



WOLLENSAK
LENSES *and*
SHUTTERS

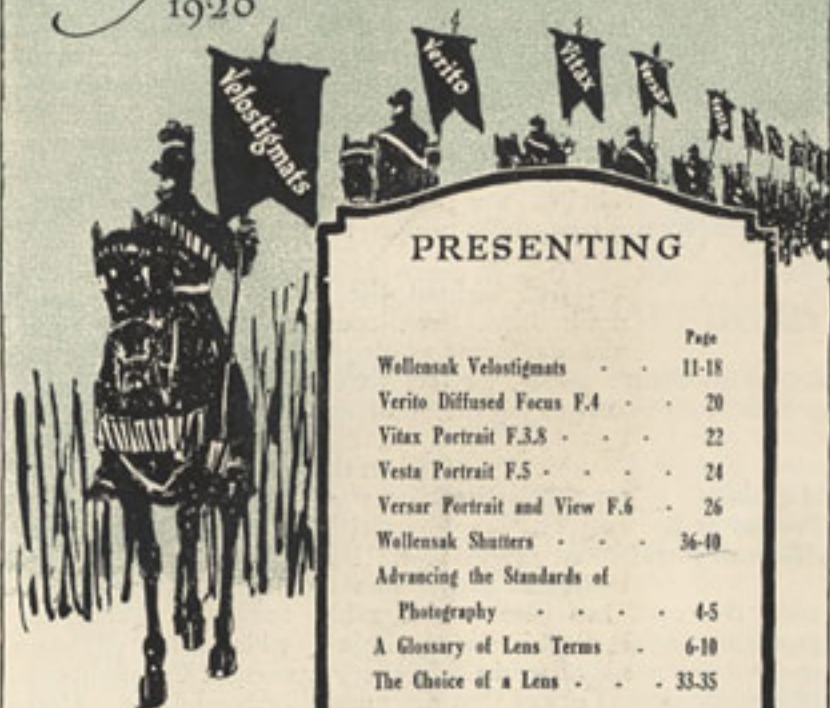


Attention is called to the fact that some of the definition and quality of the original prints shown in this catalogue are lost in the process of reproduction. : : : :



The above photograph, copyrighted by Harris & Ewing, is one of a number made by Mr. Geo. Harris, when he went to France with the president's party and photographed every member of the peace delegation. A Series II Velostigmat F:4.5 was used to make this collection of historic negatives.

A Catalogue of PHOTOGRAPHIC LENSES and SHUTTERS 1920



PRESENTING

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WOLLENSAK OPTICAL COMPANY
ROCHESTER, *New York* U.S.A.

Advancing the Standards of Photography

Photography's Importance

One of the greatest factors in the civilization of today is, without doubt, photography, which is so generally applied that few of us fully appreciate its scope. As a means of scientific research; as an educational element aided by the "movies," periodicals and other literature; as a method of perpetuating the memory of pleasant happenings and dear ones; in exploration, medicine, war and in dozens of other ways, photography has repeatedly proven itself indispensable.

The Lens

But without the lens, photography could never have been commercially practical. In manufacturing photographic objectives of quality at moderate prices, we feel that we have played an important part in advancing the standards of photography.

A Quality Product at a Moderate Price

Years ago, when the cost of accurate photographic objectives was frequently as high as two or three hundred dollars, the price was often prohibitive. But by constant experiment and improvement in manufacturing methods, the cost has been considerably reduced. Wollensak products, as described herein, include a wide variety of lenses to meet the needs of workers in every branch of the photographic profession at prices that are unusually reasonable. However, we have always made our products conform to a standard rather than to a price.

Manufacturing Standards

In our testing department the following is prominently displayed: "Subject all products to more rigid tests than purchasers require. A reputation for producing the best is a sure foundation upon which to build." Our standards of inspection are mighty exacting, but the result is a product unsurpassed in quality. It is our conservative claim that Wollensak lenses are at least the equal of any lenses of similar type, but our customers frequently state in their letters that they excel all others. Reference to our guarantee and liberal terms is made on page 41.

***"Let the
User Judge"***

As our aim has always been "none but satisfied customers," it has ever been our policy to "Let the User Judge," and we are willing to abide by his decision. In order that a thorough test might be made, in comparison with competitive products if desired, we offer to send through the established dealer any lens and shutter on memorandum for thirty days' trial. This obligates the customer in no way whatsoever. As is customary, however, the customer is expected to pay express charges for goods sent on trial.

***A Lens for
Every Purpose***

There is a Wollensak lens for every purpose, whether for professional or amateur, pictorialist or commercial photographer, and we are confident that you will find in our extensive line an outfit to meet your needs at a satisfactory price. On page 33 recommendations are made as to the proper lens for various phases of work.

***American vs.
Foreign-Made
Lenses***

The war has given manufacturers an opportunity to demonstrate the quality of American-made products, in the lens industry as well as in others. Everything entering into the manufacture of Wollensak products is of American origin, except French glass, which we have found preferable for certain high-grade lenses. In fact, it is used to a greater or lesser extent in all of our catalogued products. One of our customers writes:

"Your lens has been a revelation to me. I, like many others, have gone under the delusion that German, English and other foreign lenses were superior and so have passed up good things all these years. So I'm glad I changed to a Series II Velostigmat, as my negatives are of much better quality."

This customer has used practically every lens of any importance of American and foreign manufacture and now claims that a Wollensak surpasses them all. Please bear in mind that American lenses are the equal of any foreign, and Wollensak lenses the equal of any American products.

***Our
Facilities***

The complicated process of making photographic lenses requires formulae of extreme accuracy, highly skilled labor and expensive machinery. In all of these we are especially well equipped. With our new factory we have almost 80,000 square feet of floor space, whereas at the time our last catalogue was published we had only half that capacity. So we are now in a position to promptly meet your requirements and solicit the opportunity of serving you.

A Glossary of Lens Terms

FOCAL LENGTH or equivalent focal length, is the distance between the nodal point (node of emergence) of the lens and the ground glass, plate or film, when an object at infinity—100 feet or more—is in sharp focus. Generally this "nodal point focus" is practically the same as the diaphragm focus, the distance from the diaphragm to the ground glass.

See Table I, page 42.

THE SPEED of a lens, which determines the brightness of the image, is generally expressed in the F system by the ratio existing between the focal length and the effective aperture. This effective aperture (the clear diameter of outer lens) is approximately the same as the largest diaphragm stop, but is not identical, as it takes into consideration the refraction and dispersion of the light rays. So if the speed of a lens is designated as F:4, the focal length is four times as great as the effective aperture. Exposure varies directly as the square of the F value, so an F:8 lens would be given four times the exposure of an F:4 lens, since 8×8 or 64 is four times as great as 4×4 or 16. Focusing on nearby objects increases the distance between lens and ground glass, decreasing the speed so that the exposure should be proportionately greater.

Diaphragm apertures of lenses are now generally marked in the F system. This has become standard in all countries, although cheaper types of objectives are sometimes marked in the US system, even at this late date. The relative stops in the US and F systems are given herewith:

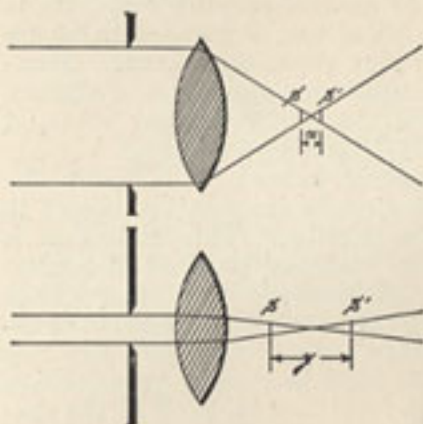
| | | | | | | | | |
|----|---|-----|---|----|----|----|----|-----|
| US | 1 | 2 | 4 | 8 | 16 | 32 | 64 | 128 |
| F | 4 | 5.6 | 8 | 11 | 16 | 22 | 32 | 45 |

ANGLE OF VIEW, according to the usual convention, is the angle included between the lines drawn from the opposite corners of the plate to the lens (or to the nodal point of emergence). But a more scientific definition is to specify the angle included between the lines drawn from opposite ends of the diameter of the circular field of a lens.

All lenses do not utilize the entire circle of light, but only that portion of sharpest definition. Consequently they are lenses of ordinary angle, but can be used on larger plates when stopped down. Those lenses that utilize the entire circle of

light with good definition are called wide angle lenses. Our Series III Velostigmat is both wide angle and anastigmatic.

DEPTH OF FOCUS is a term used to indicate the area or distance—near to far—over which a lens will render sharp definition. Theoretically, there is only one point (where the light rays cross) that is absolutely sharp, but for practical purposes an object-point that is reproduced in the negative as an image-circle not over 1/100th of an inch in diameter



will prove satisfactory in definition. This image-circle is termed the "circle of confusion," indicated by S and S' in the illustration, which is exaggerated for clearness. Depth of focus decreases as the size of aperture or the focal length increases. From the diagram it can be readily seen how the use of a smaller stop narrows the cone of light, thus increasing the distance between S and S' from x to y. As a greater range

of focal planes is included in the greater distance y than in x, the depth is proportionately better.

Short-focus lenses, because their images lie in planes closer together, have greater depth. Photographs in which the object is near have not as much depth as those showing the object at a distance. It is a law of optics that all lenses having same speed and focal length have same depth of focus. Speed is obtained at the sacrifice of depth, and vice versa.

COVERING POWER expresses the ability of a lens to sharply reproduce in the negative an evenly illuminated flat field. Because of their fine corrections Wollensak Velostigmats will "cover" the plates for which they are listed at their widest aperture. Any of our lenses will cover a size larger plate than listed, when stopped down. Covering power depends principally on how well the various aberrations are corrected.

