

5TH EDITION

ESTABLISHED 1850.

PART B

ILLUSTRATED AND DESCRIPTIVE

CATALOGUE AND PRICE LIST

—OF— ~~WITHDRAWN from LIBRARY, USCGS.~~
~~6112~~

OPTICAL AND METEOROLOGICAL
INSTRUMENTS

621
K12

INCLUDING

EXPERIMENTAL ELECTRICAL AND PHILOSOPHICAL APPARATUS

CLASSIFIED AS FOLLOWS:

1. MICROSCOPES AND ACCESSORIES, READING AND PICTURE GLASSES, POCKET MAGNIFYING GLASSES, GRAPHOSCOPES, ETC.
2. TELESCOPES, OPERA GLASSES, FIELD OR MARINE GLASSES, ETC.
3. BAROMETERS, HYGROMETERS, THERMOMETERS, HYDROMETERS, ANEMOMETERS, ETC.
4. ELECTRO-MEDICAL BATTERIES, RHUMKORFF COILS, MAGNETS, ETC.

MANUFACTURED AND IMPORTED BY

B. KAHN & SON,

No. 32 MAIDEN LANE,

NEW YORK

LIBRARY

NOTICE.

1. The prices in this Catalogue will be strictly adhered to, deviations emanating only from fluctuations in the market values.
2. In ordering any of the articles enumerated in this Catalogue it will be necessary to state the number and price of the article, as in many instances a series of prices appears in connection with the same ordinal.
3. Owing to special facilities, we are enabled to furnish goods in our line other than those here enumerated, at short notice, and at prices frequently below those of other houses.
4. Each article, before leaving our establishment, is thoroughly examined, and warranted to be free from defect.
5. Goods not exceeding four pounds, and not over thirty-six inches in length, may be sent by mail in open packages at one cent per ounce. Pointed Tools and Glassware have to pay full letter rates, two cents per ounce.
6. The postage must invariably be added to the price of the goods ordered.
7. Articles sent by mail at the risk of the purchaser.
8. Mail packages can be registered for ten cents each.
9. In cases where extra packing and boxing become necessary for shipment by express, we reserve the option to charge for the same.
10. Every possible precaution is adopted in the packing of goods, in consequence whereof we do not hold ourselves responsible for damage incurred during transit.
11. Explicit directions as to mode of shipment, route, etc., should accompany all orders.
12. In absence of satisfactory "references," our terms of payment are uniformly cash. Remittances should be made either by Bank draft payment to our order, Post-office Money Order, or Express C. O. D.; in the latter case, a remittance of ten per cent. on the purchase being required to insure the prompt taking up of the package on receipt.
13. The Express Company's charges for collecting and returning money on C. O. D. bills must be paid by the purchaser.
14. In this Enlarged Edition we have been compelled to use an entirely new system of numbering, and caution our patrons to mention Edition from which they are ordering, as we cannot hold ourselves responsible for mistakes arising from this cause.

Respectfully,

B. KAHN & SON,

No. 32 Maiden Lane, New York.



681.2085

K12
SciTech

To Our Friends and Patrons.

WE take pleasure in presenting the *Fifth* Edition of our Illustrated and Descriptive Catalogue and Price-List, in which it has been our aim to mention the leading and more popular articles only, these having been compiled with a view to condense, as much as possible, the various departments to which they are assigned. Where omissions may prove apparent, the same must be attributed to the limited space at our disposal in this enlarged edition, and we therefore solicit correspondence pertaining to any articles known to come within the province of our branch of trade. This we do not merely suggest, but confidently recommend, as by special facilities, as well as from the fact of our being established in the largest commercial center in America, we are enabled to obtain goods of the latest and most improved pattern and to offer such at prices frequently below those quoted by other houses.

It is our earnest desire to meet the demands of our patrons in a satisfactory manner in all our transactions, thus enabling us to sustain our reputation as dealers in the best goods in our line. Hence, we are in a position to place in evidence **an acknowledged distinction extending over a period of forty years.**

The articles referred to in this Catalogue are partly of our own make, or otherwise by us imported, and will be found to be so described as to aid in a practical selection, thereby enabling those residing at a distance to make their purchases with the same confidence as if buying on our premises. Trusting that in the future we may receive that favorable support which has always been commensurate with our endeavors in the past, we further offer our reduced prices as an additional inducement.

In a work where brevity has been our great object, occasional omissions or oversights may possibly be discovered, but which, we hope, when the difficulties attending such a varied compilation are taken into consideration, will receive every indulgence from a generous public.

Respectfully,

B. KAHN & SON,

32 Maiden Lane, New York.



INTRODUCTION.

We particularly desire to call attention to our

SPECTACLE AND EYE-GLASS DEPARTMENT

which is in charge of skillful and competent managers. Our stock comprises



Spectacle and Eye-glass Frames in Gold, Silver, Steel, Shell, Celluloid, Rubber, and "Frameless," including the very latest improvements, in shapes, style and convenience, and combining the use of lenses only of the highest optical perfection with skilled labor, we are prepared to fill all orders with

PERFECTLY FITTING GLASSES

with promptness and at as moderate a cost, consistent with individual requirements.

OCULISTS' PRESCRIPTIONS A SPECIALTY.

CORRESPONDENCE SOLICITED.

OPTICAL INSTRUMENTS,

COMPRISING

Microscopes and Accessory Apparatus, Magnifying, Reading and Picture Classes, Telescopes, Opera and Field or Marine Classes, Mirrors, Prisms, etc.

* P REF A C E .

In opening Part B of our Catalogue, and prior to directing the reader's attention to the following

POPULAR OPTICAL INSTRUMENTS,

We beg to say that DETAILED mention of such Optical Instruments as are based upon the laws of DOUBLE REFRACTION AND POLARIZATION we have been obliged to exclude, these not coming within the limits of the present edition. We, however, kindly solicit correspondence pertaining to FINE OPTICAL PRISMS, SPECTROSCOPES, POLARISCOPES AND POLARIZING APPARATUS, CALCSPAR, QUARTZ, SELENITE AND MICA PREPARATIONS, as, with our facilities, we are enabled to furnish such at more reasonable prices than those heretofore prevailing. Where not otherwise stated, the same uniform high degree of excellence pervades all the articles in this as in every other department of our business.

Immediately preceding the enumeration of

Microscopes and Accessories, Telescopes, Opera and Field or Marine Glasses, Etc.,

under appropriate headings, will be found such general information as may tend to direct the intending purchaser to a judicious selection.

We also desire to call the attention of our patrons to the different parts of our Catalogue, viz.:

Part A. Spectacles, Eye-Glasses, etc., etc.

Part C. Magic Lanterns and Accessories, including Slides.

Part D. Drawing Instruments, Scales, Rules, Inks, Brushes and Colors, Engineering Instruments, Pocket Compasses, Pedometers, Odometers, etc., etc.

These are arranged in separate Catalogues for convenience, but form one book when bound together, and will be sent upon application.

Respectfully,

B. KAHN & SON,

32 Maiden Lane, New York.

READING AND PICTURE GLASSES.

DIAMETER OF LENSES SPECIFIED ACCORDING TO FRENCH MEASUREMENT.

11 LIGNES = 1 INCH.



1200-1221

DOUBLE-CONVEX LENS, MOUNTED IN ROUND NICKEL-PLATED METAL FRAME,
WITH POLISHED EBONIZED WOOD HANDLE.

1200.	12 Lignes.....each,	\$0 50	1209.	39 Lignes.. . . . .each,	\$2 25
1201.	15 "	60	1210.	42 "	2 50
1202.	18 "	75	1211.	45 "	2 75
1203.	21 "	85	1212.	48 "	3 00
1204.	24 "	1 00	1213.	51 "	3 50
1205.	27 "	1 25	1214.	54 "	4 00
1206.	30 "	1 50	1215.	57 "	5 00
1207.	33 "	1 75	1216.	60 "	6 00
1208.	36 "	2 00			

ART GALLERY LENSES, SIMILAR TO PRECEDING, OF EXTRA LONG FOCUS.

1217.	6 inch diameter, real ebony handles	each,	\$7 00
1218.	7 " " " " "	"	9 00
1219.	8 " " " " "	"	12 00

ARTISTS' DIMINISHING GLASSES.

1220.	2 inch nickeled frames, ebonized wood handles.....each,	\$1 75
1221.	3 " " " " " "	3 00

DOUBLE-CONVEX LENS, MOUNTED IN ROUND FIRE-GILT METAL FRAME, WITH
POLISHED WHITE OR ORIENTAL PEARL HANDLE.

1222.	24 Lignes.....each,	\$2 50	1225.	42 Lignes.....each,	\$5 00
1223.	30 "	3 00	1226.	45 "	6 00
1224.	36 "	4 00	1227.	54 "	7 50

ACHROMATIC READING AND PICTURE GLASSES.

TWO PLANO-CONVEX LENSES, MOUNTED IN ROUND OXIDIZED METAL FRAME, WITH
EBONIZED WOOD HANDLE.

1228.	21 Lignes.....each,	\$1 25	1233.	36 Lignes.....each,	\$3 00
1229.	24 "	1 50	1234.	39 "	3 50
1230.	27 "	1 75	1235.	42 "	4 00
1231.	30 "	2 00	1236.	45 "	4 50
1232.	33 "	2 50	1237.	48 "	5 00

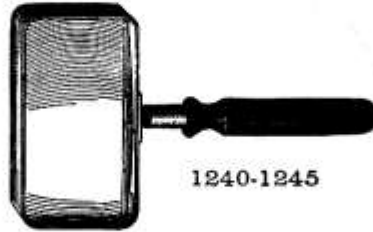
DOUBLE-CONVEX LENS, MOUNTED IN METAL FRAMES, WITH METAL HANDLES.

1238.	1½ inch.....each,	\$0 40	1239.	2 inch.....each,	\$0 60
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B. Kahn & Son, New York.

READING GLASSES.

DIAMETER OF LENSES SPECIFIED ACCORDING TO FRENCH MEASUREMENT.
11 LIGNES = 1 INCH.



1240-1245

CYLINDRO-CYLINDRICAL READING GLASSES.

MOUNTED IN ROUND-CORNERED OBLONG METAL FRAMES, NICKEL-PLATED.

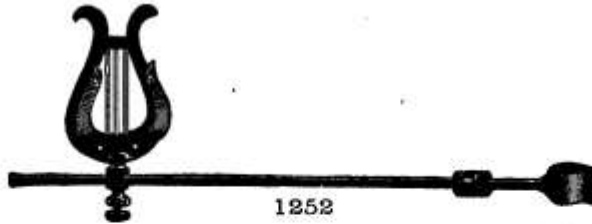
These are recommended as being superior to all others, as the lenses have two cylindrical surfaces whose axes cross at a right angle, thereby affording an entirely flat field, free from chromatic and spherical aberration, and rendering the field of view available even to the extreme edges.

1240. Lens, 30 x 19 lignes.....each, \$3 00	1243. Lens, 39 x 24 lignes .....each, \$5 50
1241. " 33 x 22 " " 3 75	1244. " 42 x 25 " " 6 00
1242. " 36 x 24 " " 4 50	1245. " 45 x 28 " " 6 50

DOUBLE-CONVEX LENS MOUNTED IN SQUARE-CORNERED, NICKEL-PLATED METAL FRAME, WITH EBONIZED WOOD HANDLE.

1246. 30 x 17 lignes. ....each, \$1 50	1249. 39 x 19 lignes.. each, \$2 50
1247. 33 x 17 " " 1 75	1250. 42 x 19 " " 3 00
1248. 36 x 17 " " 2 00	1251. 45 x 19 " " 3 75

READING AND PICTURE GLASS GRAPHOSCOPE ATTACHMENT.



1252

A novel and inexpensive device, designed to be attached, by means of a simple clamp, to the handle of any Reading or Picture Glass; the combination affording the convenience of a perfect Graphoscope.

1252. Graphoscope Attachment, nickel-plated 9 inch bar, and sliding picture-carrier, \$1 25

STANDS FOR READING GLASSES.

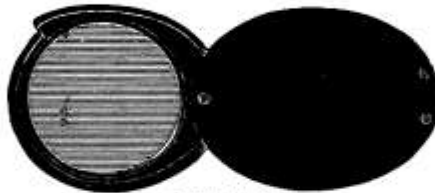


1253

1253. Mahogany Stand for the display of Reading Glasseseach, \$2 00

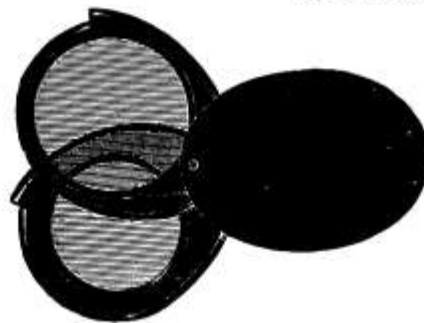
POCKET MAGNIFIERS.

WITH LENSES FOLDING WITHIN PROTECTIVE CASINGS.



1254-1259

1254.	Single Lens,	$\frac{3}{4}$	inch diameter,	rubber casing.	.....	\$0	30
1255.	" " 1	"	"	"	"	"	40
1256.	" " $1\frac{1}{4}$	"	"	"	"	"	60
1257.	" " $1\frac{1}{2}$	"	"	"	"	"	75
1258.	" " $1\frac{3}{4}$	"	"	"	"	"	1 00
1259.	" " 2	"	"	"	"	"	1 25



1260-1265

1260.	Double Lenses, of	$\frac{5}{8}$	and	$\frac{3}{4}$	inch diameters, in rubber casing.	.....	\$0	60
1261.	" " "	$\frac{7}{8}$	and	1	"	"	"	0 80
1262.	" " "	$1\frac{1}{8}$	and	$1\frac{1}{4}$	"	"	"	1 00
1263.	" " "	$1\frac{1}{4}$	and	$1\frac{1}{2}$	"	"	"	1 25
1264.	" " "	$1\frac{1}{2}$	and	$1\frac{3}{4}$	"	"	"	1 75
1265.	" " "	$1\frac{3}{4}$	and	2	"	"	"	2 25

COMBINED POCKET MAGNIFIER AND COMPASS.



1266-1271

GILT DIAL COMPASS.			RUBBER CASE MAGNIFIER.		PAPER DIAL COMPASS.		
1266.	Single Lens,	\$1 00	$\frac{3}{4}$	inch diameter.	1269.	Single Lens,	\$0 75
1267.	" "	1 25	1	"	1270.	" "	1 00
1268.	" "	1 50	$1\frac{1}{4}$	"	1271.	" "	1 25

B. Kahn & Son, New York.

POCKET MAGNIFIERS.

WITH LENSES FOLDING WITHIN PROTECTIVE CASINGS.



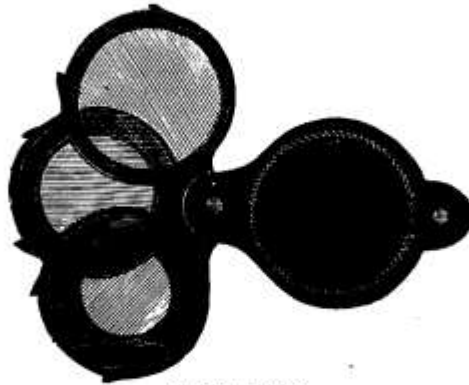
1272-1274

1272.	Single Lens, $\frac{3}{4}$ inch diameter, rubber casing.....	\$0 40
1273.	" " $\frac{7}{8}$ " " " "	50
1274.	" " I " " " "	60



1275-1277

1275.	Double Lenses of $\frac{5}{8}$ and $\frac{3}{4}$ inch diameters, in rubber casing.....	\$0 60
1276.	" " $\frac{3}{4}$ " $\frac{7}{8}$ " " " "	75
1277.	" " $\frac{7}{8}$ " I " " " "	I 00



1278-1280

1278.	Triple Lenses of $\frac{1}{2}$, $\frac{5}{8}$ and $\frac{3}{4}$ inch diameters, in rubber casing.....	\$0 80
1279.	" " $\frac{5}{8}$, $\frac{3}{4}$ " $\frac{7}{8}$ " " " "	I 00
1280.	" " $\frac{3}{4}$, $\frac{7}{8}$ " I " " " "	I 30

B. Kahn & Son, New York.

WATCHMAKERS' AND ENGRAVERS' LENSES.

HARD RUBBER AND METAL.



1281



1282

1281.	Watchmaker's Lens, 2, 2½, 3, 3½ or 4 inch focus.....	\$0 50
1282.	" " " 1 inch focus.....	50
1283.	" " " 2, 2½, 3, 3½ or 4 inch focus, of wire gauze.....	60
1284.	" " " of Aluminum.....	1 00



1285



Upper part of No. 1285.

1285.	Watchmaker's Lens, separable, affording two powers.....	\$0 75
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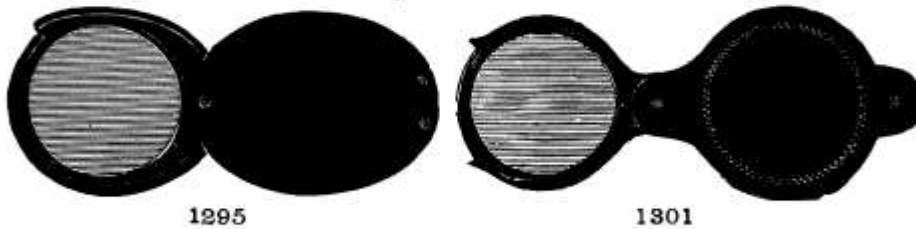
1286-1293

WITH DOUBLE PLANO-CONVEX LENSES.			WITH SINGLE DOUBLE-CONVEX LENSES.		
1286.	Engraver's Lens, 1 3/8 in. diam.	\$2 00	1290.	Engraver's Lens, 1 3/8 in diam.	\$0 75
1287.	" " " 1 5/8 " "	2 50	1291.	" " " 1 5/8 " "	1 25
1288.	" " " 1 7/8 " "	3 00	1292.	" " " 1 7/8 " "	1 50
1289.	" " " 2 1/8 " "	3 75	1293.	" " " 2 1/8 " "	2 00

B. Kahn & Son, New York.

POCKET MAGNIFIERS.

WITH LENSES FOLDING WITHIN PROTECTIVE CASINGS.



1295.	Single lens,	$\frac{3}{4}$ inch diameter,	casing of shell or ivory zylonite	.....	\$0 50
1296.	" "	1 "	" " " " " " " "	.....	75
1297.	" "	$1\frac{1}{4}$ "	" " " " " " " "	.....	1 00
1298.	Double lenses of	$\frac{5}{8}$ and $\frac{3}{4}$ inch diameter,	casing of shell or ivory zylonite..		1 00
1299.	" "	$\frac{3}{8}$ and 1 "	" " " " " " " "	..	1 50
1300.	" "	$1\frac{1}{8}$ and $1\frac{1}{4}$ "	" " " " " " " "	..	2 00
1301.	Single lens,	$\frac{3}{4}$ "	" " rubber lens frame, ivory zylonite casing		75
1302.	Double "	$\frac{5}{8}$ and $\frac{3}{4}$ "	" " " " " " " "	" "	1 00
1303.	Triple "	$\frac{1}{8}$, $\frac{5}{8}$ and $\frac{3}{4}$ "	" " " " " " " "	" "	1 25

ALUMINUM POCKET MAGNIFIERS.

WITH LENSES FOLDING WITHIN PROTECTIVE CASINGS, PARTICULARLY RECOMMENDED FOR THEIR EXTREME LIGHTNESS, STRENGTH AND HANDSOME APPEARANCE.

1304.	Single lens,	1 inch diameter	.....	4.	\$1 50
1305.	" "	$\frac{3}{4}$ "	" "		1 25
1306.	" "	$\frac{7}{8}$ "	" "		1 75
1307.	Double "	$\frac{5}{8}$ and $\frac{3}{4}$ "	" "		2 00
1308.	" "	$\frac{3}{4}$ and $\frac{7}{8}$ "	" "		2 50

PROSPECTOR'S MAGNIFIER.

1309.	Double lens,	$1\frac{1}{2}$ and 1 inch,	very powerful	\$3 00
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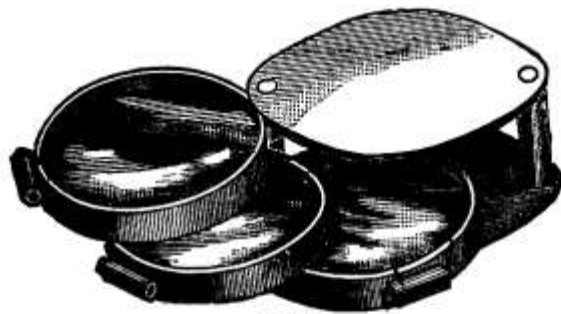
POCKET MAGNIFIERS.

WITH LENSES FOLDING WITHIN PROTECTIVE METAL CASINGS.



1310

- | | | |
|-------|---|--------|
| 1310. | Single lens, $1\frac{1}{8}$ inches in diameter, nickel-plated casing..... | \$1 25 |
| 1311. | " " " " " " oxidized " | 1 00 |
| 1312. | Double lenses, $1\frac{3}{8}$ inches in diameter, nickel-plated casing..... | 1 75 |
| 1313. | " " " " " " oxidized " | 1 50 |



1314

- | | | |
|-------|---|--------|
| 1314. | Triple lenses, $1\frac{5}{8}$ inches in diameter, nickel-plated casing..... | \$2 25 |
| 1315. | " " " " " " oxidized " | 2 00 |

POCKET MAGNIFIERS.

WITH SINGLE LENS, FOLDING WITHIN PROTECTIVE NICKEL-PLATED CASINGS.



OPEN.

1316

CLOSED.

FULL SIZE.

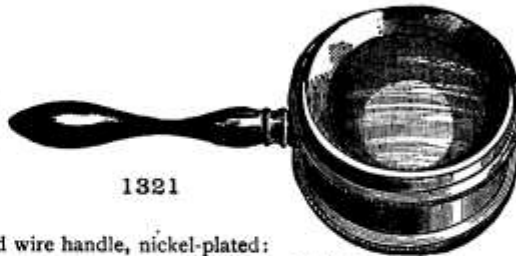
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|-------|---|--------|
| 1316. | Pocket Magnifiers, 1 inch diameter, self-folding with a spring..... | \$0 25 |
| 1317. | " " $1\frac{1}{2}$ " " " " " " | 50 |
| 1318. | " " 2 " " double lenses..... | 50 |

B. Kahn & Son, New York.

“CODDINGTON” MAGNIFIERS.



1320



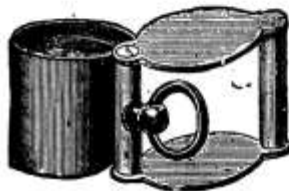
1321

1320. Coddington Magnifier, with twisted wire handle, nickel-plated:

$\frac{1}{4}$	$\frac{3}{8}$	1	$1\frac{1}{8}$	$1\frac{5}{8}$ inches in diameter.
\$1 25	1 75	2 00	2 50	3 00

1321. Coddington Magnifier, with turned handle and milled caps:

	$\frac{3}{8}$	1	$1\frac{1}{8}$	$1\frac{5}{8}$ inches in diameter.
1321-1. Brass.....	\$1 00	1 50	2 00	2 50
1321-2. Nickel-plated	1 50	2 00	2 50	3 00



1322



1323



1324

1322. Coddington Magnifier, with sliding cover and ring, nickel-plated:

$\frac{1}{4}$	$\frac{3}{8}$	1	$1\frac{1}{8}$	$1\frac{5}{8}$ inches in diameter.
\$1 50	2 00	2 50	3 00	3 50

1323. Coddington Magnifier, two hinged covers and ring, German-silver:

$\frac{3}{8}$	$\frac{5}{8}$	$\frac{3}{8}$ inch in diameter.
\$2 50	3 00	3 50

1324. Coddington Magnifier, $\frac{3}{8}$ inch diameter, with sliding cover and twisted wire handle:

1324-1. Coin silver.....	\$3 50	1324-2. German-silver.	\$2 25
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PICK GLASSES.

U. S. CUSTOM HOUSE STANDARDS FOR COUNTING THREADS IN LINEN, COTTON, SILK AND BURLAPS.



1325

		BRASS, NICKEL-PLATED
1325.	Pick Glass, either $\frac{1}{4}$, $\frac{1}{2}$, $\frac{1}{4} \times \frac{1}{4}$ in. aperture, or $\frac{1}{16}$ in. circular orifice,	\$0 50 0 60
1326.	“ “ combining $\frac{1}{8}$, $\frac{1}{8}$, $\frac{1}{4}$ and $\frac{1}{2}$ inch aperture.....	75 1 00
1327.	“ “ $\frac{1}{4}$ in. aperture and shifting plate, with $\frac{1}{8}$ in. circular orifice,	75 1 00
1328.	“ “ with adjustable achromatic lens, $\frac{1}{4}$ inch aperture.....	1 00 1 25
1329.	“ “ extra large model “ “ “ “	2 00
1330.	“ “ “ “ “ “ “ “	3 00
1331.	“ “ “ “ “ “ $\frac{1}{2}$ inch aperture.....	1 25 1 50
1332.	“ “ “ “ “ “ “ “	2 25 2 50
1333.	“ “ with rotating lens and circular brass plate.....	2 50

B. Kahn & Son, New York.

THE MICROSCOPE.

Although the Microscope was formerly considered a mere toy, it is now an instrument of such vast importance that scarcely any other can vie with it in the interest we attach to the discoveries made by its aid.

In disclosing the wonderful structure of minute organic and inorganic substances, and in detecting the presence of foreign matter in adulterations, the Microscope has proven itself indispensable to the student of Botany, Physiology, Zoölogy, Anatomy, and Geology, not omitting the Manufacturer and Farmer, as, by its assistance, the power of vision is increased, so enabling the observer to see what otherwise must necessarily have remained a secret to him. Thus not only many hours of wonderment, delight, and intellectual improvement are to be derived from its use, but also many a doubtful hypothesis in science may thereby be set aside.

In the following brief description of this valuable instrument, we shall avoid mentioning the abstruse problems by which the construction of the Microscope is governed, kindly referring the reader to authors who have given the subject that specific attention which the limit of our catalogue necessarily causes us to exclude.

Before entering into an explanation of the principle of the microscope, it will, however, be necessary to explain under what circumstances an object appears best defined to the naked eye.

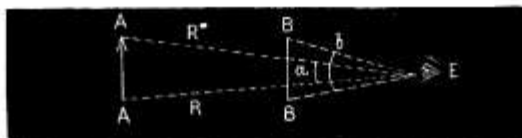


Fig. 1.

By reference to Fig. 1, it will be apparent that if *A* represents an object (a distended silk thread), and *E* a human eye, the rays *R*, emanating from such object and entering the eye, will inclose what is termed the visual angle *a*. On bringing the object nearer the eye, say to *B*, the rays will inclose the visual angle *b*; and by reference to the diagram we find the angle *b* greater than the angle *a*.

As we are all familiar with the fact that objects appear clearer and larger to us, when more closely approached, we have now also learned that the visual angle increases with a decrease of the visual distance; or, in other words, objects appear larger and more distinct with an increase of the visual angle.

In the examination of very minute objects, however, the nearest distance at which we are enabled to clearly see the same is five inches. We have therefore met with the first obstacle—our seeming inability to increase the visual angle; but, according to the laws of Optics, a convex lens, when interposed between the eye and an object, possesses the power of apparently increasing that angle under which the object would have been seen if viewed by the unassisted eye, and it is in consequence that such is employed.

B. Kahn & Son, New York.

THE MICROSCOPE.

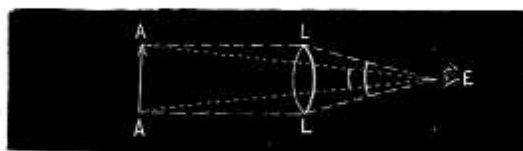


Fig. 2.

In Fig. 2, L represents a double-convex lens placed between the eye E and the object A . The rays AL emanating from the object are caused by the curvature of the lens, to converge, to the eye E , under the angle LEL , whereas if the lens be removed, the object will be observed under the smaller visual angle AEA . It will depend entirely on the curvature of the lens as to how close the eye can be brought to the object to assist clear vision; but this great fact will be observed, that the nearer both the eye and the lens can be brought to an object, to enable the eye to see, the more of its details will be discerned. The apparent size of an object when examined under a convex lens being greater than that of the object itself, leads us to explain what is meant by the magnifying power. When we say a lens magnifies an object three or four times, it is meant that it exhibits that object under a visual magnitude three or four times as great as that which the same object would have if viewed with the naked eye at a distance of five inches.

The linear magnifying power is the number of times an object appears greater in length, and the superficial magnifying power is the number of times it is increased in surface. If the object examined is a diminutive square, and the limit of distinct vision is 5 inches, then a lens of 1 inch focus will magnify each side of the square 5 times, and its area 25 times. However, it is not by the increase of superficial, but of linear dimensions, that magnifying powers are usually taken, the degree to which objects are magnified being designated by "diameters." The reader should bear this in mind, as the glowing descriptions of magnifying powers so frequently advertised are not according to diameters, but superficial measure, the latter being intended as a decoy to the intending purchaser. From what we have learned, the most important part of a microscope, then, consists of a lens by means of which the eye can be brought nearer to objects for the purpose of magnifying and examining their diminutive structure, the details of which are invisible to the unassisted eye.

A lens, such as the one referred to in Fig. 2, constitutes a simple microscope, and is generally mounted in a frame for convenience and the protection of its highly polished surfaces. Sometimes two, or even three lenses are mounted together, thereby affording the option of various powers, such being known, respectively, as doublets and triplets.

Although the simple microscope embraces the essential conditions of all microscopes, and has, in the hands of competent observers, done so much for science, it is nevertheless giving precedence to the compound microscope, which, as might be inferred from its name, is more complicated than the former, but it is now constructed with so much accuracy that it can be used with as great certainty and ease as the simple microscope itself.—See page 21.

SIMPLE MICROSCOPES.



