 6	8 0	4 6	13 6	9 6	15 0
3¼-in. by 2¾-in.	5 0	6 0	13 8	8 0	24 0	17 6	27 0
4¼-in. by 3¼-in.	7 0	9 6	21 0	12 6	37 0	26 6	41 6
5-in. by 4-in.	10 0	13 6	30 0	18 0	53 6	38 6	60 0
6½-in. by 4¾-in.	16 0	21 0	47 0	31 0	60 0	58 6	98 0
8½-in. by 6½-in.	27 6	37 0	85 0	55 0	87 6	106 0	175 0
Stereoscopic size—							
6¾-in. by 3¼-in.	10 0	14 0	35 0	26 6	156 0	42 0	98 0

Per gross.

VIGNETTE PLATES.

PORTRAIT AND LANDSCAPE VIGNETTES.

Inches.	Each.	Inches.	Each.
2½-in. by 2-in.	1/0	9-in. by 7-in.	3/4
3¼-in. by 2¾-in.	1/4	10-in. by 8-in.	4/0
4¼-in. by 3¼-in.	1/8	12-in. by 10-in.	4/8
5-in. by 4-in.	2/0	14-in. by 10-in.	5/8
6½-in. by 4¾-in.	2/4	18-in. by 12-in.	8/8
8½-in. by 6½-in.	2/8		

POSITIVE VIGNETTES.

Inches.	Each.	Inches.	Each.
2½-in. by 2-in.	3/4	9-in. by 7-in.	6/4
3¼-in. by 2¾-in.	4/0	10-in. by 8-in.	6/8
4¼-in. by 3¼-in.	4/8	12-in. by 10-in.	7/4
5-in. by 4-in.	5/0	14-in. by 10-in.	8/8
6½-in. by 4¾-in.	5/8	18-in. by 12-in.	10/8
8½-in. by 6½-in.	6/0		

Reverse of the Portrait and Landscape Vignettes.

1928 **Stereoscopic Vignettes**, 2/4 each.

These Plates (the halo of which is permanently burnt into the body of the glass,) are manufactured for the purpose of producing the Vignette style of printing, adapted to every description of pressure frame.

MODE OF USING THE VIGNETTES: Fasten the vignette with gum paper on a piece of card-board, having an opening cut in it a quarter of an inch smaller than the vignetting glass; then place the card-board outside the plate glass of the copying frame, *i.e.*, between the plate glass and frame. By this plan breakage is avoided, and additional softness given to the picture.

1929 **Tinted Glass**, for photographic rooms

1930 **Finely worked, or Greyed Focus Glasses**, of various dimensions, at same prices as above.

PHOTOGRAPHIC COLOURS.

1931 **Photographic Colours**, very finely ground and prepared on an entirely new principle, possessing qualities which render them of the greatest importance to photographers; they adhere firmly to pictures on glass, paper, or silver plate, without preparation :—

Photographic Colours—

Carmine.	Complexion, No. 1, 2, 3	Yellow, No 1, 2, 3 & 4.	White.
Crimson.	Pink, No. 1 and 2.	Orange.	Aerial White.
Scarlet.	Claret.	Horizon.	Military Red, 1 and 2
Red for Lips.	Blue, No. 1, 2, 3 and 4.	Green, No. 1, 2, 3 & 4.	Solarization.
Carnation.	Violet.	Grey, No. 1, 2 and 3.	
Deep Rose.	Purple.	Brown, No. 1, 2 and 3.	In Bottles, 9d. each.

PHOTOGRAPHIC COLOUR BOXES FITTED.

		Each. £ s. d.	Each. £ s. d.
1932	**Mahogany French Polished Caddy Lid Box,** fitted with brushes, gold and silver saucers, and 12 colours . .		0 15 0
1933	Ditto ditto and 18 colours		1 1 0
1934	Ditto ditto „ 24 „		1 5 0
1935	Ditto ditto „ 36 „		1 15 0

PHOTOGRAPHIC BRUSHES, &c.

