TAYLOR-HOBSON
COOKE ANASTIGMATS

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TAYLOR-HOBSON

COOKE

ANASTIGMATS

FOR FINE PHOTOGRAPHY

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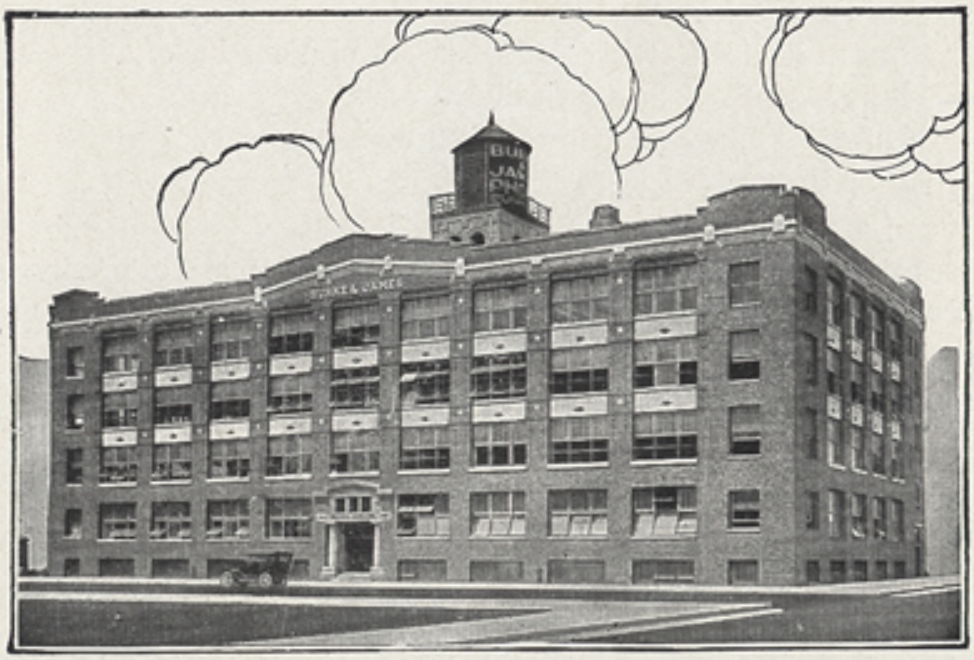
CHICAGO



HOME OFFICE AND FACTORY AT CHICAGO

Catalog No. 22

Introduction

This book is not merely a catalog of the famous Taylor-Hobson Cooke Anastigmats but it also contains a treatise on applied photographic optics.

Its careful study and application will prove of great practical value to every camera user, enabling him to handle his camera more intelligently, thereby securing better pictures.

We earnestly recommend that the following articles be carefully read:

Which Lens to Choose.
Why Taylor-Hobson Cooke Lenses Excel.
What Is an Anastigmat?
What Are Taylor-Hobson Cooke Anastigmats?
How to Decide Quickly on the Right Lens for Your Work.
How to Test Lenses.
How to Focus.
Essentials for Getting the Most Out of Your Lens.
What Depth of Focus Really Means.
How to Find the Angle Covered by Your Lens.
How to Preserve Lenses.

These articles explain in a clear and concise manner many of the mysteries in photographic optics and will prove of value to every prospective user of an anastigmat lens.

Keep this book for future reference.

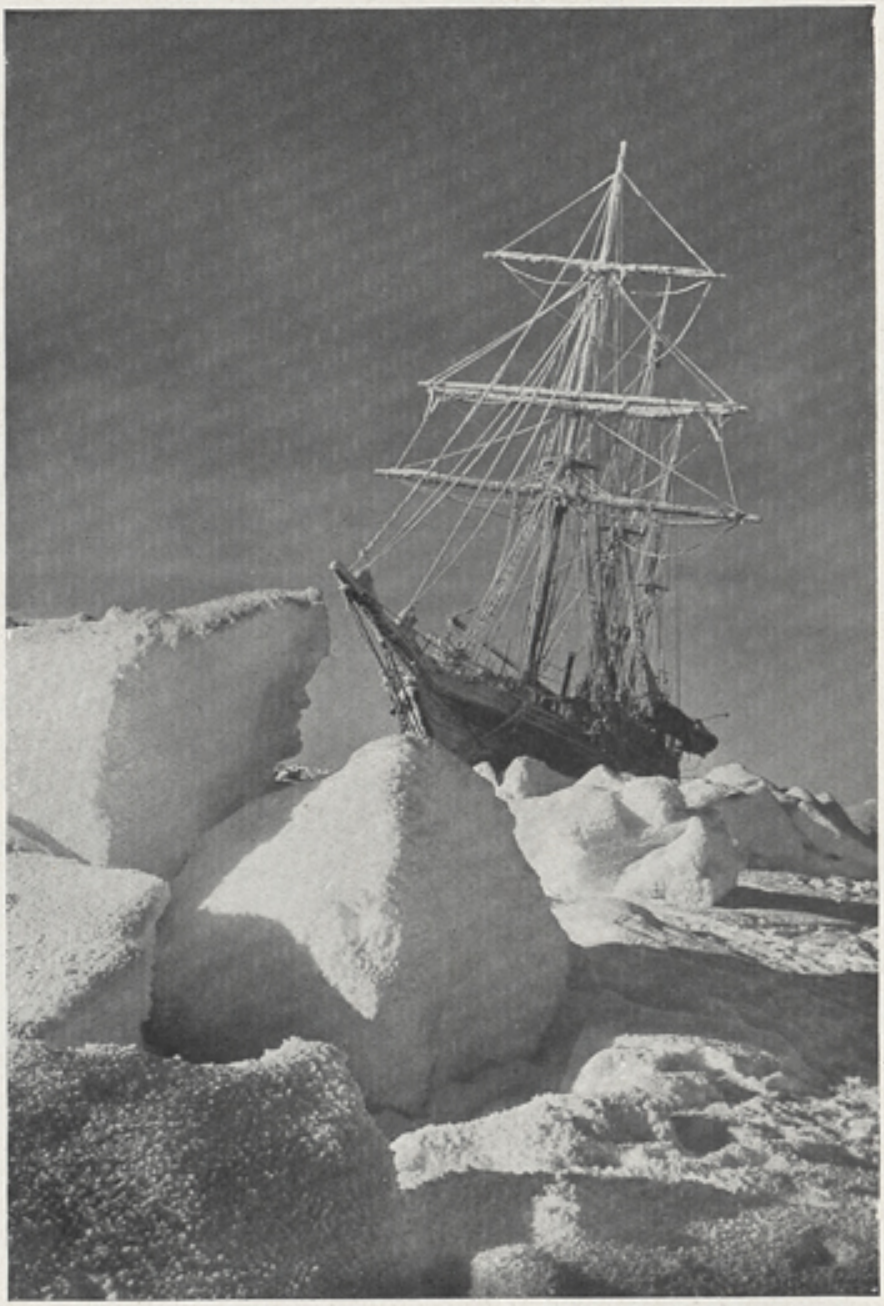
All quotations include the Excise War Tax.