1334



1336



1337

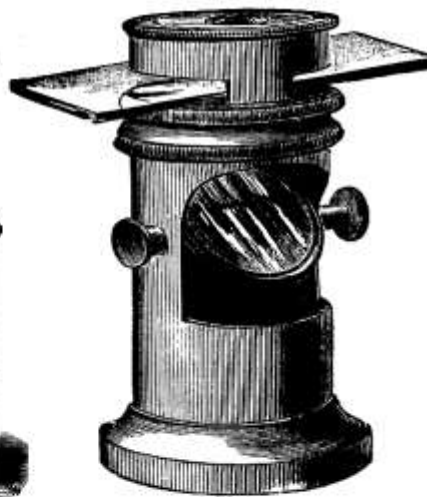
1334. Three-legged Microscope, lacquered brass, adjustable for focus, two lenses.
 $1\frac{1}{8}$ inches in diameter. \$0 75 1 00
1335. Three-legged Microscope, nickel-plated, adjustable for focus, two lenses.
 $1\frac{1}{8}$ inches in diameter. \$1 00 1 25
1336. Three-legged Microscope, oxidized, non-adjustable, two lenses. $1\frac{3}{4}$ in. diam. \$0 75
1337. Four-legged Microscope, lacquered brass, two powerful lenses, 3x2 in. diam. 3 00



1340



1338

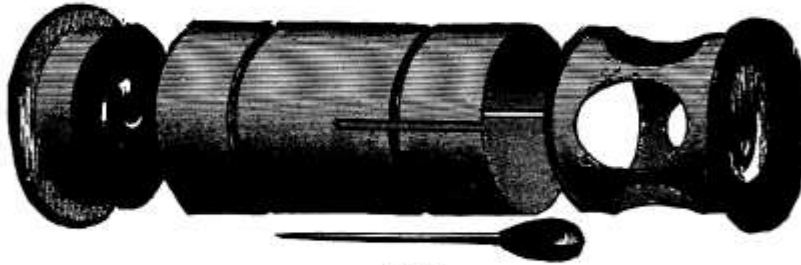


1341

1338. Seed Microscope, with glass cage for reception of objects, lens adjustable for focus, mounted on metal box, the whole arranged to reverse and close for the pocket.
 $1\frac{1}{4}$ inches in diameter.
 Brass.....\$0 75 1 00 1 50
 Nickel-plated.... 1 00 1 25 1 75
1339. Seed Microscope, simple, non-adjustable. \$0 30
1340. Entomological Microscope, adjustable lens 1 00
1341. Botanical Microscope, with illuminating mirror. 1 50

B. Kahn & Son, New York.

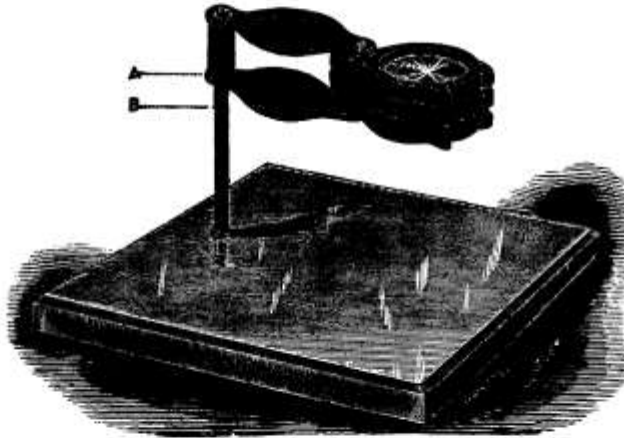
SIMPLE MICROSCOPES.
THE FLORASCOPE.



1342

1342. Pocket Florascope, brass lacquered, and insect holder.....\$0 75

HANDY DISSECTING MICROSCOPES



1343

The Dissecting Microscopes represented in above cut are very efficient and convenient for the examination of minerals, insects, flowers, etc.

They consist of an iron base with glass plate inlaid, into which a steel stem is screwed, and the magnifiers arranged to slide on the stem. The magnifiers are furnished with one, two or three lenses, which give a magnifying power of from 5 to 25 diameters. Those with two or three lenses are provided with a diaphragm, which secures distinctness of definition.

The stem can easily be unscrewed, and the whole packed in a small box. Extra stems of suitable length for lenses of short foci accompany the double and triplet-lens magnifiers. Nickel-plated pliers are furnished with each instrument.

The cuts are two-thirds of actual size.

1343.	Dissecting Microscope, with triplet-lens, rubber-cased magnifier	\$2 00
1344.	" " " double " " "	1 50
1345.	" " " single " " "	1 25
1346.	" " " triplet-lens, rubber-framed "	1 25

B. Kahn & Son, New York.

THE FOLDING DISSECTING AND MOUNTING MICROSCOPE.



1347

(Cut one-third actual size.)

1347. The instrument, as above illustrated, is the most compact, portable, and efficient Dissecting Microscope now in the market. It has all the elements of the ordinary dissecting microscope, and besides these, the important feature that, when folded, it is brought into a very small compass, and with no greater inconvenience than is necessary in placing any other stand in its case. This fact allows it to be fastened in any ordinary microscope case, and is of especial value in traveling.

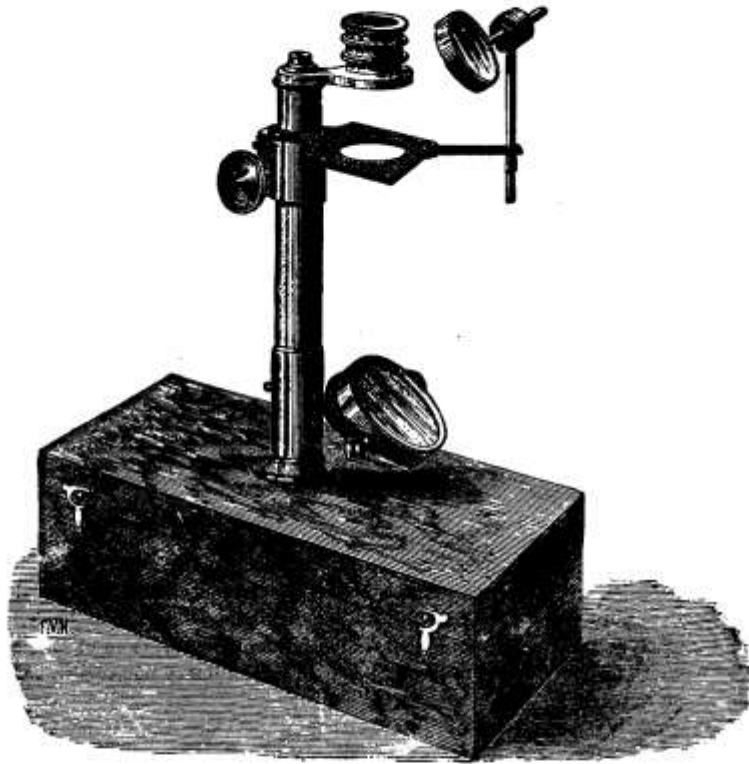
The base is neatly japanned and of large dimensions, thus insuring firmness. The stage is of brass, blackened, has spring clips, and in its center contains a removable glass disc. It is of convenient height, so that any amount of work may be done without any fatigue to the arms or hands. The arm holding the lenses is adjustable in the rack-rod, and is arranged with "society screw," thus permitting the use of low power objectives, such as our 1 in., $\frac{3}{4}$ in., and $\frac{1}{2}$ in., which are excellent dissecting lenses. The rack and pinion adjustment works perfectly smooth and without any lost or lateral motion. The mirror is easily detachable from the base, and can be readily attached to the stage for oblique light or illumination of opaque objects. The pillar, pinion-head, mirror-arm, and rack are all heavily nickel-plated. In folding, the rack is brought down, arm detached, the stage swings backward on the pillar and the base on the stage, so that the space occupied is merely the size of the base, and thickness of this, stage and arm. Two mounted lenses, respectively of 1 and 2 inch focus, and nickel-plated pliers, accompany the instrument. The whole packed in neat black walnut case, with receptacles for each part; complete..... \$12 00

EXTRAS TO ABOVE.

1347.—1. Hand Rests	2 00
2. Jointed Arm for lenses, in lieu of single arm	1 00
3. Single lens of $\frac{3}{4}$, $\frac{1}{2}$, or $\frac{1}{4}$ inch focus	1 00
4. Coddington Lens, 1 inch, $\frac{3}{4}$, $\frac{1}{2}$, or $\frac{1}{4}$ inch focus	2 50
5. Achromatic Triplets, especially for this Microscope, same foci as above, each	6 00
6. Extra arm, carrying standard length of tube, with eye-piece. This has a society screw at its lower end, and when attached to the stand converts it into a compound microscope	12 00

B. Kahn & Son, New York.

THE SCHOOL MICROSCOPE.



1348

The instrument, as above shown, consists of a tubular stem about 5 inches high, the lower end of which screws firmly into the lid of the box wherein the instrument is packed when not in use. To the upper end of this stem the stage is firmly fixed, while the lower end carries a concave mirror. Within the tubular stem is a round pillar, having a rack cut into it, against which a pinion works that is turned by a milled head, and the upper part of this pillar carries a horizontal arm which bears the lenses, so that by turning the milled head the arm may be raised or lowered, and the requisite focal adjustment obtained. Three magnifiers are supplied, and by using them either separately or in combination, a considerable range of powers, from about five to forty diameters, is obtained. A condensing lens for opaque objects, and an aquatic box for the examination of objects in water, are also supplied. This instrument is peculiarly adapted for educational purposes, being fitted in every particular for the examination of botanical specimens, small insects or parts of insects, water-fleas, the larger animalcules, and other such objects as young people may readily collect and examine for themselves; and those who have trained themselves in the application of it to the study of nature are well prepared for the advantageous use of the Compound Microscope.

- | | |
|---|--------|
| 1348. The School Microscope, complete as above..... | \$6 00 |
| 1349. The Child's Microscope, similarly mounted to the preceding, but without condensing lens and rack-adjustment, with live-box, brass forceps, watch glass, two glass slips, and one prepared object..... | 3 00 |

THE COMPOUND MICROSCOPE.

(CONTINUED FROM PAGES 15 AND 16.)

If we take an ordinary convex lens L (Fig. 3), and place it between an object O , and a



Fig. 3.

piece of ground glass G , we shall find, at a certain distance, that an enlarged picture of the object will be produced upon the glass when viewed from the position of the eye at E , very much in the same manner as the picture projected by a magic

lantern. Now, if we look at this picture with another lens of the same character, but of somewhat less magnifying power, we shall obtain a second picture larger than the first. This is the principle involved in the Compound Microscope, though in its construction the ground glass or screen above referred to is abandoned, the magnified image of the first lens being directly received and enlarged by the second. The former lens is called the object-glass, or objective, as it is always immediately directed toward the object, which is placed very near it; and the second lens is named the eye-glass, or eye-piece, as the eye of the observer is applied to it.

A Compound Microscope, then, consists essentially of two parts,—an object-glass and an eye-piece, which, for convenience, are mounted at opposite ends of a tube, called the body, and supported by an arm and foot constituting the stand, the latter being also supplied with a table beneath the objective for holding the object, known as the stage, and a reflector for illumination, termed the mirror.

The better grades of Compound Microscopes are furnished with *achromatic* object-glasses, consisting of a combination of two or more lenses of flint and crown glass, for the correction of the *spherical* and *chromatic* aberration; a rack and pinion, for adjusting the body, designated the coarse adjustment; and a micrometer screw for the higher powers, titled the fine adjustment, being also supplied. First-class instruments are furnished with a stage beneath the regular one, termed the sub-stage, which is designed to support additional apparatus effecting various modifications of the light reflected by the mirror.

ACCESSORY APPARATUS.

Under this heading, pages 28 to 34, will be found a condensed list of useful accessories adapted to instruments of standard dimensions, a brief description of their application being given in connection with their enumeration. As workers with the microscope frequently find it to their advantage to employ a greater variety of objectives than those furnished with the Microscopes herein listed, we also mention a line of Achromatic Objectives, furnished with the "society screw," the latter being a universal thread adopted in the manufacture of the higher class of instruments for the purpose of enabling the purchaser to provide himself at any time with objectives that are insured to fit his microscope.

On pages 31, 32 and 33 we enumerate only such of our stock of

MOUNTING IMPLEMENTS

that have entered into more general use, and acknowledged as being indispensable in the

PREPARATION OF OBJECTS.

For general information pertaining hereto, we refer the reader to works dedicated to the subject, and which may be procured through us.

B. Kahn & Son, New York.

COMPOUND MICROSCOPES.



1350



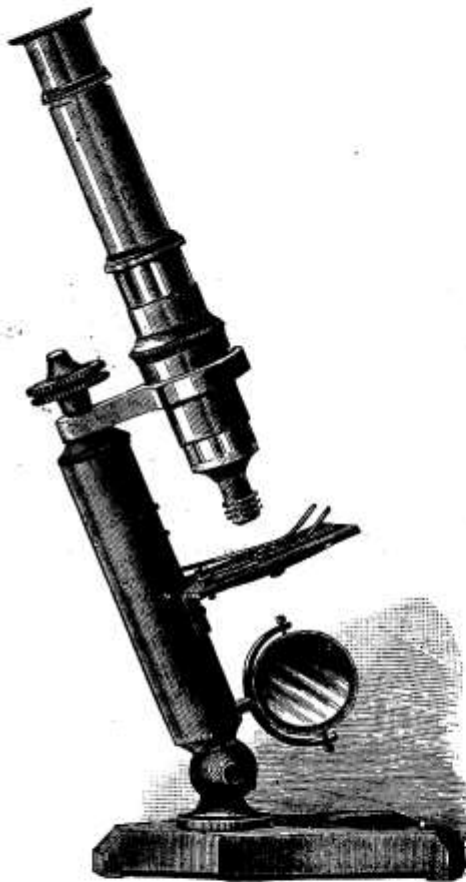
1352



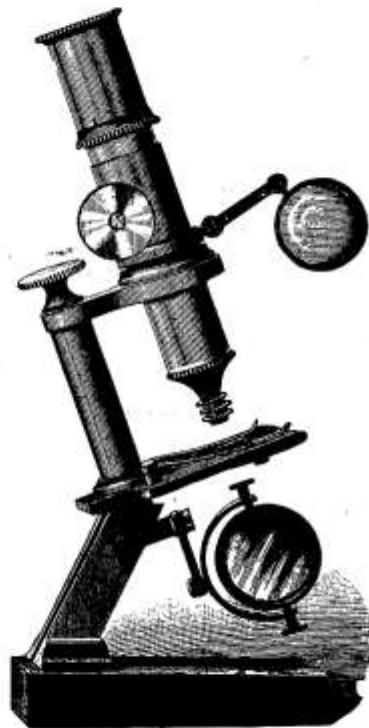
1354

1350. Boys' Microscope, 6 inches in height, with tubular lacquered brass stand, simple objective and one eye-piece, affording power of 40 diameters, including one prepared object, two glass slips, and a pair of brass forceps, in polished mahogany box \$2 50
1351. Youths' Microscope, 6 inches in height, with bronzed stand, two objectives and one eye-piece, affording powers of 50 and 75 diameters, including one prepared object, two glass slips and a pair of brass forceps, in polished walnut box. 3 50
1352. "Arcade" Microscope, 6 inches in height, with tubular lacquered brass stand, having joint affording any angle of inclination, triplet objective and one eye-piece, affording powers of 40, 60 and 80 diameters, including one prepared object, two glass slips, and a pair of brass forceps, in polished mahogany box. 5 00
1353. "Amateur" Microscope, 8 inches in height, with bronzed stand, having joint affording any angle of inclination, triplet objective and one eye-piece, affording powers of 45, 60 and 90 diameters, including one prepared object, two glass slips and a pair of brass forceps, in polished mahogany box. 6 00
1354. "Challenge" Microscope, similar to preceding, but with rack motion for the adjustment of focus. 7 00
1355. "Acme" Microscope, 9 inches in height, with bronzed stand having joint affording any angle of inclination, triplet objective and one eye-piece, affording powers of 50, 80 and 110 diameters, including one prepared object, two glass slips and a pair of brass forceps, in polished mahogany box. 7 50
1356. "Climax" Microscope, similar to preceding, but with rack motion for the adjustment of focus 8 50

MICROSCOPES.



1357

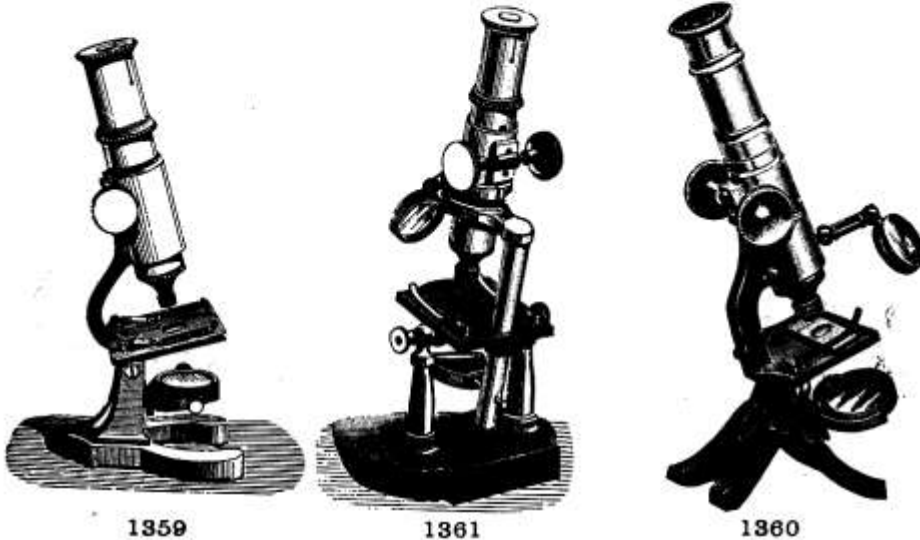


1358

1357. "International" Microscope, 12 inches in height, with lacquered brass stand having bronzed foot, and joint affording any angle of inclination, micrometer screw for fine adjustment of focus, revolving stage diaphragm, triplet objective and two eye-pieces, affording powers of 60 to 200 diameters ; including three prepared objects, three glass slips, one concave slip, and a pair of brass forceps; in polished walnut box with handle, lock and key \$16 00
1358. "Standard" Microscope, 9 $\frac{1}{2}$ inches in height, with lacquered brass stand having black japanned foot, and joint affording any angle of inclination, rack and pinion for adjustment of focus, attached condenser for illumination of opaque objects, revolving stage diaphragm, triplet objective and one eye-piece, affording powers of 50 to 175 diameters ; including two prepared objects, two glass slips, one concave slip and a pair of brass forceps; in polished mahogany box, \$17 50

B. Kahn & Son, New York.

MICROSCOPES.



1359. "Household" Microscope, 10 inches in height, with bronzed stand, having joint affording any angle of inclination, rack and pinion for adjustment of focus, a triplet objective and one eye-piece, affording powers of 40, 80 and 120 diameters, including three prepared objects, three glass slips, one concave slip and a pair of brass forceps, in polished walnut box with handle, lock and key.....\$12 00
1360. "Library" Microscope, 9 $\frac{1}{8}$ inches in height, with lacquered brass stand having black japanned foot, and joint affording any angle of inclination, rack and pinion for adjustment of focus, attached condenser for illumination of opaque objects, revolving stage diaphragm, triplet objective and one eye-piece, affording powers of 50 to 175 diameters, including two prepared objects, two glass slips, one concave slip and a pair of brass forceps, in polished mahogany box 12 00
1361. "Model" Microscope, 12 inches in height, with lacquered brass pillar-stand having bronzed base, and joint affording any angle of inclination, having *only* rack motion and attached condenser for illumination of opaque objects, stage diaphragm, extension draw-tube, one separable objective and one eye-piece, affording powers of 75 to 250 diameters, including two prepared objects, two standard glass slips, French polished mahogany box (objectives provided with "society screw.")..... 20 00
- 1361B. "Ideal" Microscope, similar to preceding, but having japanned iron base, no "society screw" non-extension draw-tube, and one triplet objective, affording powers of 50 to 150 diameters..... 15 00

MICROSCOPES.

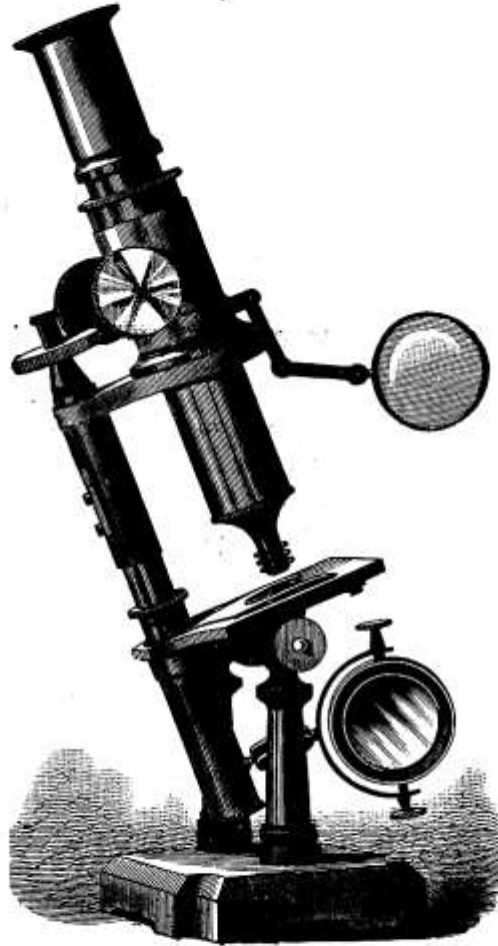


1362

1362. "Research" Microscope, 11 inches in height, with lacquered brass stand having black japanned foot, and joint affording any angle of inclination, rack and pinion for adjustment of focus, brass stage covered with hard rubber for resisting the action of acids or chemicals, revolving diaphragm, one eye-piece and one separable standard objective, $\frac{1}{4}$ inch focus, affording powers of 75 to 200 diameters, including two prepared objects, three glass slips and a pair of brass forceps, in polished mahogany box (objectives provided with society screw)...\$20 00
1363. "Educational" Microscope, 11 inches in height, with lacquered brass stand having black japanned foot, and joint affording any angle of inclination, rack and pinion for adjustment of focus, brass stage covered with hard rubber for resisting the action of acids, revolving diaphragm, extension draw tube, one eye-piece and two separable standard objectives of $\frac{1}{4}$ and $\frac{1}{2}$ inch focus, affording powers of 80 to 300 diameters, including prepared objects, glass slips and forceps, in polished mahogany box (objective provided with society screw) ... 30 00
1365. "College" Microscope, 11 inches in height, with lacquered brass stand having black japanned foot, and joint affording any angle of inclination, rack and pinion for adjustment of focus, brass stage covered with hard rubber to resist the action of acids, revolving diaphragm, extension draw tubes, two eye-pieces and three standard separable objectives of $\frac{1}{4}$, $\frac{1}{2}$ and $\frac{3}{8}$ inch focus, affording powers of 80 to 480 diameters, including prepared objects, glass slips and forceps, in polished mahogany box (objective provided with society screw) ... 40 00

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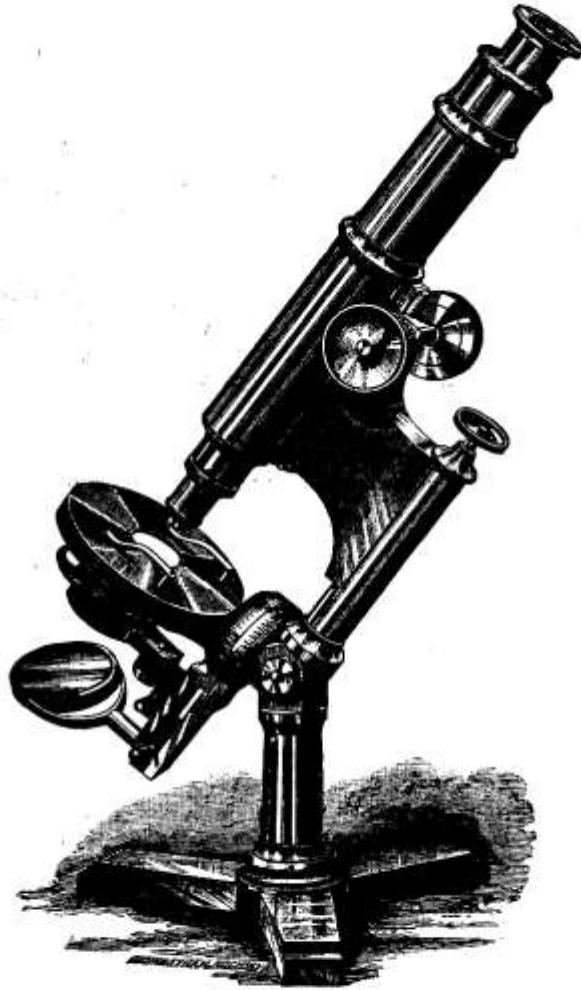
PHYSICIANS' MICROSCOPES



1365

1365. Physician's Microscope, 12 inches in height, with lacquered brass pillar-stand having bronzed base, and joint affording any angle of inclination, coarse and fine adjustment of focus effected, respectively, by rack and pinion and micrometer screw, attached condenser for illumination of opaque objects, stage-diaphragm, extension draw-tube, two triplet objectives and two eye-pieces, affording powers of 75 to 800 diameters; including two prepared objects, four standard glass slips, four concave centers and covers, a pair of brass forceps, one ivory disk, two dissecting needles and one knife; in French polished mahogany box (objectives provided with society screw)..... \$60 00
1366. Student's Microscope, 12 inches in height, similar to preceding, affording powers of 60 to 500 diameters, with but one dissecting needle and prepared object, etc., as in the above (objectives provided with society screw)..... 50 00

THE UNIVERSAL MICROSCOPE.



1367

1367. The "Universal" Microscope, 12 inches in height, having a brass base of tripod form, pillar and arm connected by a solid joint, which allows inclination of body to any angle, with swinging sub-stage revolving around the upper stage upon a graduated circle, very thin circular stage with clips, allowing the utmost obliquity of illumination and removable stage plate, rotating concentrically with the optic axis. Coarse adjustment by rack and pinion, and fine motion by delicate micrometer screw, conveniently placed at rear of arm, moving entire body without tremor, main tube with two draw-tubes, two eye-pieces, one of which being arranged with slot for micrometer, objectives $\frac{3}{4}$ and $\frac{1}{5}$ inch, glass stage and slide carrier, camera lucida, eye-piece micrometer, pliers, slides and covers. The whole packed in upright walnut case with handle, lock and key, and a drawer for accessories. Magnifying power, 35 to 600 diameters, complete \$87 00

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ACCESSORY APPARATUS.

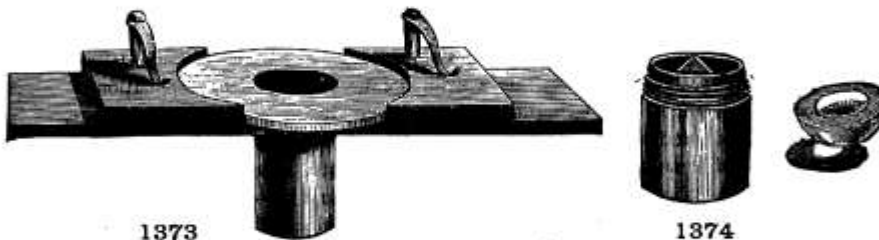
We here enumerate only such accessory apparatus as may prove of interest to amateurs. A complete line of professional accessories will be furnished to order.



1368. Polarizing Apparatus, with revolving polarizer and stationary analyzer, the latter to be placed either in the draw-tube or directly over the objective; complete, with one selenite.....\$13 50

The Polarizer has for its object the subdivision of a ray of light by refraction, resulting in the so-called polarized ray; the analyzer possessing the property of alternate transmission and retention of such polarized ray. The most gorgeous effects are obtained by the interposition of a doubly refractive film (selenite or mica) between the polarized ray and the analyzer, producing what is termed "chromatic polarization." Various objects in Nature, such as potato starch, fish scales, hairs, rock sections, etc., possess this quality to a marvelous degree, exhibiting many of the magnificent colors known to the spectrum.

1369. Selenites, of three colors, mounted on slide\$5 00
 1370. Parabolic Reflector, for dark field demonstration, rendering the appearance of a transparent object as if converted opaque..... 7 50
 1371. Condenser Mounting with iris diaphragm for controlling the volume of light-affording apertures from that of a pin-hole to a full opening by means of a lever, with graduated scale for recording aperture used..... 6 00
 1372. Camera Lucida, neutral tint, to fit any eye-piece, assisting in the drawing of an object by apparently reproducing its outlines upon the paper. 1 50

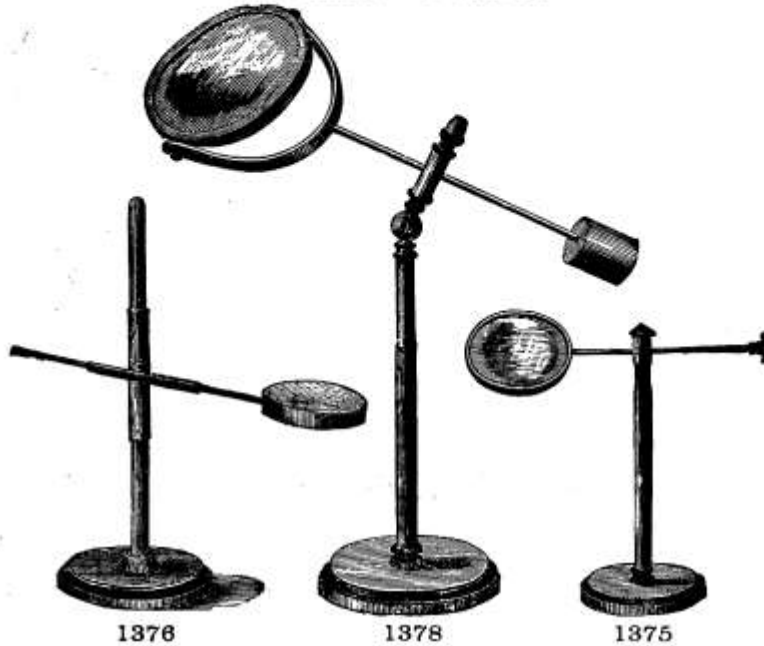


1373. Universal Accessory, combining the uses of polarizing apparatus, condenser and parabolic reflector, especially adapted to microscopes which are not provided with sub-stage\$15 00
 1374. Blue Glass Light-Moderator, either with fitting to sub-stage, or with society screw..... 1 50

B. Kahn & Son, New York.

ACCESSORY APPARATUS.

SEE "HEADING" ON PAGE 28.



CONDENSING LENSES.

MOUNTED ON LACQUERED BRASS STANDS, WITH UNIVERSAL ADJUSTMENT.

1375.	Condenser, double-convex lens, $1\frac{1}{2}$ inches in diameter.....	\$2 50
1376.	" plano- " " $1\frac{1}{2}$ " "	4 00
1377.	" " " " $2\frac{1}{2}$ " "	7 00
1378.	" " " " 3 " "	10 00

MICROSCOPE OBJECTIVES.



1379. MODERATE ANGULAR APERTURE.

Focal length:	$\frac{1}{2}$	$\frac{1}{2}$	$\frac{1}{2}$	$\frac{1}{2}$	$\frac{1}{2}$	$\frac{1}{10}$ inch.
	\$9 00	10 00	12 00	13 50	16 50	20 00

1380. WIDE ANGULAR APERTURE.

Focal length:	1	2 inches.
	\$9 00	10 50

STANDARD OBJECTIVES.