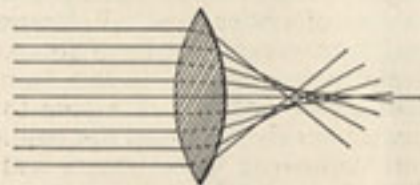
DEFINITION in a negative, that is, distinct, sharp results, are obtained by the use of a lens of correct formula constructed by expert workmen. The Velostigmats well illustrate the superior definition obtainable by the use of an anastigmat of quality. Definition in inexpensive lenses is improved by the use of a smaller opening.

DIFFUSION, such as the soft-focus results produced by our Verito, is for pictorial purposes often preferable to wiry definition, as it is a means of producing lifelike tonal values in artistic landscapes and portraits. See page 20.

CURVATURE OF FIELD is that undesirable quality of a lens that brings a flat object to a focus in a saucer-shaped or convex field. The result is that it is impossible to obtain an image of a flat object in focus at the center and edges of the field at the same time. So in general purpose anastigmats a curved field is a bad fault. All of our Velostigmats have a flat field so much desired in a high grade anastigmat. However, for strictly studio work, large heads and busts, a slightly curved field is often preferable. In our Vitax and Vesta, it helps in producing the desirable "standing-out" effect.

DISTORTION, more properly termed "curvilinear distortion," is a fault that causes straight lines in the object to be rendered as curved in the negative. This distortion is generally noticeable only on the marginal portions of a plate and is characteristic of Single Achromatic and other cheap lenses. With a single lens in back of the diaphragm, lines are bowed out, causing "barrel-shape" distortion; with the lens in front of the diaphragm, lines bend in causing "pin-cushion distortion." So with lenses in front and in back of the diaphragm, each will nullify the distortion of the other. This is the principle of the R. R. or Rapid Rectilinear Lens.

SPHERICAL ABERRATION is a defect caused by the fact that rays passing through the marginal portions of a lens focus nearer the lens than do rays passing through the center, as shown in diagram.



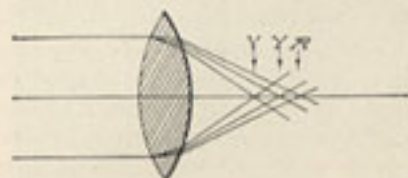
Theoretically, the curves in a lens should be parabolical, but for manufacturing reasons it is only practical to have them conform to spherical surfaces. This causes spherical aberration, cor-

rected by the optician by carefully balancing positive with negative spherical aberration.

COMA resembles spherical aberration, but whereas the latter is caused by perpendicular rays, coma is caused by rays passing obliquely through the lens and failing to focus at a common plane. It usually causes a pear-shaped blur.

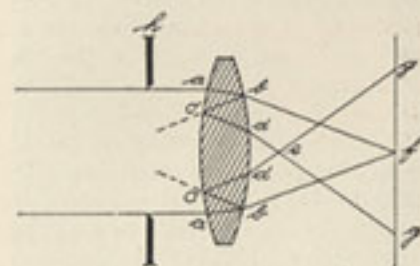
CHROMATIC ABERRATION. Lenses with this fault fail to bring to a focus in the same plane the yellow and green rays to which the eye is most sensitive and the blue and violet

rays which affect the chemical properties of the plate. The result is that while the image may appear sharp in the ground glass, it is out of focus in the negative, as the chemical and visual



foci are at different points. As shown in illustration, a lens acts upon the rays of white light in much the same way as does a prism, breaking up the light ray into the colors of the spectrum. Various kinds of glass differ greatly in refractive and dispersive properties, so correction is secured by a careful combination of glasses.

FLARE. Flare spot or ghost is the effect produced in the negative by the reflection of rays of light from the lens surfaces, forming secondary images and rendering a fogged appearance in the negative. Below, this is clearly shown where a few of



the light rays *ab* are reflected back along the path *bc*, most of them emerging at *c*. Part of this reflected ray in turn causes the reflections *cd* emerging and focusing at *e* and spreading over the plate in the circle *gh*, which is an image of diaphragm *h*. In many cheap lenses, circle *gh* is of

so small a diameter that it would form a noticeable flare spot; but in high grade objectives whatever reflections are present are so spread out over the negative that they have no noticeable effect. Flare is most frequently apparent when photographing against the light.

ASTIGMATISM is the inability of a lens to sharply focus vertical and horizontal lines at the same time. It is most noticeable at the edges of a plate and seriously impairs marginal definition. Lenses corrected for astigmatism are termed anastigmats. Every Velostigmat is an anastigmat.

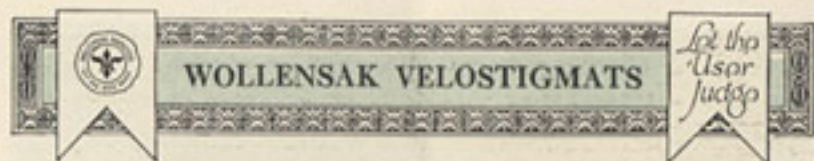
AIR BUBBLES are not, as is often thought, a defect in photographic lenses. In fact, while they are more apparent in the highest type of lens, they seldom appear in the cheaper grades. Bubbles are caused by the necessity of fusing the



Series II Velostigmat Negative Home Portraiture By Philip Conklin

optical glass used in making lenses of high quality at a certain temperature, whether all bubbles have risen to the surface or not, in order to maintain certain optical properties. Such bubbles absolutely do not impair the definition or lessen the efficiency of a lens in the slightest degree.

*For the diagrams shown in this article, we are indebted to MacMillan & Co.'s
"Photography for Students Physics and Chemistry" by Carr.*



BEFORE discussing our various Velostigmats individually, let us say a word in regard to the qualities and characteristics of the line in general.

First of all, *every Velostigmat is an anastigmat*, "Velostigmat" being a trade name to brand them as Wollensak quality products. Its derivation is from the Latin word "velox" meaning fast, "stigmat" denoting their anastigmat qualities. As anastigmats, they are fully corrected for the many faults that are characteristic of rapid rectilinear lenses and single achromatic lenses, such as spherical and chromatic aberration, coma, distortion and flare. (These technical terms are defined in the Glossary on page 6.)

Wollensak Velostigmats will sharply cover the plates for which they are listed without the necessity of stopping down, rendering accurate definition to the extreme corners of the negative. Because of their speed, photographs are possible under unfavorable lighting conditions where the ordinary R. R. would not answer at all. Their rapidity renders adequate illumination in photographing rapidly moving objects, when the shutter is sufficiently fast.

We have spared no expense in bringing our Velostigmats to their present state of perfection, and have exercised the utmost care in deriving the formulae. Inasmuch as air-spaced and cemented lenses each have their respective advantages, both constructions are combined in our Velostigmats.

These lenses as well as our other catalogued products are handsomely finished in black enamel with gold engraving. Every Velostigmat is furnished in a plush-lined case complete with flange. All barrel mountings on our Velostigmat and other lenses include an iris diaphragm. Caps are furnished with all lenses mounted in barrel or studio shutter.

Be sure your *anastigmat* is a *Velostigmat*.

SERIES I VELOSTIGMAT F:6.3

TRIPLE-
CONVERTIBLE
LITTY



Rare indeed is the lens that is so well adapted to general work and the many needs of the commercial photographer as is the Series I Velostigmat F:6.3. As a Velostigmat, it has a flat field and the accurate corrections outlined on the foregoing page, while its speed of F:6.3 is sufficiently rapid for all general work excepting extreme speed photography.

A distinctive advantage of the Series I is its triple-convertible construction. The front and rear elements are both corrected for use alone and are of different focal lengths, so that the user has virtually three lenses in one. The single combinations may be employed to advantage where a larger image is desired, or for improving the perspective, telephoto work, etc. In using the elements singly, however, it is necessary to stop down to F:16 or smaller to obtain accurate definition.

The Series I Velostigmat is equally suitable for commercial and architectural photography, landscape and view work, copy-



Series I Velostigmat Negative

By Philip Conklin



Series I Velostigmat Negative

By C. H. Staunton

ing and enlarging, and the many other classes of work requiring a fully corrected anastigmat.

It is made in a range of sizes to meet the needs of the amateur with the small hand camera or the professional with the more elaborate outfit.

(Have you read page 11 on Wollensak Velostigmats?)

| No. | Size | Focus | Diameter of Lens | In Barrel | With Auto Shutter | With Optimo Shutter | Focus of Separate Lens Combinations | |
|-----|---------------|-----------|------------------|-----------|-------------------|---------------------|-------------------------------------|-----------|
| | | | | | | | Front | Rear |
| 0 | 2 1/4 x 3 1/4 | 3 1/2 in. | 3/8 in. | \$23.00 | \$26.50 | \$34.50 | (No. 0 not conv't.) | |
| 1 | 3 1/4 x 4 1/4 | 5 " | 7/16 " | 26.50 | 30.00 | 38.00 | 11 1/4 in. | 8 1/4 in. |
| 2 | 4 x 5 | 5 1/4 " | 7/16 " | 29.00 | 32.50 | 40.50 | 13 1/4 " | 10 " |
| 2A | 2 1/4 x 4 1/4 | 6 1/2 " | 1 1/8 " | 31.00 | 34.50 | 42.50 | 16 " | 10 " |
| 3 | 3 1/4 x 5 1/2 | 6 1/2 " | 1 1/8 " | 40.00 | 45.00 | 54.00 | 17 " | 11 " |
| 4 | 5 x 7 | 7 1/4 " | 1 1/2 " | 61.00 | 65.50 | 75.00 | 21 1/2 " | 16 1/2 " |
| 5 | 6 1/2 x 8 1/2 | 9 1/2 " | 2 " | 75.00 | 80.50 | 92.00 | 28 " | 20 " |
| 7 | 8 x 10 | 12 1/2 " | 2 1/2 " | 129.00 | 135.00 | ..... | 38 " | 26 " |

Lenses in cells fitted to customer's own shutter at price of lens in barrel.