Burke & James, Inc.

Chicago—New York

TAYLOR-HOBSON COOKE ANASTIGMATS

Used in Every Part of the World



Read the following letter from Sir Ernest Shackleton, C. V. O :—

Marlborough Club,
Pall Mall, London, S. W.
February 26th, 1920.

"Dear Sirs,

Now that the affairs of my late expedition to the Antarctic have all been settled, I am writing to those who have been of proved assistance to me in various ways.

I must include your firm, for it was largely through the excellent quality of lenses you supplied, and the care and interest taken by your firm that Capt. Hurley was able to achieve the first-class photographic records we obtained.

I propose, as a slight recognition of the way in which you met our needs, to send you some photographs which you will be at liberty to make whatever use of you may desire.

Believe me, dear Sirs,

Messrs. Taylor, Taylor & Hobson, Ltd.,
Leicester.

Yours faithfully,
E. H. SHACKLETON."

Which Lens to Choose

Taylor-Hobson Cooke Anastigmats are made in several series for different purposes. The mounts vary somewhat in design, see the following page of illustrations, but the finish and workmanship is uniformly excellent.

LIST OF USES OF ALL TAYLOR-HOBSON COOKE ANASTIGMATS

SERIES I F/3.1—For Taking Motion Pictures. Page 9.

SERIES IIA F/3.5—For Extra Rapid Work, Sporting Events, Press Subjects, etc., under Difficult Light Conditions. Page 10.

SERIES II F/4.5—Aviar—For High-Speed Subjects and Difficult Work with Reflecting and Other Cameras. Page 11.

SERIES III F/6.5—For General Photography with Rexos, Kodaks, and Other Hand Cameras. Pages 12 and 13.

SERIES IV and V F/5.6 and F/8—For Commercial Photography and Every Class of Work Demanding Microscopically Sharp Definition Combined with Great Depth of Focus and Speed. The Best Lenses for Commercial Photographers Requiring One Lens for All-Round Work. Pages 14 and 15.

SERIES VIIA F/6.5—Primoplane—For High Speed Wide Angle Work. Page 16.

TELEPHOTO F/5.8—For Obtaining Large Images of Distant Objects. Pages 17 and 18.

SERIES I F/3.1—Cooke Portrait Anastigmats—For Extra Rapid Artistic Portraiture. Page 21.

SERIES IIA F/3.5—For Very Rapid Studio Work. Page 22.

SERIES II F/4.5—For Rapid Group Work. Page 23.

SERIES VI F/5.6—For Daylight Studio and Outdoor Work. Page 24.

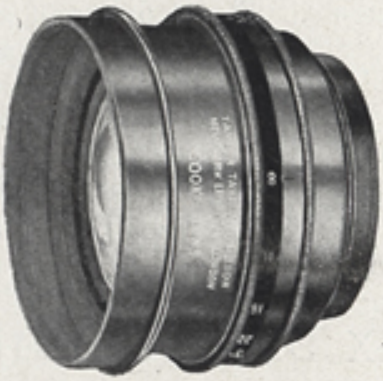
PROCESS ANASTIGMATS F/8 and F/16 and Prisms—For Line, Halftone, Three and Four Color Process nda for Copying Work. Page 25.

SUPER-SPEED MOTION PICTURE TAKING LENSES F/2 in PREPARATION.

Write for details and prices.

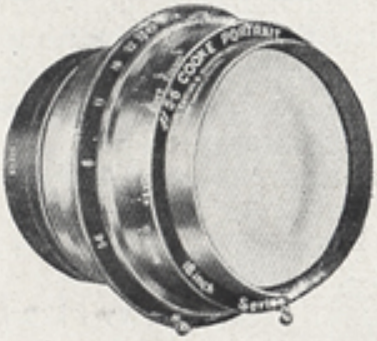
TAYLOR-HOBSON
COOKE ANASTIGMATS

AVIAR
Series II F/4.5



SERIES IV
F/5.6

PORTRAIT
Series II F/4.5



PORTRAIT
Series VI F/5.6

PRIMOPLANE W. A.
Series VII-A F/6.5

PROCESS
Series V and V-A

Why Taylor-Hobson Cooke Anastigmats Excel

For many years these famous lenses have been recognized as supreme in optical and mechanical perfection.

Taylor, Taylor & Hobson through many years of successful operation have created a unique condition through ideal labor conditions. Their workmen, through long years of special training, have become highly skilled specialists. Their tools and appliances are instruments of precision in a rare sense, while the microscopic tests are of the most sensitive nature. The standard of excellence is of the highest.

Taylor-Hobson Cooke Lenses always attract special attention by the singular beauty, design and finish of their mounts and are instantly recognized as a quality product which no other manufacturer has attained. The optical precision is on the same high level, offering a combination of mechanical and optical excellence which is unique and acknowledged pre-eminent by thousands of users throughout the world.

SIX DISTINGUISHING FEATURES OF COOKE ANASTIGMATS

1. The uncemented triple lens construction, insuring the utmost precision and maximum light transmitting power.
2. The microscopically sharp definition given at full aperture.
3. The remarkable polish of the glasses.
4. The method of mounting the glasses in their cells.
5. The flange-screws with abrupt thread, all made to standard.
6. The substantial screw-threads, insuring quick interchange of lenses and uniform rigidity.

Knowing that the manufacturers have realized their ideal, we invite intelligent comparison between their lenses and others. On page 31 are some instructions for making a simple and scientific test.

WHAT ARE ANASTIGMATS?

No "rectilinear" lens condenses to fine points the light which passes through it obliquely to the margins of the plate. Consequently the images formed by such lenses are built up, not of fine circular points, but of blurred lines of light which overlap and cause that peculiar streakiness of definition noticeable in many photographs, particularly at the margins. This is improved by "stopping down" the lens, but that involves a longer exposure. The defect is called astigmatism and lenses which are more or less free from it are called Anastigmats.

Another defect of the rectilinear lens is the formation of images which are not flat like the plates, but dished as shown in the illustration.

Obviously a curved image cannot be focused sharply on a flat plate. If the center be focused, the margins must be out of focus. If the margins be in focus, the center cannot be. This error is known as "curvature of field," but the perfect anastigmat shows no curvature, its field being flat like the plate.

What Are Taylor-Hobson

COOKE ANASTIGMATS

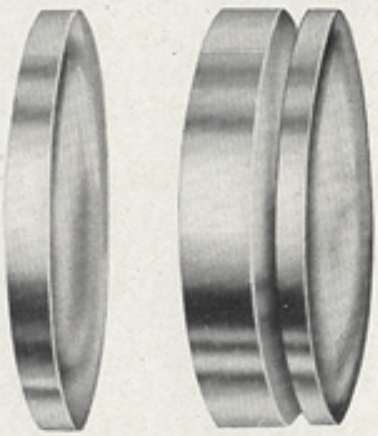
There are many types of modern anastigmats and the claims for each are so conflicting as to mislead rather than guide. We wish to state fairly how Taylor-Hobson Cooke Anastigmats differ from others.