1936	**Camel Hair,** in quills, 4 sizes, on stick . . per doz.		0 1 6
1937	**Sable Hair,** in tins, 2 sizes . . . . „		0 0 9
1938	**Camel Hair Dusting Brushes** . . . „		0 1 0
1939	**Gold Saucers** (large and small)	0 1 0	0 0 6
1940	**Gold Shells** (large and small)	0 0 9	0 0 6
1941	**Silver Saucers,** (large and small)	0 0	0 0 4
1942	**Silver Shells** (large)		0 0 6
1943	**Second Quality Photographic Colours,** at 15 per cent. less in price.		
1944	**Prepared Gold Beaters' Skin,** for mounting pictures in frames . . . . . per doz. sheets		0 3 0
1945	**Gummed Paper** . . . . . per quire .		0 2 0
1946	**Black Paper** . . . . . „ .		0 2 0

PHOTOGRAPHIC PAPER.

PLAIN AND PREPARED.

		Per Quire.	Per Quire.
1947	**Whatman's Negative,** large, 19-in. by 15¼-in. . .		0 3 0
1948	**Whatman's Positive,** ditto „ „	0 4 0	0 3 0
1949	**Turner's Negative,** 19-in. by 15-in.		0 6 0
1950	Ditto ditto large, 24-in. by 19-in . . .		0 10 0
1951	**Turner's Positive**		0 3 0
1952	**Canson Frere's Positive,** selected, 22-in. by 17½-in .		0 4 6
1953	**Canson Frere's Negative** „ „ .		0 3 6

		per Quire. £ s. d.	per Quire. £ s. d.
1954	**Papier Saxe,** Positive, 23-in. by 18-in.		0 4 6
1955	Ditto ditto Negative		0 3 6
1956	**Best Stout White-wove Bibulous Paper** . . .		0 2 0
1956*	**Common** ditto ditto		0 1 0
1956**	**Best Pink** ditto ditto		0 1 6
1957	**Papier Joseph**		0 1 0
1958	**Swedish Filter Paper**		0 4 0
1959	**Negretti and Zambra's superior Albumenized Paper,** 22-in. by 18-in.		0 10 0
1960	**Waxed, Iodized, and other Sensitive Papers,** for negative and positive pictures, according to size . .		

MOROCCO LEATHER CASES AND TRAYS, GILT MATS, &c.

FIG. 1961.

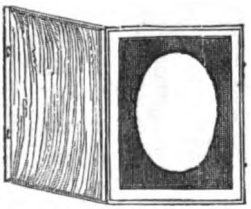


FIG. 1962.

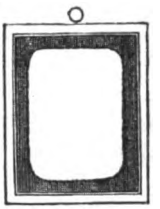


FIG. 1961.*

1961 **Morocco Leather Cases,** best quality, lined with silk velvet, fitted with gilt mats, and best edged glasses (figs. 1961 and 1961*) .—

	Per doz. £ s. d.	Common make. Per doz. £ s. d.
2½-in. by 2-in.	0 9 0	0 3 0
3¼-in. by 2¾-in.	0 12 0	0 5 0
4-in. by 3-in.	0 18 0	0 7 6
4¼-in. by 3¼-in.	1 1 0	0 8 0
5-in. by 4-in.	1 10 0	0 14 0
6½-in. by 4¾-in.	2 3 0	1 5 0

1962 **Morocco Frames or Trays,** best quality, with suspension ring, mats and glasses, for plates (fig. 1962) :—

2½-in. by 2-in.	0 3 0	0 2 0
3¼-in. by 2¾-in.	0 4 0	0 3 0
4-in. by 3-in.	0 4 6	0 4 6
4¼-in. by 3¼-in.	0 5 0	0 6 0
5-in. by 4-in.	0 7 0	0 7 0
6½-in. by 4¾-in.	0 11 0	0 10 6

1963 **Gilt Metal Mats**, either square, oval, cushion, or dome form :—

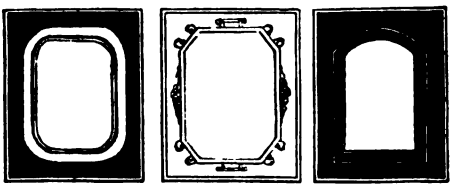
Outside measurement.	Per doz. £ s. d.	Best chased. Per doz £ s. d.
2½-in. by 2-in.	0 0 6	0 0 7
3¼-in. by 2¾-in.	0 0 7	0 0 9
4-in. by 3 in.	0 0 9	0 1 0
4¼-in. by 3¼-in.	0 0 10	0 1 2
5-in. by 4-in.	0 1 10	0 2 8

1964 **Embossed German Gilt Mats** . . . 2/6, 0 5 0 0 7 0

PASSE PARTOUT OR SKELETON FRAMES.