SERIES II VELOSTIGMAT F: 4.5

SPEED



The Series II having all the characteristic Velostigmat corrections, together with high speed, is in every sense of the word a *modern lens*, and will handle well the many phases of work that come within the scope of an ultra rapid anastigmat, such as studio, speed, press, group and home portrait work as well as copying and enlarging, commercial and general view work.

For the studio, the professional will find the Series II ideal by reason of its rapidity and the Diffusing Device with which the three largest sizes are equipped. With this diffusion attachment the amount of softness is variable at will, so making possible portraits of artistic distinctiveness. The Diffusing Device makes the Series II a lens of universal usefulness while it is at the same time moderate in price.

The Series II Velostigmat has proven extremely popular on the Graflex, Reflex and other types of reflecting cameras because of its extreme speed and anastigmatic corrections. It also makes an ideal equipment for the amateur, when mounted in a between-the-lens shutter, such as our high speed "Optimo."

Its flatness of field and perfect covering power make it an ideal objective for groups, and these same features, together with its compactness and moderate focal length, render it almost indispensable for satisfactory home portraiture.

See page 11 for a description of the other qualities of this lens.

| No. | Size | Focus | Diameter of Lens | In Barrel or Studio Shutter | With Auto Shutter | With Optimo Shutter |
|-----|---------------|-----------|------------------|-----------------------------|-------------------|---------------------|
| 0 | 2 1/4 x 3 1/4 | 3 1/2 in. | 7/16 in. | \$34.50 | \$40.00 | \$46.00 |
| 1 | 3 1/4 x 4 1/4 | 5 " | 1" " | 37.00 | 42.50 | 49.50 |
| 12 | 4 x 5 | 6 " | 1 1/16 " | 43.50 | 49.50 | 56.50 |
| 3 | 5 x 7 | 7 1/4 " | 1 1/4 " | 52.00 | 57.50 | 65.50 |
| 3A | 5 x 8 | 8 1/4 " | 1 1/8 " | 60.00 | 75.00 | 83.00 |
| *4 | 6 1/2 x 8 1/2 | 9 1/2 " | 2 1/4 " | 84.00 | 90.00 | 98.00 |
| *5 | 8 x 10 | 12 " | 2 1/2 " | 126.50 | 150.00 | ..... |
| *7 | 11 x 14 | 15 1/4 " | 3 1/8 " | 207.00 | ..... | ..... |

Lenses in cells fitted to customer's own shutter at price of lens in barrel.

† No. 2 can also be furnished in 6 1/4 inch focal length.

*Only these sizes supplied in Studio Shutter. Fitted with Diffusing Device, regardless of mounting.



Series II Velostigmat Negative

By Roger P. Jordan

(See also pages 10, 28 and 29)

The Series III Wide Angle Velostigmat F:9.5



Generally speaking, no photographer's equipment—especially that of the commercial man—is complete without a wide angle lens. Frequently a picture must be made in a small room, or a photograph taken of a building in a narrow street, an interior, or perhaps a banquet group, where the focal length of a general purpose lens would be too great. In just such instances the Series III proves indispensable.

The disadvantage of most wide angle lenses is their lack of speed. In the Series III, we have combined the unusual speed of F: 9.5 and an angle of view of 90 degrees. The lens will cover sharply the plate for which it is listed, stopping down



Series III Velostigmat Negative

By H. H. Coburn



Series III Velostigmat Negative

being only necessary to increase the depth of focus, and this only in the most remote cases. While there may not be many exposures made at the full aperture, it is always available and will prove a great convenience when focusing in dimly lighted interiors. The largest opening of $F:9.5$ will be found sufficiently rapid for snapshots out of doors or for flashlight work.

The Series III has all the Velostigmat corrections and features outlined on page 11, and is highly recommended for use where it is necessary to work in a confined space.

| No. | Plate Covered at $F:9.5$ | Equivalent Focus | Working Aperture | In Barrel | With Auto Shutter | With Optimo Shutter |
|-----|-----------------------------------|------------------|-------------------|-----------|-------------------|---------------------|
| 3 | 5 x 7 | 4.3 in. | $\frac{1}{8}$ in. | \$32.00 | \$34.50 | \$43.50 |
| 4 | 6 $\frac{1}{2}$ x 8 $\frac{1}{2}$ | 5.4 " | $\frac{3}{16}$ " | 39.00 | 41.50 | 50.50 |
| 5 | 8 x 10 | 6.25 " | $\frac{1}{4}$ " | 49.50 | 52.00 | 61.00 |
| 7 | 11 x 14 | 9 " | $\frac{3}{8}$ " | 75.00 | 77.00 | 86.00 |

Lenses in cells to fit customer's own shutter at prices of lens in Barrel.

SERIES IV VELOSTIGMAT F: 6.3



To meet the demand for an inexpensive lens of anastigmatic quality, we designed, some years ago, a lens that we called the "Vinc-Anastigmat." While this lens lacks the convertible feature of the Series I Velostigmat and the high speed of the Series II Velostigmat we have, nevertheless, combined in it the quality and accuracy of our Velostigmats, so in the future the Vinc will be termed "Series IV Velostigmat."

The Series IV is a real opportunity to the photographer who has been handicapped by the lack of speed and marginal definition of the R. R. type of lens and the high prices of anastigmats in general. Since it is an anastigmat, this lens will sharply cover the plate for which it is listed at its largest aperture, F: 6.3, which speed will be found sufficient for practically all purposes. The Velostigmat corrections are further discussed on page 11.

Mounted in the Optimo or Auto shutter, it makes an excellent outfit for either hand cameras or the larger commercial equipments. Suitable for commercial, architectural, landscape and view work, copying and enlarging, and home portraiture where the lighting is good, the Series IV will fully meet most requirements.

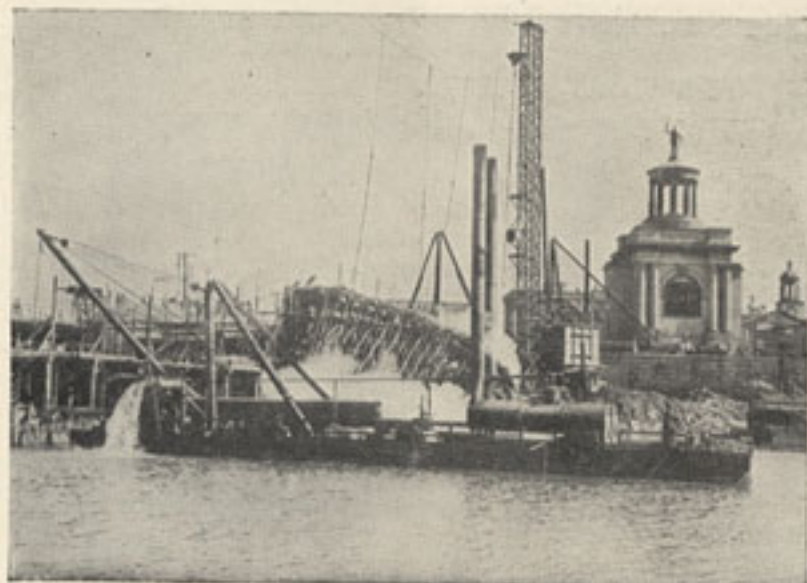
In the smaller sizes the lens is an ideal objective and readily adapted to the small and compact film cameras.

This lens is guaranteed to be the equal of any lens selling at a lower price than our Series I Velostigmat.

| No. | Size | Focus | Diameter of Lens | In Cells | In Barrel | With Auto Shutter | With Optimo Shutter |
|-----|--|--------|------------------|----------|-----------|-------------------|---------------------|
| *0 | $\left\{ \begin{array}{l} 2\frac{1}{4} \times 3\frac{1}{4} \\ 1\frac{1}{2} \times 2\frac{1}{2} \end{array} \right\}$ | 3½ in. | ¾ in. | \$15.00 | \$16.00 | \$18.00 | \$24.00 |
| *1 | $\left\{ \begin{array}{l} 3\frac{1}{4} \times 4\frac{1}{4} \\ 2\frac{1}{2} \times 3\frac{1}{2} \end{array} \right\}$ | 5 " | 1½ " | 17.00 | 18.00 | 20.00 | 26.00 |
| *2 | $\left\{ \begin{array}{l} 4 \times 5 \\ 2\frac{3}{4} \times 4\frac{3}{4} \end{array} \right\}$ | 5¾ " | 1½ " | 17.25 | 19.25 | 21.00 | 27.00 |
| *2A | $\left\{ \begin{array}{l} 2\frac{1}{4} \times 4\frac{1}{4} \\ 3\frac{1}{4} \times 5\frac{1}{4} \end{array} \right\}$ | 6½ " | 1½ " | 18.00 | 20.00 | 22.00 | 28.00 |
| 3 | 5 x 7 | 7¼ " | 1¾ " | | 25.00 | 28.00 | 35.00 |
| 4 | 6½ x 8½ | 9½ " | 1¾ " | | 35.00 | 38.00 | 45.00 |
| 5 | 8 x 10 | 12 " | 1¾ " | | 45.00 | 48.00 | 57.00 |

* These sizes can be adapted to practically all types of hand cameras, and where desired can be fitted to the Victo Shutter at the cost of the lens in barrel. Please specify camera to which lens is to be fitted unless it is sent to us for fitting.

Lenses in cells to fit customer's own shutter at prices of lens in Barrel.



Series IV Velostigmat Negative (See also page 31)

By H. Jackson

WOLLENSAK SERIES V ANASTIGMAT F:7.5

THE amateur who has been using a hand camera with an ordinary R. R. lens will welcome the Series V, as it presents the possibility of securing anastigmatic sharpness in his pictures, and yet is offered at a price that is within the reach of all.

The Series V can be furnished in our shutters of quality, or in mounts to fit the shutters on the popular hand cameras of the better grade, such as Ansco, Seneca, Kodak, Ensign, etc.