Cooke Anastigmats, except the Aviar which is a four lens combination, consist of three uncemented glasses. This simple construction makes possible final corrections of utmost precision in the mounting. Errors which remain in some complex systems are easily removed, giving a uniform excellence in the Cooke whereas other anastigmats frequently show a marked difference in their uniformity.

More light reaches the sensitive plate through three glasses than through six or eight glasses. Moreover, there is no cement used in the Cooke Anastigmats and the adjustable air-spaces assist still further in correcting the entire system. It is well known that the cemented lenses eventually turn yellow in time. Lenses which have become even slightly discolored in this way do not pass as much light as do Cooke Lenses of the same focal length and aperture which are free from cement. Compare a Taylor-Hobson Cooke Anastigmat of any age with a cemented lens which has been used for a year or two by laying them on a sheet of white paper side by side, the difference is frequently very marked indeed.

The familiar night pictures by John Beeby and W. A. Fraser, of NewYork, show how singularly free are Cooke Lenses from what is known as "flare" and "ghost." This again is due to the simple construction and to the design of the curves.

Taylor-Hobson Cooke Anastigmats are not only mathematically and optically perfect but they are the simplest mechanically, light and compact yet rigid and durable, it being impossible with ordinary treatment to disturb their corrections.

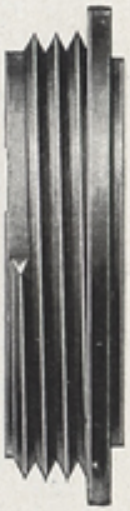


Showing the Standard Cooke Construction

These statements show why Taylor-Hobson Cooke Anastigmats are employed in astronomical observatories, and why they are used at Harvard University. For difficult copying and enlarging they are invaluable, and are used exclusively by the U. S. Geological Survey and by other departments at Washington. In process-engraving works throughout America and Europe, they are used under process-screens of 250 lines or more to the inch. For three and four color photography they are unique because the maker's final adjustment gives an exact coincidence in the sizes of the color-images.

While thus selected for the best scientific work, the lenses are used by amateurs everywhere—by engineers, in the portrait studio, by army and navy photographers, and by newspaper men, who seek, above all else, rapidity and fine definition. Wherever possible, we facilitate the trial of Taylor-Hobson Cooke Anastigmats for comparison with other lenses.

IMPROVED INTERCHANGEABLE THREADING SCREW



The thread of the screw to fit the flange commences abruptly, insuring quick and smooth engagement, three turns will bring the lens home while in the movement there is no fear of dropping the lens. Notice the cut which shows the large screw thread. The screw threads are as heavy as is consistent with the lens barrel to effect the utmost security, rigidity and convenience. A further improvement is that any number of Cooke lenses fitting the same flange, screw home with their diaphragm indexes in their proper position. Adapters can also be supplied for two or more Cooke lenses of various sizes to fit the flange instead of having an extra front board. Standard screws are interchangeable. Old lenses need never be returned for fitting to any flange.

ADVANTAGES OF TAYLOR-HOBSON COOKE ANASTIGMATS SUMMARIZED

No. 1—Every lens made with infinite care by thoroughly trained scientific specialists.

No. 2—Three glass systems, microscopically and permanently adjusted without cement.

No. 3—Three glasses admit more light than six or eight and error is far less likely.

No. 4—The uniform excellence insured by scientific test of every lens.

No. 5—Most lenses vary appreciably, while Taylor-Hobson Cooke Anastigmats do not.

No. 6—They may be focused wide open and afterward stopped down without affecting the image. This is a great advantage.

No. 7—They are light and compact, yet rigid and durable.

No. 8—The mounts are of rare beauty and uniformly perfect in mechanical design and operation.

No. 9—All lens surfaces are readily accessible for cleaning without danger of disturbing the optical alignment.

TAYLOR-HOBSON
COOKE ANASTIGMATS

SERIES I FULL APERTURE F/3.1

For Motion Picture Taking

Hitherto is has been considered only possible to make extra rapid lenses at some sacrifice of definition. One example is the Petzval lens whose definition rapidly fell off away from the center.

In cinematography and press-work it is necessary to secure such definition as will stand considerable enlargement. In portraiture also, where some degree of diffusion is desirable, it is necessary that the definition should be equal throughout the field. These requiremen's call for the flat field anastigmat.

In the Cooke Lenses Series I, it has been possible to obtain critical definition at F/3.1 over the listed plate. The smaller sizes are especially suitable for cinematography and the pictures will stand any degree of enlargement on the screen. The medium sizes provide the press-photographer with a lens which will give good results under conditions that would be otherwise hopeless.

These lenses can be readily used on the Universal and other Motion Picture cameras at a moderate extra charge for fitting. Prices on application.

Cat. No.	Equiv. Focus Inches	MM	Plate Covered Full Aperture	Price in Barrel	In Focusing Mount	Extra for Micrometer Mount
150	1⅝	40	M. P. Film	$43.50	$61.50	.....
151	2	51	M. P. Film	45.00	63.00	.....
152	2¼	58	M. P. Film	46.50	69.00	.....
153	3	76	M. P. Film	51.00	72.50	$24.00
154	3½	90	M. P. Film	57.75	.....	24.00
155	4	102	1⅝x2½	64.50	.....	24.00
156	5	127	2¼x2¼	75.75	.....	24.00

TAYLOR-HOBSON
COOKE ANASTIGMATS

SERIES 11A FULL APERTURE F/3.5

For Extra Rapid Work, Sporting Events and Press Subjects Under Unfavorable Light Conditions

Lenses of this large Super-speed aperture are especially suitable for use by the expert. Their speed is greater than is required for ordinary photography, and used at full aperture special care is needed in focusing, as little depth of focus is possible, unless "stopped down." Further improvement in their definition and covering power has recently been effected.

Lenses in this Series are confidently recommended to the experienced photographer as being particularly suitable for exceptional work, providing a reserve speed for almost every emergency.

The larger sizes are particularly adapted for use on reflecting cameras, their super-speed insuring good negatives even under the difficult conditions of light or in photographing rapidly moving objects with high speed shutters.

These lenses are ideal for photographing automobile races, aeroplanes in flight, baseball and football games, tennis tournaments and all sporting events.

Cat. No.	Equiv. Focus Inches	Plate Covered Full Aperture	Takes Acme Shutter	Takes Optimo Shutter	Takes Compound Shutter	Price in Barrel
160	3½	1⅝x2½	1	1A	1	$55.50
161	4	2¼x2¼	2	2	2	60.00
162	5	2½x3½	3	3	2	64.50
163	6¼	3¼x4¼	4	4	3	76.50
164	7½	3¼x5½	4	4	4	91.50

Always specify whether desired in Standard or Sunk Mount.