We are also prepared to furnish any of the first-class Achromatic Objectives offered by celebrated foreign or domestic manufacturers at prices which cannot fail to meet with approval. Parties desiring to purchase are kindly requested to communicate with us.

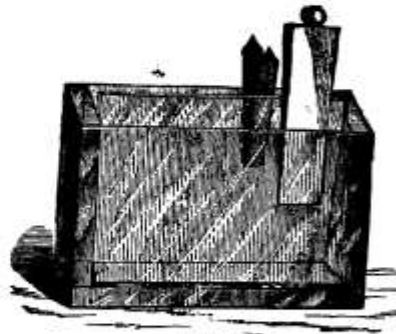
B. Kahn & Son, New York.

ACCESSORY APPARATUS.

SEE "HEADING" ON PAGE 28.



1381



1382

1381. Life-Box, for securing living objects while under observation :
 1381-1. Large size \$3 00 | 1381-2. Small size..... \$2 00
 1382. Zoöphyte Trough, complete with wedge and spring, for holding and sustaining the larger aquatic objects, best make..... 2 50
 1383. Zoöphyte Trough, of simple construction, small 60



1384



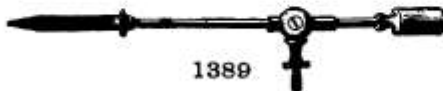
1386

1384. Holman's Life Slide, highly adapted to the protracted observation of living Infusoria, etc., with cover in box..... \$1 50
 1385. Holman's Siphon Slide, cover and tubes; no bottles..... 4 00
 1386. Glass Plate, with ledge..... 40

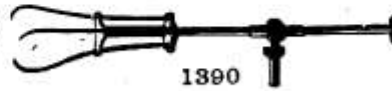


1387

1387. Compressor, similar to illustration, but without folding arm and lens, for investigating organic objects, etc., while under pressure..... \$2 50
 The above, when furnished with arm and lens, constitutes the only ready, convenient and portable Trichinoscope for the detection of the Parasitic Worm in Pork, etc. Additional cost, 50 cents.
 1388. Micrometer, ruled on glass in $\frac{1}{100}$ and $\frac{1}{1000}$ of an inch..... 1 25



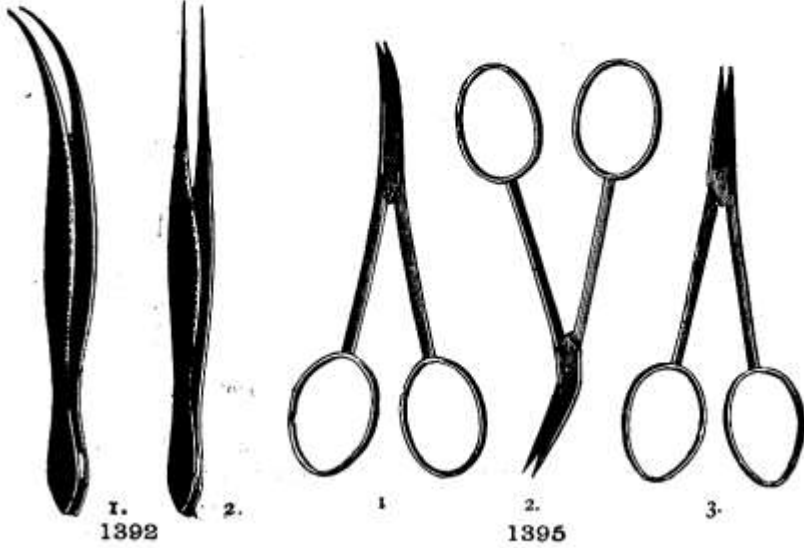
1389



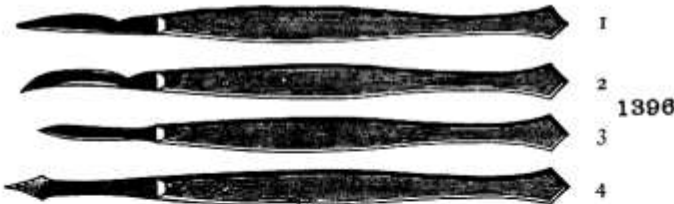
1390

1389. Stage Forceps, fitted to stage, of best make..... \$2 75
 1390. Stage Forceps, " " for holding minerals..... 5 00
 1391. Stage Forceps, mounted on universal stage-plate..... 2 00

MOUNTING IMPLEMENTS.



- 1392. Forceps, brass, nickel-plated, No. 2.....\$0 15
- 1393. " steel, " " Nos. 1 or 2..... 40
- 1394. " " " " " 1 or 2 delicate..... 1 00
- 1395. Dissecting Scissors, Nos. 1, 2 or 3..... 1 50



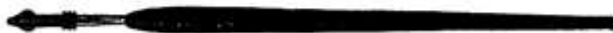
- 1396. Dissecting Knife, Nos. 1, 2, 3 or 4\$0 75



- 1397. Valentine's Knife, for cutting sections of soft tissues.....\$6 00



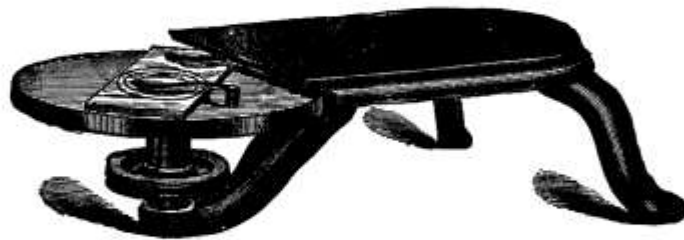
- 1398. Dissecting Needle, Nos. 1 or 2.....\$0 15



- 1399. Dissecting Needle-Holder, with clamp.....\$0 50

B. Kahn & Son, New York.

MOUNTING IMPLEMENTS.



1401

1400.	Turn-Table, japanned iron stand, for centering and mounting objects on glass slips.....	\$3 00
1401.	Turn-Table, improved, with revolving plate beneath hand-rest.....	4 00
1402.	Table and Lamp, for heating glass slips in balsam mounts, consisting of a brass tray supported by legs, and a glass spirit-lamp, complete.....	1 50
1403.	Capped Bottle, for holding mounting fluid.....	50
1404.	Bottle, with ground dipping and dropping stopper.....	25
1405.	Dipping and Dropping Tube, Bohemian glass.....	10
1406.	Pipette, with rubber bulb.....	20
1407.	Test-Tubes, Bohemian glass, per dozen.....	50
1408.	Watch Glasses, all sizes, each 5 cents, per dozen.....	50

MOUNTING MATERIALS.

GLASS SLIPS, WITH SMOOTHED EDGES.

STANDARD: 3 x 1 INCHES.

		PER DOZ.	PER GROSS.
1409.	Glass Slips, best "crown" plate, medium.....	\$0 15	\$1 75
1410.	" " " " " extra white and thin.....	20	2 00
1411.	" " " " " extra white and extra thin.....	40	4 50
1412.	Glass Slips, with concave centers, each, 10 cents.....	1 00	
1413.	Opal Glass Slips, " " " 15 ".....	1 25	

COVERS AND CELLS.

		PER DOZ.	PER OUNCE.
1414.	Cover Glasses, $\frac{1}{2}$, $\frac{5}{8}$, $\frac{3}{4}$, $\frac{7}{8}$, 1 inch, square, No. 1.....	\$0 18	\$1 80
1415.	" " " " " " " 2.....	16	1 40
1416.	" " " " " " " 3.....	14	1 00
1417.	" " " " " " circles, " 1.....	20	2 25
1418.	" " " " " " " 2.....	18	1 80
1419.	" " " " " " " 3.....	16	1 40
1420.	Ebonite Cells, $\frac{1}{2}$ inch, for mounting opaque objects.....	20	
1421.	" " or Block Tin Rings, for making cells on slides, assorted sizes.....	20	

MOUNTING AND STAINING MEDIA

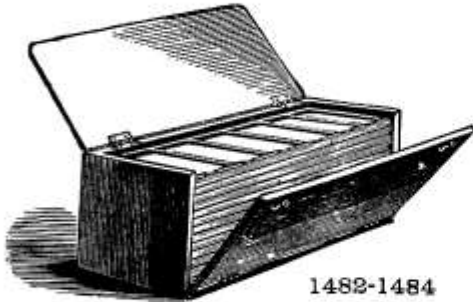


1422-1481

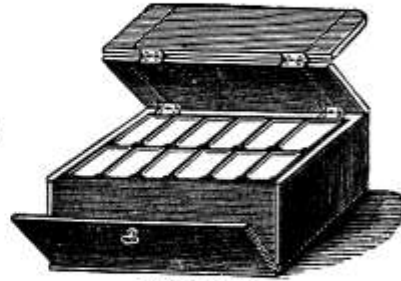
PER BOTTLE.		PER BOTTLE.		
1422.	Absolute Alcohol, Dr. Squibb's \$0	20	1455. Aniline Red	20
1423.	Benzole, pure	20	1456. " Violet	20
1424.	Canada Balsam, paper filtered, in flexible tubes	25	1457. Methyl, Blue	20
1425.	Canada Balsam, in benzole	50	1458. " Violet	20
1426.	" " in chloroform	50	1459. " Green	20
1427.	" " in Xylol	50	1460. Eosine	20
1428.	Damar, in Benzole	50	1461. Hæmatoxylin	20
1429.	Deane's, medium	35	1462. Sulpho-Indigotate Soda	20
1430.	Farrant's, medium	50	1463. Burrill's Stain for Bacillus Tuberculosis, with directions	35
1431.	Glycerine, pure	25	1464. Gentian Violet	20
1432.	" camphorated, for delicate vegetable tissues	25	1465. Bismarck Brown	20
1433.	Glycerine, jelly	50	1466. Osmic Acid, 1/2 oz., in glass capsule	2 00
1434.	Oil of Cloves	35	1467. Carmine Injecting Gelatine, Dr. Seiler's	1 00
1435.	Asphaltum	25	1468. Aniline Oil, pure, for use in preparation of Bacillus Tuberculosis	20
1436.	" quick drying	35	1469. Paraffine, pure, soft, melting point 109° F., pound	50
1437.	Turpentine	25	1469A Paraffine, pure, hard, melting point 129° F., pound	50
1438.	Brown's Transparent Rubber Cement	35	1470. Celloidine, 1 oz. box	1 25
1439.	Brunswick Black	25	1471. Cedar Oil, for microscopic purposes	50
1440.	Gold Size	25	1472. Dr. Gibbe's Double Stain, for Bacillus Tuberculosis	50
1441.	Hollis' Glue	30	1473. Fuchsine	25
1442.	King's Amber Cement, transparent, with directions	25	1474. Safranine	25
1443.	King's White Cement, transparent, with directions	25	1475. Vesuvin	25
1444.	King's Lacquer Cell and Finish, scarlet, with directions	50	1476. Nitric Acid in Alcohol, 3 per cent. solution	25
1445.	King's Lacquer Cell and Finish, blue, with directions	50	1477. Iodo-Iodide Potassa, 0.3 per cent. solution	25
1446.	Marine Glue, hard, melting point 250° F., box	35	1478. Caustic Potassa, 0.5 per cent. solution	25
1447.	Marine Glue, fluid	35	1479. Carbonate of Potash, 0.3 per cent. solution	25
1448.	" " colorless	40	1480. Phenolphthaleine	25
1449.	White Zinc Cement	50	1481. Pot. Ferro-Cyanide, with 0.1 per cent. Acetic Acid	25
1450.	Ammonia Carmine, Beale's	25		
1451.	Borax	25		
1452.	Picro	25		
1453.	Aniline Blue	20		
1454.	" Green	20		

B. Kahn & Son, New York.

OBJECT CABINETS.

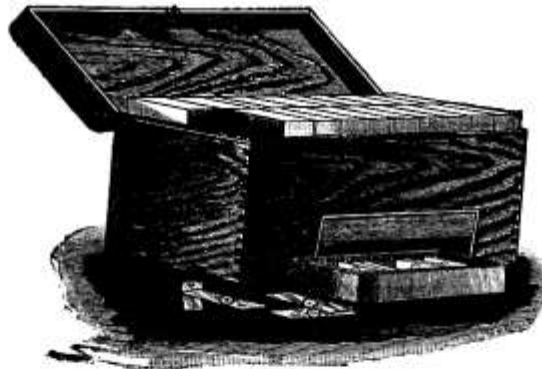


1482-1484



1485-1486

1482.	Whitewood Cabinet,	4	Trays,	capacity,	24	objects.....	\$1 00
1483.	"	"	8	"	"	48	"
1484.	"	"	12	"	"	72	"
1485.	Mahogany	"	12	"	"	72	"
1486.	"	"	12	"	"	144	"
1487.	Walnut	"	with	racks,	"	200	"



1488

1488.	Portable Cabinet, Pilsbury's,	containing	10	boxes	for	200	slides.....	\$3 00
1489.	"	"	20	"	"	500	"	4 00

The Pilsbury Cabinet consists of a finely polished cherry case, containing ten or twenty boxes, grooved on the inside, to receive twenty-five slides each, and provided with a lock. When the boxes are in place in the cabinet the slides lie horizontally, thus avoiding all liability of damage to slides in top.

The top of each box, as placed in the cabinet, is provided with an index, and on the bottom of the box, inside, is a corresponding number to show the proper location of each slide. If a cabinet is not required, the boxes may be used singly, as a simple rubber band serves to hold the cover securely in place. They are of plain whitewood, neatly finished.

1490.	Cabinets, mahogany, solid door, for	500	objects.....	\$35 00	
1491.	"	"	750	"	
1492.	"	"	1,000	"	
1493.	"	glass panel door, for	500	objects.....	40 00
1494.	"	"	750	"	
1495.	"	"	1,000	"	

Objects in all above cabinets lie flat. In cabinets Nos. 1489 to 1494 the knobs are numbered, and porcelain tablets are inlaid into the fronts of the drawers.

MICROSCOPE OBJECT BOXES.

		PER DOZEN.	EACH.
1496.	Tray of heavy cardboard, 13 x 8 $\frac{1}{2}$ inches, holding 20 objects, with flap covers.	\$5 00	\$0 50
1497.	Mailing Boxes, wood, to hold 1 object.	60	06
1498.	" " " " 3 "	80	08
1499.	" " " " 6 "	90	10
1500.	" " " " 12 "	1 00	12
1501.	" " " " 25 "	1 25	15

These are neatly finished and arranged same as those furnished with Pillsbury's cabinets, Nos. 1488 and 1489

LABELS AND COVERS FOR SLIDES.

1502.	Adhesive Labels, white, round or oval, per 100.	\$0 10
1503.	" " square, with borders, assorted colors, per 100.	25
1504.	" " gilt fronts, for covering slides, per 100.	25
1505.	" " backs, per 100	25
	Backs and Fronts, if with holes punched, per 100, extra.	10

FINE MICROSCOPE OBJECTS.

1506.	Mounted upon slides, 3 x 1 inches, including preparations of animals, insects, vegetables and minerals, diatoms, etc., etc.	from 50 cents each upwards
1507.	Micro-Photographs, 3 x 1 inches	per dozen, \$5 00, each, \$0 50

MICROSCOPIC RULINGS.

1508.	Test Plate of 19 Bands, from 1-100 to 1-6,000 of a millimetre.	\$18 00
1509.	" " 26 " " 1-5,000 to 1-250,000 of an inch.	25 00
1510.	" " 18 " " 1-5,000 to 1-120,000 "	15 00
1511.	" " ruled, from 1-5,000 to 1-60,000 "	10 00
1512.	" " " 1-5,000 to 1-50,000 "	8 50
1513.	" " " 1-2,000 to 1-30,000 "	7 00
1514.	Abbe's Test-Plate, for proving objectives in respect of spherical and chromatic aberration	2 50

EDUCATIONAL OBJECTS.

To meet the wants of schools and amateurs we keep in stock a series of cheap, well-mounted, interesting and instructive objects, which we will select with special reference to subjects desired by the purchaser.

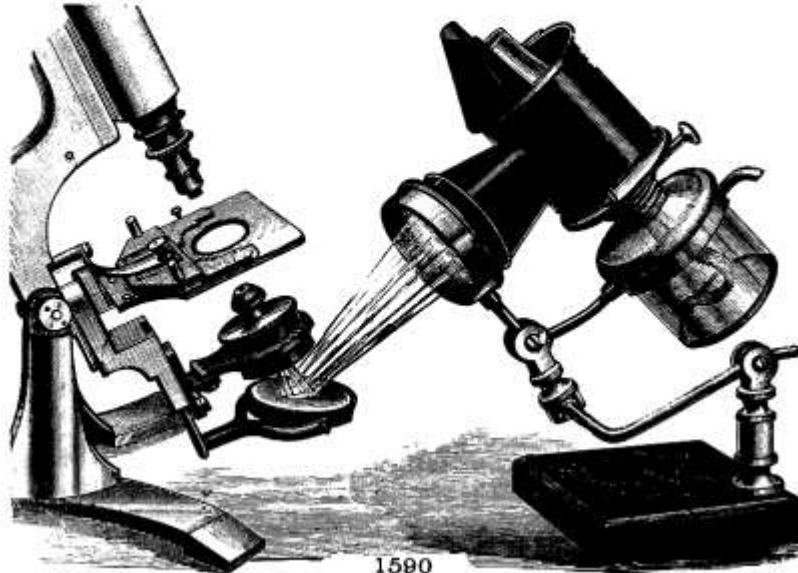
1515.	On slips 2 $\frac{3}{8}$ x $\frac{3}{4}$ inches	each, \$0 15; per dozen, \$1 25
1516.	On slips 3 x 1 inches.	" 25; " 2 50

BOOKS ON THE MICROSCOPE.

1517.	Cook. 1,000 objects described, 400 illustrations, colored.	\$0 75
1518.	Wood. Common Objects of the Microscope, 400 illustrations.	50
1519.	Phin. Practical Hints on the Selection and Use of the Microscope.	1 00

B. Kahn & Son, New York.

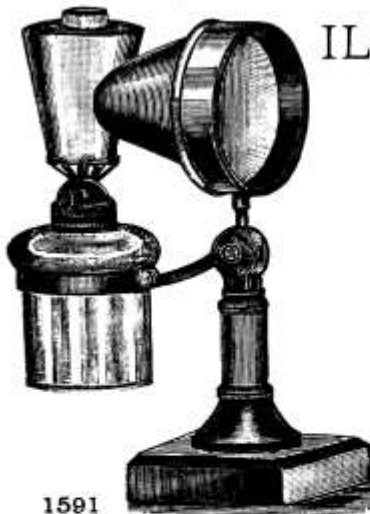
PEERLESS MICROSCOPIST'S LAMP.



1590

1590. Peerless Microscopist's Lamp, incomparably the best lamp made. Combining the best features of all other lamps, with many new and original. 2 3/4 inch condenser, with reflector and blue glass moderator..... \$6 00

ILLUMINATORS.



1591



1592

Its value for making examinations of the natural cavities in operations of minor surgery will be obvious to physicians. Very useful as a night lamp for the sick in cases of insomnia, etc. in which it is desirable to avoid diffused light, permitting a concentrated light only on necessary objects, such as the clock or the medicines to be administered, while leaving the room dark.

- 1591. Illuminator, full nickel-plate, with oil lamp..... \$3 50
- 1592. " " " " for gas, with drop-light attachment. 4 00
- 1593. " " " " for gas, with upright attachment..... 3 00

THE TELESCOPE.

The Telescope is an optical instrument for viewing distant objects, by increasing the apparent angle under which they are seen without its assistance; and hence the effect on the mind of an increase in size or a magnified representation of the object. The invention of the telescope is one of the most important acquisitions that the sciences ever attained, as it unfolds to our view the wonderful mechanism of the heavens, and enables us to obtain data for astronomical, nautical, and engineering purposes.

The principle is identical with that of the compound microscope described on page 21. The simplest construction of the telescope consists of two convex lenses so combined that their distance apart shall be equal to the sum of their respective focal distances.



If we take a convex lens *A* of, say, 8 inches focus as an object-glass, and another *B*, say of 2 inches focus, as an eye-piece, and place them at a distance apart equal to the sum of their foci, or 10 inches, we will obtain an image of the object *O* through agency of the lens *A* at *F*, which, being magnified by the lens *B*, will render the object *O* as if viewed under the apparent angle *BEB* instead of the natural angle *OEO*.

By this arrangement we obtain a telescope suitable for viewing distant objects transmitting parallel rays; but when the object is comparatively near, the distance between the two lenses must be increased to adjust for distinct vision; it is in consequence that the eye-lens is mounted in a tube sliding within another tube in which the object-glass is fixed, and therefore can be drawn out for near objects. By the employment of a single-lens objective, however, a false coloring of the image is produced, due to *chromatic aberration*, which defect is almost wholly corrected by closely uniting a convex lens of *crown* glass with a concave lens of *flint* glass, constituting what is termed an *achromatic lens*. And yet, even were the image formed by such object-glass *absolutely* perfect, if viewed through a single convex eye-lens of short focus, it would appear curved, indistinct, colored, and also *distorted*, from the fact that the pencils of light fail to pass exactly through the center of such eye-piece. This defect is, however, successfully obviated by the use of an eye-piece consisting of *two* lenses instead of one, in which case the lens nearest the object-glass is termed the *field-lens*.

Our Achromatic Portable Telescopes are all of the latter type, the 22-ligne glasses being very superior Terrestrial instruments, as well as affording excellent views of the Sun, Moon, Satellites of Jupiter, etc., etc. To obtain the best results, they should be used on a Tripod Stand, or with one of our Clamp-Rests. See page 42 and 43.

THE ASTRONOMICAL TELESCOPE

Is of the same principle of construction as that just described, object-glasses of increased diameter and long focal distance being employed. To insure perfect steadiness and convenience, astronomical telescopes should be mounted upon firm stands, the larger and more powerful instruments requiring, for ready observation, to be provided with a *Finder*, which is a small telescope attached with its axis parallel to that of the larger telescope, so that a star brought to the center of the large field of the Finder is in, or very near, the center of the smaller field of the larger telescope. By such arrangement the line of sight is quickly established, the inconvenience of tedious searching being fully obviated.

Owing to the limited space at our disposal, we cannot enter into a description of the more elaborate Telescopes with Equatorial Mountings, though we shall be pleased to render special quotations for instruments of this class.

The telescopes herein enumerated are manufactured by the celebrated maker, Bardou of Paris.

B. Kahn & Son, New York.

ACHROMATIC PORTABLE TELESCOPES.

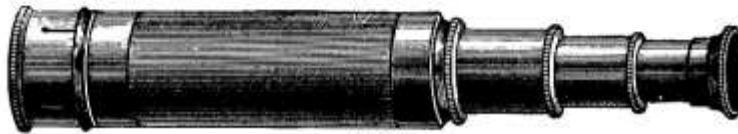
11 LIGNES=1 INCH.



1600

1600. Portable Telescope, black morocco covered body, highly burnished brass draw-tubes, according to size as follows :

DIMENSIONS.		DIAMETER OF OBJECT-GLASS.	MAGNIFYING POWER.	
OPEN.	CLOSED.			
13 $\frac{1}{2}$ inches.	5 inches	10 lignes	10 times	\$2 50
16 $\frac{1}{2}$ "	6 "	12 "	15 "	3 00
17 "	6 $\frac{1}{4}$ "	13 "	20 "	4 00
17 "	6 $\frac{1}{2}$ "	14 "	20 "	4 50
23 "	8 "	16 "	25 "	5 50
30 "	9 $\frac{3}{4}$ "	19 "	30 "	7 50
34 "	10 $\frac{1}{4}$ "	22 "	35 "	12 00



1601

1601. Portable Telescope, polished mahogany covered body, highly burnished brass draw-tubes, according to size as follows :

DIMENSIONS.		DIAMETER OF OBJECT-GLASS.	MAGNIFYING POWER.	
OPEN.	CLOSED.			
13 $\frac{1}{2}$ inches.	5 inches	10 lignes	10 times	\$2 50
16 $\frac{1}{2}$ "	6 "	12 "	15 "	3 00
17 "	6 $\frac{1}{4}$ "	13 "	20 "	4 00
17 "	6 $\frac{1}{2}$ "	14 "	20 "	4 50
23 "	8 "	16 "	25 "	5 50
30 "	9 $\frac{3}{4}$ "	19 "	30 "	7 50
34 "	10 $\frac{1}{4}$ "	22 "	35 "	12 00



1602

1602. Portable Telescope, braided twine covered body, highly burnished brass draw-tubes, according to size as follows :

DIMENSIONS.		DIAMETER OF OBJECT-GLASS.	MAGNIFYING POWER.	
OPEN.	CLOSED.			
23 inches.	8 inches	16 lignes	25 times	\$6 50
30 "	9 $\frac{3}{4}$ "	19 "	30 "	7 50
34 "	10 $\frac{1}{4}$ "	22 "	35 "	15 00

1603. Portable Telescope, as above, with sun-shade to extend over object-glass, according to size as follows :

DIMENSIONS.		DIAMETER OF OBJECT-GLASS.	MAGNIFYING POWER.	
OPEN.	CLOSED.			
23 inches.	8 inches	16 lignes	25 times	\$7 00
30 "	9 $\frac{3}{4}$ "	19 "	30 "	8 00
34 "	10 $\frac{1}{4}$ "	22 "	superior 40 "	16 50
48 "	12 $\frac{1}{4}$ "	25 "	45 "	20 00
51 "	13 $\frac{1}{2}$ "	27 "	50 "	30 00
54 "	16 "	30 "	75 "	40 00

ACHROMATIC PORTABLE TELESCOPES.

11 LIGNES = 1 INCH.



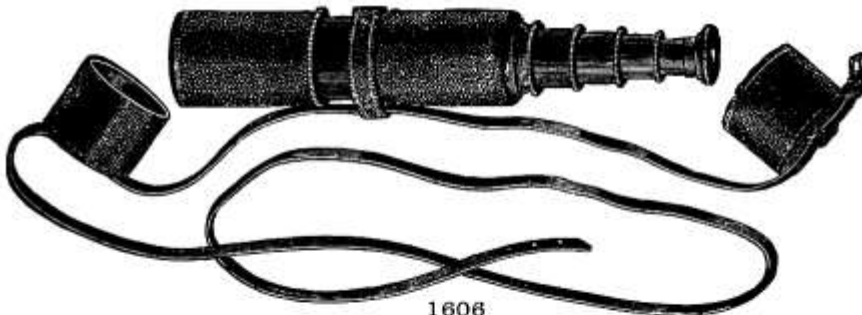
1604

1604. Portable Telescope, black morocco covered body, oxidized metal draw tubes and sun-shade, according to size, as follows :

DIMENSIONS.		DIAMETER OF OBJECT-GLASS.	MAGNIFYING POWER.	
OPEN.	CLOSED.			
23 inches.	8 inches	16 lignes	25 times	\$7 75
30 "	9 ³ / ₄ "	19 "	30 "	9 00
34 "	10 ¹ / ₄ "	22 " superior	35 "	17 50

1605. Portable Telescope, as above, without sun-shade, as follows :

DIMENSIONS.		DIAMETER OF OBJECT-GLASS.	MAGNIFYING POWER.	
OPEN.	CLOSED.			
23 inches.	8 inches	16 lignes	25 times	\$6 75
30 "	9 ³ / ₄ "	19 "	30 "	9 00
34 "	10 ¹ / ₄ "	22 " superior	40 "	16 50



1606

1606. Tourist's Telescope, superior, black morocco covered body, with sun-shade, leather caps and strap, oxidized metal draw-tubes, manufactured by Bardou, Paris:

DIMENSIONS.		DIAMETER OF OBJECT-GLASS.	MAGNIFYING POWER.	
OPEN.	CLOSED.			
20 ¹ / ₂ inches	6 ¹ / ₂ inches	16 lignes	25 times	\$12 00
29 "	7 ³ / ₄ "	19 "	30 "	18 00
36 "	11 "	22 "	35 "	22 50



1607

- 1607. Rifleman's Telescope, one draw, 7 inches closed, 11 inches open, object-glass ³/₄ inch diameter. \$2 50
- 1608. Target Telescope, one draw, 13 inches closed, 18 inches open, object-glass 1¹/₄ inches diameter 3 50
- 1609. Officer's Conical Telescope, two draws, 15 inches closed, 29 inches open, object-glass 1⁷/₈ inches diameter. 9 00

B. Kahn & Son, New York.

ACHROMATIC MARINE TELESCOPES.

11 LIGNES = 1 INCH.



1610

1610. Marine Telescope, braided twine covered body, with sun-shade, and highly burnished draw tube :

DIMENSIONS.		DIAMETER OF OBJECT-GLASS.	MAGNIFYING POWER.	
OPEN.	CLOSED.			
33 inches.	20 inches	16 lignes	30 times	\$8 00
35 "	20 1/2 "	19 "	35 "	11 00
42 "	23 1/2 "	22 "	40 "	14 00

1611. Marine Telescope, as above, with two "draws" :

DIMENSIONS.		DIAMETER OF OBJECT-GLASS.	MAGNIFYING POWER.	
OPEN.	CLOSED.			
33 inches.	14 3/4 inches	16 lignes	30 times	\$8 00
35 "	15 1/2 "	19 "	35 "	11 00
42 "	18 "	22 "	40 "	14 00

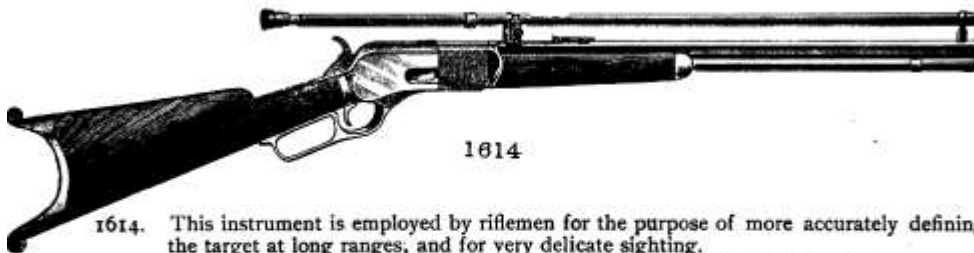
1612. Marine Telescope, smooth black kid body, with sun-shade, and highly burnished draw-tube, manufactured by Bardou, Paris :

DIMENSIONS.		DIAMETER OF OBJECT-GLASS.	MAGNIFYING POWER.	
OPEN.	CLOSED.			
37 inches.	21 1/4 inches	19 lignes	35 times	\$18 00
39 "	22 1/8 "	22 "	40 "	22 50
42 "	24 "	25 "	45 "	30 00
44 "	26 "	27 "	50 "	40 00

1613. Marine Telescope, braided twine covered body, highly burnished draw-tube, without sun-shade ; dimensions as follows :

OPEN.	CLOSED.	OBJECT-GLASS.	MAGNIFYING POWER.	
24 inches.	14 1/2 inches	16 lignes	25 times	\$5 00

THE RIFLE TELESCOPE.