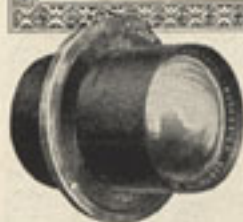
It is advisable to send the camera in to us to insure accurate adjustment of the focal scale to the lens.

| No. | Size | Focus | Diameter of Lens | In Cells | In Barrel | With Auto Shutter | With Optimo Shutter |
|-----|--|--------------------|-------------------|----------|-----------|-------------------|---------------------|
| *0 | $\left\{ \begin{array}{l} 2\frac{3}{4} \times 3\frac{3}{4} \\ 1\frac{1}{2} \times 2\frac{1}{2} \end{array} \right\}$ | $3\frac{1}{2}$ in. | $\frac{3}{8}$ in. | \$8.00 | \$9.00 | \$11.00 | \$18.00 |
| *1 | $\left\{ \begin{array}{l} 3\frac{1}{4} \times 4\frac{1}{4} \\ 2\frac{1}{2} \times 4\frac{1}{4} \end{array} \right\}$ | 5 " | $\frac{3}{8}$ " | 9.00 | 10.00 | 12.50 | 19.50 |
| *2 | $\left\{ \begin{array}{l} 4 \times 5 \\ 2\frac{3}{4} \times 4\frac{3}{4} \end{array} \right\}$ | $5\frac{3}{4}$ " | $\frac{3}{8}$ " | 9.50 | 11.50 | 13.50 | 20.50 |
| *2A | $3\frac{1}{4} \times 5\frac{1}{2}$ | $6\frac{1}{2}$ " | $\frac{7}{8}$ " | 10.00 | 12.00 | 14.50 | 21.50 |
| 3A | 5×8 | $8\frac{1}{2}$ " | $1\frac{1}{8}$ " | | 22.00 | 26.00 | 35.00 |
| 4 | $6\frac{1}{2} \times 8\frac{1}{2}$ | $10\frac{1}{2}$ " | $1\frac{1}{2}$ " | | 27.00 | 31.00 | 39.00 |
| 5 | 8×10 | 13 " | $1\frac{7}{8}$ " | | 35.00 | 39.00 | 50.00 |

* These sizes can be adapted to practically all types of hand cameras, and where desired can be fitted to the Victo Shutter at the cost of the lens in barrel. Please specify camera to which lens is to be fitted unless it is sent to us for fitting.

Lenses in cells to fit customer's own shutter at prices of lens in Barrel.

THE VERITO DIFFUSED FOCUS F: 4



Some years ago we prophesied that "the Verito has come to stay." Our prediction has been fulfilled and the volume of Verito sales has surpassed our most optimistic hopes. Verito diffusion is a means of artistic expression to the pictorialist and practical photographer producing, at a click of the shutter, results that equal the arduous work of brush or crayon.

For portraiture, the Verito is ideal, beautifully blending the high-lights, half-tones and shadows. Verito prints are not mere mechanical reproductions, showing with wiry definition every mole and freckle. Rather do they correctly portray the texture of the skin, suppressing unnecessary detail.

In landscape work this lens will produce a photograph that is truly a picture, not a conglomeration of detail. Definition is not destroyed, but only relegated to its proper importance.

Diffusion varies as the speed, F: 4 rendering a maximum, F: 6 a medium softness and F: 11 practical sharpness. Even at F: 4 the lens is remarkably free from flare.

The Verito is unique in construction, being a double lens, free from distortion because it is rectilinear. The rear lens may be used alone and renders about the same diffusion as the doublet, so the Verito is virtually two lenses in one.

By reducing the lens separations, we have made it much more compact and of a much larger circle of light. The compactness of sizes No. A and No. B well adapts them for roll film and plate cameras, and their speed of F: 6 will be found sufficiently rapid for work of this nature. At this opening, diffusion is about the same as in the F: 4 lens stopped to F: 6.

| No. | Size | Equivalent Focus | Focus Rear Combination | Diameter of Lens | Speed | In Barrel or Studio Shutter | With Auto Shutter |
|-----|---------------|------------------|------------------------|------------------|-------|-----------------------------|-------------------|
| A | 3 1/4 x 4 1/4 | 5 in. | 10 in. | 1 in. | F:6 | \$17.00 | \$18.00 |
| B | 4 x 5 | 6 1/2 " | 14 " | 1 1/4 " | F:6 | \$20.00 | 21.00 |
| 2 | 4 x 5 | 7 1/4 " | 11 " | 1 1/8 " | F:4 | \$28.00 | 37.50 |
| 3 | 5 x 7 | 8 3/4 " | 14 " | 2 1/4 " | F:4 | 34.50 | 44.90 |
| 4 | 6 1/2 x 8 1/2 | 11 1/2 " | 20 " | 3 " | F:4 | 46.00 | ..... |
| 5 | 8 x 10 | 14 1/2 " | 24 " | 3 1/2 " | F:4 | 63.00 | ..... |
| 7 | 11 x 14 | 18 " | 30 " | 4 1/8 " | F:4 | 80.50 | ..... |

* In barrel only. Special Speed and focal length, 3" or shorter, \$17.00 in barrel; 5" or shorter \$20.00 in barrel.



Verito Negative

(See also illustration on page 34)

By H. M. Eates

VERITO DIFFUSING STOPS



Controllable diffusion in enlarging is a valuable asset to the photographer wishing to make artistic projected prints. By means of the diffusing stops used with the Verito, the sharpest negatives are made to breathe a softness of unparalleled beauty.

Each of the three stops renders a different degree of softness, No. 1 minimum, No. 2 medium and No. 3 a maximum diffusion. To use, simply focus sharply at F:32, open diaphragm to F:4, insert stop and expose.

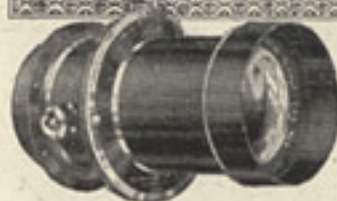
Veritos No. 2 to No. 5 are now supplied slotted ready to receive the stops, which are furnished at an additional cost of \$2.50. The 11 x 14 size can be specially slotted at an additional charge of \$7.50, including stops.

THE VERITO FOR GRAFLEX

So great has been the demand for Veritos among users of Graflex, Reflex and other reflecting cameras that we have modified its construction so that the camera can be closed with the lens in place. Below is indicated the proper size of Verito for all modern Graflexes, but kindly specify the camera when ordering your lens.

| Graflex | Verito No. | Graflex | Verito No. | Graflex | Verito No. |
|-------------------------|------------|-------------------------------------|------------|-------------------------------|------------|
| 1A Autographic..... | A | Auto Junior..... | A | Telescopic R. B. 4 x 5..... | 2 |
| 3A Autographic..... | 2 or B | R. B. Junior..... | B | R. B. Auto 3 1/4 x 4 1/4..... | 2 |
| Auto 3 1/4 x 4 1/4..... | A | Compact 3 1/4 x 5 1/2..... | 2 or B | R. B. Auto 4 x 5..... | 3 |
| Auto 4 x 5..... | B | Compact 5 x 7..... | 3 | Press..... | 3 |
| Auto 5 x 7..... | 3 | Telescopic R. B. 3 1/4 x 4 1/4..... | B | Home Portrait..... | 4 |

VITAX PORTRAIT F: 3.8



While anastigmatic portrait lenses, such as our Series II Velostigmat with diffusion attachment, have come into great favor, it cannot be denied that a modern studio lens like the Vitax, an improvement on the popular Petzval formula, will produce superior results on some classes of work. For this reason the Vitax will be found in a vast number of leading studios, including many where there is also a Series II Velostigmat.

CHILD PHOTOGRAPHY requires a lens of unusual speed to insure satisfactory results. Because of its rapidity, F: 3.8, the Vitax stands supreme for this purpose.

The field of the Vitax is curved, a feature that makes it preferable for portraiture to the anastigmat with its flat field. By reason of the curved field, the Vitax produces beautifully rounded images with that desirable "stereoscopic" effect.

Like the Series II, the Vitax is equipped with a diffusion device, a revolving knob conveniently located in back of the diaphragm, or shutter, as shown in the above illustration. This device is simple to operate, rendering as much or as little diffusion as the operator desires.

Besides child photography, the scope of the Vitax is large heads, busts, three-quarter and full lengths, as well as small groups. Larger groups should be stood in a semi-circle to allow for the curved field of the lens.

We do not list sizes with the Vitax as the different numbers are used on different sizes of plate, from 5 x 7 to 11 x 14, so for 8 x 10 negatives we would recommend a No. 5 lens although a No. 4 would cover the same plate. It is generally acknowledged that a long focal length will produce much superior results in portraiture, so we urge that in every instance as long a focal length be selected as the studio will accommodate.

| No. | Equivalent Focus | Outside Diameter of Flange | Diameter of Lens | In Barrel | With Studio Shutter |
|-----|------------------|----------------------------|------------------|-----------|---------------------|
| 3 | 10 in. | 4½ in. | 3 in. | \$ 80.50 | \$ 90.00 |
| 4 | 13½ " | 5¼ " | 3½ " | 103.50 | 115.00 |
| 5 | 16 " | 6 " | 4½ " | 144.00 | 157.50 |



Vitax Negative

By L. L. Higginson

VESTA PORTRAIT F: 5



Built on a modification of the Petzval formula, the Vesta, like the Vitax, produces "rounded" or "stereoscopic" effects so much desired in portraiture.

It is unlike the Vitax, principally because of its slower speed, and lack of a diffusion or equalizing attachment.

To those photographers who are in need of a most satisfactory studio lens, but who cannot invest the price of the Vitax or Series II Velostigmat, we very highly recommend the Vesta.

The Vesta will be found entirely practical for busts, large heads and three-quarter lengths, and by slightly stopping down, will take care of standing figures and groups where speed in exposure is not essential.