TO CONTAIN PORTRAITS AND VIEWS, ETC.

FIG. 1966. FIG. 1972. FIG. 1966*.



1966 **Passe Partout, common manufacture**, black, chocolate, or white grounds, with gold bevil and line, all shapes (fig. 1966) :—

Size—Inches—2½ by 2.	3½ by 2¾.	4½ by 3¼.	5 by 4.	6½ by 4¾.	8½ by 6¼.
Price, per doz. 1/6	2/	2/6	4/6	6/6	11/

1967 Ditto ditto **with superior quality** of glass and gold bevil (fig. 1966*) . per doz., 2/9, 3/3, 3/9, 6/, 0 8 3 0 15 6

1968 Ditto ditto with best cardboard and gold bevil, extra large margins . per doz., 7/, 8/6, 10/, 12/, 1 0 0 1 7 0

1969 Ditto ditto white cardboard, bevelled, and rough ground, same prices as above . . . .

1970 Ditto ditto all gold . . . 5/, 6/, 7/, 11/, 0 16 0 1 8 0

1971 Ditto ditto stereoscopic size . . per doz., 6/, 0 8 0 0 12 0

1972 **A great variety of Passe Partout**, of all sizes, with arabesque fancy ornaments, on buff, chocolate, black or white grounds, prices various (fig. 1972) . . .

1973 **Gutta Percha and Composition Frames**, to contain the Passe Partout when mounted 1/, 0 1 6 0 2 0

1974 **Card Mounts**, for stereoscopic pictures, with gold border, per sheet 0 1 6

1975 **Composition, Gilt and Papier Mache Miniature Frames**, with oval or square sights, various patterns, sizes and prices . . . . . .

		Each. £	s.	d.	Each. £	s.	d.
1976	**Preservers** . . . . . per doz., /6, /8,	0	1	0	0	1	8
1977	Ditto American . . . . per doz., /8, /9, 1/6,	0	2	2	0	2	9
1978	Ditto patent, with mat, ring, and black varnished back, to save varnishing the picture . . per doz.	0	1	3	0	3	6
1979	**Portrait Show Frames,** with various openings . .						
1980	**Solid Gold Lockets and Brooches, for Portraits,** with mats and glasses 10/6,	1	1	0	2	2	0
1981	**Plated** ditto ditto 2/, 3/,	0	5	0	0	10	6
1982	**Mica,** for mounting above, size, 2½-in. by 2-in. per doz.				0	3	6

PURE CHEMICALS.

PREPARED EXPRESSLY FOR PHOTOGRAPHIC PROCESSES ON PAPER AND GLASS.

		Per oz.			Per oz.		
1983	**Acid Acetic,** crystallisable or glacial for paper process .				0	1	0
1984	„ „ ordinary, for collodion ditto . .				0	0	6
1985	„ **Gallic,** pure				0	1	6
1985*	„ **Citric**				0	0	6
1986	„ **Pyro Gallic** . . . . . per drachm, 1/				0	7	0
1987	„ **Formic Solution**				0	0	4
1988	„ **Nitric,** pure				0	0	2
1989	„ **Nitro Muriatic**				0	0	4
1990	„ **Sulphuric,** pure				0	0	2
1991	**Ammonia Solution**	0	0	2	0	0	3
1992	„ **Hydrochlorate,** pure, and free from iron .				0	0	6
1993	**Ammonium Bromide**				0	3	0
1994	„ **Iodide**				0	3	6
1995	**Barium Hydrochlorate**				0	0	6
1996	„ **Nitrate**				0	0	2
1996*	**Benzine**				0	0	4
1997	**Collodion, Negative,** Negretti and Zambra's . . .				0	0	9
1998	„ **Positive**				0	0	6
	The Iodizing Preparation for above, can be had separately for export.						
1999	**Best Rectified Æther**				0	0	6
2000	Ditto ditto washed				0	0	9
2001	**Chloroform**				0	0	9
2002	**Iron Protosulphate,** pure				0	0	2
2003	**Iodine,** re-sublimed				0	2	0
2003*	**Bromine**				0	2	6
2004	**Potassium Bromide** pure				0	3	0
2005	„ **Cyanide** „				0	0	6
2006	„ **Iodide** „				0	2	0
2007	„ **Fluoride** „				0	2	0
2008	**Gold Chloride Crystals,** pure . . per 15 grains				0	2	9