TAYLOR-HOBSON
COOKE ANASTIGMATS

AVIAR SERIES II FULL APERTURE F/4.5

For High Speed Pictures and Difficult Work with Reflecting and Other Cameras Under Trying Conditions of Lighting

The Taylor-Hobson Cooke Aviar Anastigmat was developed during the war to meet the exacting requirements of aerial photography. A sample Cooke-Aviar Anastigmat was made and tested in a stereo camera against the best foreign lens of similar focus and aperture ever produced for this class of work. The results were submitted to independent examiners who unhesitatingly preferred the "Aviar." Subsequent use of the "Aviar" lens for aerial work convinced all users of its superior qualities.

Since then this lens has been slightly modified to render it suitable for commercial photography, and it is now perhaps the most popular high-class large aperture lens on the English market.

The lens consists of four separate glasses. Its large flat field of fine definition at the full aperture of F/4.5 makes the lens a general favorite and one we confidently recommend for difficult subjects and under unfavorable light conditions.

With the exception of No. 170 (4¼ inches focus) all the lenses in the following list are of the new "Aviar" type.

The Cooke Aviars in sunk mounts are especially suitable for use on Graflex and other Reflecting Cameras.

The lens mount is light and compact and is enamelled black.

Cat. No.	Equiv. Focus Inches	Plate Covered Full Aperture	Takes Acme Shutter	Takes Optimo Shutter	Takes Compound Shutter	Price in Barrel
170	4¼	2¼x3½	1	1A	0	$47.25
171	5¼	3¼x4¼	2	2	2	55.50
172	6	4x5	3	3	2	63.00
173	7	3¼x5½	3	3	2	76.50
174	8¼	5x7	4	4	3–4	87.75

TAYLOR-HOBSON
COOKE ANASTIGMATS

SERIES III FULL APERTURE F/6.5

For General Photography with Rexos, Kodaks and Other Hand Cameras

These anastigmats are designed for general photography and are recommended for instantaneous work with folding and hand cameras of all types.

The defining power of the Series III Anastigmats is such that a test chart photographed from corner to corner of the plate, and examined under a powerful magnifier, shows detail as sharp at the corners as at the center.

This claim is made confidently. From their own plates, these anastigmats make perfect enlargements to a size limited only by one's enlarging apparatus.

Their speed adapts them to amateur home portraiture, flash lights, and speed work.

This series has been selected as regular equipment for Rexo Specials, De Luxe Models, and are equally desirable for other makes of roll film and hand cameras. Sold in cells for fitting all standard high grade shutters, see following page.

Cat. No.	Equiv. Focus Inches	Plate Covered Full Aperture	Takes Acme Shutter	Takes Optimo Shutter	Takes Compound Shutter	Price in Barrel
190	4¾	2½x4¼	0	1	0	$45.00
191	5¼	3¼x4¼	0	1	0	48.00
192	5½	4x5	1	1A	1	50.25
193	6⅞	3¼x5½	1	1A	1	54.00
194	7½	5x7	2	2	2	64.50
195	8½	5x8	2	3	2	72.00
196	3½	1⅝x2½	00	..	00	37.25
197	4¼	2¼x3¼	00	..	00	42.75

TAYLOR-HOBSON

SERIES III **COOKE ANASTIGMATS** F/6.5

In Cells for Folding and Hand Cameras

These lenses are supplied in cells for use with Rexos, Kodaks, Anscos and all other folding and hand cameras. Combined with a high grade shutter they provide the amateur with an optical equipment which leaves nothing to be desired. They have all the speed necessary for this type of camera and produce negatives of remarkable definition and brilliance.

Every amateur will be proud to own a Cooke Anastigmat and the investment is moderate compared to the satisfaction that results from the use of such a high grade objective.

Cat. No.	Equiv. Focus Inches	Plate Covered at Full Aperture	Takes Acme Shutter	Takes Optimo Shutter	Takes Compound Shutter	Price of Cells Only
196	3½	1⅝x2½	00	..	00	$33.75
197	4¼	2¼x3¼	00	..	00	39.00
190	4¾	2½x4¼	0	1	0	41.50
191	5¼	3¼x4¼	0	1	0	44.50
192	5½	4x5	1	1A	1	46.75
193	6⅞	3¼x5½	1	1A	1	50.50
194	7½	5x7	2	2	2	61.00
195	8½	5x8	2	3	2	68.50

TABLE OF COOKE LENSES IN BARRELS WITH IRIS DIAPHRAGM TO FIT GRAFLEX AND GRAPHIC CAMERAS

Cameras	F/5.8 Telephoto Inches	Series II-A F/3.5 Inches	Series II Aviar F/4.5 Inches	Series IV F/5 6 Inches
R. B. Cycle 4x5, Graphic	.....	.....	6, 7	6
R. B. Cycle 5x7, Graphic	.....	.....	8¼	8, 9½
R. B. Cycle 6½x8½, Graphic	.....	.....	10½	11
Speed 3¼x4¼, Graphic	11	.....	5¼	5
Speed 4x5, Graphic	12½	7½	6, 7, 8¼	6
Speed 3¼x5½, Graphic	12½	7½	6, 7, 8¼	6
Speed 5x7, Graphic	15	.....	8¼	8
Stereo 5x7, Graphic	.....	.....	.....	6
Graflex 1-A. 2½x4¼	11	.....	5¼	5, 6
Graflex 3-A. 3¼x5½	12½	7½	6, 7	6, 8
Auto 3¼x4¼	11	6¼	5¼, 6	5, 6
Auto 4x5	12½	7½	6	6
Auto 5x7	15	9½	8¼	8
Auto Junior 2¼x3¼	8½	.....	4¼	5
R. B. Junior 2¼x3¼	11	.....	5¼, 6	5, 6
Compact 3¼x5½	12½	7½	6, 7	6, 8
Compact 5x7	15, 20	9½	8¼	8, 9½
Telescopic R. B. 3¼x4¼	11	6¼	6 and over	6
Telescopic R. B. 4x5	12½	7½, 9½	7, 8¼	8, 9½
R. B. Auto 3¼x4¼	11, 15	7½	(Sunk 7), 8¼	8, 9½
R. B. Auto 4x5	15, 20	.....	8¼	8, 9½
Press 5x7	15, 20	9½	8¼	8, 9½
Home Portrait 5x7	20	10½, 12½	10½	.....
Stereo Auto 5x7	.....	.....	.....	6
Naturalist 4x5	20	12½	7 and over	13

TAYLOR-HOBSON
COOKE ANASTIGMATS

SERIES IV FULL APERTURE F/5.6

For Commercial Photography

It is often necessary for the commercial photographers to choose one anastigmat for various classes of work. If this work calls for an anastigmat of large aperture, we unhesitatingly recommend the Series IV Taylor-Hobson Cooke Anastigmats, because the large opening of F/5.6 affords ample speed for portraits, groups and other work demanding short exposures.

On the other hand, when stopped down only slightly, these fine Anastigmats possess that "great depth of focus" so necessary for all commercial photography, including machinery, architectural views, etc.