The front lens is corrected for use alone, hence the owner of a Vesta has two lenses in one. The focal length of the single element, as shown in the table given below, is considerably greater than the doublet and serves admirably in photographing large heads or other subjects requiring a long focus lens to obtain proper perspective. In using the front lens, place it behind the diaphragm by first removing the rear element.

| No. | Size | Equivalent Focus | Focus Front Combination | Outside Diameter of Flange | Diameter of Lens | Price in Barrel with Iris Dia. | Price with Studio Shutter |
|-----|---------|------------------|-------------------------|----------------------------|------------------|--------------------------------|---------------------------|
| 1 | 3¼ x 4¼ | 6 in. | 9 in. | 3¼ in. | 1½ in. | \$17.00 | ..... |
| 2 | 4 x 5 | 7 " | 11 " | 3¾ " | 1¾ " | 23.00 | ..... |
| 3 | 5 x 7 | 10 " | 14 " | 4 " | 2¼ " | 29.00 | \$37.00 |
| 4 | 6½ x 8½ | 11½ " | 17 " | 4½ " | 2½ " | 40.00 | 48.50 |
| 5 | 8 x 10 | 14 " | 21 " | 5¼ " | 3 " | 57.50 | 66.50 |



Vesta Negative

By Van de Sande Studio

VERSAR PORTRAIT AND VIEW F: 6

VERSAR
TILITY



The Versar is a general-purpose objective, moderate in price, and entirely suitable for general work where the fine corrections obtained with the Velostigmat are not essential.

The speed of the Versar makes it desirable for ordinary studio work, including busts, full lengths and groups, and because of its compactness and high speed, it is a practical objective for home portraiture, and work of similar character. General view, commercial and architectural work can be done with the Versar when slightly stopped down, and its construction is such that it is very desirable for enlarging and copying.

The two elements of the Versar are of the same focal length, being about double the equivalent focus, and can be used separately by stopping down, the speed of the single element being about one-fourth that of the doublet, taking aperture for aperture. We recommend using the rear lens, as the proper place for the diaphragm in such cases is before the lens. Only the best imported optical glass is used in its construction and it is given the same care in manufacture as the Velostigmats.

Its merits as a portrait enlarging lens are deserving of special emphasis, as it possesses the faculty of practically eliminating the traces of retouching in the original.

Attention is directed to the fact that the Versar will not give fine definition to the extreme corners of the size plate for which it is listed unless stopped down to an aperture of about F: 11.

| No. | Size | Equivalent Focus | Diameter of Lens | Mounted in Barrel | With Studio Shutter | With Auto Shutter | With Optimo Shutter |
|-----|---------------|------------------|------------------|-------------------|---------------------|-------------------|---------------------|
| 2 | 4 x 5 | 6 1/2 in. | 1 1/4 in. | \$ 18.50 | \$ 19.50 | \$22.00 | \$29.00 |
| 3 | 5 x 7 | 8 3/4 " | 1 3/4 " | 22.00 | 23.00 | 25.50 | 32.00 |
| 4 | 6 1/2 x 8 1/2 | 9 1/2 " | 1 3/4 " | 29.00 | 31.00 | 34.50 | 43.50 |
| 5 | 8 x 10 | 11 3/4 " | 2 " | 38.00 | 40.00 | 44.00 | 55.00 |
| 6 | 10 x 12 | 15 " | 2 1/4 " | 48.50 | 52.00 | 56.00 | |
| 7 | 11 x 14 | 16 1/2 " | 2 3/4 " | 62.00 | 65.50 | | |
| 8 | 14 x 17 | 18 " | 3 " | 80.50 | 86.00 | | |
| 9 | 17 x 20 | 22 1/2 " | 3 3/4 " | 103.50 | 109.00 | | |

Lenses in cells to fit customer's own shutter at price of lens in barrel.



Versar Negative

By A. E. Hargett

VOLTAS F:8

THE Voltas F: 8, while lacking the fine corrections of the Velostigmats and the speed of the Versar, is an inexpensive outfit, suitable where rapidity and definition are not essential.

The Voltas will, under good lighting conditions, satisfactorily handle groups and portraits as well as landscape and general view work, copying and enlarging when slightly stopped down. Fair detail is rendered at the full opening, but in order to secure fine definition in the extreme corners an aperture of F: 11 or smaller is necessary.

The Voltas is triple convertible in construction. The front or rear combination may be used alone by employing a small aperture, making possible a much enlarged image.

| No. | Size | Equivalent Focus | Diameter of Lens | In Barrel | With Auto Shutter | Focus of Single Combinations | |
|-----|---------------|------------------|------------------|-----------|-------------------|------------------------------|------------|
| | | | | | | Rear | Front |
| 1 | 3 1/4 x 4 1/4 | 5 in. | 3/4 in. | \$6.00 | \$9.00 | 8 1/4 in. | 11 1/2 in. |
| 2 | 4 x 5 | 6 1/2 " | 1 " | 7.00 | 10.50 | 11 " | 14 1/2 " |
| 3 | 5 x 7 | 8 " | 1 1/8 " | 8.00 | 11.50 | 14 " | 17 1/2 " |
| 4 | 6 1/2 x 8 1/2 | 10 1/2 " | 1 1/2 " | 14.00 | 18.50 | 18 " | 23 1/2 " |
| 5 | 8 x 10 | 12 1/2 " | 1 3/4 " | 18.50 | 23.00 | 20 " | 28 1/2 " |
| 6 | 10 x 12 | 16 " | 2 " | 30.00 | 35.00 | 26 " | 38 " |
| 7 | 11 x 14 | 18 1/2 " | 2 1/4 " | 34.50 | 42.00 | 31 " | 43 " |
| 8 | 14 x 17 | 22 " | 2 3/4 " | 54.00 | ..... | 37 " | 51 " |
| 9 | 17 x 20 | 26 " | 3 1/4 " | 69.00 | ..... | 44 " | 60 " |

Lenses in cells to fit customer's own shutter at price of lens in barrel.



Series IV Velostigmat Negative

By J. L. Boyd

WOLLENSAK PROCESS LENS AND PRISM

PHOTO Engravers will be interested in the Wollensak Process Lens, a lens that has given unusually satisfactory results on process work.

This lens is made of the finest grade of glass obtainable on a formula that affords fine definition and absolute color correction. Chromatic aberration is a fault that destroys the usefulness of any Process Lens and on this account, we have given particular attention to its elimination. Each Process Lens is furnished in barrel with iris diaphragm as standard equipment.

The front lens is threaded to receive the prism we supply for Process Lenses. The cost of these prisms is shown in the table given below.

Wollensak Process Lenses and Prisms are manufactured with the care and accuracy characteristic of Wollensak products and are subject to our broad guarantee and liberal thirty days trial offer.

| No. | Focus | Diameter Lens | Speed | Plates Covered for Reduction | Plates Covered for Full Size Copy | Price | Size of Prism to Fit | Price of Prism |
|-----|------------|---------------|-------|------------------------------|-----------------------------------|---------|----------------------|----------------|
| 4 | 10 1/4 in. | 1 1/8 in. | F:8 | 6 1/2 x 8 1/2 | 10 x 12 | \$75.00 | 2 in. | \$50.00 |
| 5 | 12 1/4 " | 1 3/8 " | F:8 | 8 x 10 | 11 x 14 | 100.00 | 2 " | 50.00 |
| 6 | 15 1/2 " | 2 " | F:8 | 10 x 12 | 12 x 15 | 120.00 | 2 1/2 " | 55.00 |
| 7 | 18 " | 2 1/4 " | F:8 | 12 x 15 | 14 x 17 | 140.00 | 3 " | 75.00 |
| 9 | 25 " | 3 1/4 " | F:10 | 16 x 20 | 20 x 24 | 200.00 | 3 1/2 " | 100.00 |
| 10 | 33 " | 3 3/4 " | F:16 | 20 x 24 | 24 x 30 | 290.00 | 4 " | 125.00 |
| | | | | | | | 4 1/2 " | 150.00 |

THE CHOICE OF A LENS

(Series I, II, III and IV, so termed in the following for brevity are all our Velostigmats.)

FOR the guidance of those who may be undecided as to the best lens for their particular purpose, we have briefly outlined below the order of preference and the essential qualities necessary in different branches of work.

STUDIO WORK

requires primarily a fast lens. For general studio needs the Series II will prove most versatile, but for portraits exclusively, the Vitax is preferable. Where artistic soft-focus results are desired, the Verito is the best selection. (See "Groups" and "Child Photography.")

Secondary choice: Vestla, Versar.

COMMERCIAL AND ARCHITECTURAL PHOTOGRAPHY

both demand a lens that is rectilinear, rendering anastigmatic definition to the extreme corners of the plate. Our fully corrected Series I is by all means first choice because it is triple-convertible, giving three available focal lengths.

Secondary choice: Series IV, Versar.

AMATEUR WORK

For this purpose, speed and accurate definition are desirable assets. The Series II is recommended for plate and reflecting types of cameras, and for film cameras for pictures not larger than $2\frac{1}{4} \times 3\frac{1}{4}$, since this small size well accommodates an F:4.5 lens. For larger film cameras, a lens of greater depth, such as our Series I or Series IV, is preferable. The amateur will welcome the Verito for obtaining beautiful pictorial effects.

Secondary choice: Series V Anastigmat, Versar.

HOME PORTRAITURE

In selecting a lens for this work, one must consider first, speed, as the lighting is often poor; then focal length, as the average room is too small to accommodate a lens of over 12" focus. The Series II with its anastigmatic corrections, speed, compactness, moderate focal length, flat field and diffusing device, will be found ideal for this purpose.

Secondary choice: Series I, Versar. For diffused effects: Verito.



Verito Negative

By John Garo

SPEED AND NEWSPAPER WORK

require extreme speed, as many exposures are made as rapid as $1/1000$ of a second. Flat field and critical definition are essential, as press photographs are generally for reproduction, in which much detail is lost. The compact Series II in barrel for Graflex, Reflex and other reflecting cameras, or with Optimo shutter on small hand cameras, is particularly recommended for speed work.