		Per oz. £ s. d.	Per oz. £ s. d.
2009	**Sel d'Or,** Fordos et Gelis . . . . . per bottle		0 3 0
2010	**Mercury** . . . . . per lb.		0 3 0
2011	**Silver Nitrate,** pure, crystallised		0 4 0
2012	„ „ fused, perfectly pure		0 5 0
2013	**Soda Hyposulphate,** pure . . . per lb., /9		0 0 1
2014	**Sodium Chloride,** pure		0 0 6
2015	**Prepared Cotton Wool** . . . . . per lb.		0 2 6
2016	**Sugar of Milk**		0 0 3
2017	**Perfectly Pure Animal Charcoal**		0 0 8
2018	**Virgin Wax** . . . . . per lb.		0 3 0
2019	**Tripoli**		0 0 6
2020	**Naptha,** rectified, for burning . . . . per pint		0 2 0
2021	**Distilled Water,** pure . . . . per gallon		0 1 0
2022	**Varnish for Collodion Pictures** . . per bottle		0 1 0
2023	**Amber Varnish,** for ditto . . . „	0 1 6	0 2 6
2024	**Black Varnish,** for backing ditto . . „		0 1 0
2025	**Polishing Liquid,** for cleaning glass plates „	0 0 6	0 1 0
2026	**Cyanogen Paste,** for removing nitrate of silver stains, per pot		0 1 0

These prices are subject to constant variation.

All other chemical tests and re-agents, at current market prices.

DAGUERREOTYPE APPARATUS.

The Daguerreotype process upon the silver plate having been almost superseded by the collodion and paper processes, Messrs. Negretti and Zambra have determined not to detail or quote prices for this branch of photography; but having had a long practical experience in the daguerreotype process, they can supply apparatus, &c. connected with this art, of the most perfect and improved manufacture.

Daguerreotype Cameras.
Parallel Mirrors.
Iodising and Bromine Apparatus.
Mercury Boxes.
Thermometers for ditto.
Polishing Buffs and Apparatus.
Plate Holders, metal and wood.
Plate Benders and Cutters.
Electro-Silvering Apparatus.
Washing and Gilding ditto.
Silver Plates, best English.
Ditto ditto French and German
Chemicals for daguerreotype.

ESTIMATES FOR COMPLETE SETS OF PHOTOGRAPHIC APPARATUS.

SETS FOR THE COLLODION PROCESS.

2027 **A complete Set of Apparatus for the Positive Collodion Process,** to take portraits or views 4¼-in. by 3¼-in.; complete in case, with lock and key, £3 0 0

This set of apparatus contains a double combination achromatic lens, with rack-work adjustment, mounted on a shifting body camera; a camera stand, exciting bath and dipper, scales and weights, glass funnel and graduated measure, washing tray, filter paper; one dozen glass plates and bottles, containing solution of nitrate of silver, prepared for the exciting bath, collodion, developing solution, cyanide of potassium, and varnish; with book of directions for use.

		Per set. £ s. d.	Per set. £ s. d.
2028	**A similar Set of Apparatus** to No. 2027, **for positive collodion process,** to take portraits or views 6½-in. by 4¾-in.		5 0 0
2029	**A complete Set of Best Apparatus for the Negative and Positive Collodion Processes,** fitted up with superior achromatic double combination lenses, and ample supply of the requisite chemicals and apparatus; to take portraits and views 4¼-in. by 3¼-in.; in stout case with lock and key, and directions for use		5 5 0
2030	**A similar Set of Best Apparatus** to No. 2029, for **positive and negative collodion process,** to take portraits and views 6½-in. by 4¾-in.		10 0 0
2031	**A similar Set of Best Apparatus** to No. 2029, for **positive and negative collodion process,** to take portraits and views 8½-in. by 6½-in.		15 10 0

Sets Nos. 2030 and 2031 have the lenses so arranged, that one can be removed and the other reversed in the mounting, to work as a single combination, for obtaining larger views or pictures of near objects.