1614

1614. This instrument is employed by riflemen for the purpose of more accurately defining the target at long ranges, and for very delicate sighting.

It is very neat in appearance, and adds but little to the weight of the rifle.

Price, with attachments.....\$25 00
Mahogany Case for the above..... 4 00

TOY TELESCOPES.

1615. Toy Telescope, colored japan body, brass draw-tubes :

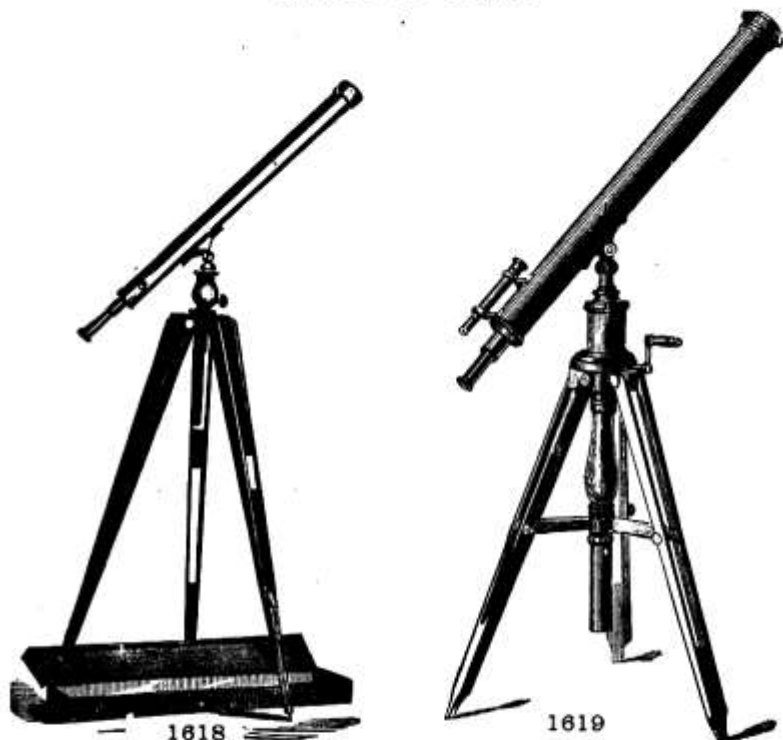
Open, 3 1/2 - 5 1/2 inches; closed, 2 1/2 inches; object-glass, 11 lignes; draws, 1 2 3
\$0 35 45 65

OBJECTIVES FOR TELESCOPES.

1616. Objective for Portable Telescope :	10	11	13	16	19	22 lignes.
	\$1 00	1 00	1 00	1 50	2 50	4 50
1617. Objective for Marine Telescope :		16	19			22 lignes.
		\$1 50		2 50		4 50

ACHROMATIC ASTRONOMICAL TELESCOPES

MANUFACTURED BY
BARDOU, OF PARIS.



1618. Astronomical Telescope, with body and movements of highly finished lacquered brass, rack and pinion for adjustment of focus, object-glass 3 inches in diameter, one terrestrial eye-piece and one celestial eye-piece, with sun-glass, affording, respectively, powers of 45 and 100 diameters; packed in strong wood case, with lock and key. The telescope is mounted upon a firm walnut tripod stand, with altitude and azimuth movements, and arrangement for setting at any desired height for convenient observation; complete..... \$75 00
1619. Astronomical Telescope, body with finder and movements of highly finished lacquered brass, rack and pinion for adjustment of focus, object-glass $3\frac{1}{4}$ inches in diameter, two terrestrial eye-pieces, affording, respectively, powers of 50 and 70 diameters; three celestial eye-pieces, with sun-glass, powers of 75, 100 and 150 diameters; packed in strong walnut case, with lock and key. The telescope is mounted upon a very finely polished, firm mahogany tripod stand with folding legs, and can be adjusted to any desired height by a rack and pinion operated by a crank; complete.....200 00
1620. Astronomical Telescope, similar to above, having object-glass, $3\frac{1}{2}$ inches in diameter, with two terrestrial eye-pieces, affording, respectively, powers of 60 and 80 diameters, and three celestial eye-pieces, with sun-glass, powers of 100, 135 and 175 diameters; complete.....250 00

B. Kahn & Son, New York.

TRIPODS FOR TELESCOPES.



1621



1622

1621. Tripod, hardwood, with saddle for support of telescope, affording altitude and azimuth movements, best make.....\$5 00
 1622. Tripod, similar to preceding, with staunch legs, and an additional arrangement for raising and lowering the telescope, best make..... 8 00

PARTS AND ACCESSORIES.

FOR ASTRONOMICAL TELESCOPES.



1624



1625

1623. Terrestrial Eye-pieces for telescopes.....\$7 50
 1624. Celestial Eye-pieces with black sun-glass..... 5 50
 1625. Diagonal or Prismatic Eye-piece.....15 00

IMPROVED TRIPODS FOR TELESCOPES.



- 1626. Tripod, hardwood, with saddle for support of telescope, affording altitude and azimuth movements, and sliding legs, rendering it more portable, best make... \$5 00
- 1627. Tripod, same as above, without saddle for telescope, arranged to attach clamp rests of any size 4 00
- 1629. Tripod, similar to 1626, heavier model, best make 8 00

CLAMP RESTS FOR TELESCOPES.

A convenient device with suitably hinged collar and gimlet screw for fastening to tree, post or window-frame, intended to relieve the fatigue of the arm during protracted observations with the larger portable telescopes.



1630

- 1630. Clamp Rest, collar and clamp-nut of lacquered brass, with steel gimlet screw :

16	19	22	25	27 lignes.
\$2 00	2 50	3 00	4 00	5 00

B. Kahn & Son, New York.

OPERA GLASSES.

These are binocular instruments, in which the optical construction differs but little from that of the simple telescope already described, a plano, or double, concave eye-lens being merely substituted for the ordinary convex one, with reference to each of the tubes, the comparative shortness of body rendering such arrangement available.

The Opera Glasses herein enumerated except in few instances, are all furnished with object-glasses of that class known as "Achromatic" (see description of the telescope), the sizes being listed according to French measurement, with reference to the diameter of the object-glasses, and wherein 11 lignes are equal to 1 inch.

Where not otherwise specified, our Opera Glasses are all of the latest improved model, with curved cross-bars and low tops, and are furnished in satin-lined, fine morocco cases.

FIELD OR MARINE GLASSES

are but a modification of the above in point of size, their application to longer ranges of view requiring the distance between the object-glasses and eye-pieces to be increased, to afford higher power, as well as an increase in the diameter of the object glasses being necessary for sustaining a fair proportion of light. As they are intended for outdoor use, sun-shades are arranged to extend beyond the object-glasses to keep off the sun or rain, and are made very substantially throughout, in order to bear the rough handling of field or marine service. Where not otherwise specified, our Field Glasses are all of the latest improved model, with curved cross-bars and high tops. We call particular attention to the appropriate application of

ALUMINUM

to the manufacture of both Opera and Field Glasses, as the extreme lightness of this metal reduces the weight of the instruments very materially, thereby tending to greatly obviate that fatigue of the arm consequent to the use of those of other material.

OPERA AND FIELD GLASSES

MANUFACTURED BY THE

SOCIÉTÉ D'OPTIQUE, PARIS,

as made exclusively for us, are constructed with special reference to their optical perfection, and are warranted to afford the highest attainable results. Since their first introduction they have been received with extraordinary favor, and we confidently believe them to be of higher finish and more graceful than those of any other make.

As the styles of fancy leather opera glasses are constantly changing, we will always "substitute" unless specially requested not to do so.

ACHROMATIC OPERA GLASSES.



1700



1705

ALL PEARL.

1700. Opera Glasses, 12 superior lenses, with body, cross-bars, tops, draw-tubes, trimmings, and adjusting bar all of best selected white pearl; manufactured by Lemaire, Paris:

13	15	17 lignes.
\$30 00	35 00	40 00

PEARL AND ALUMINUM.

1701. Opera Glasses, 12 superior lenses, best selected white pearl body, tops and draw-tubes, aluminum frame, cross-bars and trimmings; manufactured by Lemaire, Paris:

13	15	17 lignes.
\$30 00	35 00	40 00

1702. Opera Glasses, similar to preceding, with aluminum draw-tubes in lieu of pearl; manufactured by Lemaire, Paris:

13	15	17 lignes.
\$30 00	35 00	40 00

1703. Opera Glasses, 6 superior lenses, best selected white pearl body, tops and draw-tubes of aluminum; also cross-bars and trimmings; manufactured by Lemaire, Paris:

13	15	17 lignes.
\$25 00	30 00	35 00

1704. Opera Glasses, similar to preceding, with aluminum draw-tubes; manufactured by Colmont, Paris:

13	15	17 lignes.
\$18 00	20 00	23 00

ALL ALUMINUM.

1705. Opera Glasses, 12 superior lenses, with elaborately chased aluminum body and cross-bars, burnished draw-tubes, tops, trimmings and adjusting bar; manufactured by Lemaire, Paris:

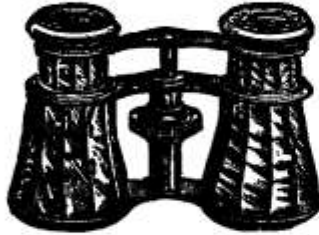
13	15	17 lignes.
\$30 00	35 00	40 00

1706. Opera Glasses, 12 superior lenses, with elaborately chased aluminum body and cross-bars, burnished draw-tubes, tops, trimmings and adjusting bar; manufactured by Colmont, Paris:

13	15	17 lignes.
\$18 00	20 00	23 00

THE ABOVE ARE ALL FURNISHED IN SATIN-LINED SILK-VELVET CASES.

ACHROMATIC PEARL OPERA GLASSES.



1708



1707

1707. Opera Glasses, with either white or iridescent pearl body, draw-tubes and tops, richly gilt cross-bars and trimmings; manufactured by Lemaire, Paris:
- | | | | |
|---------|-------|-------|------------|
| 11 | 13 | 15 | 17 lignes. |
| \$12 00 | 13 50 | 15 00 | 16 50 |
1708. Opera Glasses, similar to preceding, with richly gilt draw-tubes in lieu of pearl; manufactured by Lemaire, Paris:
- | | | | |
|---------|-------|-------|------------|
| 11 | 13 | 15 | 17 lignes. |
| \$10 00 | 12 00 | 13 50 | 15 00 |
1709. Opera Glasses, as above, with milled-edge trimmings; manufactured by Colmont, Paris:
- | | | | |
|--------|------|-------|------------|
| 11 | 13 | 15 | 17 lignes. |
| \$8 50 | 9 50 | 10 50 | 12 00 |
1710. Opera Glasses, with iridescent pearl body and draw-tubes, inlaid pearl tops, black japanned cross-bars and trimmings; manufactured by Lemaire, Paris:
- | | | | |
|---------|-------|-------|------------|
| 11 | 13 | 15 | 17 lignes. |
| \$12 00 | 13 50 | 15 00 | 16 50 |
1711. Opera Glasses, similar to preceding, with richly gilt draw tubes and black tops in lieu of pearl; manufactured by Lemaire, Paris:
- | | | | |
|---------|-------|-------|------------|
| 11 | 13 | 15 | 17 lignes. |
| \$10 50 | 11 50 | 12 50 | 14 00 |
1712. Opera Glasses, 12 superior lenses, with either white or oriental pearl body and tops, richly gilt draw-tubes, cross-bars and trimmings; manufactured by Lemaire, Paris:
- | | | | |
|--|---------|------------|--|
| | 13 | 15 lignes. | |
| | \$20 00 | 22 50 | |
1713. Opera Glasses, with either amber, royal purple or cardinal pearl body and tops, richly gilt draw-tubes, cross-bars and beaded trimmings; manufactured by Lemaire, Paris:
- | | | | |
|---------|-------|------------|--|
| 11 | 13 | 15 lignes. | |
| \$12 50 | 13 50 | 15 00 | |
1714. Opera Glasses, with either white or oriental pearl body, draw-tubes and tops, gilt cross-bars and trimmings; manufactured by Marquis, Paris:
- | | | | |
|--------|------|------|------------|
| 11 | 13 | 15 | 17 lignes. |
| \$6 75 | 7 50 | 9 00 | 10 50 |
1715. Opera Glasses, similar to preceding, with nickeled draw-tubes, cross-bars and trimmings; manufactured by Lemaire, Paris:
- | | | | |
|---------|-------|-------|------------|
| 11 | 13 | 15 | 17 lignes. |
| \$10 50 | 12 50 | 14 00 | 15 00 |

ACHROMATIC PEARL OPERA GLASSES.



1716



1717

1716. Opera Glasses, smoked, white or oriental pearl body, encircled by richly gilt "laurel-leaf" bands, pearl tops, silvered cross-bars, richly gilt draw-tubes and trimmings; manufactured by Lemaire, Paris :

11	13	15 lignes.
\$12 00	13 50	15 00

1717. Opera Glasses, with body, draw-tubes and tops of alternating sections of black and white pearl, richly gilt cross-bars and beaded trimmings; manufactured by Lemaire, Paris :

13	15 lignes.
\$15 00	16 50

1718. Opera Glasses, similar to preceding, with richly gilt draw-tubes in lieu of pearl, not beaded; manufactured by Lemaire, Paris :

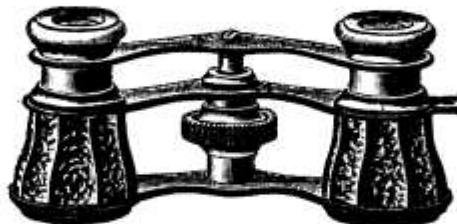
13	15 lignes.
\$12 00	13 50

1719. Opera Glasses, with smoked pearl body, draw-tubes and tops, black japanned cross-bars and trimmings; manufactured by Lemaire, Paris :

13	15 lignes.
\$11 00	12 00

VEST-POCKET GLASSES.

MADE BY LEMAIRE, PARIS.



1720

1720. Opera Glasses, white pearl body and tops, gilt draw-tubes and cross-bars, 8 lignes. \$10 50
- 1720A. Opera Glasses, oriental pearl body and tops, gilt draw-tubes and cross-bars, 8 lignes. 10 50
- 1720B. Opera Glasses, black morocco body, black japanned draw-tubes, tops and cross-bars, 8 lignes. 6 50

B. Kahn & Son, New York.

OPERA GLASSES AND HOLDERS.



1732



1726



1721

- | | | | | |
|-------|--|---------|-------|---------|
| 1721. | Opera Glasses, oriental pearl body, richly gilt draw-tubes and trimmings, pearl tops and detachable handle, in plush case ; manufactured by Lemaire, Paris : | 13 | 15 | |
| | | \$35 00 | 40 00 | |
| 1722. | Opera Glasses, white pearl body, richly gilt draw-tubes and trimmings, pearl top and detachable handle in plush case ; manufactured by Lemaire, Paris: | 13 | 15 | |
| | | \$35 00 | 40 00 | |
| 1723. | Opera Glasses, with oriental pearl body and tops, richly gilt draw-tubes and trimmings, and folding pearl handle attached to the side of glass, in plush case ; manufactured by Colmont, Paris : | 13 | 15 | |
| | | \$30 00 | 35 00 | |
| 1724. | Opera Glasses, similar to preceding, but white pearl : | 13 | 15 | |
| | | \$30 00 | 35 00 | |
| 1725. | Opera Glasses, similar to preceding, but body and handle of elaborately chased aluminum : | 13 | 15 | |
| | | \$35 00 | 40 00 | |
| 1726. | Opera Glass Holders, oriental pearl handle..... | | | \$10 00 |
| 1727. | " " " white " " | | | 9 50 |
| 1728. | " " " smoke " " | | | 9 00 |
| 1729. | " " " "Gorham" solid silver handle..... | | | 9 00 |
| 1730. | " " " silver handle, bright or oxidized..... | | | 7 50 |
| 1731. | " " " hard rubber handle and gilt, engine turned..... | | | 4 50 |
| 1732. | Single Opera Glasses, fine morocco covered body, black japanned draw-tube ; manufactured by Lemaire, Paris : | 13 | 15 | 17 |
| | | \$3 50 | 4 00 | 4 50 |

ACHROMATIC LEATHER OPERA GLASSES.



1733



1739

SPECIAL MODEL OPERA GLASSES.

DESIGNED TO AFFORD LARGE FIELD OF VIEW.

MANUFACTURED BY THE

SOCIÉTÉ D'OPTIQUE, PARIS.

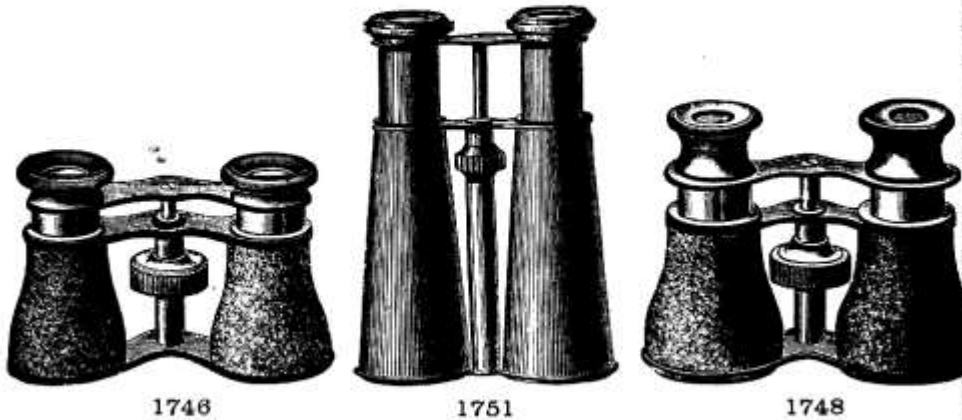
1733. Opera Glasses, smooth black kid, bell-shaped body, encircled by three finely gilt unique beaded bands, richly gilt draw-tubes and trimmings, black japanned cross-bars and tops:
- | | | |
|--|---------|------------|
| | 15 | 17 lignes. |
| | \$13 50 | 15 00 |
1734. Opera Glasses, as above, with 12 superior lenses:
- | | | |
|--|---------|------------|
| | 15 | 17 lignes. |
| | \$18 00 | 20 00 |
1735. Opera Glasses, smooth black kid, full tubular body, large oculars, black japanned draw-tubes, cross-bars, tops and trimmings:
- | | | | |
|--|---------|-------|------------|
| | 15 | 17 | 19 lignes. |
| | \$10 60 | 12 00 | 15 00 |
1736. Opera Glasses, similar to preceding, with black morocco body, burnished oxidized draw-tubes and trimmings, black japanned cross-bars and tops:
- | | | |
|--|--------|------------|
| | 15 | 17 lignes. |
| | \$8 00 | 10 00 |
1738. Opera Glasses, black morocco, bell-shaped body, black japanned draw-tubes and trimmings, cross-bars and tops; manufactured by Lemaire, Paris:
- | | | | |
|--|--------|------|------------|
| | 13 | 15 | 17 lignes. |
| | \$6 00 | 6 75 | 7 50 |
1739. Opera Glasses, black morocco, full tubular body, large oculars, black japanned draw-tubes, cross-bars, tops and trimmings; manufactured by Lemaire, Paris:
- | | | | |
|--|--------|------|------------|
| | 13 | 15 | 17 lignes. |
| | \$7 50 | 8 00 | 9 00 |

LEATHER AND ALUMINUM.

1740. Opera Glasses, smooth black kid body, aluminum frame, burnished tops, draw-tubes, cross-bars and beaded trimmings; manufactured by Lemaire, Paris:
- | | | | |
|--|---------|-------|------------|
| | 13 | 15 | 17 lignes. |
| | \$15 00 | 16 50 | 18 00 |
1741. Opera Glasses, same as above, with 12 superior lenses; manufactured by Lemaire, Paris:
- | | | | |
|--|---------|-------|------------|
| | 13 | 15 | 17 lignes. |
| | \$18 00 | 20 00 | 22 50 |
1742. Opera Glasses, 6 lenses, same as above; manufactured by Colmont, Paris:
- | | | | |
|--|---------|-------|------------|
| | 13 | 15 | 17 lignes. |
| | \$11 00 | 12 50 | 14 00 |

B. Kahn & Son, New York.

ACHROMATIC LEATHER OPERA GLASSES.



MANUFACTURED BY BARDOU, PARIS.

1743. Opera Glasses, fine Turkish morocco body, black japanned draw-tubes, cross-bars, tops and trimmings:
- | | | | |
|--------|------|------|------------|
| 13 | 15 | 17 | 19 lignes. |
| \$7 50 | 8 00 | 9 00 | 10 00 |

MANUFACTURED BY LEMAIRE, PARIS.

1744. Opera Glasses, with either dark brown or green latticed kid body; richly gilt draw-tubes, cross-bars and trimmings; black tops:
- | | | |
|--------|------|------------|
| 13 | 15 | 17 lignes. |
| \$6 00 | 7 00 | 8 00 |
1745. Opera Glasses, similar to preceding, with richly gilt tubes and bands:
- | | |
|---------|------------|
| 13 | 15 lignes. |
| \$10 00 | 11 50 |
1746. Opera Glasses, fine black morocco body, black japanned draw tubes, cross-bars, tops and trimmings:
- | | | | | |
|--------|------|------|------|------------|
| 11 | 13 | 15 | 17 | 19 lignes. |
| \$5 00 | 6 00 | 7 00 | 8 00 | 9 00 |
1747. Opera Glasses, as above, 12 lenses:
- | | | | |
|--------|------|-------|------------|
| 13 | 15 | 17 | 19 lignes. |
| \$8 50 | 9 00 | 10 00 | 12 00 |
1748. Opera Glasses, fine black morocco body, black japanned draw-tubes, cross-bars, high tops and trimmings:
- | | | | | | |
|--------|------|------|------|------|------------|
| 11 | 13 | 15 | 17 | 19 | 21 lignes. |
| \$5 00 | 6 00 | 7 00 | 8 00 | 9 00 | 10 00 |
1749. Opera Glasses, superior lenses, similar to preceding, with jointed cross-bars, affording adjustment for pupillary distance:
- | | |
|---------|------------|
| 15 | 17 lignes. |
| \$13 50 | 15 00 |
1750. Opera Glasses, fine black morocco body, nickel-plated draw-tubes, cross-bars, tops and trimmings:
- | | | |
|--------|------|------------|
| 13 | 15 | 17 lignes. |
| \$6 00 | 7 50 | 9 00 |
1751. Race Glass, fine black morocco body of conical shape, black japanned draw-tubes, cross-bars, tops and trimmings, in soft leather sling case with strap:
- | | | | | | |
|---------|-------|-------|-------|-------|------------|
| 13 | 15 | 17 | 19 | 21 | 24 lignes. |
| \$10 00 | 10 50 | 12 00 | 13 50 | 15 00 | 16 50 |

ACHROMATIC LEATHER OPERA GLASSES.



1752



1754

1752. Opera Glasses, smooth black kid body, encircled by beaded "jet" bands, black japanned draw-tubes, cross-bars, tops and trimmings:
 13 15 lignes.
 \$4 50 5 00
1753. Opera Glasses, with either dark brown or green latticed kid body, richly gilt draw-tubes, cross-bars and trimmings, black tops:
 13 15 lignes.
 \$5 00 6 00
1754. Opera Glasses, colored kid body, encircled by gilt bands, gilt draw-tubes and trimmings, black cross-bars and tops:
 13 14 lignes.
 \$4 00 \$4 50
1755. Opera Glasses, with gilt bands, imitation alligator leather:
 13 15 lignes.
 \$4 50 5 00
1756. Opera Glasses, black morocco body, gilt draw-tubes, cross-bars and trimmings, black tops:
 11 13 15 17 19 lignes.
 \$3 00 3 50 3 75 4 00 4 75
1757. Opera Glasses, fine black morocco body, black japanned draw-tubes, cross-bars, tops and trimmings:
 11 13 15 17 lignes.
 \$4 50 5 00 5 50 6 00
1758. Opera Glasses, similar to above, plainer finish:
 13 15 17 lignes.
 \$4 00 4 50 5 00
1759. Opera Glasses, colored morocco body, black japanned draw-tubes, cross-bars, tops and trimmings:
 13 15 lignes.
 \$5 00 5 50
1760. Opera Glasses, with non-corrected objectives, black morocco body, black japanned draw-tubes, cross-bars, high tops and trimmings:
 11 13 15 17 19 lignes.
 \$2 00 2 25 2 50 2 75 3 00
1761. Opera Glasses, as above, with gilt draw-tubes in lieu of black japanned:
 11 13 15 17 19 lignes.
 \$2 00 2 25 2 50 2 75 3 00

CASES AND OCULARS FOR OPERA GLASSES.

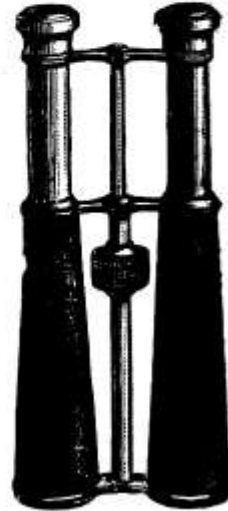
1762. Morocco Case: 11 13 15 17 19 21 lignes.
 \$1 00 1 25 1 50 1 75 2 00 2 25
1763. Silk-velvet, satin-lined case: 11 13 15 17 lignes.
 \$2 50 2 75 3 00 3 50
1764. Combination Opera Glass Case, silk-plush, satin-lined, with separate compartment for handkerchief, etc.: 11 13 15 17 lignes.
 \$3 50 4 00 4 50 5 00
1765. Oculars for opera or field glasses, assorted sizes and foci, per pair.....\$1 50

B. Kahn & Son, New York.

ACHROMATIC FIELD OR MARINE GLASSES.



1800



1801

1800. Tourists' Universal Glasses, black morocco body, with sun-shades, three revolving oculars available for marine, field and theater purposes, black japanned draw-tubes, cross-bars, low tops and trimmings, in sole leather sling case; manufactured by Lemaire, Paris:

15	17	19	21	24	26 lignes.
\$18 00	19 00	20 00	22 50	25 00	27 50

BINOCULAR TELESCOPES.

These consist of two superiorly corrected achromatic telescopes of about twelve inches in length, mounted with cross-bars, affording perfect adjustment for pupillary distance. Their extraordinary power renders them highly commendable for unusually long ranges.

1801. Binocular Telescope, 16 lenses, black morocco body, with sun-shades, black japanned jointed cross-bars for pupillary distance, black japanned draw-tubes, tops and trimmings, in sole leather sling case:

8	10	15 lignes.
\$30 00	35 00	45 00

1802. Binocular Telescope, 16 lenses, aluminum frame, latticed dark Russian leather body, highly burnished aluminum draw-tubes, jointed cross-bars, tops and trimmings, in sole leather sling case; manufactured by Lemaire, Paris:

17 lignes.
\$125 00

1803. Binocular Telescope, similar to above, but not aluminum:

17 lignes.
\$60 00

ACHROMATIC FIELD OR MARINE GLASSES.

LONG MODEL AND HIGH TOPS.



MANUFACTURED BY BARDOU, PARIS.

1804. Field or Marine Glasses, black morocco body, with sun-shades, oxidized draw-tubes, cross-bars, tops and trimmings, in sole leather sling case : 21 24 26 lignes.
 \$20 00 21 00 24 00
1805. Field or Marine Glasses, as above, with 12 lenses : 21 24 26 lignes.
 \$22 50 25 00 28 00
1806. Field or Marine Glasses, as in 1804, with jointed cross-bars, affording adjustment for pupillary distance : 21 24 26 lignes.
 \$22 50 25 00 28 00

MANUFACTURED BY LEMAIRE, PARIS.

1807. Field or Marine Glasses, superior, U. S. Signal Service, black morocco body, with sun-shades, finely black japanned or oxidized draw-tubes, cross-bars, tops and trimmings ; in sole leather sling case : 24 26 lignes.
 \$18 00 20 00
1808. Field or Marine Glasses, black morocco body, with sun-shades, black japanned draw-tubes and cross-bars, long model and high tops, "Grand Power," 26 lignes. \$25 00
1809. Field or Marine Glasses, black morocco body with sun-shades, black japanned or oxidized draw-tubes, cross-bars, tops and trimmings ; in morocco sling case :
 15 17 19 21 24 26 28 lignes.
 \$10 00 12 00 13 00 14 00 16 00 18 00 25 00
1810. Field or Marine Glasses, as above, with 12 lenses ; sole leather case :
 21 24 26 lignes.
 \$18 00 22 50 25 00
1811. Field or Marine Glasses, black morocco body with sun-shades, black japanned or oxidized draw-tubes, tops and trimmings ; jointed cross-bars, affording adjustment for pupillary distance ; in sole leather sling case :
 21 24 26 lignes.
 \$20 00 22 50 25 00

ALUMINUM FIELD OR MARINE GLASSES.

1812. Field or Marine Glasses, 12 superior lenses, black morocco body, with sun-shades, aluminum frame, with burnished draw-tubes and ring trimmings ; finely japanned cross-bars, adjusting bar and tops ; in sole leather sling case ; manufactured by Lemaire, Paris : 21 24 26 lignes.
 \$40 00 50 00 60 00

B. Kahn & Son, New York.

ACHROMATIC FIELD OR MARINE GLASSES.

COMPACT MODEL AND LOW TOPS.



1813. Field or Marine Glasses, black morocco body, with sun-shades, finely black japanned or oxidized draw-tubes, cross-bars and low tops, compact model, designed to afford large field, in morocco sling case :
- | | | | | | |
|---------|-------|-------|-------|-------|------------|
| 15 | 17 | 19 | 21 | 24 | 26 lignes. |
| \$10 00 | 12 00 | 14 00 | 15 00 | 16 00 | 18 00 |
1814. Field or Marine Glass, black morocco body with sun-shades, black japanned draw-tubes and cross-bars, compact model and low tops, with 12 lenses, in sling case ; manufactured by Lemaire, Paris :
- | | | |
|---------|-------|-------|
| 17 | 19 | 21 |
| \$15 00 | 16 50 | 18 00 |
1815. Field or Marine Glass, buff leather body, with sun-shades, black japanned draw-tubes and cross-bars and low tops, compact model, with 12 lenses, in buff leather sling case; manufactured by Lemaire, Paris :
- | | | |
|---------|-------|-------|
| 17 | 19 | 21 |
| \$18 00 | 19 50 | 21 00 |
1816. Field or Marine Glass, black morocco body, with sun-shades, oxidized draw-tubes and cross-bars, telescopic eye-piece, low tops, 18 lenses, 26 lignes; manufactured by Lemaire, Paris. \$40 00
1817. Field or Marine Glass, black morocco body, with sun-shades, japanned draw-tubes, cross-bars, and large oculars, designed to afford large field, 26 lignes. 12 50
1818. Field or Marine Glass, buff leather body, with sun-shades, nickel-plated draw-tubes, cross bars and trimmings, short model, in buff leather sling case, 15 lignes, tourist glass. 9 00
1819. Field or Marine Glass, black morocco body, with sun-shades, aluminum frames, with polished draw-tubes, cross-bars and trimmings, short model and large oculars, in sling case, 17 lignes, tourist glass. 18 00
1820. Field or Marine Glass, imitation alligator leather covered body, with sun-shades, black japanned draw-tubes, cross-bars and nickel-plated trimmings, large oculars, in sling case to match, 19 lignes. 6 00
1821. Single Field or Marine Glass, consisting of but one draw-tube; manufactured by Lemaire, Paris :
- | | |
|--------|------|
| 24 | 26 |
| \$7 00 | 8 00 |

ACHROMATIC FIELD OR MARINE GLASSES.



