

Wood's Optical Novelties.

The following novelties, devised and made by Professor R. W. Wood of John Hopkins University, afford inexpensive and striking illustrations of some of the most fundamental, and of some of the most recondite, phenomena of light.

The prices given below are net, f. o. b. cars at Chicago. *No charge is made for boxing.*



C 391



C 392



C 394

C 391. Phase Reversal Zone Plates. These are small glass plates on which are photographed concentric circles in transparent gelatine whose radii are proportional to the square roots of the natural numbers. By the combined effects of diffraction and phase-reversal, due to the retardation in the gelatine film, they act somewhat like convex lenses, bringing a parallel beam of light to a real focus. (Phil. Mag. 45, p. 511.) Focus 180, 80, or 10 cm. as desired. The zone plates of 180 cm. focus are intended for lantern demonstrations; those of 80 cm. focus are for hand use and laboratory experiments; those of 10 cm. focus may be used as eye-pieces in zone plate telescopes, or for experiments in zone plate photography. Each.....

\$1.50

C 392. Dichromatic Prisms. These are wedges of Canada balsam colored with an aniline dye and enclosed between glass plates. A gas flame or incandescent light seen through the prism shows two images, one red and the other green. As the prism is moved across the eye, both images decrease in brightness, but at different rates, so that when the thick edge of the prism is reached the red alone shows. These phenomena may also be shown with the lantern, using a slit as in projecting ordinary spectra. (Physical Review, 15, p. 121.) Each.....

3.00

C 393. Dichromatic Plates. These are similar to the preceding but have a smaller refracting angle so that the separation of the red and green images is not noticeable. The plates are green at the thin edge and red at the thick edge, the colors merging in the middle. Each.....

3.00

C 394. Cyanine Prisms with Attached Gratings. These consist of two small glass plates enclosing a thin wedge-shaped film of fused cyanine, forming a prism. To one of the plates is attached a fragment of a photographed diffraction grating, so placed that it disperses the light passing through it in a line at right angles to the direction of the



Fig. 394 a

dispersion of the prism. Holding the prism with its refracting edge horizontal and looking through it at an arc lamp, one sees a vertical spectrum showing colors the following anomalous order—red, green, blue, yellow. On each side of this spectrum are seen curved spectra, of the shape indicated in fig. 394 a, due to the combined dispersions of prism and grating. These curves clearly show the relation between the refractive index of cyanine and the wave-length of the refracted light; for the deviation given by the grating is approximately proportional to the wave-length of the light, while that given by the prism is nearly proportional to the refractive index of the cyanine for the corresponding color. Hence, in the curves, the abscissae represent wave-lengths, and the ordinates represent refractive indices. (Phil. Mag. 46, p. 380. Phil. Mag. 1, p. 624, June, 1901.) Each.....



\$4.00

- C 395. Cyanine Prisms, plain.** These are similar to C 394 but without the attached gratings. They show the anomalous spectrum, but do not give the dispersion curves. For purposes of measurement they are preferable to the former. Each.....

3.25



C 396



C 398

- C 396. Nitroso Screens.** These are films of gelatine stained with nitroso dimethylaniline and mounted between glass plates about three inches square. They absorb practically all of the visible light which affects an ordinary photographic dry plate, but transmit ultra-violet light with freedom. They are useful in spectrum photography in the ultra-violet for the purpose of eliminating the visible portions of overlapping spectra. Used as color screens in landscape photography, they give negatives in which the shadows cast by the direct rays of the sun are largely suppressed, since they absorb the visible rays which would affect the plate while freely transmitting the ultra-violet light from the sky which illuminates the shadows. (Phil. Mag. 5, p. 257, Feb., 1903.) Each.....

\$3.00

- C 397. Nitroso Screens, Double Stained.** These are films similar to C 396, but are also stained with a second dye which cuts out the yellow and red rays. Visually they are almost opaque, but they still transmit ultra-violet light with tolerable freedom. If the beam from an arc lamp is brought to a focus by means of a lens and one of these screens is interposed, one obtains an intense, but invisible pencil of

and violet light, in the focus of which uranium nitrate shows brilliant fluorescence. (Phil. Mag. 5, p. 257, Feb., 1903.) Each.....