SETS OF STEREOSCOPIC APPARATUS.

2032	**Tourists' Stereoscopic Camera,** with a double combination achromatic lens for portraits, complete, with tripod stand, and six dark plate holders, for wet or dry collodion process	6 6 0
2033	Ditto ditto same as No. 2032, with extra single achromatic combination for views, and chemicals, in stout case	10 10 0
2034	**A very complete and Portable Stereoscopic Apparatus,** with a double combination achromatic lens, with camera stand apparatus, and chemicals for wet collodion process	6 6 0

SETS FOR PAPER AND COLLODION PROCESSES.

		Per set. £ s. d.	Per set. £ s. d.
2035	**A complete Set of Photographic Apparatus,** to take portraits, 5-in. by 4-in., and views, 7-in. by 6-in., by **Paper** and **Glass** processes, with best double achromatic lenses, improved shifting back camera, dark slides, camera stand, chemicals and apparatus complete, in stout case, with lock and key		16 10 0
2036	**The same set,** with portable **folding** and sliding body camera		19 0 0

SETS FOR THE PAPER PROCESS ONLY.

2037	**A complete Set of Apparatus for the Paper Process,** to take views with a best single combination achromatic lens in rackwork mounting, 10-in. by 8-in. The camera and stand of the most portable folding form, with ample supply of chemicals and apparatus, in stout case, with lock and key		16 0 0
2038	Ditto ditto for **Paper Process,** to take pictures 12-in. by 10-in.		21 0 0

STEREOSCOPES.

Fig. 2039.

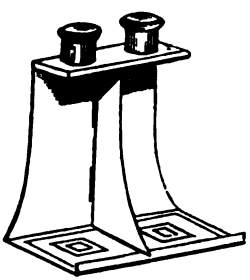
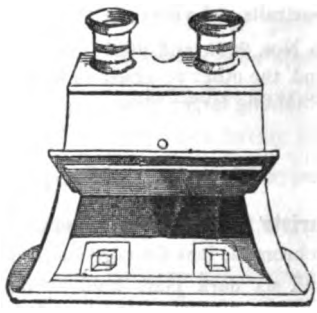


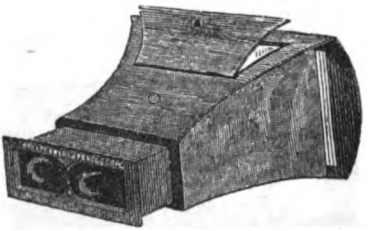
Fig. 2041.



		Each. £ s. d.	Each. £ s. d.
2039	**Stereoscopes,** plain wood or metal (fig. 2039) . . .	0 2 6	0 3 6
2040	Ditto plain mahogany		0 5 0
2041	Ditto ditto with brass adjusting eye pieces (fig. 2041)	0 5 0	0 7 6
2042	Ditto ditto superior quality, large lenses . .	0 7 6	0 10 6

FIG. 2046.

FIG. 2048.



				Each. £	s.	d.	Each. £	s.	d.
2043	**Stereoscopes,** papier maché body covered with leather, and brass adjusting mounts						0	12	6
2044	Ditto	ditto	covered with best morocco leather .				0	17	6
2045	Ditto	ditto	with bevelled edges	1	2	6	1	5	0
2046	Ditto	ditto	„ divided form (fig. 2046)	1	5	0	1	12	6

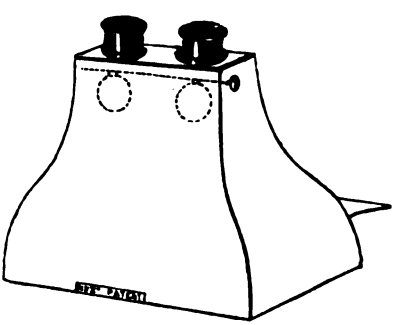
PATENT COSMORAMIC STEREOSCOPES.

2047	**Cosmoramic Stereoscopes,** with prismatic lenses, 5/, 10/6,			0	18	0	1	1	0
2048	Ditto	ditto	with rackwork adjustment (fig. 2048) .				1	12	0

FOLDING STEREOSCOPES.

2049	**Folding Stereoscopes,** with leather case, with compartment to hold slides			0	18	6	1	12	6
2050	**Book Stereoscopes**			0	3	6	0	6	0

FIG. 2051.