Secondary choice: Series I, Series IV.

LANDSCAPE AND VIEW WORK

For this class of work accurate definition and flat field are needed. Since convertibility is also a great asset, we advise the use of the Series I; for pictorial effects, the Verito.

Secondary choice: Series II, Series IV, Versar.

WIDE ANGLE WORK

it is generally conceded, is best handled by a lens of special construction. Our Series III was designed for this particular purpose and we highly recommend it on account of its unusual speed and sharp definition.

Secondary choice: Extreme W. A., F:16; Symmetrical W. A., F:16.

GROUPS

either indoors or out, require a lens of flat field, good speed and covering power. These features characterize the Series II, which we suggest for this purpose.

Secondary choice: Series I, Series IV, Versar.

CHILD PHOTOGRAPHY

To catch the fleeting expression and to avoid spoilage of negatives due to movement of the subject, speed is indispensable in child photography. In the studio the Vitax is particularly adapted to work of this nature because of its rapidity—F:3.8. The user of the Graflex and other reflecting cameras will find the Series II better suited to their purpose.

Secondary choice: Vesta, Versar.

FLASHLIGHT AND ARTIFICIAL LIGHTING

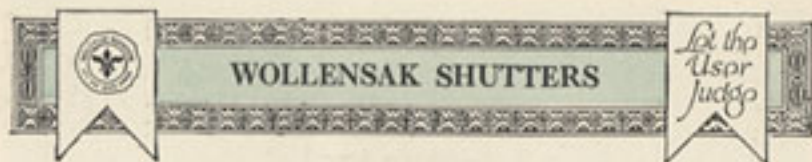
require a lens of good speed and covering power, so for strictly studio work we recommend our Vitax. Where groups figure prominently in the routine of work, the Series II would be preferable. On interior work requiring a wide angle, the Series III is sufficiently rapid to be used with flashlight.

NATURE PHOTOGRAPHY

The general needs of the naturalist are for a lens of long focal length to obtain better perspective. On this account the Series I would be best suited since it offers three focal lengths, and the doublet would be sufficiently rapid for general work. In photographing animals the Series II would be more suitable because of its greater speed.

STEREOSCOPIC WORK

We frequently have calls for lenses matched for stereoscopic work and particularly recommend our Velostigmats for that purpose. There is a charge of \$3.50 for matching the lenses. On page 40 our Stereoscopic shutter is described.



AS pioneers in the making of shutters, this company holds many basic patents covering shutters and improvements that place us at a decided advantage in manufacturing shutters which are both reliable and effective.



Showing leaf movement of Optimo. Leaves reverse on each exposure.

We take pride in our product, both as to quality of workmanship and attractive appearance, for we well realize the pleasure of owning a shutter that is reliable in action and pleasing to the eye. Because of the delicate nature of the product, only the best materials are used in the manufacture of Wollensak Shutters and only highly trained mechanics employed in the assembling.

Wollensak Shutters are today attached to hand and film cameras of all the large camera manufacturers and carried in stock by the large dealers and stock houses. If your dealer has not the desired shutter in stock he can order it for you.

All Wollensak Shutters are made to be operated with wire release, although should a bulb and tube be desired, a "bulb attachment," which screws into the socket of the wire release, can be supplied at a nominal charge.



The Optimo

Prices stated are for shutter complete with iris diaphragm, wire release, flange and a set of screws when desired for plate cameras, or with jamb nut for compact hand or film cameras.

Each model is described, illustrated and listed separately on the following pages.



OPTIMO

For the
Usur
Judge

(See illustrations on opposite page)

The unprecedented demand for the Optimo Shutter during the past few years, and the fact that it is being supplied on the most expensive hand cameras is ample evidence that the Optimo ranks supreme as a between-the-lens shutter.

The Optimo has justly been called "the Shutter of shutters," as the construction is as fine as a watch mechanically and in appearance. With practically all the working parts made of nickel silver, it is not endangered by the corrosive effects of atmosphere and the elements.

In addition to time and bulb, the Optimo has a range of exposures from 1 second to 1/300th of a second, the automatic exposures being as near to the marked speeds as it is possible to make them. The highest speed is generally conceded to be sufficiently fast to cover almost any emergency. It acts by lever in the hand camera size and by push button in the larger sizes and can be released without recoil or jar by pressure on push button, wire release (supplied with each shutter) or bulb and tube. The three smallest sizes, numbers 0, 1 and 1A, require a bulb attachment when a bulb and tube are to be used. A turn of the large milled disc, on which is engraved an arrow indicator, makes quick adjustment for any desired exposure simple and convenient. The iris diaphragm is regulated by a separate indicator.

In making exposure, the five leaves revolve, one end passing from in front of the opening, and the other coming from the casing taking its place, as indicated in the diagram. This makes actual high speed possible with but a light pressure of the release. In opening and closing it shows a star-shaped aperture, the points of the star reaching to the edges of the opening, thus giving maximum illumination to the plate.

The Optimo is light in weight, compact in size and beautifully finished in black with gold engraving and nickel trimmings, producing a handsome and durable finish. It can be fitted to cameras of all leading manufacturers.

| No. | Light Aperture | Price | No. | Light Aperture | Price |
|-----|----------------|---------|-----|----------------|---------|
| 0 | 1 1/8" | \$13.00 | 2 | 1 " | \$16.00 |
| 1 | 3/4" | 14.00 | 3 | 1 3/4" | 18.00 |
| 1a | 1 1/4" | 15.00 | 4 | 1 1/2" | 20.00 |

Bulb attachment, 50c; Bulb and Hose (small size), 25c; (large size), 40c



When we say that 90% of our large objectives are fitted with our Studio Shutter, an idea can be formed of the universal satisfaction this shutter has rendered among the professional as well as the amateur photographers. Its popularity is shown by the fact that a separate department is maintained, fitting this type of shutter to other makes of large lenses.

Practically noiseless in operation, the Studio Shutter is an efficient outfit for both studio and home portraiture.

The Studio Shutter is operated by a three-foot wire release supplied with each shutter, or if desired with bulb and tube, can be furnished at slight cost with a "bulb attachment" which readily screws into the wire release socket. Kindly specify the size of shutter when ordering this attachment.



The Studio is a "between-the-lens" type, having ten leaves which constitute both diaphragm and shutter. Exposure is made by opening and closing at the center, so rendering a much greater depth of focus than is possible with ordinary shutters.

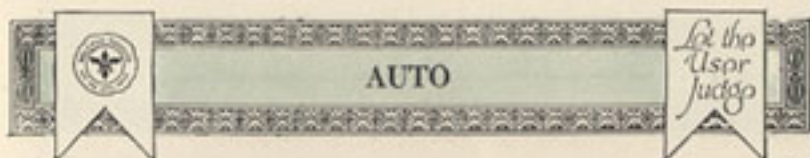
Since the Studio Shutter is designed primarily for studio use, it is not equipped with automatic exposures, but allows exposure with bulb or wire release from about 1/5th of a second to any desired duration by continuous pressure of the bulb or release. It can also be opened for focusing or for time exposure by moving the simple little lever shown at the top.

Where Studio Shutters are desired to fit one's own lens, it is essential that the objective in its original mounting be sent us to insure perfect workmanship, for all lenses require very accurate fitting and adjustment.

| No. | Outside Diameter | Light Opening | Lens Opening | Price |
|-----|------------------|---------------|--------------|---------|
| 1 | 3½" | 2½" | 2½" | \$12.00 |
| 2 | 4¼" | 2½" | 2½" | 14.00 |
| 3 | 4¾" | 2½" | 3" | 16.00 |
| 4 | 5¾" | 3½" | 3½" | 18.00 |
| 5 | 6¾" | 4½" | 4½" | 20.00 |

Large Bulb and Tube, 40c each.

Bulb attachment, \$1.00 each. State size of Shutter.



For general work and where extreme speed is not essential the practical and reliable Auto is highly recommended.

The Auto is automatic in operation, the speeds and their duration being governed by the indicator at the top, and operates by a slight pressure of the wire or finger release. The iris diaphragm for regulating apertures is governed by indicator at the bottom. This shutter has in addition to time and bulb exposures, speeds ranging from 1 to 1/100th of a second.

The five leaf system is incorporated, giving a star-shaped opening and allowing a maximum of illumination.

The Auto is handsomely finished, with all working parts concealed, thus being well protected from dust and injury.



| No. | Light Aperture | Price |
|-----|-------------------|---------|
| 1 | $\frac{3}{4}$ " | \$ 7.00 |
| 2 | 1 " | 8.00 |
| 3 | 1 $\frac{3}{8}$ " | 10.00 |
| 4 | 1 $\frac{1}{4}$ " | 12.00 |
| 5 | 2 $\frac{1}{4}$ " | 16.00 |

Bulb attachment, 50c; Bulb and Hose (small size), 25c; (large size), 40c

VICTO

The Victo is an inexpensive shutter, of light and compact construction. It is suitable for hand cameras, and so is made in sizes for this purpose only. Besides time and bulb, it has four instantaneous exposures giving a good range of speeds, all fast enough for the camera to be held in the hand.

It works automatically and is operated by a slight pressure of the wire or finger release. The Victo is similar in operation and construction to the Auto, having an iris diaphragm and five leaf exposure system, but lacking the slow instantaneous exposures.



| No. | Light Aperture | Price |
|-----|------------------|--------|
| 0 | $\frac{2}{16}$ " | \$3.00 |
| 1 | $\frac{3}{16}$ " | 4.00 |
| 2 | 1 " | 5.00 |

ULTRO

The Ultro is simple in construction and similar in operation and appearance to the Victo. However, it is vastly different from this shutter, in that besides time and bulb release it has only one instantaneous exposure, but of such a speed to obtain the best of results for all the ordinary single or inexpensive double lenses, for which this shutter is primarily intended.