The definition is perfect throughout for the sizes of plate specified, even with the full aperture of F/5.6. In that respect the lenses equal the Series V at F/8. With their diaphragms wide open, however, they require but half the exposure. This Series has an exceptionally flat field which makes them especially suitable for copying and enlarging.

In the Series IV are combined, speed, critical definition and when required great depth of focus. They are ideal lenses for general commercial and view work.

Cat. No.	Equiv. Focus Inches	Plate Covered Full Aperture	Takes Acme Shutter	Takes Optimo Shutter	Takes Compound Shutter	Price in Barrel
180	5	3¼x4¼	0	1	0	$51.75
181	6	3¼x5½	1	1A	1	57.75
182	8	5x7	3	3	2	73.50
183	9½	5x8	..	..	3	88.50
184	10½ F/6	6½x8½	4	4	3	112.50
185	13 F/6	8x10	..	..	..	145.50
186	16 F/6	10x12	..	..	..	204.00
187	18 F/6	12x15	..	..	..	232.50

TAYLOR-HOBSON
COOKE ANASTIGMATS

SERIES V FULL APERTURE F/8

For Commercial Photography

The distinguishing features of the Series V Taylor-Hobson Cooke Anastigmats are exquisitely sharp definition and brilliance of the image. They define sharply to the extreme corners even of plates much larger than those for which they are designed. They also have great depth of focus.

There is a tendency nowadays on the part of some photographers to reject as "too slow" any lens having no larger aperture that F/8. But how many of these photographers ever use a larger stop than F/16? The aperture of F/8 is ample for focusing even in dull lights.

The work of the commercial photographer almost invariably demands great "depth of focus" and for such work the Series V Lenses are inimitable. The brilliance of the image rivals that of most anastigmats working at F/6.8, owing to the simple construction. These Series V Anastigmats have been selected and purchased by Professor Pickering for his wonderful star negatives made nightly at Cambridge, Mass. The makers' success with Government departments has been largely with these same Series V Anastigmats.

Cat. No.	Equiv. Focus Inches	Plate Covered Full Aperture	Takes Acme Shutter	Takes Optimo Shutter	Takes Compound Shutter	Price in Barrel
200	11 (F/8)	6½x8½	3	3	2	$75.75
201	13 (F/8)	8x10	..	..	3	97.50
202	16 (F/8)	10x12	..	..	..	144.00
203	18 (F/8)	12x15	..	..	..	180.00
204	25 (F/10)	16x18	..	..	..	252.00

TAYLOR-HOBSON
COOKE ANASTIGMATS

PRIMOPLANE — WIDE ANGLE
SERIES VII-A — FULL APERTURE F/6.5

This well known series is designed exclusively for wide angle work. For dim interiors, banquets and large groups the Primoplane anastigmats have this great advantage. They may be accurately focused with the largest diaphragm opening, so that the photographer may see clearly what he is getting on the focusing screen.

Fairly good definition is given even at F/6.5, but this wide opening is usually too large to permit sharp definition of everything grouped within the limited space available. The diaphragm must therefore be stopped down to increase the depth of focus, though it need rarely be stopped below F/16.

An immense saving in time is effected. If, for example, the ordinary wide angle lens with a full aperture of F/16, demands an exposure of four seconds, the Taylor-Hobson Cooke Primoplane Anastigmat at F/8 requires only one second, under the same conditions of light.

Taylor-Hobson Cooke Primoplane Anastigmats can, if desired, be mounted to "between-lens" shutters with the complete Anastigmat fitted in the front of the shutter. When thus fitted these Anastigmats permit the extreme rise of the camera-front.

Read article on "What Depth of Focus Really Means." Page 33.

Cat. No.	Equiv. Focus Inches	Plate Covered Full Aperture	Shutters Taking These Lenses			Price in Barrel
			Acme	Optimo	Compound	
210	3	3¼x 4¼	3	2	1A	$43.50
211	4	3¼x 5½	3	2	2	45.00
212	5	5 x 7	3	3	2	48.00
213	6	6¼x 8½	4	3	2	54.00
214	7	8 x10	4	4	4	64.50
215	8	10 x12	4	4	4	87.00

TAYLOR-HOBSON

Cooke Telephoto Anastigmats

F/5.8

BIG BEN, WESTMINSTER

Taken with a 6-inch F/4.5 Taylor-Hobson Cooke Aviar Lens

Taken with a 12½-inch F/5.8 Taylor-Hobson Cooke Telephoto Lens

BOTH PICTURES TAKEN FROM THE SAME POSITION

The Taylor-Hobson Cooke Telephoto Anastigmat is a compact high-speed lens of long focus requiring only a short bellows extension. It gives large images of far distant objects, and is used for both time and instantaneous exposures of scenes which another lens would render too small. The press-photographer who wishes, unobserved, to obtain photographs of celebrities can stand far away, and secure an image of the same size as with a normal lens used close at hand, using about the same bellows extension. At twice the distance his image is the same size as with the other lens. At the same distance, it is twice the size. It is invaluable for pictures of birds and animals which would be frightened at close range; while for views of aeroplanes, athletic events, mountain scenery, and for all distant subjects, the Taylor-Hobson Cooke Telephoto Anastigmat is simply indispensable.

Taylor-Hobson Cooke Telephoto Anastigmats—Con't

THE TAYLOR-HOBSON COOKE TELEPHOTO REQUIRES THE SAME BELLOWS EXTENSION AS AN ORDINARY LENS, YET ITS IMAGE IS APPROXIMATE' Y TWICE AS LARGE

The possibility of using a fine high-speed Anastigmat of long focus on a camera having a short extension is, perhaps, the most remarkable development of modern photographic science. The camera extension required for a lens of 12½-inch focus is approximately the same as that for a normal 6½-inch lens, while the size of image given is twice as great, but the difference appears greater in reality than this statement suggests. (See illustrations on preceding page.)

The old form of Telephoto Attachment, for use in combination with the ordinary photographic lens, was clumsy and inconvenient. It never worked at a large aperture and necessitated a calculation of the aperture for every different magnification. These drawbacks hindered the development of tele-photography. They have, however, been entirely overcome in the Taylor-Hobson Cooke Telephoto Anastigmat, which is light, very rapid and has fixed magnification.

The mount is made from specially selected light metal, and the flange screw is fixed near the center to balance it, thus preventing strain upon the camera front.

The workmanship and finish are of the same excellence as characterize all other types of Cooke Anastigmats.

Cat. No.	Equiv. Focus Inches	Plate Covered Full Aperture	Camera Ext. Required	Takes Acme Shutter	Takes Optimo Shutter	Takes Compound Shutter	Price in Barrel
220	8½	2½x3½	5¼	1	1A	1	$ 66.00
221	11	3¼x4¼	6¾	3	3	2	78.00
222	12½	4x5	7½	3	3	2	87.00
223	15	5x7	9	4	4	3*4	132.00
224	20	6½x8½	12¼	..	..	5	240.00

*Full aperture .06" small.