PATENT STEREOSCOPES,

WITH ADDITIONAL LENSES ADAPTED FOR SHORT OR LONG SIGHTS.

2051 **Patent Stereoscopes,** in mahogany or walnut wood (fig 2051) 18/, 21/.

2052 Ditto ditto in papier maché, divided form, covered with leather 25/, 26/.

2053 Ditto ditto in ornamental mountings, of various patterns 32/6, 42/.

PATENT MAGIC STEREOSCOPES.

Fig. 2058.

Fig. 2063.

		Each. £	s.	d.	£	s.	d.
2054	**Patent Magic Stereoscope,** without stand . . .				5	0	0
2055	Ditto ditto with two-draw adjusting stand . .				5	15	0
2056	Ditto ditto with three-draw adjusting stand . .				6	6	0
2057	Ditto ditto with three-draw stand, and rack-work adjustment to eye lenses				6	10	0
2058	Ditto ditto of the most complete form, with achromatic eye lenses (fig. 2058)	7	7	0	10	10	0

NEGRETTI AND ZAMBRA'S ACHROMATIC STEREOSCOPES.

			Each. £ s. d.	Each. £ s. d.
2070	**Achromatic Stereoscopes,** plain mounting . . .		1 15 0	2 0 0
2071	Ditto ditto	ornamental wood or leather . . .	2 2 0	2 10 0
2072	Ditto ditto	plain mounting, and stand . . .		3 3 0
2073	Ditto ditto	walnut wood mounting . . .		4 4 0
2074	Ditto ditto	ornamental wood or leather mounting, with rack-work adjusting eye lenses, and best three-draw stand (fig. 2063)		5 5 0

Fig. 2076.

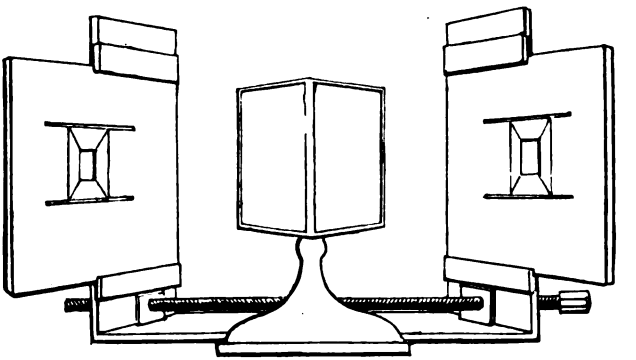
PATENT REVOLVING OR MAGAZINE STEREOSCOPES.

2075 **Magazine Stereoscopes,** to hold and exhibit twenty-five transparent glass, or fifty paper slides.
£4 4s. £8 8s.

2076 Ditto ditto with **achromatic lenses** (fig. 2076).
£5 5s. £10 10s.

2076* **Magazine Stereoscopes,** on a pedestal, to hold 100 or 200 slides, to order.

Fig. 2077.



2077 **Wheatstone's Reflecting Stereoscopes,** for large photographs (fig. 2077), £2 10s. to £4 4s.

GLASS STEREOSCOPIC VIEWS.

2078 **Glass Stereoscopic Views,** by Ferrier, Clouzard, Frith, and Negretti and Zambra, of the following places, price 7/6 and 6/6 each :—

Paris and its Environs.	Wurtemberg.	Mayence.
Provinces of France.	Bavaria.	Eppstein.
England.	Austria.	Wiesbaden.
Egypt and Nubia.	Prussia.	Banks of the Rhine.
Holy Land.	Tyrol.	Saxon Switzerland, &c.
Glacier and Snow Scenes.	Saxony.	Banks of the Elbe.
Russia.	Stuttgart.	Spain.
Italy.	Baden Baden.	Madrid.
Belgium.	Heidelberg.	Segovia.
Black Forest.	Frankfort on the Maine	Cuença.
Switzerland.	Schwitzingen Park.	Cordova.
Constantinople.	Homburgh.	Seville.
Athens.	Mannheim.	Granada.
Prague.	Nuremberg.	Malaga.
Pyrenees.	Ratisbonne.	Ronda.
Rhine.	Wurtzburgh.	Algiers.
Germany.	Bamberg.	Oran.