1822



1828

1822. Field or Marine Glasses, black morocco body, with sun-shades, finely oxidized draw-tubes, cross-bars, tops and trimmings, in sole leather sling case. The Monarch:

21	24	26 lignes.
\$12 00	13 50	15 00

1823. Field or Marine Glasses, black morocco body, with sun-shades, oxidized draw-tubes, cross-bars and high tops. The Pilot:

19	21	24	26 lignes.
\$7 00	8 00	9 00	10 50

1824. Field or Marine Glasses, black morocco body, black japanned draw-tubes, cross-bars, tops and trimmings, in morocco sling case. Chevalier, Paris:

15	17	19	21	24	26 lignes.
\$5 00	6 00	7 00	8 00	9 00	10 00

1825. Field or Marine Glasses, black morocco body, black oxidized draw-tubes, cross-bars, low tops and trimmings, in morocco sling case. Victor, Paris:

21	24	26 lignes.
\$9 00	10 50	12 00

1826. Field or Marine Glasses, with non-corrected objectives, black morocco body, black japanned draw-tubes, cross bars, tops and trimmings, in morocco sling case:

21	24	26 lignes.
\$4 50	5 00	6 00

SLING CASES FOR FIELD OR MARINE GLASSES.

1827. Morocco Case: 17 19 21 24 26 lignes.
\$2 00 2 00 2 50 2 50 2 50

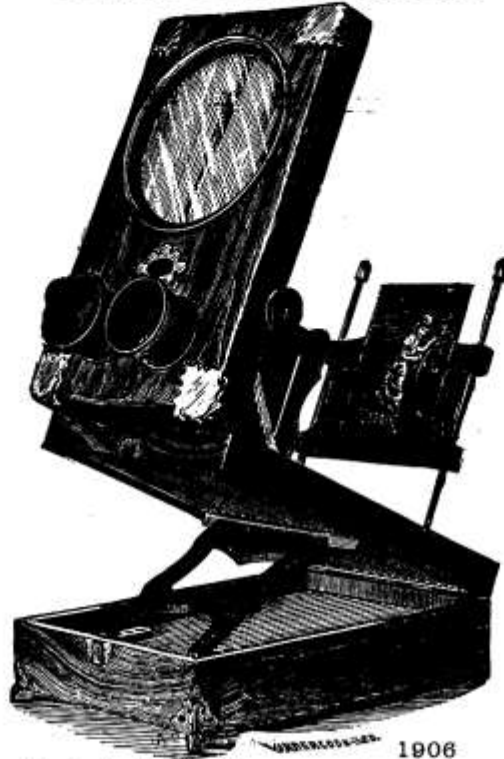
1828. Sole Leather Case 3 00 3 50 4 00

1829. Strap, with buckle\$0 60 | 1830. Strap, without buckle.....\$0 50

1831. Leather Cord, with swivel..... 50

B. Kahn & Son, New York.

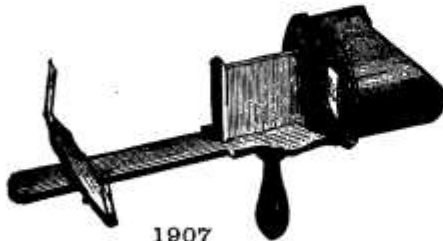
GRAPHOSCOPES.



1906

1900.	Rosewood, polished,	4 inch lens with stereoscope lenses.....	\$6 00
1901.	"	black inlaid edge, 5 inch lens with stereoscope lenses....	9 00
1902.	Olive wood,	nickel-plated trimmings, 5 in lens with stereoscope lenses.	10 00
1903.	Ebony wood,	engraved front, 6 inch lens with stereoscope lenses.....	12 00
1904.	"	engraved and carved, 6 inch lens with stereoscope lenses..	13 50
1905.	"	inlaid with pearl, 7 inch lens with stereoscope lenses.....	15 00
1906.	"	rack motion to stereoscope, 7 in. lens with stereoscope lenses.	25 00

STEREOSCOPES.



1907



1910

1907.	Hand Stereoscope, walnut frame, imitation rosewood hood.....	\$1 00
1908.	" " " rosewood hood.....	1 50
1909.	" " full polished rosewood, superior large lenses.....	2 50
1910.	Stereoscope on stand, walnut, imitation rosewood hood.....	1 50
1911.	" " full polished rosewood, superior large lenses.....	3 50

DEMONSTRATION LENSES.



1912.

- 1912. Demonstration Lenses, representing six superior spherical lenses, viz., plano-convex, plano-concave, bi-convex, bi-concave, periscopic-convex and periscopic-concave, $1\frac{1}{2}$ inches in diameter, per set.\$1 00
- 1913. Demonstration Lenses, similar to preceding, $1\frac{5}{8}$ inches, in case..... 2 00
- 1914. Demonstration Lenses, superior, $1\frac{3}{4}$ inches, in wooden case..... 3 00
- 1915. Demonstration Lenses, " $2\frac{1}{2}$ " " " " 4 50
- 1916. Glass Discs to show Newton's rings, 3 inches in diameter, per pair..... 6 00

DOUBLE-CONVEX LENSES.

GROUND EDGES.

1917.	$\frac{1}{4}$	inch	diameter,	$\frac{1}{8}$	inch	focus	.....	\$0 75
1918.	$\frac{1}{8}$	"	"	$\frac{1}{4}$	"	"	.....	90
1919.	$\frac{1}{4}$	"	"	$\frac{1}{2}$	"	"	.....	1 00
1920.	$\frac{1}{2}$	"	"	1	"	"	.....	1 25
1921.	$\frac{3}{4}$	"	"	$1\frac{1}{2}$	"	"	.....	1 25
1922.	1	"	"	2	"	"	.....	1 50
1923.	2	"	"	6 to 72	"	"	.....	1 50
1924.	3	"	"	6 to 72	"	"	.....	1 50
1925.	4	"	"	12 to 72	"	"	.....	1 75
1926.	5	"	"	18 to 72	"	"	.....	2 25
1927.	6	"	"	24 to 72	"	"	.....	3 00
1928.	7	"	"	30 to 72	"	"	.....	4 00
1929.	8	"	"	30 to 72	"	"	.....	5 00

Double-Convex Lenses, accurately centered, furnished to order.

B. Kahn & Son, New York.

THE NEW KALEIDOSCOPE.



1930



1931

1930. The New Kaleidoscope, a desirable parlor ornament, with cell containing a varied collection of brilliantly colored solid and fluid objects, presenting, by a revolution of the object-cell, an ever-changing number of most elaborate designs; handsomely mounted on improved pedestal\$3 00

THE RADIOMETER.

1931. An instrument, designed by Prof. Crookes, to illustrate the property of light as a motive power, being also available as a photometer.....\$3 50
 1932. Radiometer, with two sets of vanes, revolving in opposite directions..... 7 50
 1933. Radiometer, with one set of vanes, and a porcelain scale thermometer on the stem of same 5 00

THE ZOETROPE, OR WHEEL OF LIFE.



1931

1934. Zoetrope, 12 inch, on heavy oak base, with 12 pictures\$3 00
 1935. Extra pictures, 6 different series, per set of 12..... 75

MIRRORS.



1936

1936. Plane Mirror of Plate Glass, 10 x 8 inches diameter, in metal frame, on adjustable stand, nickel-plated..... \$4 50
 1937. Magnifying Mirror of Plate Glass, 6 inches diameter, on adjustable stand.... 6 00

SPHERICAL MIRRORS.

1938. Mirror, magnifying on one side, neutral on the opposite side, mounted in polished ebonized wood frame, with handle : 4 5 6 inches in diameter.
 \$2 00 2 50 3 00
 1939. Mahogany wood frame, magnifying on one side, neutral on the other, superior quality : 5 6 inches in diameter.
 3 50 4 00
 1940. Ebonized wood frame, magnifying, with wood back : 4 4½ inches in diameter,
 \$1 25 1 75
 Ebonized wood frame, diminishing : 4 4½ "
 \$1 75 2 50
 1941. Spherical, Concave and Convex Mirrors, mounted in one frame, back to back.. \$3 50

CYLINDRICAL MIRRORS.

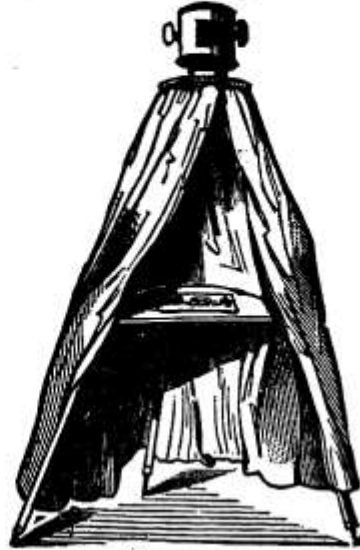
1942. Cylindrical Convex Mirror of glass, 6 inches diameter, in frame, with ring, \$12 00
 1943. Cylindrical Concave Mirror of glass, 6 inches diameter, mounted in frame..... 12 00
 1944. Multiple Mirror, with 6 discs..... 4 00

B. Kahn & Son, New York.

CAMERA OBSCURAS.



1944



1946 A

1944. Camera Obscura Head or Lens, without box ; a prismatic lens, mounted with brass. This is the best kind of lens for a camera obscura, as it forms both lens and mirror ; prism $1\frac{5}{8}$ inches long..... \$5 00
1945. Camera Obscura Head, prism $1\frac{3}{8}$ inches long..... 7 50
1946. " " " " $2\frac{1}{8}$ " " " "..... 10 00
- 1946A Improved Camera Obscura. This is recommended as the best drawing apparatus yet introduced ; it is light and portable, and can be used to satisfaction by persons entirely unacquainted with drawing.....each, 20 00

WINDOW MIRRORS.

Mounting of Tin, handsomely japanned, can be attached to any window casing.



1947

1947. Window Mirror, beveled French plate..... \$7 50
1948. " " French plate..... 6 00
1949. " " German "..... 4 00

CLAUDE LORRAINE OR LANDSCAPE MIRRORS.



1950.

1950. Claude Lorraine Mirror, a pleasing and ingenious device for viewing landscapes, in truthfully reduced perspective, being invaluable to the artist or tourist; bound in velvet-lined morocco case with cover:

$6\frac{1}{4} \times 5\frac{1}{4}$	$8\frac{1}{2} \times 6\frac{1}{4}$	$9\frac{1}{2} \times 7\frac{1}{2}$	$9\frac{1}{2} \times 8\frac{1}{2}$	$10\frac{1}{2} \times 8\frac{1}{2}$ inches.
\$5 00	7 50	10 00	11 50	12 00

SPECTROSCOPES.



1951



1952

1951. Pocket Spectroscope, Browning's, $3\frac{1}{4}$ inches long, $\frac{5}{8}$ inches in diameter, with adjustable slit and collimating lens.....\$16 50

This little instrument will show a large number of Fraunhofer and metal lines, and exhibits really a fine spectrum.

CAMERÆ LUCIDA.

1952. Camera Lucida, an instrument for projecting upon paper a visionary image to be traced in effecting a sketch of objects; with extension bar and lateral adjustment, upon circular brass base, in morocco case.....\$7 00

1953. Camera Lucida, similar to above, with clamp for edge of table, in lieu of circular base..... 9 00

1954. Camera Lucida, as above, with colored glasses for modifying the light.....13 50

B. Kahn & Son, New York.

' PRISMS.

SEE PREFACE, OPTICAL INSTRUMENTS.



1955



1956

1955. Equilateral Prism, with cut handles :	3	4	5	6	7	8 inches.
	50c	60c	80c	\$1 00	1 25	1 50
1956. Flint Glass Prism, highly polished :	1	1½	2	3 inches.		
	\$1 50	2 00	2 50	3 50		
1957. Flint Glass Prism, very pure and of high refractive power, perfectly polished, 1½ inches.....						\$6 00
1958. Crown Glass Prism, 1½ inches on a side.....						5 00
1959. Hollow Prism for bisulphide of carbon, bottle form, 3 inches.....						6 00
1960. Compound Prism of Crown and Flint, 1½ inches.....						7 50

PRISMS OF ICELAND SPAR.



1961-65



1965-68



1969

1961. Prism of Iceland Spar, 8 millimetres across face.....						\$2 00
1962. " " 16 " "						3 00
1963. " " 30 " "						4 00
1964. " " 60 " "						7 50
1965. " " 8 " cut perpendicular to axis.....						3 50
1966. " " 25 " "						10 00
1967. " " 30 " "						13 50
1968. " " 60 " "						25 00
1969. Crystals of Iceland Spar Specimens.....						75

Meteorological

Instruments.

PREFACE.

— + —

PURSUANT to the increased interest manifested in Meteorological Science, and to the progressive application of meteorological instruments in most every branch of calling, we have endeavored, in the following pages, to mention instruments of a class well calculated to meet the general demand.

In accordance with this motive, we take pleasure in presenting to the public

A POPULAR SERIES OF METEOROLOGICAL INSTRUMENTS,

intended to meet the requirements of

**Civil, Mining, and Sanitary Engineers, Physicians,
Horticulturists, Agriculturists, Manufacturers, and Amateurs.**

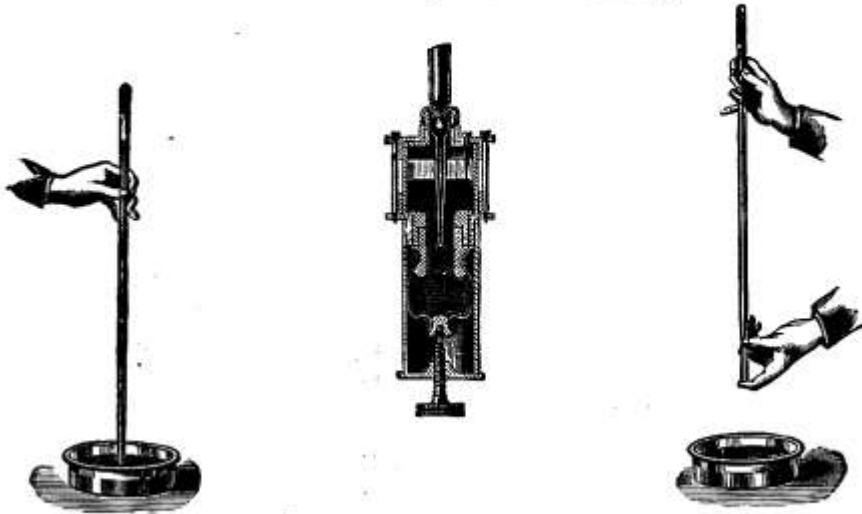
As our stock comprises a collection of instruments executed to specification, and as manufactured by the most celebrated makers *only*, we are further enabled to recommend them as being unexcelled in point of finish and efficiency.

The Engineer's application of the Aneroid Barometer, in ascertaining slight variations of gradients, or for the purpose of obtaining data of levels in a preliminary survey, has further inspired the Tourist to avail himself of that pleasure incident to the use of the barometer in railway travel or the ascension of mountains, by aid of which instrument the traveler is enabled to note the changes in grade, and of his elevation, foot by foot, during the progress of his journey. It is in consequence of the now universal and valuable application of the Altitude Aneroid Barometer that we feel constrained to direct particular attention to our instruments of this class, these being of that special type known as the "Shallow Model," so termed from the fact of the space occupied by the mechanism being reduced to a minimum, rendering the instruments more compact and less weighty than those of dissimilar pattern; the Stem-winding Adjustment to the Altitude Scale, on some of our instruments, being still another improvement.

Our Altitude Aneroids are all supplied with *revolving* altitude scales in lieu of revolving indexes, being of *best* English manufacture, and are not to be mistaken for those *imitations* so frequently offered at less price.

We have special facilities for testing and adjusting Aneroid Barometers, Anemometers, Thermometers and kindred instruments, and are therefore in a position to afford our customers the convenience of having their instruments compared, from time to time, with the respective "Standards."

B. Kahn & Son, New York.
THE BAROMETER.



The Barometer, an instrument indicating the pressure of the atmosphere, and our chief assistant in enabling us to forecast changes of the weather, was invented by Torricelli, a Florentine, in 1643, and in so perfect a form that in its essential features it has not been superseded—the inventor having made himself forever famous by the production of an instrument, the usefulness of which it is impossible to overestimate.

The construction of a barometer in its simplest form consists in hermetically sealing, at one end, a glass tube about three feet long, and filling it with mercury. The finger is placed over the open end of the tube, which is then inverted and placed in a cistern of mercury and the finger withdrawn. The left-hand figure shows the result—the mercury is seen to fall some three or four inches, leaving an empty space at the top of the tube, which is called the "Torricellian Vacuum."

The mercury is prevented from falling lower than is shown, by the external pressure of the atmosphere on the mercury. The weight of this column, therefore, represents the *weight* or pressure of a corresponding column of air many miles in height; and so close is the relation between the column of mercury and the external air that the *height* of the former changes with the slightest variation in the *weight* of the latter, and the instrument thus becomes a measure of the weight of the air, from which property its name is derived—the Greek words *baros* and *metron* signifying respectively "weight" and "measure."

FORTIN'S BAROMETER.

When the mercury in the tube falls, that in the cistern rises in corresponding proportion, and *vice versa*, so that there is an ever varying relation between the level of the mercury in the tube and the mercury in the cistern, which affects the accuracy of the readings. M. Fortin's form of cistern completely obviates this difficulty by making the cistern of glass, with flexible leather bottom and a brass adjusting-screw, as shown in the cut. Through the top of the cistern is inserted a small ivory pointer, the lower end of which corresponds with the zero of the scale; and in order that the readings should possess uniform value, it is necessary, at each observation, that the level of the mercury in the cistern should be adjusted by the screw until the ivory point appears to touch its own reflection on the surface. The reading is then taken. Standard Barometers are provided with this cistern.

B. Kahn & Son, New York.

STANDARD BAROMETER.

Standard Barometer on Fortin's principle, with tube 0.5 inch bore, inclosed in bronzed brass body, having at its upper end two vertical openings in which the vernier works, the latter operated by rack movement. The readings are taken through these openings, aided by light reflected from a white opaque glass reflector let into the mahogany board behind. The scale is divided on one side into inches and zoths, and on the other to centimeters and millimeters, the vernier enabling a reading to be taken, in each case respectively, of 1-500th of an inch and 1-10th of a millimeter. In making the instrument, the mercury is boiled in the tube, to insure the com-



plete exclusion of air and moisture, while Fortin's cistern insures a constant level from whence to take the readings.

A highly sensitive Thermometer, with scale engine-divided on stem, is attached to the brass mount, which is perforated to admit the attenuated bulb of the Thermometer into absolute contact with the glass tube of the Barometer, to insure its indicating the same temperature as the contained mercury.

The instrument is suspended by a ring from a brass bracket attached to a mahogany board, and the lower end passes through a larger ring having three screws for its true vertical adjustment.

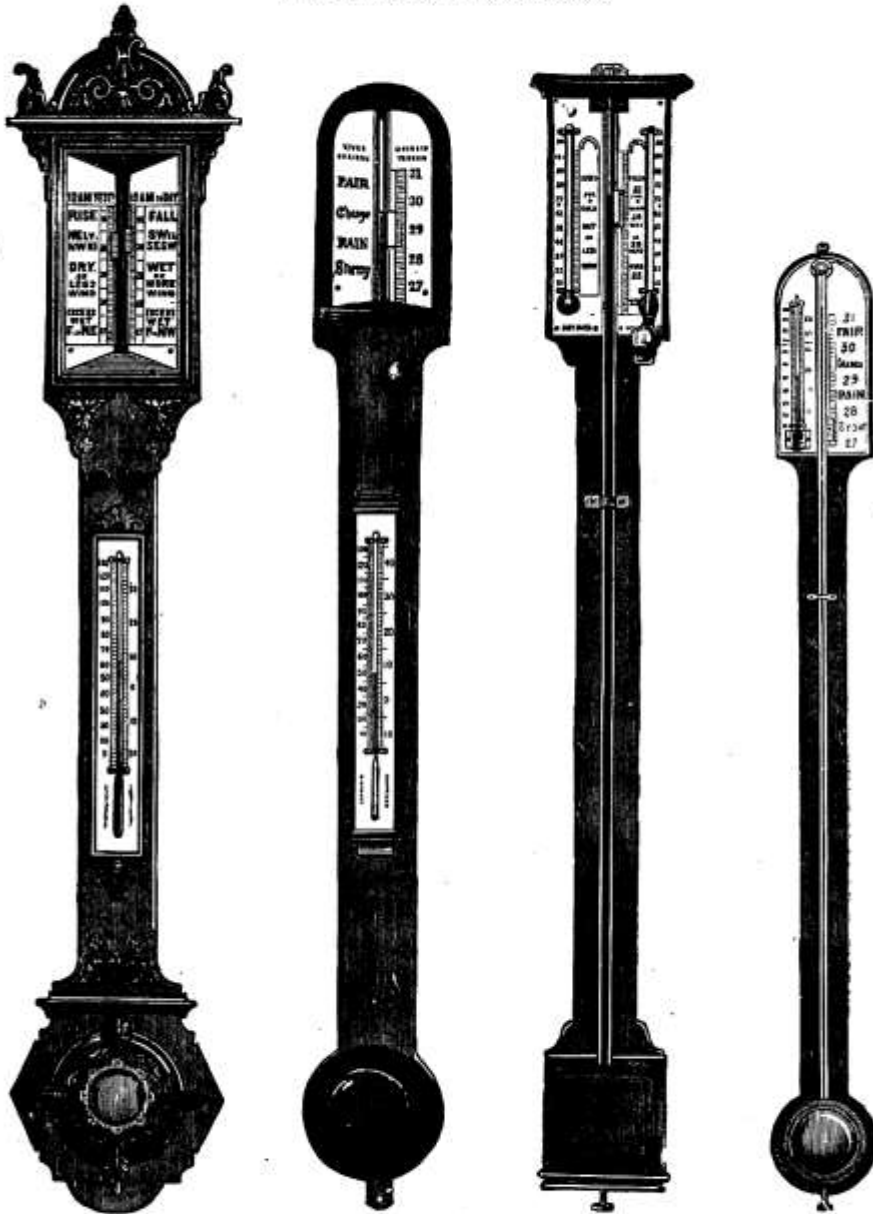
2000

2000.	Standard Barometer, as above.....	\$90 00
2001.	" Mountain Barometer, with tripod and sling case.....	100 00
2002.	" Marine Barometer.....	60 00

B. Kahn & Son, New York.

MERCURIAL BAROMETERS.

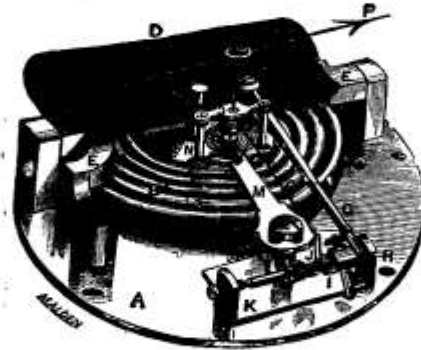
WITH ATTACHED THERMOMETERS.



- | | | | |
|-------|-------------------|--|---------|
| 2003. | Carved Barometer, | solid oak frame, ivory scales..... | \$50 00 |
| 2004. | Dome Top " | oak or walnut frame, opal glass scales | 25 00 |
| 2005. | " " | solid oak frame, ivory scales, small model of 2002..... | 15 00 |
| 2006. | Farmer's " | " " opal glass scales..... | 17 50 |
| 2007. | Model " | rosewood, mahogany, oak or walnut frame, opal scales.... | 10 00 |

B. Kahn & Son, New York.

CONSTRUCTION OF THE ANEROID BAROMETER.



The Aneroid Barometer, as above shown, consists of the vacuum chamber *B*, composed of two disks of corrugated German-silver firmly soldered together, forming a box, from which the air is exhausted, and to each side of which is attached a brass center—one with a thread on it to screw the chamber to the base-plate *A*, the other plain, with a hole drilled across it to receive a knife-edge *C*, which suspends the vacuum chamber from a powerful spring *D*, as seen in the drawing. On these principally depends the action of the instrument. The base, or foundation-plate *A*, is of iron or brass and circular in form; to this the vacuum chamber is attached, while a strong iron carriage *E*, fixed across the chamber, supports the mainspring *D*, which, acting in direct opposition to the undulations of the vacuum chamber *B*, gives rise to the variations of the needle *F* on the dial. To the mainspring *D* is attached the main lever *G*, a compound bar of iron or brass, which compensates for errors arising from changes of temperature. To the end of this lever is attached a small rod of steel, connecting it with the regulator *I*, which is furnished at its center with a vertical arm of brass *J*, by which it communicates with the movement.

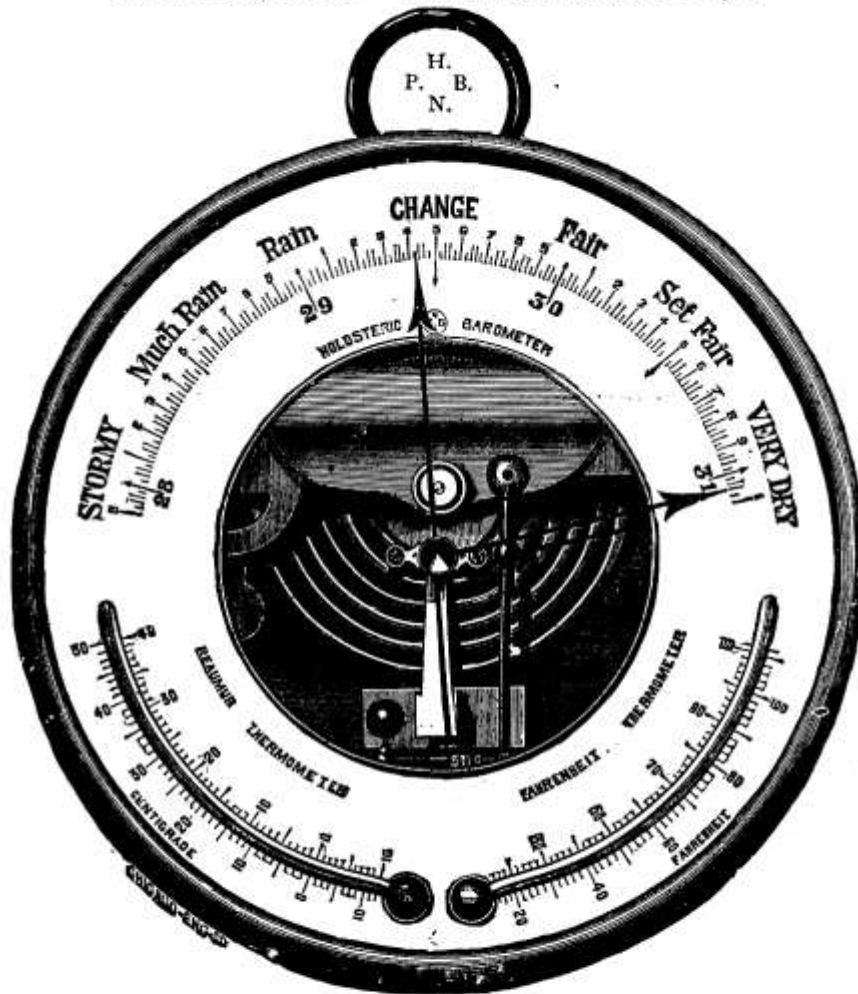
The "movement" is furnished with a stout base-plate *K*, to the center of which a short brass pillar is screwed, bearing a projecting arm *M*, at the end of which are two smaller brass pillars *N*, supporting a thin plate of brass *O*, and between these and the flat arm moves the arbor *P*, on which is fixed the index. A piece of fine chain *Q*, as used in the works of watches, is attached to and operates about the arbor *P* on the rise or fall of the lever, a fine hair-spring of coiled steel *R* keeping the hand in its proper position; the chain *Q* forming the connection between the vertical arm *J* and the arbor *P*.

The connection having been made between these various parts, the entire movement is screwed to the iron foundation-plate *A* and connected with the main lever by means of a fine steel rod at the end; and the communication thus rendered complete between the various parts of the instrument, it is ready for the final adjustment of the dial and hand.

This done, it only remains to graduate the scale, which is effected by placing the instrument under the glass receiver of an air-pump with a Standard Mercurial Barometer attached. The air is then exhausted and, as the mercury falls inch by inch, the Aneroid Scale is pointed off and graduated from 31 inches to any required range.

B. Kahn & Son, New York.

ANEROID BAROMETERS.



2008

2008.	Aneroid Barometer, 8 inch lacquered metal case, with suspensory ring, open silvered metal dial, two curved thermometers reading to scales of Fahrenheit, Reaumur, and Celsius, beveled glass front, in velvet-lined case.....	\$25 00
2009.	Aneroid Barometer, 6½ inch, as above.....	18 50
2010.	" " 5 inch, with but one thermometer, similar to preceding ..	15 00
2011.	" " 5 inch, as above, without thermometer.....	13 50
2012.	" " 5 inch lacquered metal case with suspensory ring, open card dial and one thermometer,	13 50
2013.	Aneroid Barometer, 5 inch, as above, without thermometer.....	12 50
2014.	" " " similar to preceding, closed metal dial.....	10 00
2015.	" " " similar to preceding, closed card dial.....	9 00
2016.	" " " 2¾ inch, metal dial.....	12 00

The above instruments are superior to all others in workmanship, finish and reliability, and are recommended as the most trustworthy and efficient barometers in the hands of observers of the weather. Each instrument bears the trade-mark shown within the ring of above cut.