\$4.00

C 398. Uranium Nitrate Cells. These consist of cells, made of glass plates and watch glasses, which contain crystals of uranium nitrate. These crystals show brilliant fluorescence at the focus of the beam from an arc lamp which has passed through a C 397 nitroso screen. Each.....

1.50

C 399. Soret Zone Plates. These zone plates are of the original Soret type with opaque circles. They are useful for illustrating Fresnel's explanation of the rectilinear propagation of light. They have the same focal properties as the phase-reversal plates C 391, but give only about one-fourth the intensity at the focus. Focal length about 80 c. m. Each.....

1.00

The "Little Jack" Independent Levelling Screws.



C 288

The illustration, C 288, shows a novel device for very quickly setting up a levelling table or stand of any required size or shape, or for providing any piece of apparatus with temporary levelling screws. The "The Little Jack" consists of a bell-shaped brass casting with three feet, into the top of which is fitted a screw with a milled head, the whole forming a miniature screw jack. It will be seen that with three of these "Little Jacks" and a piece of plate glass, wood, metal, ebonite, or the like, a very superior levelling table with no projections can be made at short notice and small cost. In physical laboratories where research work is carried on these independent levelling screws will be found a great convenience. The "Little Jack" is about three inches high when screwed down, a convenient height for admitting the fingers underneath the plate for operating the screw, which is made to fit comfortably in the nut.

The "Little Jack" is made in two sizes, one with a screw $\frac{1}{4}$ inch in diameter, suitable for ordinary purposes; and one with a screw $\frac{3}{8}$ inch in diameter, for heavier work.

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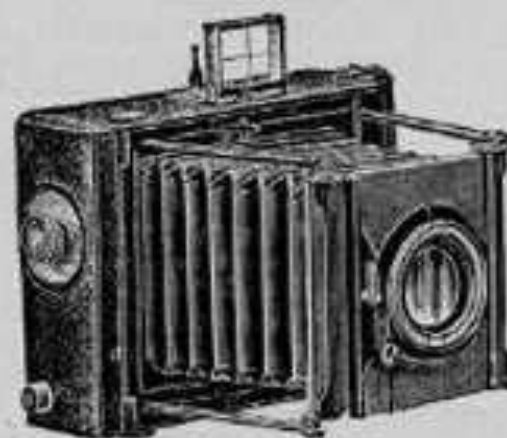
C 287. "Little Jacks" with $\frac{1}{4}$ inch screw, per set of three, from stock.....

\$1.75

C 288. Same with $\frac{3}{8}$ inch screw, per set of three, from stock.....