Exposures and diaphragm openings are governed by the indicators.

This shutter can be fitted to cameras ranging in size from 1 $\frac{5}{8}$ " x 2 $\frac{1}{2}$ " to 5" x 7".

| No. | Light Aperture | Price |
|-----|------------------|--------|
| 0 | $\frac{1}{16}$ " | \$2.00 |
| 1 | $\frac{3}{4}$ " | 3.00 |



REGULAR STEREOSCOPIC SHUTTER

This shutter is of the type consisting of two shutters in one, practical for stereoscopic work only. These two shutters are so synchronized that their exposures are simultaneous and of the same duration.

The Regular Stereoscopic has the standard separation of $3\frac{1}{4}$ " from center to center of the openings and in addition to time and bulb release, has exposure speeds ranging from 1/100th to 1 second. As this shutter is non-automatic, it requires setting before each exposure and is operated by bulb and tube or finger release lever. It cannot be operated by wire or cable release.

Any of our standard lenses of 6 $\frac{1}{2}$ " focus and shorter can be fitted, excepting the Series II Velostigmat type where 5" is the maximum focus that can be accommodated.

To ascertain cost of any of our lenses for this shutter, double the price of lens in barrel and add \$3.50 for matching. Price of Stereoscopic Shutter, \$17.50.



This and the reproduction opposite illustrate the Series II Velostigmat F:4.5 as used on Graflex Cameras for extreme speed work.

WIDE ANGLE F: 16

FREQUENTLY a photographer requires a wide angle lens for only occasional use and so cannot afford our more rapid and better corrected Series III Velostigmat. To these we recommend our Wide Angle F: 16 Lens.



The Symmetrical Wide Angle gives approximately an angle of view of 80 degrees, the Extreme Wide Angle, an angle of 90 degrees. To secure sharp definition to the extreme corners of the plate for which they are listed, they must be stopped down to an aperture of F: 32. Either of these can be furnished in barrel with iris diaphragm or fitted to our various shutters. The uses of a wide angle lens are fully outlined in

SYMMETRICAL WIDE ANGLE F:16—80 DEGREES

| No. | Size | Focus | In Barrel | In Auto Shutter |
|-----|---------------|----------|-----------|-----------------|
| 2 | 4 x 5 | 4 in. | \$8.00 | \$11.00 |
| 3 | 5 x 7 | 5 1/4 " | 10.50 | 13.50 |
| 4 | 6 1/2 x 8 1/2 | 6 1/2 " | 14.00 | 17.00 |
| 5 | 8 x 10 | 7 1/2 " | 17.00 | 21.00 |
| 6 | 10 x 12 | 9 " | 21.50 | 25.50 |
| 7 | 11 x 14 | 10 1/2 " | 26.00 | 30.00 |

EXTREME WIDE ANGLE F:16—90 DEGREES

| | | | | |
|---|---------------|----------|---------|---------|
| 3 | 5 x 7 | 4 in. | \$14.00 | \$17.00 |
| 4 | 6 1/2 x 8 1/2 | 5 " | 19.50 | 22.50 |
| 5 | 8 x 10 | 6 1/2 " | 25.50 | 28.50 |
| 6 | 10 x 12 | 7 1/2 " | 30.50 | 34.50 |
| 7 | 11 x 14 | 8 " | 36.00 | 40.50 |
| 8 | 14 x 17 | 10 1/2 " | 42.00 | 46.00 |

SPECIAL ORDER WORK

OUR greatly increased facilities, labor-saving machinery and staff of skilled workers, place us in an excellent position to handle on contract or otherwise special optical and opti-mechanical outfits at the most reasonable costs. Furthermore, with our large organization we can turn out such special equipment in any desired quantities and assure prompt shipment.

We solicit the opportunity of estimating on work of an optical nature and invite anyone who contemplates putting on the market cameras, projecting or reflecting machines, or any apparatus requiring either highly corrected or inexpensive optical units, to communicate with us. We list below some of the special equipment we have produced completely in the past:

Trench and Battery Commanders' Periscopes for army use, of twelve optical units, including prisms.

Finders for cameras and aeroplanes.

Magnifying and reducing lenses of all descriptions.

Lenses for motion picture cameras.

Reading glasses and hundreds of other varieties.

Our research and experimental departments can, where it is desired, make up sample models and would be pleased to submit prices upon receipt of the proper specifications. We assure you that such inquiries will have our most prompt attention.

RAY AND DIFFERENTIAL RAY FILTERS

WOLLENSAK filters are made of fine imported optical glass, free from striae and other imperfections. Mounted in hand-spun brass mounts, with three adjusting screws, they enable the operator to secure the filter in perfect plane of alignment, to the lens on which it is used. Wollensak Filters are hand coated with the best dyes obtainable, each carefully tested before leaving the factory.

Our standard filter, which is most commonly supplied on orders, requires an exposure of but four times normal, and is therefore suitable for work requiring fast exposure, giving sufficient corrections for commercial photography.



For cloud and landscape work, we suggest the Differential filter, the density of which is graduated so as to hold back the sky while full exposure is given the foreground. No additional exposure is required with the Differential or graduated screen.

Each filter is packed in a durable lined leather case, and the range of sizes is such that they fit all products of our manufacture as well as other standard makes.

(AUXILIARY LENSES for portrait, wide angle, copying and enlarging, and telephoto work are supplied on special order in the sizes and at the prices given below. As they are inexpensive outfits, they cannot be expected to render anastigmatic definition even when used with an anastigmat. These auxiliaries are not carried in stock, and so are not subject to our thirty day trial offer.)

| No. | Will Fit Lens Mounts from | Price | No. | Will Fit Lens Mounts from | Price |
|-----|---------------------------|--------|-----|---------------------------|--------|
| 1 | 1 1/8 in. to 1 3/8 in. | \$2.00 | 6 | 2 3/4 in. to 2 7/8 in. | \$4.50 |
| 2 | 1 1/8 " " 1 7/8 " | 2.25 | 7 | 2 7/8 " " 3 " | 5.25 |
| 3 | 1 1/8 " " 1 3/4 " | 2.50 | 8 | 3 " " 3 1/4 " | 6.75 |
| 4 | 1 1/8 " " 2 " | 3.00 | 9 | 3 1/4 " " 4 1/4 " | 7.50 |
| 5 | 2 " " 2 1/4 " | 3.75 | 10 | 4 1/4 " " 4 3/4 " | 9.00 |

TERMS, GUARANTEE, ETC.

MOUNTING LENSES

We have a special department for the accurate fitting and mounting of lenses of all makes, in charge of skilled workmen, and can therefore guarantee perfect satisfaction, best possible work, in a minimum length of time.

Lenses having separation of $2\frac{1}{2}$ m/m ($\frac{3}{8}$ ") or more can be mounted in our shutters. If the lens is wanted with threads in new mounting interchangeable with those on old, it should be specifically stated on order. On account of the necessity of having correct separations, etc., in lenses of practically all types, it is advisable in every instance to send lenses in their original barrels or mounting when ordering shutters fitted.

By referring to Table II, page 42, giving dimensions of our various shutters, also mounting and fitting Table on page 43, no trouble will be had in determining the size necessary for any objective, and price charged for mounting, fitting, special focusing scale, added to the price of the shutter will give the total charge for fitting.

GUARANTEE

As a matter of record, although entirely unnecessary, we place in the hands of each purchaser of a Wollensak lens a bonafide guarantee of quality in the form of a "guarantee certificate," signed by the inspector who subjected it to the final test, giving the name of lens, its number, size, date of test and shipment. This guarantee, together with our broad and liberal sales policy, gives absolute protection to the purchaser, and puts into tangible shape one of the most binding guarantees ever issued by any concern in the industry.

TRIAL PRIVILEGE

All Wollensak products are subject to thirty days trial, when so desired, and can be obtained for inspection and trial through any established photographic dealer. This obligates the customer in no way whatsoever, although, as is customary, he is expected to pay express charges for goods sent on memorandum.

TERMS

All goods are sold only through regular dealers in photographic supplies. Should difficulty be encountered in obtaining same, a card to that effect will enlist our effort to have you supplied promptly.

No goods are sent on consignment, but every article is subject to our broad guarantee and trial privilege. (See above.)

Goods are packed and delivered to transportation companies in good order and without charge, and prices are F. O. B. Rochester.

In the absence of instructions we will use our best judgment in routing shipments.

TABLE No. 1

DISTANCE REQUIRED FROM LENS TO SUBJECT WITH WOLLENSAK OBJECTIVES

| Name and Number of Lens | Heights of image on ground glass for average standing figures of 68 inches | | | | Heights of image on ground glass for average head of 9 inches | | | |
|-------------------------|--|-------|-------|--------|---|-------|-------|-------|
| | 4 in. | 6 in. | 8 in. | 10 in. | 2 in. | 4 in. | 6 in. | 8 in. |
| Series II | | | | | | | | |
| Velostigmat | | | | | | | | |
| No. 3 | 126 | 86 | ... | ... | 38 | 25 | 18 | ... |
| * 3A | 148 | 102 | 88 | ... | 45 | 29 | 21 | 17 |
| * 4 | 171 | 117 | 91 | ... | 53 | 33 | 24 | 20 |
| * 5 | 216 | 148 | 114 | 94 | 66 | 42 | 30 | 25 |
| * 7 | 279 | 191 | 148 | 121 | 85 | 54 | 39 | 33 |
| Vitax | | | | | | | | |
| No. 3 | 180 | 123 | ... | ... | 55 | 35 | 25 | ... |
| * 4 | 234 | 160 | 124 | 101 | 72 | 46 | 33 | 27 |
| * 5 | 288 | 197 | 152 | 125 | 88 | 56 | 40 | 34 |
| Vesta | | | | | | | | |
| No. 2 | 126 | 86 | ... | ... | 38 | 25 | ... | ... |
| * 3 | 180 | 123 | ... | ... | 55 | 35 | 25 | ... |
| * 4 | 216 | 148 | 114 | 94 | 66 | 42 | 30 | 25 |
| * 5 | 252 | 173 | 133 | 109 | 77 | 49 | 35 | 29 |
| Versar | | | | | | | | |
| No. 3 | 160 | 108 | ... | ... | 48 | 30 | 21 | ... |
| * 4 | 175 | 118 | 92 | ... | 51 | 32 | 23 | ... |
| * 5 | 210 | 142 | 110 | 91 | 63 | 40 | 29 | 23 |
| * 6 | 267 | 182 | 140 | 113 | 81 | 51 | 37 | 31 |
| * 7 | 297 | 216 | 157 | 129 | 91 | 58 | 41 | 35 |
| * 8 | 329 | 224 | 173 | 142 | 102 | 64 | 46 | 39 |
| Verito | | | | | | | | |
| No. 3 | 162 | 111 | ... | ... | 50 | 32 | 23 | ... |
| * 4 | 207 | 141 | 110 | ... | 63 | 40 | 29 | 23 |
| * 5 | 279 | 179 | 138 | 113 | 80 | 50 | 36 | 30 |
| * 7 | 324 | 221 | 171 | 140 | 90 | 63 | 45 | 38 |

Figures given in above tables are in inches and are the approximate distance from lens to subject.