*B. Kahn & Son, New York.***ANEROID BAROMETERS.**

2017

2017. Aneroid Barometer, 4 $\frac{3}{4}$ inch metallic case with ring, card dial, attached thermometer, in case. \$7 50
2018. Aneroid Barometer, as above, without thermometer. 5 50
2019. Aneroid Barometer, as above, without thermometer, bronzed case. 6 00
2020. Aneroid Barometer, iron suspension case (see cut page 82) 6 00
2021. Aneroid Barometer, 2 $\frac{3}{4}$ inch, brass case, card dial. 4 00
2022. Aneroid Barometer, 4 inch nickel-plated case, with ring for suspension and feet to stand on mantel, open card dial. 4 50
2023. Aneroid Barometer, 2 $\frac{3}{4}$ inches, as above. 4 00
2024. Aneroid Barometer, nickel-plated square metallic case, 3 $\frac{1}{2}$ x 2 $\frac{3}{4}$ inches, with thermometer and counter-sunk compass in top. 5 00

GLASS DIAL BAROMETERS.

2025. Aneroid Barometer, 8 inch lacquered metal case, porcelain well and divisions enameled on under side of plate glass front. \$13 50
2026. Aneroid Barometer, 6 inch, similar to preceding. 12 00
2027. Aneroid Barometer, 5 " " " " " 10 00

PLATE GLASS FRONTS FOR ANEROIDS.

2028. Plate Glass Front, with mounted index, for above barometers :
- | | | |
|--------|-----------------|-----------------------|
| 5 | 6 $\frac{1}{2}$ | 8 inches in diameter. |
| \$1 00 | 1 50 | 2 50 |
2029. Plate Glass Dials for barometer, with divisions and index :
- | | | |
|--------|------|-----------------------|
| 5 | 6 | 8 inches in diameter. |
| \$2 50 | 3 00 | 4 00 |
- Extra air-chambers, hands and dials furnished to order.

ANEROID BAROMETERS.



2030



- | | | |
|-------|---|---------|
| 2030. | Aneroid Barometer, 8 inch open porcelain dial and thermometer, in richly carved solid oak mount..... | \$25 00 |
| 2031. | Aneroid Barometer, 8 inch porcelain dial and thermometer, in richly carved solid oak mount..... | 22 00 |
| 2032. | Aneroid Barometer, 6 inch open porcelain dial and thermometer, in carved solid oak frame, 25 inches long..... | 22 00 |
| 2033. | Aneroid Barometer, 6 inch dial, thermometer, oak frame..... | 20 00 |
| 2034. | Aneroid Barometer, 5 inch open dial, thermometer, oak frame..... | 20 00 |
| 2035. | Aneroid Barometer, 5 inch dial with thermometer, in carved oak mount..... | 18 00 |

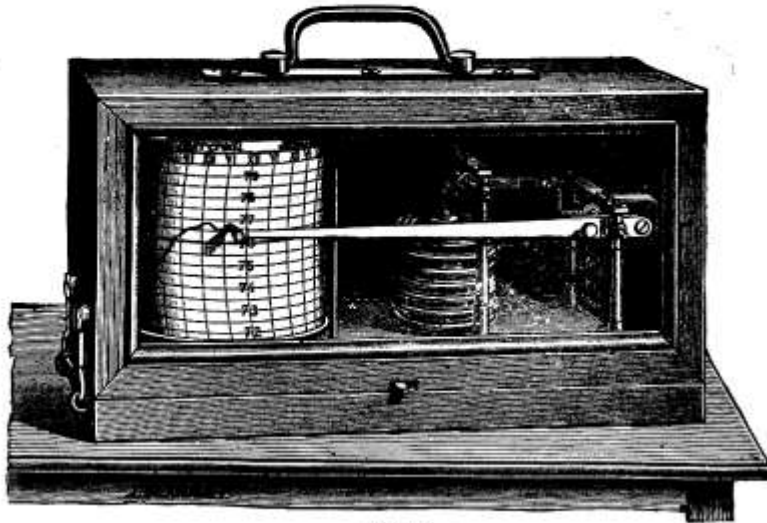
ANEROID BAROMETER STANDS.

We are prepared to furnish imitation Bronze Stands for Aneroid Barometers in great variety, the constant change in patterns and prices preventing detailed mention of the same.

As an instance of the class of subjects, we mention: Figures of Shakespeare, Raphael, Mozart, Napoleon, Muses, Goddesses, Knights, Heralds, Setter Dog, Retriever, Rampant Mustang, Normandy Steed, etc., etc. Sketches or Photographs with prices can be had on application.

B. Kahn & Son, New York.

RECORDING BAROMETER.



2036

2036. Self-Recording Barometer of improved construction. The variations of the atmospheric pressure are automatically recorded by a pen attached to an arm connected with the lever of the vacuum chamber and moving over a paper scale fastened upon a brass cylinder, which revolves upon its axis once every seven days, by means of a very accurate clockwork concealed within the cylinder. The paper scale bears horizontal divisions reading from 28 to 31 inches, subdivided into twentieths, and vertical divisions for each day of the week, with subdivisions for every two hours, from which the correct time of the day may be estimated to within five minutes. Contained in a finely finished mahogany framed glass case with handle. Furnished with a bottle of ink and sufficient paper scales for one year and full instructions.....\$45 00
2037. Self-Recording Thermometer, same as above..... 50 00
2038. Draper Thermograph, large..... 30 00
2039. Draper Thermograph, small..... 15 00
2040. Extra Charts for above, per 100..... 3 00

BOOKS ON METEOROLOGY.

- LOOMIS.—A Treatise on Meteorology, with a collection of meteorological tables. By Elias Loomis, LL. D., Professor of Natural Philosophy and Astronomy in Yale College. Cuts, 8vo, sheep.....\$1 75
- PLYMTON.—The Aneroid and How to Use It. Compiled by Geo. W. Plymton (Van Nostrand's Science Series No. 35)..... 50
- Weather Warnings. By A. Watcher... 1 00
- The Aneroid Barometer. London Edition..... 50

ENGINEERS' ALTITUDE BAROMETERS.

SEE PREFACE, METEOROLOGICAL INSTRUMENTS.



2041

- 2041. Mining Aneroid Barometer, English government pattern, 3 inch, compensated for temperature, bronzed metal case, silvered metal dial, revolving altitude scale reading from 2,000 feet below sea level to 4,000 feet above, with rack-movement operating vernier reading by microscope to 1 foot; extremely sensitive, and highly commendable; in sole-leather case with shoulder strap. . . \$40 00
- 2042. Portable Aneroid Barometer, English government pattern, 3 inch, compensated for temperature, bronzed metal case, silvered metal dial, revolving altitude scale reading to 6,000 feet, with rack-movement operating vernier reading by microscope to 1 foot; in sole-leather case with shoulder strap. 40 00
- 2043. Portable Aneroid Barometer, similar to preceding, 10,000 feet. 43 50
- 2044. Portable Aneroid Barometer, English government pattern, 5 inch, compensated for temperature, bronzed metal case, silvered metal dial, revolving altitude scale reading to 5,000 feet, with rack-movement operating reading vernier by microscope to 1 foot; extremely sensitive, and highly commendable; in sole-leather case with shoulder strap. 45 00
- 2045. Portable Aneroid Barometer, English government pattern, 5 inch, compensated for temperature, bronzed metal case, silvered metal dial, revolving altitude scale reading to 10,000 feet, with rack-movement operating vernier reading by microscope to 1 foot; in sole-leather case with shoulder strap 48 00
- 2046. Portable Aneroid Barometer, English government pattern, 5 inch, compensated for temperature, bronzed metal case, silvered metal dial, revolving altitude scale reading to 15,000 feet, with rack-movement operating vernier reading by microscope to 1 foot; in sole-leather case with shoulder strap 50 00
- 2047. Portable Aneroid Barometer, English government pattern, 5 inch, compensated for temperature, bronzed metal case, silvered metal dial, in sole-leather case with shoulder strap; revolving index to altitude scale of

5,000	10,000	15,000 feet.
\$30 00	33 00	35 00

B. Kahn & Son, New York.

ENGINEERS' ALTITUDE BAROMETERS.

SEE PREFACE, METEOROLOGICAL INSTRUMENTS.

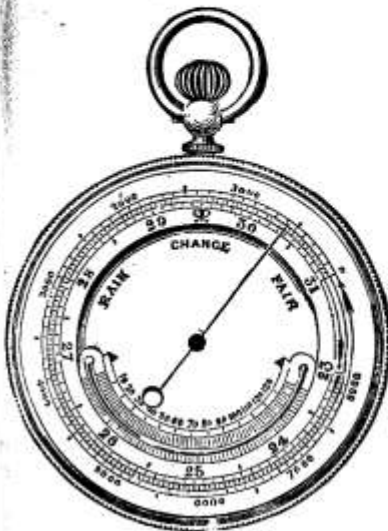


2048

2048. Reconnaissance Aneroid Barometer, compensated for temperature, lacquered metal case, $2\frac{5}{8}$ inch silvered metal dial, having thermometer attached, with detachable metal dial compass mounted, at back, in sole-leather sling case; revolving scale of altitude reading to
- | | | |
|---------|--------|--------------|
| 10,000 | 15,000 | 20,000 feet. |
| \$35 00 | 37 00 | 40 00 |
2049. Pocket Aneroid Barometer, compensated for temperature, lacquered metal case, $2\frac{5}{8}$ inch silvered metal dial, having thermometer attached, in morocco case, revolving altitude scale reading to
- | | | |
|---------|--------|--------------|
| 10,000 | 15,000 | 20,000 feet. |
| \$23 00 | 25 00 | 28 00 |
2050. Pocket Aneroid Barometer, similar to preceding, without thermometer, reading to
- | | | | | | |
|---------|-------|-------|--------|--------|--------------|
| 3,000 | 5,000 | 8,000 | 10,000 | 15,000 | 20,000 feet. |
| \$20 00 | 21 00 | 21 00 | 23 00 | 24 00 | 25 00 |
2051. Pocket Aneroid Barometer, lacquered metal case, $2\frac{3}{8}$ inch silvered metal dial, in morocco case, revolving altitude scale reading to
- | |
|-------------|
| 8,000 feet. |
| \$12 00 |
2052. Pocket Aneroid Barometer, similar to preceding, reading to
- | |
|-------------|
| 10,000 feet |
| \$13 50 |

ENGINEERS' AND TOURISTS' ALTITUDE BAROMETERS.

SEE PREFACE METEOROLOGICAL INSTRUMENTS.



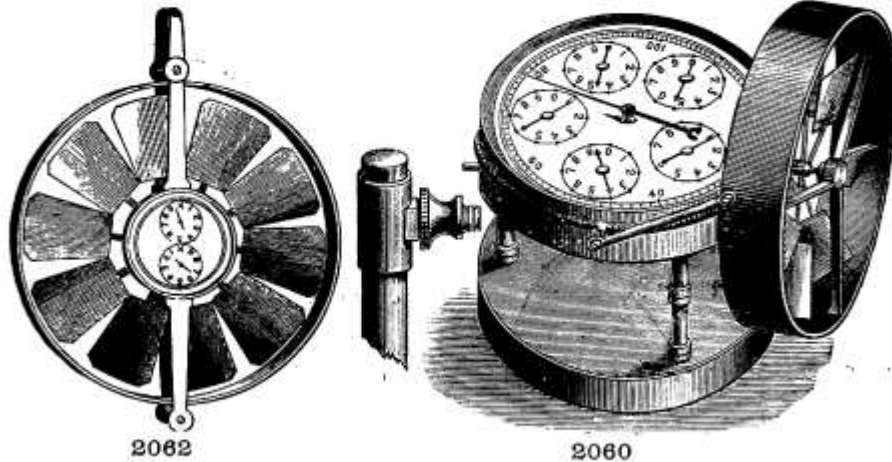
2053



2057

2053. "Watch" Aneroid Barometer, compensated for temperature, gilt metal case, $1\frac{3}{4}$ inch silvered metal dial, having thermometer attached, with detachable metal dial compass mounted at back, and stem-winding adjustment to revolving altitude scale, in morocco case, for altitudes of
- | | | | |
|--|---------|--------|--------------|
| | 10,000 | 15,000 | 20,000 feet. |
| | \$35 00 | 38 00 | 40 00 |
2054. "Watch" Aneroid Barometer, compensated for temperature, open face sterling silver watch-case, $1\frac{3}{4}$ inch silvered metal dial, with stem-winding adjustment for operating revolving altitude scale reading to
- | | | | |
|--|---------|--------|--------------|
| | 5,000 | 10,000 | 15,000 feet. |
| | \$30 00 | 32 00 | 35 00 |
2055. "Watch" Aneroid Barometer, compensated for temperature, open face nickel hunting case, $1\frac{3}{4}$ inch silvered metal dial, with stem-winding attachment operating revolving altitude scale reading to
- | | | | |
|--|---------|--------|--------------|
| | 5,000 | 10,000 | 15,000 feet. |
| | \$20 00 | 22 50 | 25 00 |
2056. "Watch" Aneroid Barometer, compensated for temperature, gilt metal case, $1\frac{3}{4}$ inch silvered metal dial, with attached thermometer, revolving altitude scale for
- | | | | |
|--|---------|--------|--------------|
| | 10,000 | 15,000 | 20,000 feet. |
| | \$23 50 | 25 50 | 28 50 |
2057. "Watch" Aneroid Barometer, similar to preceding, without thermometer:
- | | | | | | | |
|--|---------|-------|-------|--------|--------|--------------|
| | 3,000 | 5,000 | 8,000 | 10,000 | 15,000 | 20,000 feet. |
| | \$22 00 | 20 00 | 20 00 | 21 00 | 24 00 | 27 00 |
2058. "Watch" Aneroid Barometer, non-compensated, gilt metal case, $1\frac{1}{2}$ inch silvered metal dial, with raised revolving altitude scale reading to 15,000 feet, attached thermometer, in morocco case\$13 50
2059. "Watch" Aneroid Barometer, similar to preceding, without thermometer, but stem-winding adjustment for operating revolving scale to 15,000 feet.... 15 00
2060. "Watch" Aneroid Barometer, non-compensated, gilt metal case, $1\frac{3}{4}$ inch silvered metal dial, with raised revolving altitude scale reading to 8,000 feet, in morocco case..... 12 50
2061. Sling Case, very superior, of buff English sole leather, for Pocket Aneroids... 4 00

ANEMOMETERS OR AIR METERS.



2062

2060

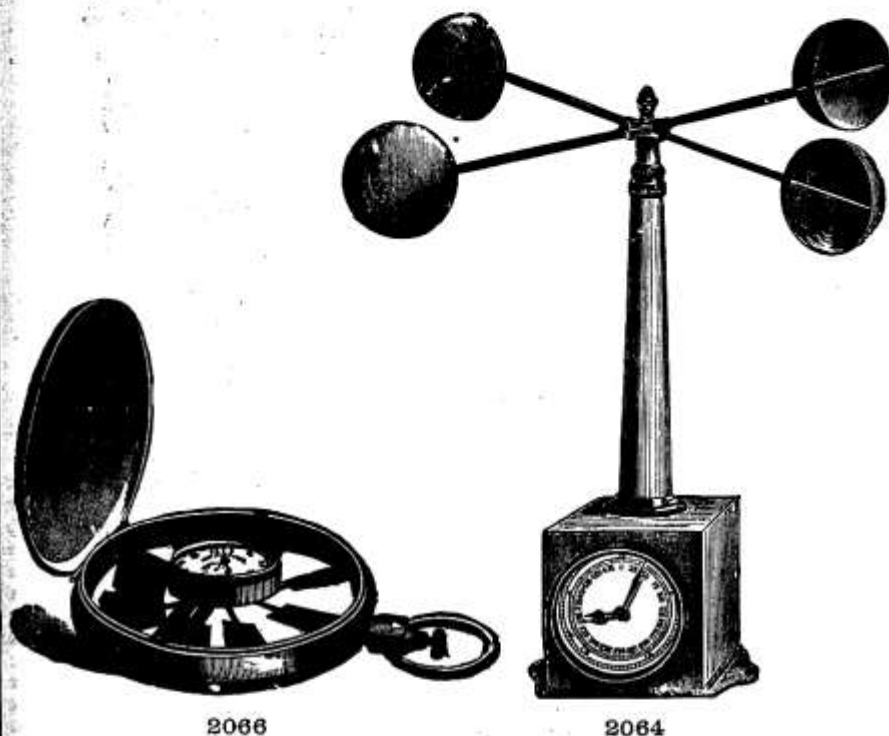
These instruments are designed with a view to record the velocity of the wind, those here enumerated being more particularly intended for the use of millwrights, mining and sanitary engineers.

2060. Air Meter, for measuring the velocity of air-currents in mines, sewers, hospitals, etc. The indications are obtained by the revolution of a series of fans, acting first on a long hand capable of recording the low velocity of fifty feet per minute on a long dial divided to 100 feet, and then successively by a train of wheels on the indices of five smaller dials, each divided into ten parts, and recording respectively 1,000, 10,000, 100,000 and 10,000,000 feet, or 1,894 miles, an amount found to be more than adequate to the most protracted observations. A disconnecter is provided on the rim of the instrument, which sets the recording hands in or out of gear without influencing the uniform rotation of the fans. In wooden case. \$25 00
2061. Air Meter, similar to the preceding, with sand glass, running one minute, attached to the stop, rendering observation of a time-piece unnecessary. In case. 27 50
2062. Biram's Anemometer, improved, with disconnecter, in wooden case, recording:
- | | | |
|---------|-------|------------------------|
| 100 | 1,000 | 1,000 feet per minute. |
| 4 | 5 | 6 inch. |
| \$22 00 | 25 00 | 26 50 |
2063. Biram's Pocket Anemometer, improved, with disconnecter, 3 inch, recording 100 feet per minute, in wooden case, highly commendable. 20 00

BIRAM'S ANEMOMETER.

This is an ingenious and trustworthy form of air meter—combining portability with strength, as with rough usage it is less liable to derangement than the instruments preceding. Biram's Anemometer is invaluable as a "tell-tale" on the ventilation in mines, flues, etc. It consists of a broad brass ring, inclosing eight or ten vanes, which, by means of an endless screw in the center, operate a series of wheels, giving motion to the hands on the dials, and recording a velocity up to 1,000 feet per minute; though, if required, instruments of a higher range could be furnished. The same are provided with or without disconnecter, but as the former are the more convenient, such only are enumerated on the following page.

ANEMOMETERS OR AIR METERS.



- 2064. Robinson's Anemometer, consisting of four hemispherical cups acting by a vertical axis upon two graduated concentric circles, the outer one representing five miles, divided into tenths, and the inner one having one hundred divisions, each of which is equivalent to five miles.....\$35 00
- 2065. Gibson's Electrical Recording Apparatus for above..... 30 00
- 2066. Biram's Anemometer, with outer dial recording 100 feet and inner dial recording 1,000 feet, in hunting watch case, with lifting spring and morocco case... 35 00

WIND VANE.

- 2067. United States Signal Service Wind Vane, sunset.....\$10 50
- 2068. The above with cardinal points,..... 16 50

B. Kahn & Son, New York.

TIME GLASSES.



2073



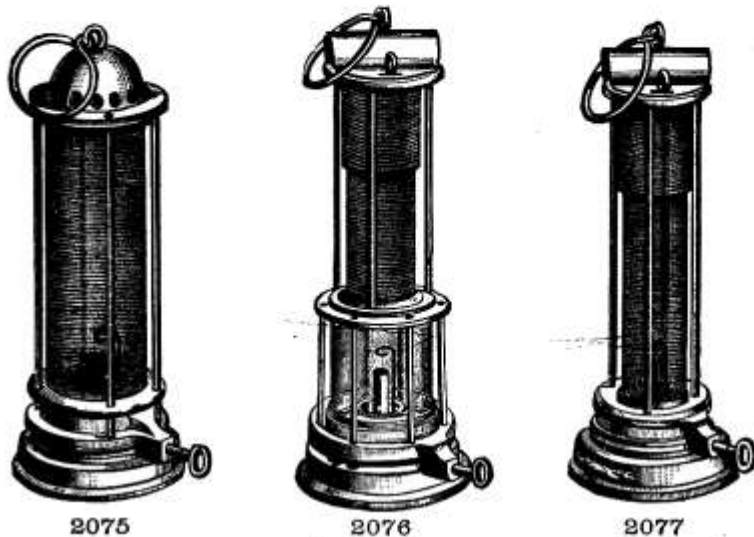
2069

2069.	Time or Sand Glasses, mounted in whitewood, running :			
		3	15	30
		60 minutes.		
		\$0 25	0 75	1 50
				2 00
2070.	Time or Sand Glasses, mounted in rosewood, running :			
		3	15	30
		60 minutes.		
		\$0 50	1 50	1 75
				3 00
2071.	Log Glasses, mounted in brass frames, running :		14	28 seconds.
			\$1 25	1 50
2072.	Log Glasses, mounted in wood frames, running :		14	28 seconds.
			\$1 00	1 25

MINUTE REGISTER OR HORSE TIMER.

2073. Nickel cased, stem winding, flyback $\frac{1}{4}$ second, minute register operated from the pendant and very accurate. For scientific experiments, racing, boating, bicycling, &c\$10 00

MINERS' SAFETY LAMPS.

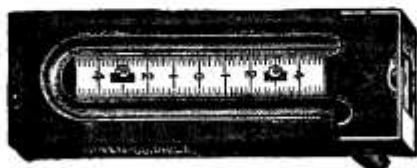


	EACH.	PER DOZ.
2075. Stephenson Lamp	\$3 50	\$36 00
2076. Clanny Lamp	3 00	30 00
2077. Davy Lamp	2 25	24 00
2078. Fireman's Lamp	2 25	24 00
2079. Marsont Lamp, with iron protection over gauze ..	4 75	51 00
2080. Muessler Lamp	2 50	28 00
2081. Bull's-Eye Lamp, lens 2 inch diameter	4 50	48 00
2082. " " " and large reservoir for oil ..	6 00	62 00
2083. Mine Bosses' Clanny Lamp, 8 inches high, with iron gauze	3 25	36 00
2084. Same as 2083, with copper gauze	3 75	40 00
2085. Mine Bosses' Davy Lamp, 8 inches high, with iron gauze	3 25	36 00
2086. Same as 2085, with copper gauze	3 75	40 00

SAFETY LAMP EXTRAS.

2087. Extra Gauzes, for Davy or Clanny lamps	40	3 50
2088. Extra Glasses, for Clanny lamps	30	2 50
2089. Extra Glasses, for Stephenson lamps	40	3 75
2090. Ordinary Hair Brushes, for cleaning gauze	30	3 00
2091. Best Hair Brushes, for cleaning gauze	35	3 75
2092. Metallic Brushes, for cleaning gauze	35	3 75

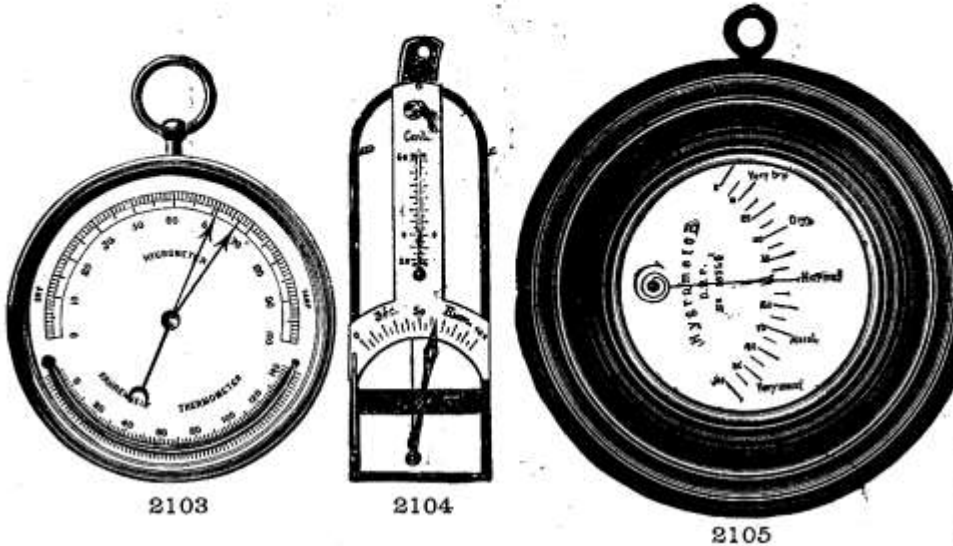
MINER'S WATER GAUGE.



2093. Water Gauge	\$3 75
2094. " improved, with adjusting screw for scale	5 50

B. Kahn & Son, New York.

HYGROMETERS.



HYGROMETERS.

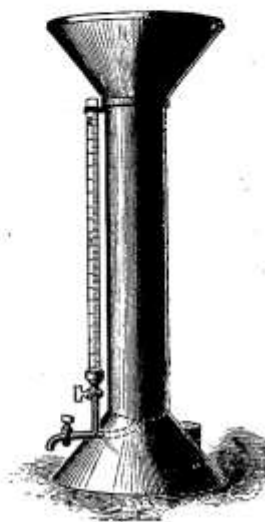
These instruments are employed for estimating the amount of moisture in the air. The atmosphere is never completely dry, nor completely saturated with moisture, and the amount of aqueous vapor held in suspension is very variable. This fact has important bearings on many branches of industry, as also on the hygienic qualities of the atmosphere. The consideration that a certain amount of moisture is necessary to the continuance of health will suggest the importance of maintaining that due proportion in the atmosphere of sick rooms, where the artificial heat, so injudiciously used, often disturbs the healthful hygrometric condition of the air. The Board of Health and the medical profession should enforce, as far as lies in their power, the use of these simple and effective instruments, which give indications so important to the comfort of the patient.

- | | | |
|-------|---|---------|
| 2100. | Daniell's Hygrometer or Dew Point Thermometer, glass tube containing thermometer, mounted on brass stand, with attached thermometer, in black walnut case, with cut-glass ether bottle..... | \$15 00 |
| 2101. | Mason's Hygrometer, with wet and dry bulb thermometers and cistern, mounted and graduated on solid boxwood, with hygrometric tables | 4 00 |
| 2102. | Mason's Hygrometer, similar to preceding, graduated on boxwood, in japanned tin case (see cut on page 82)..... | 5 50 |
| 2103. | Naudet's Hygrometer, indicating percentage of moisture by a hand traversing 5 inch dial, with thermometer, mounted in circular perforated metallic casing.. | 10 50 |
| 2104. | Saussure's Hygrometer, indicating percentage of moisture by a hand traversing scale, operated by human hair, with thermometer, mounted in open metallic frame..... | 9 00 |
| 2105. | Mitthoff Hygrometer, with index traversing card dial, indicating absolute and relative dryness, mounted on round wood frames..... | 3 00 |

RAIN GAUGES



2107



2108

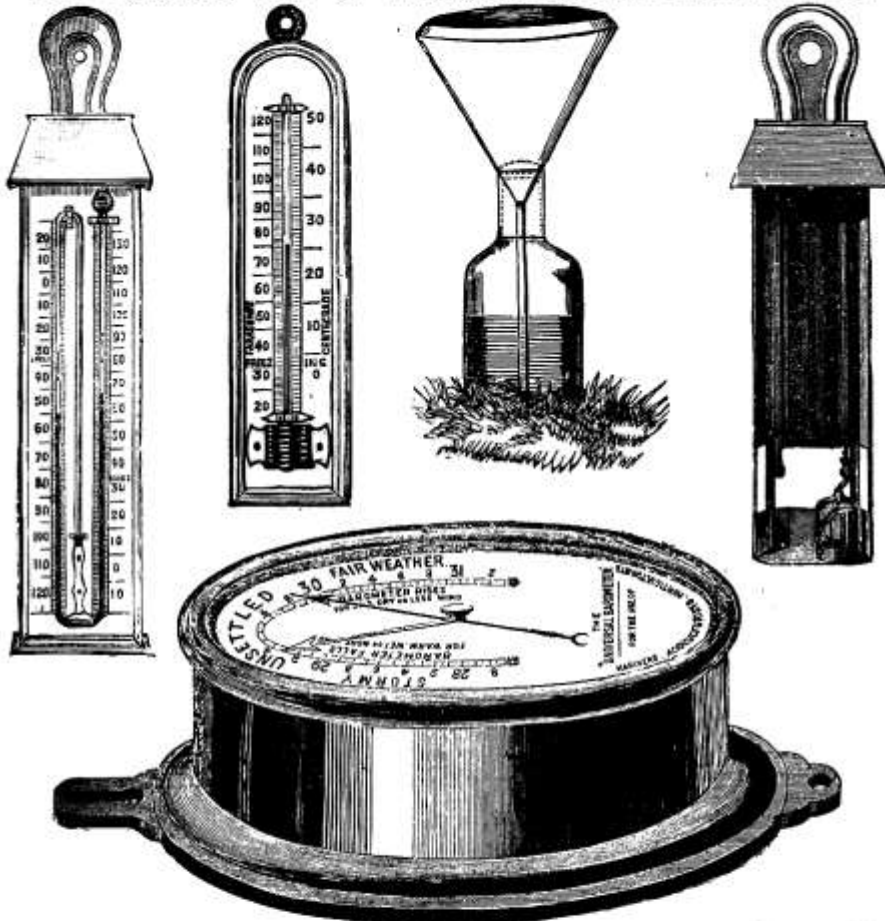
These instruments are for measuring the amount of rainfall in any desired locality; and when the influence of rain upon the growth and quality of crops and upon the sanitary condition of large cities is considered, it seems hardly possible to overestimate the commercial and social importance of accurate statistics on this interesting branch of weather observation.

The established and extraordinary fact, in connection with the fall of rain, being that a series of rain gauges placed at different elevations above the soil are found to collect very different quantities of rain, the amount being greater at the lower level, meteorologists have agreed that the edge of the rain gauge should be placed ten inches above the ground. The spot should be perfectly level, and at least as far distant from any building or tree as the building or tree is high, a southwestern aspect being preferable if the gauge cannot be equally exposed to all points. It is also important that the rain gauge should be well supported, in order to prevent its being blown over by the wind. Symons' Rain Gauge, in this respect, far surpasses any other of the cheaper instruments.

- 2107. Symons' Rain Gauge, glass receiver inclosed in white japanned metal jacket, with openings permitting an observance of the accumulating rain; metal jacket provided with spikes, which are firmly pressed into the soil, thus resisting the wind; graduated measure to contain half an inch of rain (for a 5 inch area) divided into tenths; complete..... \$5 00
- 2108. Howard's Pedestal Rain Gauge, with glass tube graduated to tenths and hundredths of an inch (for a 12 inch area), showing by direct observation the amount of rainfall without using a graduated jar; black japanned metal mount..... 18 00
- 2109. Mason's Rain Gauge (see cut page 82), with jar..... 6 00
- 2110. Signal Service Rain Gauge, 3 inches diameter, with overflow and measuring stick 2 50

B. Kahn & Son, New York.

THE POPULAR SET OF METEOROLOGICAL INSTRUMENTS.



The set of Meteorological Instruments herein described comprises all those which are essential to establish a record of statistics of the most important points in meteorology—*i. e.*, atmospheric pressure, temperature, hygrometry and rainfall.