TAYLOR-HOBSON

COOKE PORTRAIT

Anastigmats

Fitted with Diffusion Adjustments

Reduced from a negative made with the Cooke Portrait Anastigmat Series II, F4.5

Artistic Portraiture

The development in artistic portraiture has made further demands upon the opticians skill. The artistic photographer no longer aims at always producing sharply defined portraits but wishes to vary his results to suit his subject.

A large outdoor group may need to be as sharp as possible to show up each individual, but the studio portrait of an elderly person would be entirely spoiled by the same treatment. It is well-known that photography exaggerates all irregularities of the skin; and that color differences, scarcely noticed by the eye, are shown up in strong relief, thus conveying a wrong impression and disappointing the sitter. To overcome these difficulties, retouching is resorted to, with its attendant risk of destroying the likeness and producing an artificial and unreal result, besides adding appreciably to the cost. The up-to-date photographic artist uses Taylor-Hobson Cooke Portrait Anastigmats, with which he can obtain direct, without retouching, either a sharp group negative or a beautifully soft portrait study which gives satisfaction where other results have failed.

This wonderful control of definition possessed by Taylor-Hobson Cooke Portrait Lenses is secured by the diffusion adjustment with which all their mounts are fitted. By its means varying degrees of soft focus can be obtained at the discretion of the operator. The same lens can be used equally well to give sharp results.

Charming pictures can be produced by a combination of these qualities in the lens; the original may be taken sharp, or nearly so, and then enlargements made with the diffusion adjustment set to give its maximum degree of softness. In this way an even softness is obtained throughout the picture, and on suitable paper such enlargements have a beautiful softness and roundness and look almost as if made upon porcelain.

There is no effect quite like that produced with a Taylor-Hobson Cooke Portrait Anastigmat.

TAYLOR-HOBSON
COOKE PORTRAIT
Anastigmats

SERIES I F/3.1

For Extra Rapid Artistic Portraiture

For photographing restless children or for instantaneous flashlight work, this large aperture Series will be found especially useful.

The super-speed of this Series especially recommend it for use under artificial lighting.

The diffusion adjustment described in the preceding page enables the operator to produce the exact results required for each particular subject.

Instructions for operating are engraved upon each mount. Any degree of diffusion or hair line sharpness are at the command of the operator.

The introduction to this section explains the value of diffusion.

A Cooke Portrait
Medium Diffusion

Catalog No.	Equiv. Focus Inches	Plate Covered Full Aperture	Price in Barrel
240	8¼	3¼x4¼	$126.00
241	10¼	4 x5	190.50
242	12½	5 x7	244.50

TAYLOR-HOBSON
COOKE PORTRAIT
Anastigmats

SERIES II-A F/3.5

For Very Rapid Studio Work

While the difference in aperture between this and the preceding Series is small, it is sufficient to permit of lenses in this Series being constructed to cover rather larger plates.

By comparison, if an exposure of four seconds were required with a lens of F/3.1 aperture, then five seconds would be needed for a lens of F/3.5 aperture.

It will also be noticed that a 10½-inch F/3.1 lens will only cover a 4x5 plate, whereas the same focus lens of F/3.5 aperture will cover a 5x7 plate.

This Series is highly recommended to portrait photographers for all round artistic portrait work in the studio. Like the preceding Series these lenses are equipped with a diffusion adjustment for producing soft focus effects.

See introductory article to this section.

Catalog No.	Equiv. Focus Inches	Plate Covered Full Aperture	Price in Barrel
250	9½	4¾x 6½	$144.00
251	10½	5 x 7	172.50
252	12½	6½x 8½	220.50
253	15	8 x10	336.00

TAYLOR-HOBSON
COOKE PORTRAIT
Anastigmats

SERIES II F/4.5

For Rapid Group Work

The F/4.5 aperture in this Series is large enough for all ordinary requirements in the studio, as it permits of lenses being constructed with greater covering power than is possible with larger aperture lenses, and thus provides the professional photographer, who is limited to the use of one lens, with one best suited to all round work.

These lenses cover, at full aperture the plates for which they are listed, but as is the case with other large aperture lenses, stopping down does not materially increase their covering power.

The requisite depth of focus for group work is readily obtained by stopping down.

The diffusion adjustment in this Series is operated by rotating the body of the mount, containing the hood and front glass, in the direction of the arrow.

Read introduction to this section for particulars of how to use diffusion to greatest advantage.

Catalog No.	Equiv. Focus Inches	Plate Covered Full Aperture	Price in Barrel
260	10½	6½x 8½	$133.50
261	13	8 x10	204.00
262	14½	8 x10	252.00
263	16	10 x12	405.00
264	18	12 x15	540.00

TAYLOR-HOBSON
COOKE PORTRAIT
Anastigmats

SERIES VI F/5.6

For the Daylight Studio and Outdoor Work

With the development of high-speed lenses, F/5.6 is no longer looked upon as a specially large aperture, but for all daylight work in the studio including large head studies, and for groups, both indoors and out, lenses of this Series will be found most useful.

The smaller aperture permits of smaller diameter glasses, which being compactly mounted, make the complete lenses more portable and convenient for carrying to places where groups or home portraits have to be taken.

Lenses of this Series are also suitable for general photography and in many respects this lens might be considered as the professional's traveling companion.

The diffusion adjustment is easily operated by rotating the engraved ring just behind the hood in the direction indicated. For particulars of how and when to use diffusion, read the introduction to this section.

Catalog No.	Equiv. Focus Inches	Plate Covered Full Aperture	Price in Barrel
270	13	8x10	$150.00
271	16	10x12	210.00
272	18	12x15	240.00

Taylor-Hobson Cooke Process Anastigmats

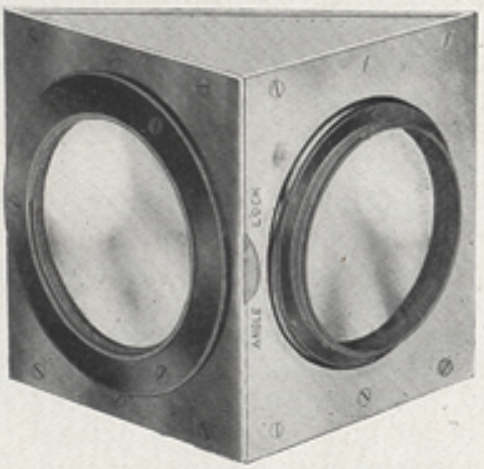
SERIES V and V-A F/8, F/10, F/16

For Photo-Engraving and Three Color Work

The illustrations in the leading magazines throughout the world are made with Taylor-Hobson Cooke Process Anastigmats. Three-fourths of the photo-engravers in America use and prefer them. The reason is that these anastigmats give uniformly well defined images, free from distortion, fog and other common defects; while for three and four-color work they have one advantage over every other Process lens made. Their unique construction makes possible a certain adjustment which is accomplished in the final corrections, thus securing color-images of equal size. When operated with color filters, the anastigmat must be focused with the red filter in place, the other filters being used with the focus unaltered. In this way alone, it is possible to obtain those color corrections which have helped make Taylor-Hobson Cooke Process Anastigmats famous the world over. For half-tone and line work they are admitted everywhere to be the finest lenses made and uniformly perfect.