TABLE No. 2

WEIGHTS, DIMENSIONS AND OPENINGS OF SHUTTERS

| Shutter | Weight | Outside Diameter | Light Opening | Lens Opening | Maximum Outside Diameter Flange | Diameter Flange Opening | Length of Shutter Barrel |
|--------------------|--------|------------------|---------------|--------------|---------------------------------|-------------------------|--------------------------|
| Ultrio No. 0 . . . | 1 1/2 | 1 1/8 | 5/8 | 3/4 | 1 1/8 | 5/8 | 5 1/2 in. |
| Ultrio No. 1 . . . | 2 | 1 1/8 | 3/4 | 1 1/8 | 1 1/4 | 1 1/8 | 5 1/8 " |
| Victo No. 0 . . . | 1 1/2 | 1 1/8 | 5/8 | 3/4 | 1 1/8 | 5/8 | 5 1/2 " |
| Victo No. 1 . . . | 2 | 1 1/8 | 3/4 | 1 1/8 | 1 1/4 | 1 1/8 | 5 1/8 " |
| Victo No. 2 . . . | 3 | 2 1/16 | 1 | 1 1/8 | 1 1/4 | 1 1/8 | 5 1/8 " |
| Auto No. 1 . . . | 2 | 1 1/8 | 3/4 | 1 1/8 | 1 1/4 | 1 1/8 | 5 1/8 " |
| Auto No. 2 . . . | 3 | 2 1/16 | 1 | 1 1/8 | 1 1/4 | 1 1/8 | 5 1/8 " |
| Auto No. 3 . . . | 4 1/2 | 2 1/8 | 1 1/4 | 1 1/8 | 2 1/8 | 2 | 5 1/8 " |
| Auto No. 4 . . . | 9 1/2 | 3 3/16 | 1 3/4 | 2 1/8 | 3 1/4 | 2 1/4 | 5 1/8 " |
| Auto No. 5 . . . | 17 1/2 | 4 1/4 | 2 1/4 | 2 1/8 | 4 1/8 | 3 1/4 | 1 " |
| Optimo No. 0 . . | 2 | 1 1/8 | 5/8 | 3/4 | 1 1/8 | 5/8 | 5 1/2 " |
| Optimo No. 1 . . | 4 | 2 1/8 | 1 1/8 | 1 1/8 | 1 1/4 | 1 1/8 | 5 1/8 " |
| Optimo No. 1-1/2 | 5 | 2 1/8 | 1 1/8 | 1 1/8 | 1 1/4 | 1 1/8 | 5 1/8 " |
| Optimo No. 2 . . | 6 1/2 | 2 1/4 | 1 | 1 1/8 | 2 1/8 | 1 1/8 | 5 1/4 " |
| Optimo No. 3 . . | 10 1/2 | 3 3/16 | 1 1/4 | 1 1/8 | 2 1/8 | 2 1/8 | 5 1/8 " |
| Optimo No. 4 . . | 17 | 4 1/8 | 1 3/4 | 2 1/8 | 3 3/8 | 2 3/8 | 5 1/4 " |

NOTE.—Weights given in ounces; diameters, in inches.

TABLE No. 3

COST OF MOUNTING AND FITTING, FLANGES, CAPS, SCALES,
RELEASES, ETC.

| Number | 1 | 2 | 3 | 4 | 5 | 6 |
|--------------------------------|--------|-----------|-----------|-----------|-----------|-----------|
| Diameter | 1 in. | 1 1/4 in. | 1 1/2 in. | 2 in. | 2 1/4 in. | 2 1/2 in. |
| Mounting and Fitting | \$2.00 | \$2.25 | \$3.00 | \$3.50 | \$4.00 | \$4.50 |
| Standard Flanges | .40 | .50 | .65 | .75 | .85 | 1.00 |
| Special Flanges | .75 | 1.00 | 1.25 | 1.50 | 1.75 | 2.00 |
| Caps | .50 | .70 | .90 | 1.20 | 1.40 | 1.60 |
| Number | 7 | 8 | 9 | 10 | 11 | 12 |
| Diameter | 3 in. | 3 1/2 in. | 4 in. | 4 1/2 in. | 5 in. | 6 in. |
| Mounting and Fitting | \$4.75 | \$5.00 | \$5.25 | \$5.50 | \$6.00 | \$6.50 |
| Standard Flanges | 1.25 | 1.50 | 1.75 | 2.00 | 2.25 | 2.50 |
| Special Flanges | 2.50 | 3.00 | 3.50 | 4.00 | 4.50 | 5.00 |
| Caps | 1.80 | 2.00 | 2.20 | 2.40 | 2.70 | 3.00 |

SPECIAL NOTE.—Sizes listed are inside diameters for standard flanges and caps, and inside diameters of shutter or barrel opening for lens mountings or fittings. In rare instances, when a special fitting of a lens or shutter of other manufacture to a Wollensak shutter or lens requires an unusual amount of time and work, the cost will be slightly higher than here specified.

Special focusing or diaphragm scales, 75 cents each.

Wire or cable release, 12 in. or shorter, 50 cents each; 36 in., \$2.00 each.

Bulbs and tubes, medium, 25 cents; large, 40 cents each.

TABLE No. 4

STANDARD LENS BARRELS

Every Wollensak Barrel Equipped with Iris Diaphragm

| No. | Lens Opening | Light Opening | Dia. of Flange | Price |
|-----|--------------|---------------|----------------|--------|
| 1 | 1 1/8 in. | 3/4 in. | 1 1/4 in. | \$5.00 |
| 2 | 1 1/8 in. | 3/4 in. | 1 1/4 in. | 6.00 |
| 3 | 1 1/8 in. | 1 1/8 in. | 2 1/8 in. | 7.00 |
| 4 | 1 1/8 in. | 1 1/8 in. | 2 1/8 in. | 8.00 |
| 5 | 1 1/8 in. | 1 1/8 in. | 2 1/8 in. | 9.50 |
| 6 | 2 1/8 in. | 1 1/8 in. | 3 1/4 in. | 11.00 |
| 7 | 2 1/8 in. | 2 1/8 in. | 4 in. | 12.50 |
| 8 | 3 1/8 in. | 2 1/8 in. | 4 1/8 in. | 15.00 |
| 9 | 3 1/8 in. | 3 1/8 in. | 5 in. | 17.50 |
| 10 | 4 1/8 in. | 3 1/8 in. | 6 1/4 in. | 20.00 |

TABLE No. 5

SIZE OF SHUTTER REQUIRED ON POPULAR WOLLENSAK LENSES

(Small figures indicate the number of shutter; capital letters O, A, V and S stand for Optimo, Auto, Victo and Studio shutters, respectively)

| Size of Lens | VELOSTIGMATS | | | | Anastigmat Series V F:7.5 | *Versar | Verito |
|---------------|----------------|-----------------|------------------|-----------------|---------------------------|----------------|-------------------------------|
| | Series I F:6.3 | Series II F:4.5 | Series III F:9.5 | Series IV F:6.3 | | | |
| 2 1/4 x 3 1/4 | 4O, 4V | 4O, 4A | ..... | 4O, 4V | 4O, 4V | ..... | ..... |
| 3 1/4 x 4 3/4 | 1O, 1A | 12O, 1A | ..... | 1O, 1A | 1O, 1A | ..... | 1O, 1A |
| 4 x 5 | 12O, 1A | 2O, 1A | ..... | 12O, 1A | 12O, 1A | ..... | (F:6) 12O, 1A (F:4) 4A, 1S |
| 3 1/4 x 5 1/2 | 12O, 1A | 1A | ..... | 12O, 1A | 12O, 1A | ..... | ..... |
| 5 x 7 | 12O, 1A | 2O, 1A, 1S | 12O, 1A | 12O, 1A | ..... | 2O, 1A, 1S | 1A, 1S |
| 5 x 8 | ..... | 2O, 1A, 1S | ..... | 12O, 1A | 12O, 1A | ..... | ..... |
| 6 1/2 x 8 1/2 | 4O, 4A | 2O, 1A, 1S | 12O, 1A | 4O, 4A | 4O, 4A | 2O, 1A, 1S | 1S |
| 8 x 10 | 4O, 4A | 1A, 1S | 2O, 1A | 4O, 4A | 4O, 4A | 4O, 1A, 1S | 1S |
| 11 x 14 | ..... | 1S | 4O, 1A | ..... | ..... | (10x12) 1A, 1S | ..... |

*Studio Shutters for largest sizes of Versar as follows: 11 x 14, 1S; 14 x 17, 1S; 17 x 20, 1S.