The importance of this subject cannot be too forcibly impressed upon all those whose occupation or vocation renders them dependent upon, or greatly affected by, atmospheric influences.

To the agriculturist, the horticulturist and those whose interests are centered in growing of crops and flowers and the various products of the earth the subject is of vital importance, and by careful notice of the indications of Instruments, added to personal observations, a fore-knowledge is obtained by which much may be done to avert damage and loss.

To the engineer, also, much of his success in works depends upon a careful consideration of the action of temperature, the amount of rainfall and force of wind, and failures and accidents thereby averted.

Indirectly, the whole community is affected by all these considerations, as well as many others. The subject, therefore, is one that should receive more general attention.

The object, therefore, we have in view is to introduce to your notice our "New Popular Set of Instruments," which has been arranged and produced at a price far lower than ever before attempted, so as to place it within the reach of the many; and this economy, *not* at the expense of efficiency, as we guarantee them to be accurate and well-made instruments.

THIS THE "POPULAR SET" COMPRISES:

(SEE ILLUSTRATIONS.)

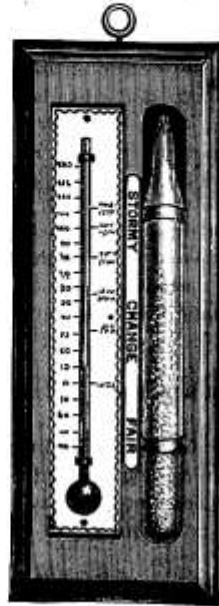
1. An Aneroid Barometer in metal frame, with enamel dial, 5 inches diameter.
2. An 8 inch Boxwood Scale Thermometer.
3. A Maximum and Minimum Registering Thermometer, with boxwood scale (Six's form), in weather protecting case. Magnet for setting indices.
4. A Rain Gauge, japanned funnel with tinned brass edge, 5 inches diameter, glass bottle receiver and graduated glass measure. (Latter not shown in cut.)
5. A Record Calendar for 12 months, with indication columns for each instrument. (Not shown in cut.)
6. A Wet and Dry Bulb Thermometer (Mason's Hygrometer), on boxwood scale, in metal weather protecting case. The whole complete in deal box, **Price, \$15.00.**

B. Kahn & Son, New York.

STORM GLASSES.



2112



2114

The Storm Glass has been known for more than a century, and although the name of its inventor is unknown, tradition attributes the honor to an Italian sailor. It is simply a glass vial containing a properly proportioned mixture of camphor, nitre, sal ammoniac, alcohol and water; and when due care is exercised in the preparation of the solution, it is very useful, with the Thermometer and Barometer, as an assistant in forecasting the weather.

In fair weather the solution appears clear, with a sediment at the bottom; in stormy weather the solution is disturbed and rendered cloudy. The more singular changes in the character of the mixture vary with the direction of the wind.

- 2112. Storm Glass, 10 inches, with thermometer, mounted on polished boxwood back, highly finished, best make \$1 25
- 2113. Storm Glass, 10 inches, consisting in metal-capped vial, with suspensory ring. 1 50
- 2114. Storm Glass, with thermometer, mounted on polished walnut back 40

THE IMPROVED WEATHER HOUSES.



2115

These indicate the changes in the weather in a unique, simple and pleasing manner. They are made of metal, handsomely decorated in different colors, provided with a reliable thermometer, and two miniature figures, arranged in such a manner that the man will come out just before the storm, whereas the lady steps out to enjoy fair weather.

- 2115. Improved Weather House \$1 25

THE THERMOMETER.

Though its invention has been ascribed to various professional men, it only assumed a practical shape in 1620, at the hands of Drebel, a Dutch physician. Halley substituted mercury for spirit in 1697; Réaumur modified the instrument in 1730, and Fahrenheit in 1749; Celsius improving it in 1742, by adding the scale now known as Centigrade.

Thermometers, briefly described, are instruments for measuring degrees of temperature by the contraction or expansion of fluids inclosed in tubes. The tubes, which are of glass, have bulbs, which may be of varied shapes, blown at one end; they have also an exceedingly fine bore, and when mercury or spirit is inclosed in them, these fluids, in contracting and expanding with variations of temperature, indicate degrees of heat in relation to two fixed points—viz., the freezing and boiling points of water.

Great care must be taken to exclude all air before sealing, so that the upper portion of the tube inside shall be a perfect vacuum, and thus offer no resistance to the free expansion of the fluid. In graduating or dividing the scales, the points at which the mercury or spirit remains stationary in melting ice and boiling water are first marked on the stem, and the intervening space divided into as many equal parts as are necessary to constitute the scales of Celsius, Fahrenheit or Réaumur.

The zero of the scales of Réaumur and Centigrade is the freezing point of water, marked, in each case, 0° , while the intervening space, up to the boiling point of water, is divided, in the former case, into 80, and in the latter to 100 parts.

In the Fahrenheit scale the freezing point is represented at 32° , and the boiling point at 212° , the intervening space being divided into 180°.

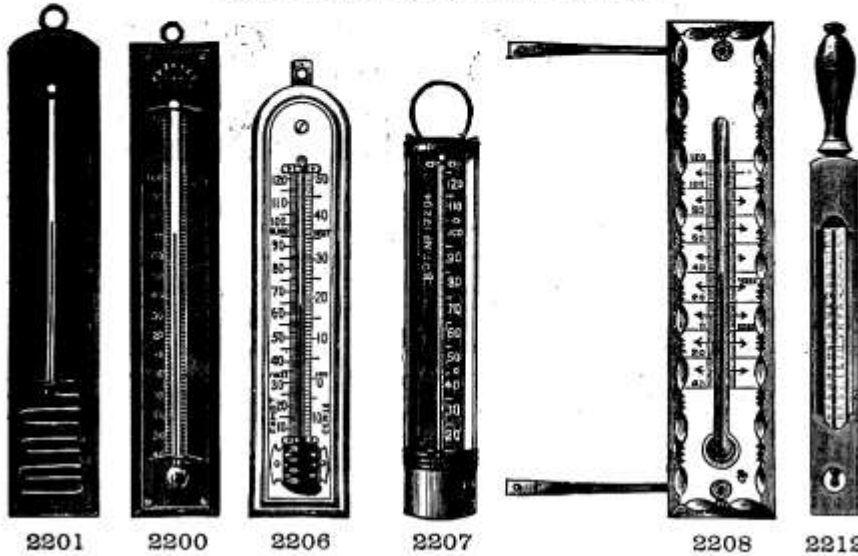
A variety of circumstances may arise in which it may become necessary to convert readings from one scale into those of the others, in which cases the following rules are to be observed:

1. To convert Centigrade degrees into degrees of Fahrenheit, multiply by 9, divide the product by 5, and add 32.
2. To convert Fahrenheit degrees into degrees of Centigrade, subtract 32, multiply by 5, and divide by 9.
3. To convert Réaumur degrees into degrees of Fahrenheit, multiply by 9, divide by 4, and add 32.
4. To convert Réaumur degrees into degrees of Centigrade, multiply by 5, and divide by 4.

SPECIAL NOTICE.

The styles, in stock, of ornamental thermometers change very frequently; in ordering, therefore, it would be well to state if we may substitute a similar article.

THERMOMETERS.

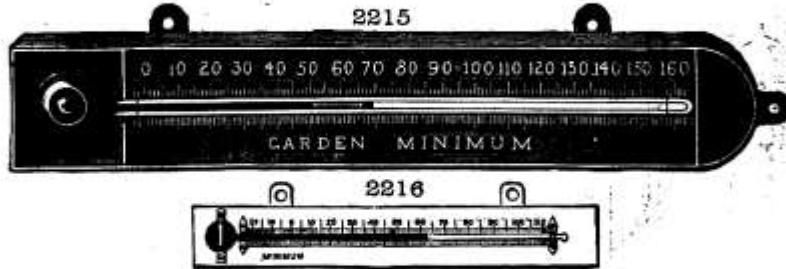


2200.	Ebony Thermometer, silvered scale, polished beveled edge back.	8	10 INCH.	
2201.	" " as above, spiral bulb, " " "	\$1 75	\$2 25	
2202.	Mahogany Thermometer, polished, silvered scale, beveled edge back	1 50	2 75	1 75
2203.	" " as above, spiral bulb, " " "	2 00	2 25	
2204.	Boxwood " counter-sunk tube, " " "	1 50	2 00	
2205.	" " " square edge back....	75	1 00	
2206.	Porcelain " indestructible scale, rounded edge back..	3 25	3 50	
2207.	Tin Case Thermometer, superior, black japanned case, silvered scale :			
		7	8	10 inches.
		\$0 75	1 00	1 25
2208.	Window Thermometer, plate glass, with cut edges....	8	10	12 INCH.
2209.	" " " beveled edges.....	\$2 25	\$2 75	\$3 25
2210.	" " " square "	2 00	2 50	3 00
2211.	" " polished walnut angle-back, 10 inches silvered scale,	1 75	2 00	2 50
2212.	Bath Thermometer, with tube and scale in glass cylinder, mounted in ash frame, with handle :			1 25
		8	10 inches.	
		\$0 75	1 00	
2213.	Pocket Thermometer, ivory scale, on boxwood or ebony back, revolving in German silver case :			
		4	5 inches.	
		\$4 00	4 25	
2214.	Pocket Thermometer, 5 inch tube and scale in glass cylinder, with brass cap in brass cylinder case.....			\$1 00

A large assortment of fancy hanging and stand thermometers constantly kept in stock.

B. Kahn & Son, New York.

MAXIMUM AND MINIMUM THERMOMETERS.



These instruments are designed to register extremes of either heat or cold; thermometers effecting the former being known as "Maximum," the latter "Minimum." Thermometers combining both above purposes are known as "Six's," a description of which will be found in the following pages:

- 2215. Garden Minimum Thermometer, 10 inch, solid zinc scale, raised figures and divisions..... \$1 50
- 2216. Garden Minimum, 8 inch, polished boxwood scale, double degrees..... 1 00
- 2217. Garden Maximum Thermometer, to match preceding..... 1 00

METALLIC THERMOMETERS.

BRASS OR BRONZED CASE.



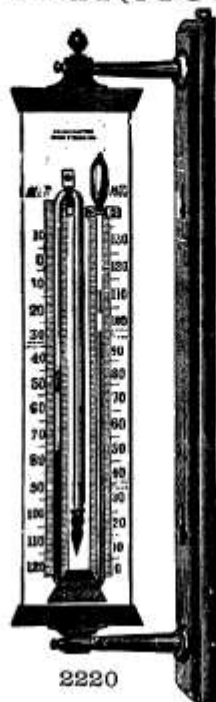
- 2218. Metallic Thermometer, 4, 5 or 6 inch dial..... \$2 50

CHARM THERMOMETERS.



- 2219. Reliable Metallic Charm Thermometer, mounted in heavy rolled plate and real stone backs..... \$1 50

SIX'S THERMOMETER



2220

Six's Thermometer, for registering extremes of heat and cold, was invented by Mr. James Six, of Canterbury, England, about 1790. When well made it is a most trustworthy instrument; and the principle being good, it remains essentially the same as when invented.

It consists of a long tubular bulb united to a smaller tube more than twice its length and bent like a siphon, so that the larger tube is in the center, while the smaller one terminates at the top, on the right-hand, in a pear-shaped bulb. This bulb and the tube in connection with it is partly filled with spirit or ether; the long central bulb and its connecting tube are completely filled, while the lower portion of the siphon is filled with mercury. A steel index, prevented from falling by a hair tied round it, to act as a spring, moves in the spirit in each of the side tubes.

The scale on the left-hand, for indicating minimum temperatures, is a descending one, the zero being at the top; while the right-hand scale, for maximum temperatures, is an ascending one, having the zero at the bottom.

When setting the instrument to register extremes of heat and cold, the indices are brought into contact with the mercury by passing a small magnet down the outside of each tube. Then, should a rise of temperature take place, the spirit in the central bulb expands, forcing down the mercury in the left-hand tube and causing it to rise in the right, which it does also partly by its own expansion. The reverse of this occurs when a diminution of temperature takes place—contraction in all the contained fluids results and the registering mercury ascends in the left-hand column, pushing the index before it, where it remains until re-adjusted for the next observation.

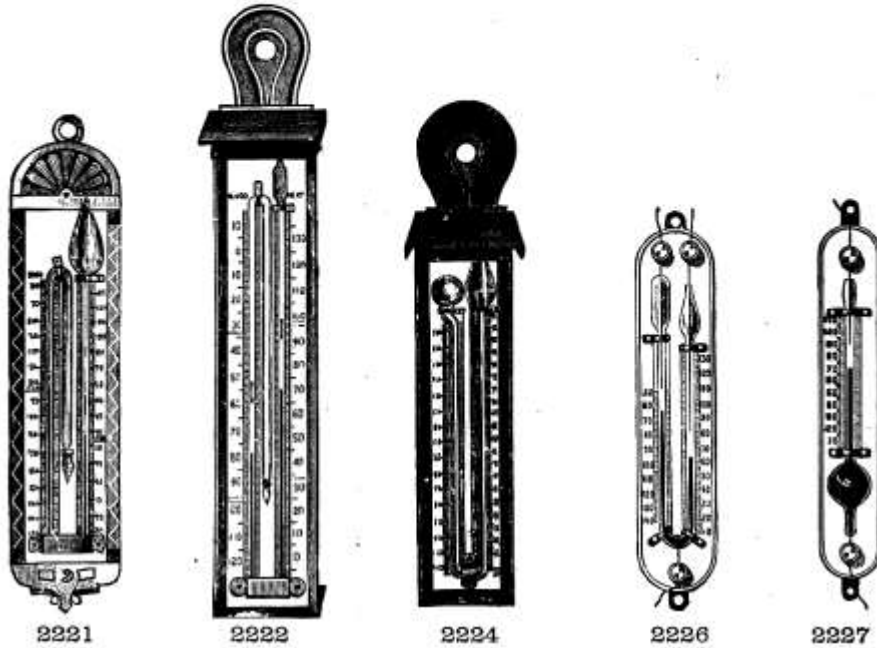
This Thermometer should be always used and carried upright, and the indices should be drawn *gently* down by the magnet into contact with the mercury; and when a reading is taken, the end of the index nearest the mercury indicates the maximum and minimum temperatures which have been attained during the stated hours of observation.

2220. Six's Thermometer, transparent opal glass scale, with brackets to revolve, on oak board, adapted to place out of window :

	10	12	14 inch.
	\$12 00	14 00	16 00

B. Kahn & Son, New York.

SIX'S THERMOMETERS.



- 2221. Six's Thermometer, 10 inches, mounted and graduated on neatly carved solid boxwood back \$6 50
- 2222. Six's Thermometer, mounted and graduated on solid boxwood, with round top and square edges :
 8 10 inches.
 \$3 75 5 00
- 2223. Six's Thermometer, with porcelain or transparent glass scale, mounted in white japanned tin case :
 8 10 12 inches.
 \$7 00 8 00 9 50
- 2224. Six's Thermometer, solid boxwood scale, mounted in black japanned tin case :
 8 10 12 inches.
 \$3 50 5 00 6 50
- 2225. Dimenun Self-Registering Maximum and Minimum Thermometer, 8 inches, similar in construction to Six's, for horizontal suspension, mounted and graduated on solid boxwood with beveled edges..... \$5 00

ELECTRIC THERMOMETERS.

These Thermometers are highly commendable for horticulturists' or manufacturers' use where a check on temperature may prove essential.

The instruments are arranged to connect by wires with battery and alarm, thereby recording any desired degree of temperature at a distance from station of exposure.

- 2226. Electric Thermometer, 7 inches, Six's self-registering, graduated on solid boxwood, with double tube and platinum wires, for recording two extremes..... \$7 00
- 2227. Electric Thermometer, 7 inches, graduated on solid boxwood, with single tube and platinum wires, for recording one extreme..... 5 00

CLINICAL THERMOMETERS.



2229

- 2228. The Patent Lens-Front Clinical Thermometer, self-registering, manufactured solely by J. J. Hicks, of London, England, is the best instrument known to the medical profession, the advantages thereof being embodied in the provision of an acute convex surface on the entire length of the stem, for the purpose of magnifying the index or register, thus facilitating an observation without the close scrutiny heretofore required; the same, 4 or 5 inch, in ebony or boxwood case \$3 00
- 2229. The Patent Lens-Front Clinical Thermometer, indestructible index, has still another advantage over the former, in being provided with a very minute contraction near the bulb, which, while admitting of a rise of the mercury for increasing temperature, also prevents its receding when removed from such influence for an observation; the same, 4 or 5 inch, in ebony or boxwood case, 3 50
- 2230. Clinical Thermometer, 4, 5 or 6 inch, with indestructible index only, in ebony case 2 50
Clinical Thermometer, 4, 5 or 6 inch, straight, self-registering, in ebony case, 2 00
- 2231. Clinical Thermometers, 4, 5 or 6 inch self-registering, one each straight and bent; in morocco case 5 00
- 2232. Surface Clinical Thermometer, self-registering, 5 inch, with annular bulb and reflector, giving very rapid indications; in ebony case 9 00

All the above Clinical Thermometers have seasoned tubes, and, where required, a certificate for any of the same will be furnished from the Kew Observatory, England, at 50 cents; Yale Observatory, at 75 cents.

URINOMETERS.



2223

These instruments indicate the departure of urine from its healthy normal standard. One side of the scale is marked with degrees, and the reverse side with the following letters: *W*, showing the point at which the instrument rests when immersed in pure water; *H*, the point for healthy, normal urine; *S*, indicating an increase of strength, or specific gravity, but a diminution of health; the last division showing the point at which the disorder known as "diabetes" has set in; its *progress* is indicated by the instrument floating at lower divisions of the scale.

- 2233. Hicks' Patent Urinometer is an elegant and superior form of instrument, which is figured and divided in *black* on the *white* enamel stem itself, thus avoiding all errors arising from shifting of scale, as is the case with ivory and paper; corrosion, as with metal, or alteration of form, as with vulcanite. This instrument is superior to all others. In "pull-off" case \$2 50

We also furnish the cheaper grades as low as 75 cents.
Importation orders taken for the more elaborate urinary cabinets, as supplied by J. J. Hicks, of London, England.

DAIRY AND CHEMICAL THERMOMETERS.



2234

2234. Floating Dairy Thermometer, marked for "churning," for "cheese," and "scalding," on paper scale in glass cylinder :
 7 8 10 inches.
 \$0 40 0 50 0 60
2235. Floating Thermometer, paper scale—20° to + 212° Fahrenheit, in glass cylinder :
 8 10 12 inches.
 \$0 50 0 75 1 00
2236. Chemical Thermometer, 14 inch scale etched on solid glass stem, graduated 0° to 400° or 700° Fahrenheit, in "pull-off" case \$2 25

HYDROMETERS.



2237

These instruments are designed for readily ascertaining the specific gravity of various fluids, on the long-established principle that "a body immersed in any liquid receives a pressure from below, upward, equal to the weight of the volume of liquid displaced by such body." They give the specific gravities of liquids by observing the degree to which they sink in fluids, and, as indicated upon the graduated stems, suited for liquids heavier and lighter than water.

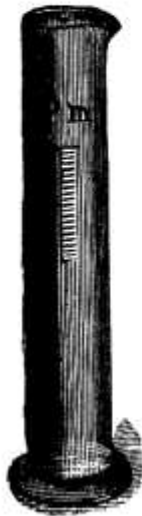
2237. Hydrometer, for any of the following liquids : 1. Acid. 2. Alkali. 3. Ammonia. 4. Bark. 5. Beer. 6. Chlorine. 7. Cider. 8. Coal Oil. 9. Ether. 10. Milk. 11. Oil. 12. Photographic Bath. 13. Salt. 14. Shellac. 15. Spirit. 16. Sugar and Syrup. 17. Vinegar. 18. Wine Must. \$0 50
2238. Hydrometer, Twaddle's Scales, numbers 1 to 6, each, as follows : 1. 0° to 24°; 2. 24° to 48°; 3. 48° to 72°; 4. 72° to 100°; 5. 100° to 134°; 6. 134° to 180°. 0 50
2239. Hydrometer, Beaumé's and Specific Gravity Scales, for liquids : 1. Lighter than water, 700° to 1,000°; 2. Heavier than water, 1,000° to 2,000°; 3. Lighter and heavier than water. 1 00
2240. Alcoholometer, 12 inches, with thermometer, Tralle's U. S. Custom House Scale 1 75
2241. Lactometer, or Milk Hydrometer, as adopted by the New York Board of Health 75

LACTOMETER FOR TESTING THE QUALITY OF MILK.

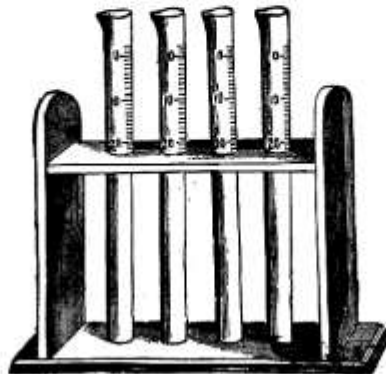
Milk being so universally used as an article of food, it becomes a matter of great importance to ascertain whether the milk obtained is pure or not. The above-named instrument was invented for this purpose, for fixing the standard weight of milk as it is produced in the best grazing districts of the country, and for detecting the fraud of adulterating milk with water, so frequently practiced by dealers.

The method of using it is as follows: Fill the jar with milk to be tested, allow it to cool to the temperature of 60 degrees, then immerse the Lactometer, and notice the mark on the scale that is level with the surface of the milk, which will show the quality: The mark P, being pure milk; the mark $\frac{3}{4}$, being three parts milk and one part water; the mark $\frac{1}{2}$, being two parts milk and two parts water; the mark $\frac{1}{4}$, being one part milk and three parts water; the mark W, being all water. Any intermediate percentage can be determined by the decimal scale on the opposite side, zero being water, and 100 pure milk.

JARS AND CREAM GAUGES.



2242



2245



2243

2242. Hydrometer Jar :	8	10	12	14	16	18 inches high.
	\$0 25	0 35	0 50	0 75	1 00	1 25
2243. Cream Gauge, graduated glass jar, showing the relative percentage of cream in milk.....						\$0 50
2244. Combination Lactometer and Cream Gauge.....						1 00
2245. Set of Four Cream Gauges, for comparison, in japanned tin stand.....						3 00

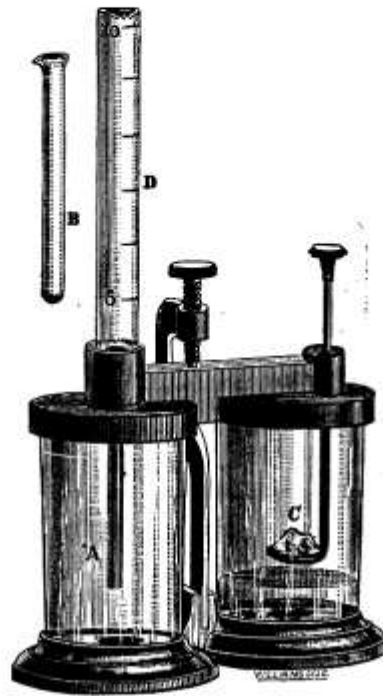
DIRECTIONS FOR USING THE CREAM GAUGES.

Whenever milk shows by the lactometer a different specific gravity from pure milk, one of two things may be suspected: either that the milk contains *more* or *less* than the usual amount of cream, which can be easily determined by comparing it with an equal quantity of pure milk, set in two equal cream gauges a sufficient length of time for the cream to rise, and if the suspected milk has more cream than the pure milk, it is well; but if less cream, the milk has probably been watered, and perhaps skimmed. Then, to ascertain how much water has been added, take a sample of milk known to be pure, from the mixed milk of several cows, and put it in a per-cent. jar, filling it up to gauge-mark ten; then fill another per-cent. jar to the same mark with the suspected milk, and one with water to zero. Place the three jars side by side, so that they will be of the same temperature, and subjected to the same atmospheric influences, until the cream has time to rise.

Note the percentage of cream on each sample of milk, before removing or disturbing it. Then, after removing the cream from both jars, insert the lactometer in the suspected milk and note the point to which it sinks. Then place the lactometer in the pure milk, and from the per-cent. jar pour in water until the lactometer sinks to the same point at which it stood in the watered milk. Place the jar of water where it will stand level, and as soon as it comes to a rest read from it the percentage of water added. The value of the cream taken from the milk can be estimated from the amount left, by comparing it with the amount furnished by the sample of pure milk. In all tests of milk which may affect the reputation of the parties delivering it, sufficient care ought to be used to make it reliable.

B. Kahn & Son, New York.

TWITCHELL'S ACIDOMETER.



2246

2246. Twitchell's Acidometer, for determining the strength of Vinegar..... \$12 00

THE SALINOMETER.

FOR MARINE BOILERS.

This Hydrometer is made with a special scale for determining the density of water in marine steam boilers. The zero of the scale is the point to which the Hydrometer will sink in pure water at a temperature of 200 degrees Fahrenheit. The graduation of the scale is based on 32 parts pure water, containing 4 parts of saline matter, and is marked 1-32, 2-32, 3-32, 4-32.

The word "Blow" is marked on scale between 2-32 and 3-32, indicating at that density the water should be drawn from the boiler and replaced with fresh water, to prevent incrustation.

2247. Glass Salinometer..... \$1 50
 2248. German Silver Salinometer..... 13 50
 2249. Copper Salinometer..... 12 00

2511117113

Electrical

Apparatus.

PREFACE.

—+—

SUBJECT to the spirit of this edition, the following pages have been dedicated *more especially* to that class of

PRACTICAL ELECTRO-MEDICAL BATTERIES

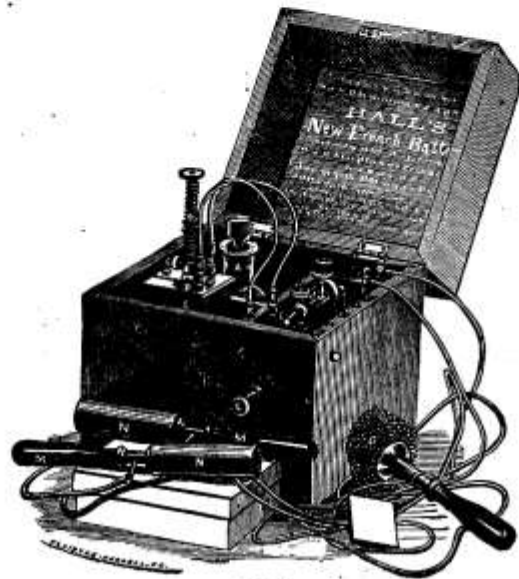
deemed *worthy* of professional and household service; brief mention of a line of

Experimental Electrical Apparatus,

calculated to be indispensable for demonstration in the primitive field of electrical science, being further included. The benefits to be derived from the judicious application of electricity to medicine and surgery are too numerous and great to be disputed, whereas its appropriations to commerce and domestic comfort are beyond what might have been expected by the most sanguine at the opening of the present century; and, notwithstanding the wonderful achievements of recent date, electricity may yet be estimated to be but in its infancy, offering one of the most extensive fields of labor to inventive genius, and, judging from past examples, likely to prove one of the most lucrative.

The above facts, it is hoped, should suffice to stimulate individual research by most every one, as it is further probable that an education in the future will not be considered complete without an understanding, *at least*, of the first principles of this useful branch of science.

HALL'S NEW PATENT BATTERY.



3000

3000. Hall's Battery, with helix connecting wires, sponge handle, two silver-plated handles and insulators, one bottle of solution of bichromate of potash and sulphuric acid; extra zinc and box of bichromate of potash, which, together with the above, afford materials for the operation of the battery for twelve months; in polished walnut case, with handle, lock and key; weight, four pounds; complete, with full directions \$15 00

This battery is of entirely new construction, and produces three distinct currents, regulated either by the regulating rod or by the immersion of the zinc in the solution. It can be so controlled as to obtain the finest or strongest electrical sensation.

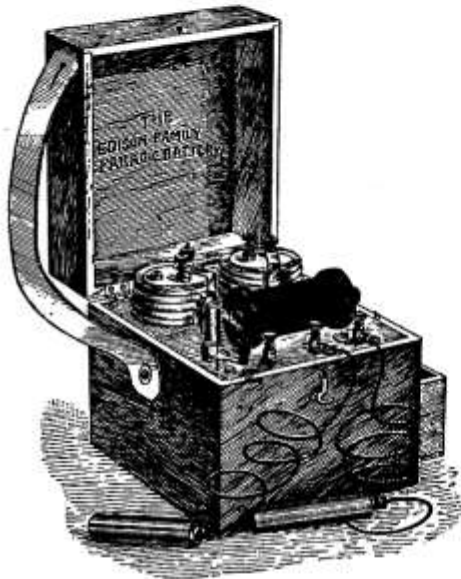
The solution is contained in a glass vessel shaped like an inverted balloon, and can be carried within the battery without fear of spilling.

The zinc, when the battery is not in use, is suspended above the solution by means of a spring, which can, at any moment, be lowered by a slight pressure, and the battery set in full operation.

Great pains have been taken in the manufacture of this instrument, thus rendering it less liable to get out of order than any other.

The wonderful efficacy and increasing success of Hall's New Patent Battery have induced the desire to place it within the reach of every physician and family.

EDISON-LALANDE FARADIC BATTERIES.



3001



3002

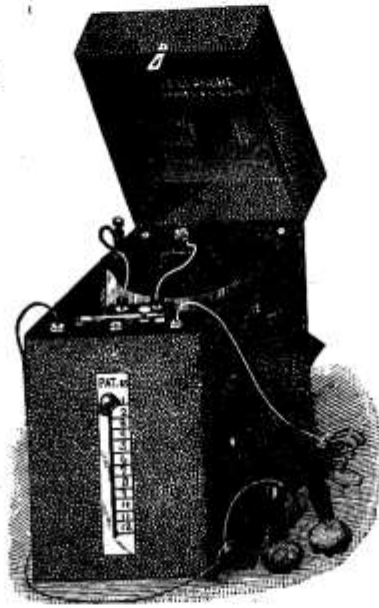
The elements employed in the Edison-Lalande cell are zinc as the positive and black oxide of copper as the negative. The exciting liquid is a solution of caustic potash. This cell requires absolutely no attention after being once charged, and a simple turn of a switch sets the battery going. Its extreme portability and being always ready for use, makes it an ideal instrument for household uses.

3001. Edison-Lalande Physician's Battery, with two cells, in polished walnut case, with drawer, together with sponge electrode, copper oxide plate, zinc plate, can containing four sticks of potash and a bottle of oil, sufficient for two cells. \$15 00

3002. Edison-Lalande Family Battery, similar to preceding, but smaller size. 10 00

RENEWAL PARTS FURNISHED AT ANY TIME.