The lens-hood which receives the cap is removable, and a screw-thread receives interchangeably any prism or mirror suitably mounted and always in the correct position. An iris diaphragm is provided instead of the old fashioned stops with circular openings, and in front of it is a slot to receive process diaphragms if necessary. This slot may be closed or opened at pleasure merely by revolving the inscription tube.

TAYLOR-HOBSON COOKE PROCESS PRISMS



Into the manufacture of these prisms are put the finest material and workmanship that money can buy. The accuracy of each surface is guaranteed, while the convenience of the mounting is unique. Standard screw-threads are provided. One thread of the prism, screws over the front of the lens after the hood of the lens has been removed, while the other thread receives the lens-hood with leather cap. These protect the glass surface of the prism. A small lock clamps the prism at any desired angle. The larger sizes are provided with a useful stop which facilitates the removal of the anastigmat and prevents its jamming. Cheaper prisms are to be had, but it is poor economy to buy them.

Cat. No.	Size of Square Face Prism	Equiv. Focus Inches	Full Aperture	Price of Lens	Price of Prisms Subject to Change
236	2	9	F/8	$ 72.50	$ 94.50
230	2¼	11	F/8	84.75	85.00
231	2½	13	F/8	109.50	94.50
232	3	16	F/8	161.00	113.00
233	3½	18	F/8	201.50	140.00
234	3½	25	F/10	282.00	140.00
235	4½	30	F/16	376.00	270.00

Taylor-Hobson Cooke Standard Adapters

For Accommodating Cooke Anastigmats in Flanges Larger than Their Own

Eliminating the Necessity of Extra Front Boards

When more than one Cooke Lens is to be used on the same camera these adapters facilitate rapid change of lenses and insure the maintenance of their optical alignment. They contain facilities for engagement and release, with the advantage of holding the various sizes Cooke Anastigmats with their diaphragm indexes in position for use. They are guaranteed interchangeable with other T. & H. lens fittings.

Diameter in inches														
External Screws.	1½	1¾	2	2	2¼	2½	2½	2¾	3	3	3½	4	5	6
Internal Screws...	1¼	1½	1½	1¾	2	2	2¼	2½	2½	2¾	3	3½	4	5
List Price.....$	1.50	1.50	1.50	1.50	2.10	2.10	2.38	2.38	2.38	2.64	2.64	3.26	3.82	4.70

Taylor-Hobson Cooke Standard Flanges

(Interchangeable)

These flanges possess the important advantages described on the introductory pages. Their screws are formed within one to two thousandths of an inch above the normal sizes, and are thus freely interchangeable. A flange of this form is included with every Taylor-Hobson Cooke Anastigmat not mounted in a between-lens shutter. Special sunk flanges can be made to order.

STANDARD FLANGES

Diam. of Screw in inches	1¼	1½	1¾	2	2¼	2½	2¾	3	3½	4	4½	5	6
Full diam. of Flange....	1.8	2.1	2.4	2.7	3.0	3.3	3.6	3.9	4.6	5.55	6.0	6.5	7.85
List Price.....$	1.50	1.50	1.50	1.50	2.10	2.10	2.38	2.38	2.64	3.26	3.56	3.82	4.70

Taylor-Hobson Cinema Projection Lenses

THE LATEST ADVANCE IN THE MOTION PICTURE FIELD

Compare the picture to right with the same picture below and the great superiority of the new Taylor-Hobson Cinema Projection Lens will be instantly apparent. The National Physical Laboratory (London), reports that the Taylor-Hobson lens transmits 52% more light than the next best lens on the English Market fitting the standard $2\frac{1}{16}$-inch jacket.

TAYLOR-HOBSON LENS

THE NEXT BEST LENS

This wonderful luminosity is obtained by using the largest diameter lenses that can be used in a standard jacket and by a patented formula which permits of the rear lens being brought close up to the film gate.

All the light passing through the gate is transmitted by this wonderful lens to the screen resulting in pictures of sparkling brilliancy.

The lens is made from the highest grade optical glass, scientifically ground and polished and beautifully finished.

It is especially recommended for use with Mazda installation. The increased clearness and brilliance of the projected image will prove the greatest drawing card for the progressive exhibitor.

Adapter for Simplex or Motiograph Machine, extra ..... $ 4.00
Focusing Jacket for Powers Machine, extra 10.00

Focal Length	F. Value	Focal Length	F. Value	Price
3½ inches	F/1.8	5 inches	F/2.6	$60.00
3¾ inches	F/2.0	5¼ inches	F/2.8	60.00
4 inches	F/2.1	5½ inches	F/2.9	60.00
4¼ inches	F/2.2	5¾ inches	F/3.0	60.00
4½ inches	F/2.4	6 inches	F/3.1	60.00
4¾ inches	F/2.5	6½ inches	F/3.4	60.00
		7 inches	F/3.7	60.00

Rexo Cameras Equipped with Cooke Anastigmats

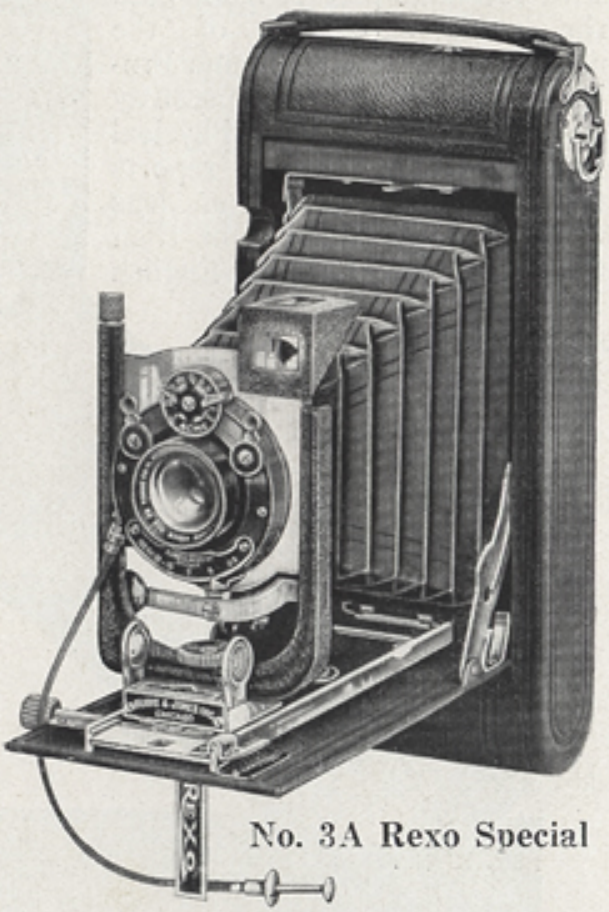
De Luxe Models

Cooke Anastigmats offer to the discriminating amateur the highest possible optical equipment when fitted to the De Luxe Rexo Cameras and high grade shutters listed below.