CRYSTAL PALACE.

2079 **Negretti and Zambra's Collection of Crystal Palace Views,** comprising all the most interesting views of the building and various courts, statuary, &c. The Crystal Palace subjects are published upon glass, paper, and daguerreotype plate, with descriptive letter-press on the back in English and French—

	£	s.	d.	
Glass	0	6	6	each.
Daguerreotype	0	3	0	„
Paper	0	1	6	„
Ditto, coloured	0	2	0	„

PAPER STEREOSCOPIC VIEWS.

2080 **Paper Stereoscopic Views** of the following places—Price 1/, 1/6, 2/, 2/6.

Egypt and Nubia.	Belgium.	Wales.
Holy Land.	Spain.	Ireland.
India.	Italy.	English Lake Scenery.
China.	Switzerland.	Exteriors and Interiors of
Manilla.	Holland.	English Cathedrals.
America.	England.	Negretti & Zambra's Series
France.	Scotland.	of London Views.

		Each. £	s.	d.	Each. £	s.	d.
2081	**Groups from Life, Rustic Scenes, Cattle, Domestic and Comic Groups; Still Life Subjects,—Game, Flowers, Fruit, Vegetables, &c.**	0	1	6	0	2	0
2082	Ditto ditto coloured 1/6,	0	2	0	0	2	6
2083	**Illuminated Views and Groups,** showing two effects (day and night)	0	2	0	0	2	6
2083*	**Instantaneous Stereoscopic Pictures** of the Moon, Clouds, Waves of the Sea, &c., by various photographers, on glass and paper						

BOXES AND CABINETS FOR PRESERVING STEREOSCOPIC PICTURES.

2084	**Plain Mahogany Boxes,** to hold 12 to 25 glass pictures, 2/6,	0	5	0	0	7	6
2085	Ditto ditto to hold 50 to 100 paper pictures . 2/6,	0	5	0	0	7	6
2086	Ditto ditto ditto better quality . . 15/,	1	5	0	1	15	0
2087	**Elegant Cabinet Boxes,** to hold a stereoscope with a selection of glass and paper views, &c.; of various forms and mountings	2	10	0	4	4	0

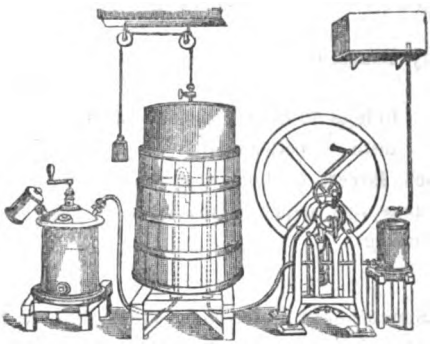
For further details of Stereoscopes, Stereoscopic Views, &c., see Negretti and Zambra's Descriptive Catalogue of Stereoscopes, &c.

ADDENDA TO CATALOGUE.

2088	**Frye's Lactometer,** as recommended by the Board of Agriculture of the American Institute, New York .				0	5	6
2089	**Model of the Human Eye,** showing the position of the various humours and lenses, and the cause of long and short sight, &c.; packed in mahogany box . . .	4	10	0	6	6	0
2090	**Elastic Caoutchouc Water Bottles,** for conveniently carrying a supply of water for photographic purposes, &c.	0	10	6	1	0	0
2091	**Vulcanized India Rubber Tube:—** Bore ¼ ½ ¾ 1 Price, per foot -/10 1/- 1/3 1/6						
2092	**Geological Compass,** with silvered ring divided into degrees, declination index, and scale. A convenient and portable instrument for ascertaining the inclination of hills or the dip of strata	0	15	0	1	0	0
2093	Ditto ditto superior finish, and best edge bar needle				2	10	0

		Each. £ s. d.	Each. £ s. d.
2094	**Dupui's Measurer,** for measuring ground, levelling, and ascertaining vertical or horizontal angles and distances, &c.; with staff, in case complete, and directions for use		2 5 0
2095	**Pedometer,** for measuring distances walked by the wearer, silver, £5 5 0 gold		8 8 0
2096	**Harris's Electro Thermometer,** for measuring the heating power of electricity		1 11 0

Fig. 2097.