LECLANCHÉ FARADIC BATTERY.



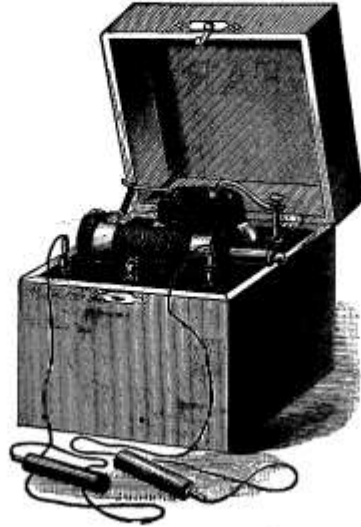
3003

3003. The Leclanché Faradic Battery is of a new and entirely original design. It is simplicity itself, and in ordinary use will run from one to two years without any attention or expenditure. It is always ready for use; no strong, poisonous and dangerous acids required. It has no zincs to raise and lower, no drip cups and no fluids to be removed. The Leclanché cell is universal; it can be obtained anywhere, and will fit this battery. It is long of life and very constant. It has three currents—mild, medium and strong—each of which can be regulated in degree by means of an improved graduator. All parts handsomely nickel-plated. Size, $8\frac{1}{2}$ x $6\frac{3}{4}$ x $5\frac{1}{4}$ inches, and is furnished with most suitable electrodes.

Leclanché Faradic Battery in leather-covered case.....\$10 00
Leclanché Faradic Battery in polished mahogany case.... 13 50

B. Kahn & Son, New York.

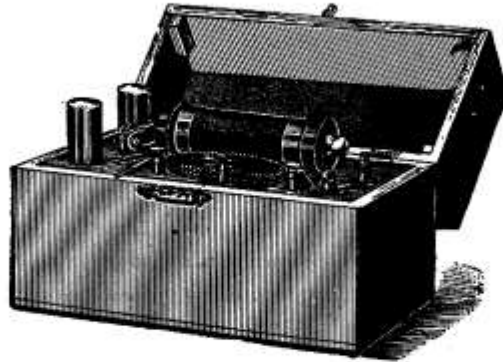
THE "ACME" BATTERY.



3004

3004. The Acme Battery is absolutely the best low-priced electro-medical machine offered to the public. It is light and portable, simple in construction and easy to operate. It is acid-proof and will last for years, and the carbons are so arranged that it is impossible to break them. Finished in ash, cherry or black walnut cases, all metal parts heavily nickel-plated; gives three currents. Dimensions, $6\frac{1}{2}$ inches square, and weighs but four pounds.... \$6 00

IDEAL DRY BATTERY.



3005

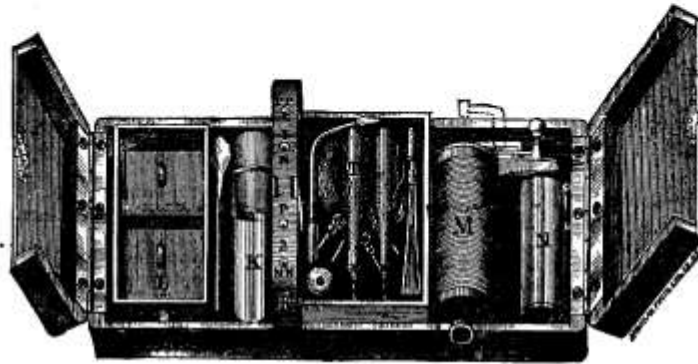
3005. The Ideal Dry Cell Battery is of an entirely new design, and there being no acid to spill, it will commend itself to physicians as an extremely portable instrument. It is merely necessary to turn the switch to turn the current off or on, and it is so arranged that it cannot be closed while the current is on, thus absolutely preventing waste. Finished in ash, cherry or black walnut cases, all metal parts heavily nickel-plated, Dimensions, $7\frac{1}{2} \times 4\frac{1}{2} \times 3$ inches; weight, three pounds..... \$7 50

GAIFFE'S POCKET ELECTRO-MEDICAL BATTERIES.

A. GAIFFE'S CELEBRATED SYSTEM OF PORTABLE ELECTRO-MEDICAL INDUCTION APPARATUS, FOR PHYSICIANS AND FAMILY USE.

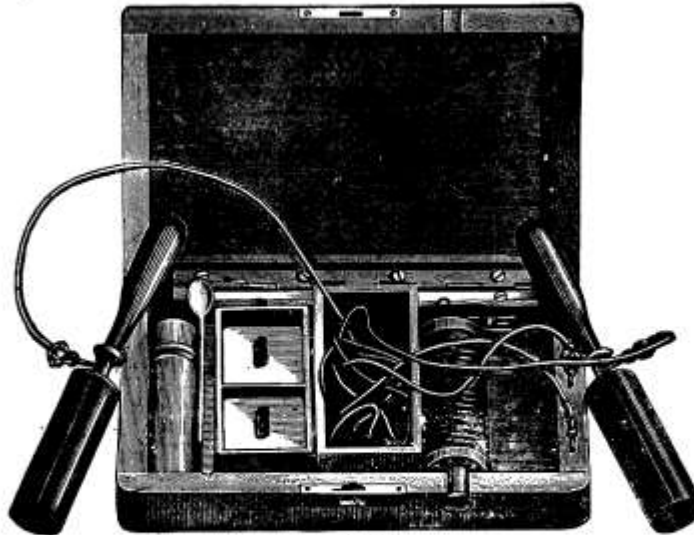
The electro-motor used in this instrument is the bisulphate of mercury battery (Pile Marie Davy). The cell of this convenient little battery is made of hard rubber, rectangularly formed, with a division in the center, each compartment having a carbon and a zinc plate. Metallic fittings are attached to the cell to connect the carbon and zinc elements to the coil.

The currents produced are as follows: 1. The primary current. 2. The secondary current. 3. The current of the first two, combined in intensity. 4. Shocks, slow or fast, according to the use of the contact breaker or lever.



3006

3006. Gaiffe's Battery, with silk-covered conducting cords, two insulated handles, one metallic brush, one olive-shaped exciter, one spherical exciter, and one vial of bisulphate of mercury, in polished mahogany case, $7\frac{1}{2} \times 4 \times 4\frac{1}{2}$ inches; complete, with full directions \$9 00



3007

3007. Gaiffe's Battery, with same size coil as in preceding, producing two currents instead of three, mounted in single cover polished mahogany case, $6\frac{1}{2} \times 4 \times 4\frac{1}{2}$ inches, containing two insulated handles and vial of bisulphate of mercury . . . \$7 50

B., Kahn & Son, New York.

MAGNETO-ELECTRIC MACHINES.



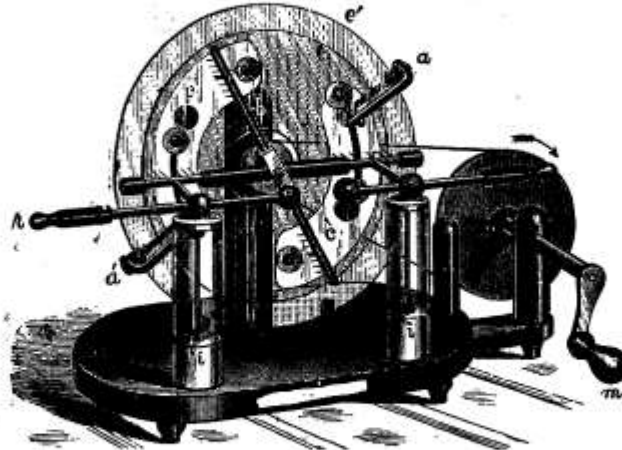
3008

3008. Magneto-Electric Machine, in polished mahogany, metal-bound case, 8 x 4 x 3 $\frac{3}{4}$ inches, with handles and conducting cords; complete with book of instructions \$6 00
3009. Magneto-Electric Machine, in polished mahogany, metal-bound case, 10 x 4 $\frac{1}{2}$ x 4 $\frac{1}{2}$ inches, with handles and conducting cords; complete with book of instructions. 10 00

ELECTRO-MEDICAL BATTERY SUPPLIES.

3011. Zincs, for Batteries. \$0 25
3012. Carbons, for Batteries. 0 25
3013. Platina Plates, for Batteries. 1 50
3014. Glass Jars, round, for Batteries. 0 60
3015. Rubber Cell and Zincs, for Gaiffe's Battery. 1 50
3016. Conducting Cords, for Batteries. per pair 0 75
3017. Foot Plate or Surface Electrode, nickel-plated planished copper. 1 25
3018. Sponge Electrodes. 1 50

EXPERIMENTAL ELECTRICAL APPARATUS

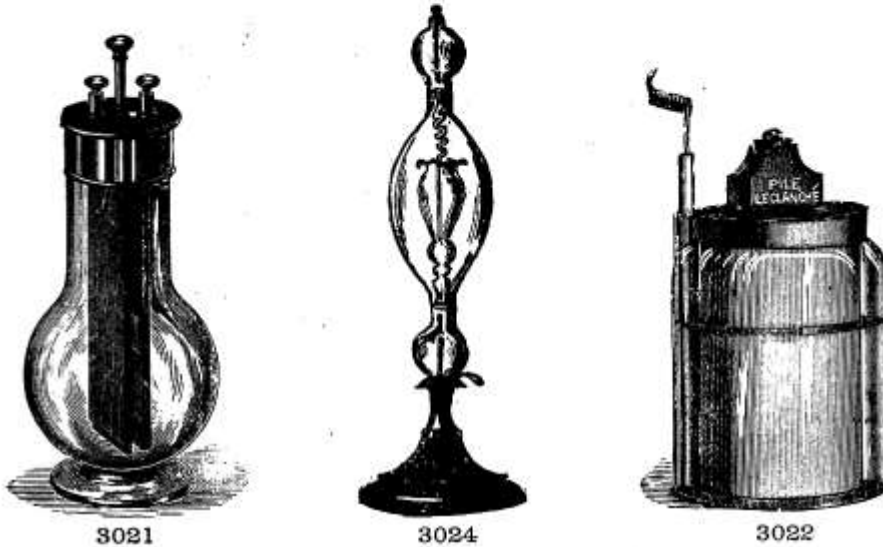


3020

3020. Holtz Electrical Machine, with 12 inch revolving plate and 14 inch stationary plate, affording a 6 inch spark, mounted on solid walnut base; complete, with catskin and rubber. \$30 00

EXPERIMENTAL ELECTRICAL APPARATUS.

We are prepared to render special quotations for the latest patterns of Geissler's Vacuum Tubes, Electro-Motors, and Electrical Apparatus of every description for experimental purposes.



THE GRENET BATTERY.

This battery is especially adapted for experimental and illustrative purposes. It occupies but little space, furnishes a strong current, is unique in design, and, as the zinc between the carbons can be raised from the fluid, may be kept charged, ready for use, for many months.

3021. Grenet Battery :	6	8	10	12	14 inches high.
	$\frac{3}{8}$	1	2	4	6 pints capacity.
	\$2 00	3 50	4 50	5 50	11 00

THE LECLANCHÉ BATTERY.

A perfect battery for all open circuit work, being the most approved form of battery for annunciators, burglar alarms and electric bells. The same will work from six to eight months without attention, contains no poisonous acids, emits no odor and will not freeze.

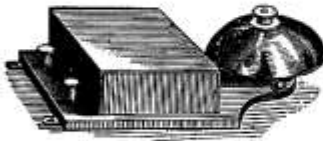
3022. Leclanché Battery or Complete Element, consisting of porous cell, jar, amalgamated zinc, and sal ammoniac	\$0 75	
3023. Leclanché Battery, sealed, in box with folding lids :		
3	4	6 elements.
\$4 00	5 00	7 50

GEISSLER'S VACUUM TUBES.

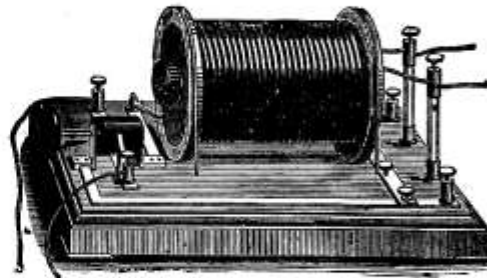
3024. Vacuum Tube, uranium glass, on ebonized wood stand, designs as follows :					
CASCADE.	MARGUERITE.	CROSS.	FLOWER.	DEMON.	
\$3 25	4 00	4 00	5 00	6 00	
3025. Vacuum Tubes, without stands, from 6 to 12 inches long, singly or in sets of 4 to 6.	from \$0 75 to 10 00				

B. Kahn & Son, New York.

EXPERIMENTAL ELECTRICAL APPARATUS.



3027



3026

RUHMKORFF OR INDUCTION COILS.

3026. Induction Coil, with commutator and automatic break, on polished mahogany base :
- | | | | | | |
|---------------|---------------|---------------|---------------|----------------|-----------------------------|
| $\frac{1}{8}$ | $\frac{3}{8}$ | $\frac{1}{2}$ | $\frac{3}{4}$ | $1\frac{1}{4}$ | 1 $\frac{1}{2}$ inch spark. |
| \$5 00 | 6 00 | 10 75 | 21 25 | 34 50 | 48 75 |

ALARM BELLS.

3027. Alarm Bell, mounted in finely polished walnut box :
- | | | | |
|--|----------------|----------------|----------|
| | $2\frac{1}{2}$ | $3\frac{1}{2}$ | 4 inches |
| | \$1 00 | 1 25 | 1 50 |

CONDUCTING WIRES.

3028. Insulated Magnet Wire, silk-covered, on spools, averaging 775 feet to the ounce.....per ounce \$1 00
3029. Insulated Office or House Wire, fine finish.....per 100 feet 0 50
3030. Field Wire, galvanized iron..... " 0 30

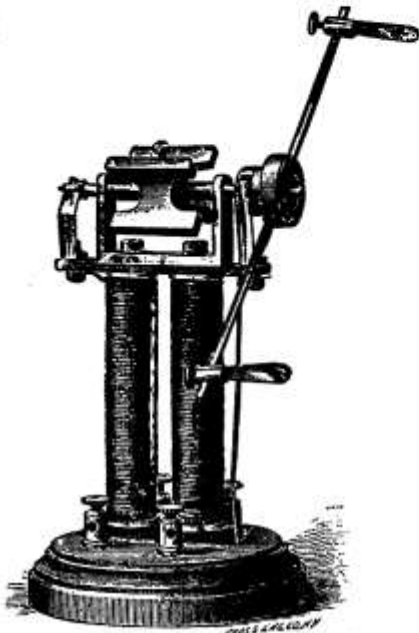


3031

GALVANOMETER.

3031. Galvanometer, index traversing vertical silvered arc of 70°, mounted on circular polished mahogany base, 4 inches in diameter, and covered by dust-protective glass shade \$5 00

ROTATORS FOR GEISSLER TUBES.



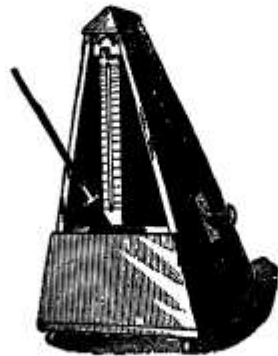
3032



3034

- | | | |
|-------|---|--------|
| 3032. | Edison Rotator for Tubes, 6 to 9 inches..... | \$6 00 |
| 3034. | Standard Rotator for Tubes, 6 to 9 inches..... | 8 50 |
| 3035. | Standard Rotator for Tubes, 7 to 12 inches..... | 18 00 |

METRONOME.

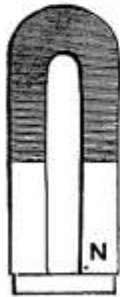


3036

- | | | |
|-------|---|--------|
| 3036. | Metronome, for seconds or fractions of seconds..... | \$7 50 |
|-------|---|--------|

B. Kahn & Son, New York.

EXPERIMENTAL ELECTRICAL APPARATUS.



3045

MAGNETS.



3037



3043

3037.	Horseshoe Magnet :	2	2½	3	3½	4	4½	5	5½	6	7	8	9	10	12 in.
		\$0 10	0 15	0 20	0 25	0 30	0 35	0 40	0 50	0 60	0 80	1 25	1 50	2 00	3 00
3038.	Bar Magnets, 3 inches long, $\frac{3}{16}$ inch square.....														per pair \$0 25
3039.	" 3 " $\frac{1}{2}$ x $\frac{1}{4}$ inch in cross-section.....														" 0 40
3040.	" 10 " $1\frac{1}{4}$ x $\frac{1}{4}$ " "														" 1 75
3041.	" 12 " $1\frac{1}{4}$ x $\frac{1}{4}$ " "														" 2 00
3042.	" 8 " $\frac{3}{4}$ x $\frac{1}{4}$ " mahogany box.....														" 3 75
3043.	Compound Horseshoe Magnet, two bars, 6 inches long.....														3 00
3044.	" " " three bars, 8 inches long.....														5 00
3045.	Potters' Parallel Magnet, 8 inches long.....														2 00

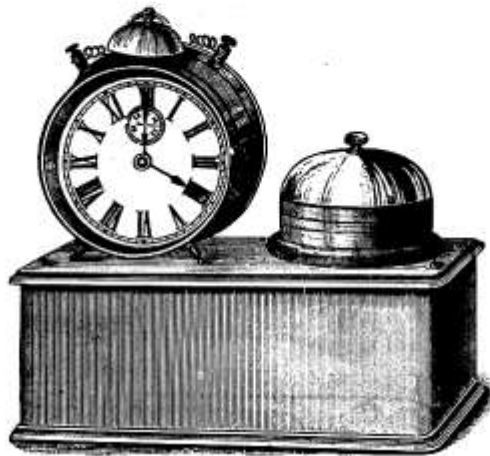
INCLINATION NEEDLE.



3046

3046.	Inclination Needle, 3 inches, agate centres, with adjusting thumb screw, and mounted on brass stand.....	\$5 00
-------	--	--------

EARLY RISER'S OUTFIT.



3047

3047. The "Manhattan" Clock, mounted on a finely finished antique oak case, with a 3 inch monitor electric vibrating bell.

The case contains a dry open-circuit battery, which, with ordinary usage, will do service one or two years. The legs to clock set into small receptacles on case, which are connected to the battery and the bell, and it is only necessary to remove the clock from these connections to open the circuit and stop the bell from ringing. When desired, we will furnish the clock with binding posts on top and connections through the legs at an additional cost of 25 cents. This makes a handsome outfit for the desk, office, chamber, etc. \$6 00

3048. "Manhattan" Clock, mounted on a finely finished mahogany case, with connections through legs or binding posts on top of clock, as desired, with Leclanché battery and iron bell on back of case. 6 50

3049. Extra Dry Batteries for above, 1 00

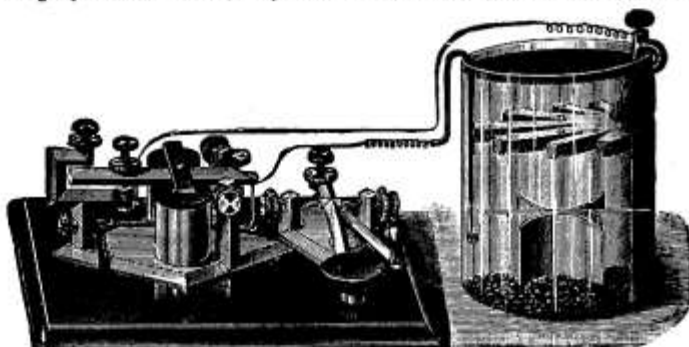
B. Kahn & Son, New York.

In addition to the Electrical Material enumerated on the previous pages, we carry a full line of

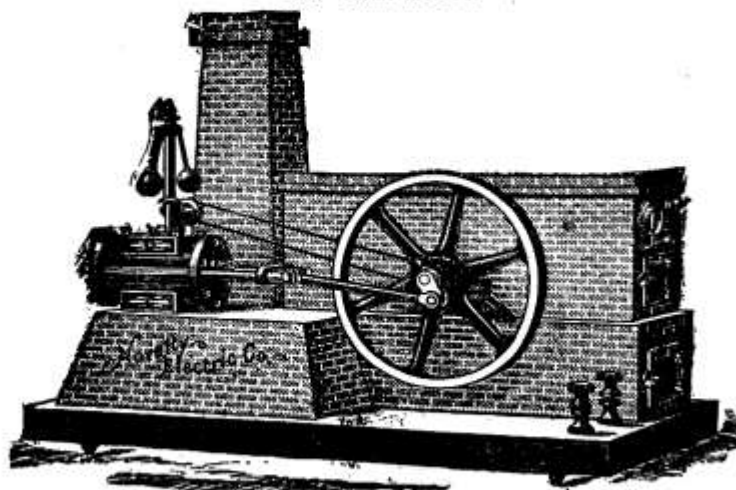
Wood, Brass, Bronzed and Nickered Push Buttons in numerous patterns and shapes.



Telegraph Instruments, Keys, Sounders, Batteries and Accessories.



Maltese Cross, Race Horse, Horizontal, Dynamo-Electric, Horizontal Engine and other Small Motors.



Correspondence Solicited.

EAR TRUMPETS.



		SMALL.	LARGE.
1025.	Conversation Tubes, hard-rubber ends, mohair tubing.....each,	\$3 00	\$4 00
1026.	" " " " " silk "	4 00	5 00
1027.	" " " " " adjustable "	"	3 00
1028.	London Dome Ear Horns, nickel-plated	3 50	4 50
1029.	" " " " black oxidized.	3 50	4 50
1030.	" " " " nickel-plated, lined with silver.	5 00	6 00
1031.	" " " " black oxidized, lined with silver.	5 00	6 00
1032.	Black Japanned Ear Trumpets.....	2 50	3 00
1033.	" " " "	2 50	3 00
1034.	Aurophones, solid silver, flesh color. ....per pair,	\$5 00	
1035.	Ear Cornets, " "	2 50	
1036.	Artificial Ear Drums of rubber, with silver wire.....	2 50	
1037.	"Cane-Head" Ear Trumpet, without cane		10 00

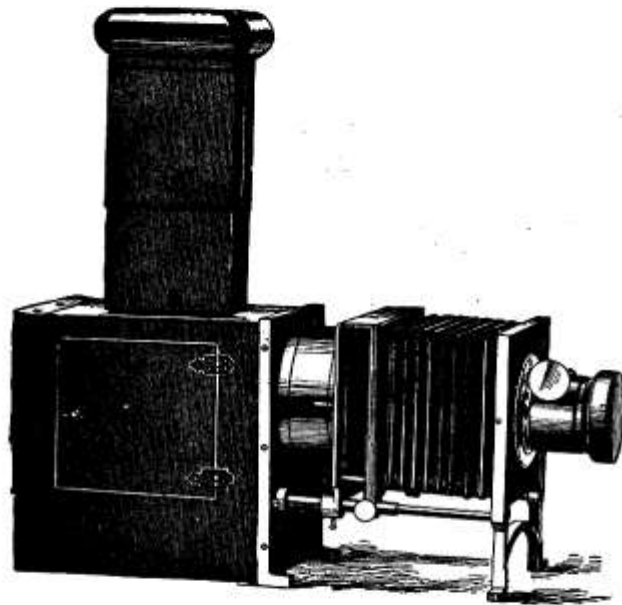
B. Kahn & Son, New York.

We also call attention to

PART C

OF OUR

Illustrated Catalogue and Price List

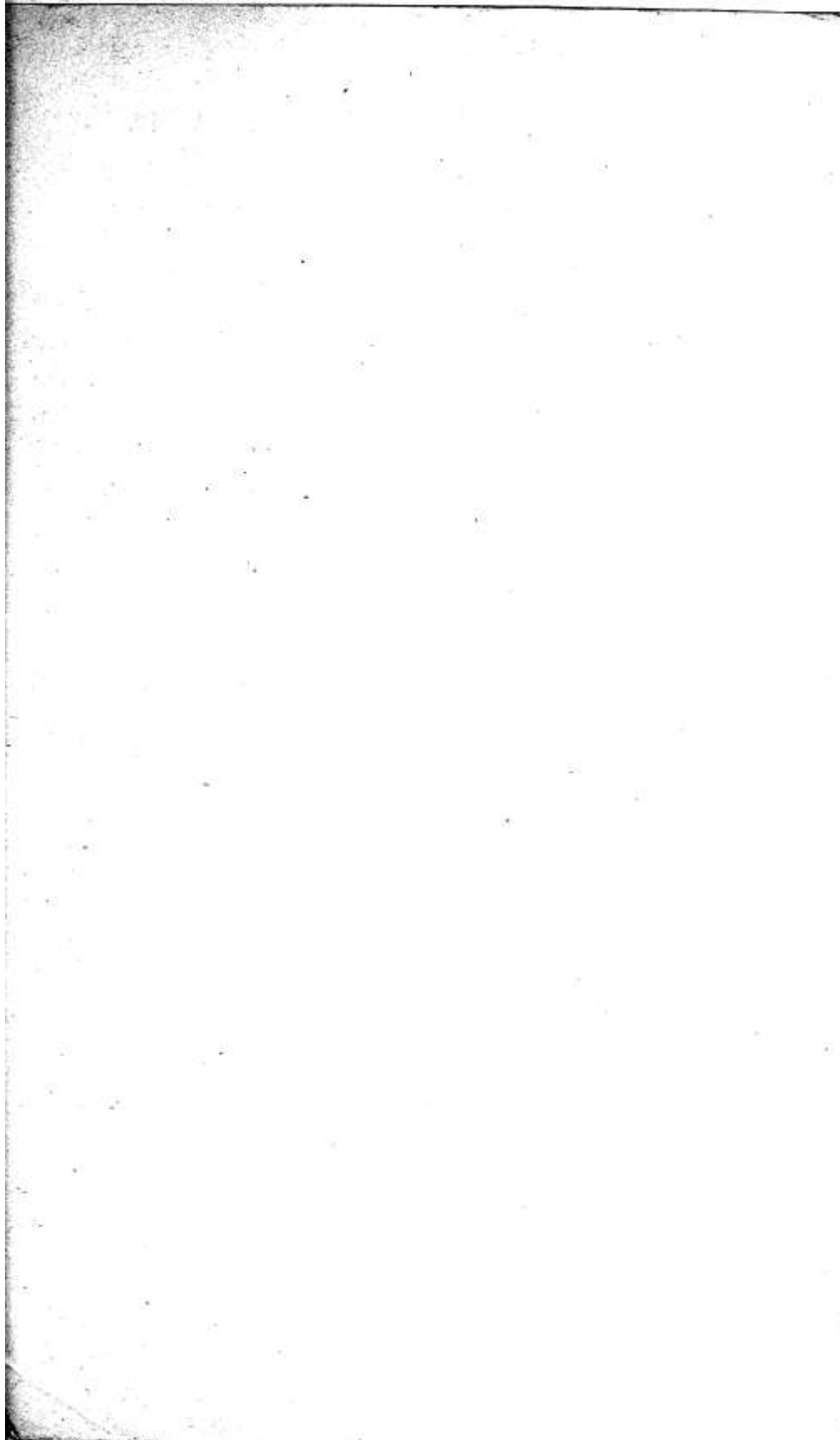


in which we list a full and complete line of

Stereopticons, Magic Lanterns,
Accessories for Projection,
Colored and Plain
Photographic Views on Glass

Mailed gratis upon application.

See Page 6.



SPECIAL NOTICE

RELATIVE TO DISCOUNTS.

Profiting by our experience in previous editions of our Catalogue, we have deemed it best, in the interests of our customers and for the protection of dealers, to withhold the **Net Wholesale Prices** of our goods, having found it impossible in the past to confine this valuable knowledge in the proper channels. We have, therefore, appended **Current Retail Prices** in this new and enlarged edition. These prices represent a reasonable and, in our judgment, adequate profit to the dealer, and are based upon a recognized standard of demand. The great variety of articles mentioned in our Catalogue makes it manifestly impossible for us to fix upon any arbitrary discount applicable to every article, and we trust we have the confidence of our patrons to a sufficient extent to enable them to order such goods for which they have not demand enough to warrant their being kept in stock, with the knowledge that a just and reasonable profit will accrue to them. Other goods being of "standard" values, most dealers will be able to judge the margin of profit, and we are at all times ready to **quote special prices** or to give any desired information.

Thanking our patrons for their generous support in the past, and trusting for its continuance in the future, we feel sure that our efforts for their protection will be fully appreciated.

Very respectfully,

B. KAHN & SON,

No. 32 Maiden Lane,

New York.

B. Kahn & Son, New York.

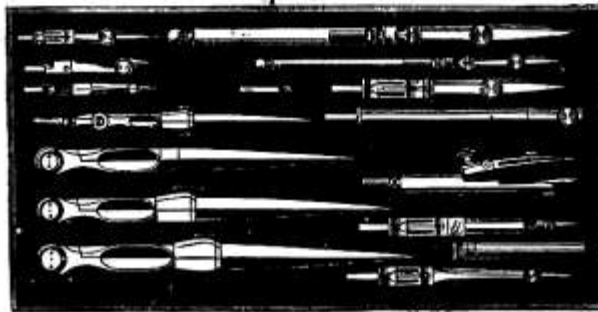
109

We beg respectfully to call your attention to

PART D

OF OUR

Illustrated Catalogue and Price List



in which we list a very complete line of

Drawing Instruments, Scales,
Inks, Brushes and Colors,
Engineering Instruments,
Pocket Compasses,
Odometers, Pedometers, etc., etc.

Mailed gratis upon application.

See Page 6.

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With a view to brevity, repetitions in the Index have been intentionally avoided. Auxiliary appliances have in many instances been placed subordinate to and will be found mentioned in connection with their associate instruments.

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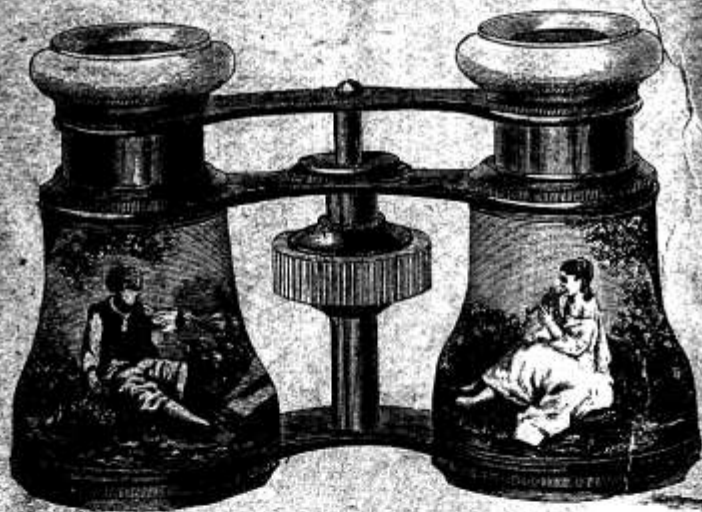
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