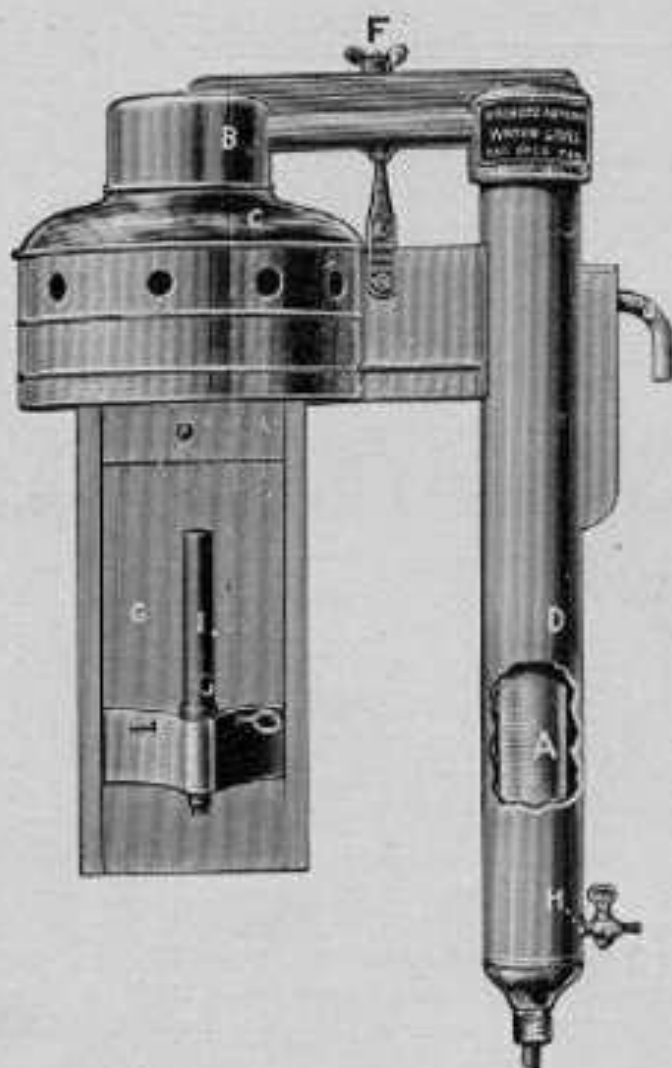
2.00

The Zeiss Minimum Pamos Camera



A hand camera made of light metal, with folding front, focusing objective mount, and focal plane shutter. It is fitted with the most rapid lenses and enables photographs to be taken with any exposure from 1-1000 of a second upward. The width of the shutter slit is adjustable from the outside, and the existing adjustment can always be immediately read on an external scale. Dry plates, cut films or daylight-loading roll-films may be used at will. In workmanship, finish, and optical perfection, this camera stands in a class by itself. Illustrated circulars with full description and prices sent on request.

The Rochlitz Automatic Water Still.



The Rochlitz Automatic Water Still marks a distinct step in advance in the construction of automatic stills.

It is made of heavy polished copper and is **tin-lined** throughout.

It is convenient and economical, giving a half-gallon of pure and sterile distilled water per hour with a gas supply of from 10 to 12 cubic feet.

It is automatic. The constant level attachment always keeps the proper quantity of water in the boiler to secure maximum efficiency. After once the water and gas supply are adjusted, it needs no attention whatever, save an occasional cleaning.

It is easy to clean. The condenser (A) is connected permanently to the boiler cap (B); both can be removed together from the boiler (C) and condenser jacket (D) by removing the packing box and rubber gasket at E and the wing-nut (F.) The hole thus opened in the top of the boiler readily admits the hand for cleaning the boiler and the feed pipe.

It gives pure distilled water. The steam dome is so high that dry steam only can reach the condenser, and the construction is such

that the feed water cannot be forced or siphoned into the condenser.

To set up the Still, screw the sheet metal bracket G to the wall or other convenient support; then insert the flange on the boiler C into the grooves of the wall bracket G. Connect water supply to stopcock H and the gas to burner I, with rubber tubing. Connect a rubber tube to overflow pipe J, using tube of a diameter as large as that of the overflow pipe itself. Turn on the water, and after allowing it to run from the overflow pipe for a few minutes, light the gas burner I. The distilled water flows from condenser tube at E. The feed water should be regulated at the main supply pipe, not the stopcock H, which is used only when dismantling the still to prevent the water in the condenser jacket from spilling on the floor. It is not necessary to have the condenser entirely cold from top to bottom; best results are obtained when the condenser is cold but one-third the distance from the bottom.

Lower Prices. The steadily increasing demand for Rochlitz stills has been such as to warrant us in making them up in much larger lots than heretofore. The cost of manufacture has thus been greatly reduced, and we have been enabled to lower the selling prices by twenty per cent. The "Rochlitz" has long been the best still on the market and, at the reduced prices given below, it is now also the cheapest.

C 33. Still with gas burner, as illustrated.....	\$12.00
C 34. Still with gasoline burner.....	16.00
C 38. Rubber Tubing for gas or water supply, per foot.....	.10
C 39. Rubber Tubing for overflow pipe, per foot.....	.20

Some Recent Purchasers of Rochlitz Stills.

Atlanta University
Elmira College
Marietta College
Ohio Agl. Expt. Station
Ontario Agl. College

U. S. Expt. Station, Honolulu
Washington Agl. College
Beaton Drug Co.
Bowman Bros. Drug Co.
Dalton Physical Research Laboratory