2097	**Soda Water Machines,** with gasometer, solution pan, &c.								
	To bottle	40	80	100	150	180	300	360	dozen per day.
		£35	£50	£55	£65	£75	£130	£150	
2098	**Improved Lever Bottling Machine,** for any size . .								12 0 0
2099	**Gazogene Apparatus,** for making soda water, and a variety of ærated beverages, 2-pint size, 21/, 3-pint size,								1 5 0
2100	**Prepared Powders,** for using in the above, per box,							0 2 6	0 5 0
2101	**Cabinets of Minerals,** containing 150 carefully-selected specimens, scientifically arranged, according to Phillips .								2 2 0
2102	**Collections of well-defined Minerals,** from 50 to 500 specimens, arranged and labelled with reference to a descriptive catalogue, with or without a cabinet . .							5 5 0	30 0 0
2103	**Geological Cabinet,** containing specimens of the tertiary, secondary, primary, and volcanic rocks . . from								2 2 0
2104	**Cabinet of Geological Strata,** with organic remains .								3 3 0
2105	**Casts of Rare and Interesting Fossils,** named with their localities, arranged according to their several strata of formation, in sets or separate . . . 100 casts								3 10 0
	200 casts								9 9 0
2106	**Cabinet of Shells,** containing 120 specimens, with the Linnean and Lannarkean names								4 4 0

		Each. £ s. d.	Each. £ s. d.
2107	**Lapidary's Portable Apparatus,** with wheel and frame complete, for cutting, grinding and polishing stones .	7 7 0	10 10 0
2108	**Chadburn's Steam Pressure Gauge**		3 3 0
2109	**Gauge Tubes** for steam boilers, &c., of stout annealed glass, average 1*d.* per inch		
2110	**Thermometers** for Super-Heated Steam	1 1 0	1 10 0
2111	**Cartier's Hydrometer**		0 5 6
2112	**Hydrometer** for lemon juice or citric acid solution . .		0 5 6
2113	**Burettes, or Pourets,** graduated into 100 parts . .	0 5 6	0 7 6
2114	**Mohr's Alkalimeter,** with supports		0 14 0
2115	**Bunsen's Gas Furnace**	0 2 6	0 3 6
2116	**Alcoholmeter, Field's Patent,** for indicating the amount of alcohol in any sample of beer, specific gravity and pounds per barrel		5 15 6
2117	**Spirit Analyzer, Long's Patent,** for ascertaining the quantity of alcohol in wines, cordials, &c., in accordance with Treasury Order of July 12, 1853, fixing the maximum of spirit in wine at 33 per cent.		

TIME GLASSES.

		Filled with sand.	Filled with metal.
2118	**Log Glasses,** in strong wood frames, 14 seconds, per doz.		0 16 0
2119	Ditto ditto 28 seconds . . . . . „		0 16 0
2120	Ditto ditto 14 and 28 seconds, brass frames „		1 11 6
2121	**3-minute Glasses,** in stout wood frames . . „		0 18 0
2122	**5-minute ditto** . . . . . „		1 0 0
2123	**Half-Hour Glasses** . . . . . each	0 1 6	0 2 8
2124	**1-Hour ditto**	0 1 9	0 3 3
2125	**2-Hour ditto**	0 3 6	0 8 6
2126	**Half-Hour Glasses,** in rosewood or cocus wood frame .	0 5 0	0 6 6
2127	**1-Hour ditto** ditto	0 6 6	0 9 6
2128	**Half-Hour Glasses,** in brass frames	0 6 6	0 7 6
2129	**1-Hour ditto**	0 10 6	0 13 0

Time Glasses mounted in ivory or fancy frames, and for any time to order.

2130	**Astronomical Clocks**		
2131	**Ships' Board of Trade Regulation Starboard and Port Lamps** . . . . . per pair	1 10 0	2 0 0
2132	Ditto ditto mast-head and anchor . . each	0 18 0	1 5 0
2133	**Speaking Trumpets**	0 5 0	0 15 0
2134	**Fog Horn**	0 8 0	0 12 0

2135.—Admiralty and Official Charts, Maps of all parts of the World, Nautical Almanacks, Admiralty Sailing Directions, Log Books, Cargo Books, Journals, and other Nautical Publications.

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**** *The figures in this Index refer to the numbers on the margin of each page of the Catalogue.*

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