Cooke Anastigmats Series III F/6.5 affords ample speed for snapshots on dull days when a slower lens would be hopeless.

These cameras are masterpieces of camera construction, embodying the famous Rexo picture saving features.

The Rexo Self-Masking Finder shows in miniature the exact view you will get in the finished picture.



No. 3A Rexo Special

The quick loading film chambers save time, no spool centers to pull out.

The rigid construction insures perfect parallelism between the lens and film.

In choosing a Rexo equipped with a Cooke Anastigmat you get the best money can buy, and the results this superlative combination makes possible means undiluted pleasure and satisfaction.

Cat. No.	Camera	Size	Shutter	Prices Including War Tax
A-359	V. P. Rexo	1⅝x2½	Acme	$ 58.00
A-376	C. P. Rexo	2¼x3¼	Acme	65.00
A-216	1A Rexo Special	2½x4¼	Compound	86.00
A-215	1A Rexo Special	2½x4¼	Acme	80.00
A-236	3 Rexo Special	3¼x4¼	Compound	86.00
A-235	3 Rexo Special	3¼x4¼	Acme	80.00
A-256	3A Rexo Special	3¼x5½	Compound	106.00
A-255	3A Rexo Special	3¼x5½	Acme	100.00

Between Lens High Grade Shutters

THE COMPOUND

The Compound is a product of correct design of the highest mechanical skill. Every part that is subject to strain is made of the finest tool steel with hardened contact points.

The exposures are very accurate and the high speeds are actually obtained. It works automatically on time and bulb but is set for all fractional speeds.

The Compound has the precision of a clock and is handsomely finished in black enamel.

No.	Light Aperture inches	Maximum Speed	Price	No.	Light Aperture inches	Maximum Speed	Price
00	9/16	1/300	$18.00	2A	1 3/8	1/150	$21.00
0	7/8	1/250	18.00	3	1 9/16	1/100	25.00
1	1 1/16	1/200	19.00	3A	1 9/16	1/100	27.00
1A	1 1/16	1/200	19.00	4	2	1/75	35.00
2	1 3/16	1/150	21.00				

THE ILEX ACME

Ilex Acme shutters embody an entirely new principle in shutter construction. The retarding speeds are controlled by a chain of wheels instead of the pump and valve system usually employed, and works without jar or recoil.

It gives absolutely accurate speeds under all conditions being unaffected by cold, heat, dampness or dust. It has a five-blade star system, insuring even illumination over the whole plate. The speeds obtainable are 1, 1/2, 1/5, 1/25, 1/50, 1/100, 1/200 and 1/300 of a second.

No.	Light Aperture	Price	No.	Light Aperture	Price
00	11/16 in.	$18.00	2	1 3/4 in.	$20.00
0	3/4 in.	18.00	3	1 3/8 in.	22.50
1	1 in.	18.50	4	1 3/4 in.	25.00

THE OPTIMO

The Optimo meets the demand for a shutter sufficiently fast for high-speed work, yet compact and reliable. The five leaves revolve in opening and closing, thus giving the greatest possible illumination of the plate. The Optimo has a range of automatically controlled exposures ranging from one second to 1/300 of a second. It sets and releases easily and operates without jar or recoil.

Catalog No.	No.	Light Aperture	Price	Catalog No.	No.	Light Aperture	Price
B-2318	0	11/16 in.	$14.00	B-2302	2	1 in.	$17.00
B-2300	1	3/4 in.	15.00	B-2303	3	1 3/8 in.	20.00
B-2301	1A	15/16 in.	17.00	B-2304	4	1 3/4 in.	22.50

How to Decide Quickly and Accurately on the Right Lens for Your Work

With the sole purpose of simplifying this choice, we have summarized as follows the three considerations which are really vital, and have carefully omitted those which are not. Photographers who choose the wrong type of lens, fail almost invariably to understand one or all of these simple questions. A proper understanding of each one makes the choice quite easy.

1. What is Your Work? Is it all-round snapshot photography with only one camera like that of the average tourist on the average vacation? If so, choose the Taylor-Hobson Cooke Anastigmat of greatest speed, listed for the size of plate that you use that can be fitted to your camera. Such a lens offers the widest possible range of usefulness, simply because it has the greatest reserve both of speed and definition. See pages 10 and 11 for Series II and II-A, recommended for Graflex cameras and pages 12 and 13 for Series III, recommended for Rexos, Kodaks and other hand cameras.

Does the work involve one lens for different cameras, and for totally different purposes, such as wide angle views and ordinary pictures? If so, choose the Taylor-Hobson Cooke Anastigmat which at full aperture covers the smallest plate that you use, and yet when stopped to F/16 covers the largest. See pages 14 and 15 for Series IV and V Taylor-Hobson Cooke Anastigmats.

2. What Angle Must the Lens Include? This question is extremely simple, though greatly misunderstood. For example, all lenses of 6 inches focal length, regardless of their construction, form on the 4x5 plate an angle of 56 degrees, while 8-inch focus lenses form on the 5x7 plate exactly the same angle, 56 degrees. A 6-inch lens forms on the 5x7 plate an angle of 71 degrees, while a 5-inch naturally forms on the same plate a still wider angle, of 81 degrees. (See Table of Angles, page 35.) The angle view is determined merely by knowing the focal length of the lens and the size of plate for which that lens is to be used. It is obvious, therefore, that all lenses having the same focal length form precisely the same angle on any one size of plate.

While lenses of relatively short focus offer the advantage of a wider angle and so are necessary in cramped spaces, they produce a more or less exaggerated perspective, so that objects which are close at hand appear unnaturally large, those at a distance appearing dwarfed. For this reason lenses of short focus should never be used with large plates for portraiture, landscapes, machinery, or, in fact, for any subjects which demand a perfectly true perspective, unless of course, the operating space is too cramped to permit the use of a lens having sufficiently long focus.

It has been found by long experience that an angle of from 50 to 56 degrees produce the most pleasing perspective with all round snapshot photographs. That, broadly speaking, is the angle formed by most modern lenses on the plates for which they are listed with full apertures.

3. Will the Lens Cover My Plate? "Covering power" simply refers to the qua'ity of definition throughout every portion of the image formed on the plate by the lens. If under a magnifier the image is absolutely sharp even to the extreme corners, the lens is said to have great covering power. Every Taylor-Hobson Cooke Anastigmat is guaranteed, if used properly, to give critically sharp definition right to the corners of the plates specified, but the lens must be tested fairly, and with a proper understanding of those three common difficulties explained in the following article, "How to Test Lenses."

How to Test Lenses

The difference in cost between an ordinary "Rectilinear" lens and a modern anastigmat is in speed and definition, as has, already been explained in the opening pages of this book under "What is Anastigmats." The image formed by the cheap lens is "dished" whereas that of a fine anastigmat should be as flat as the plates themselves.

A simple but searching test can be made by anyone who will pin a sheet of newspaper tight against the wall, and expose a plate at full aperture of the lens. To examine the ground-glass is insufficient. A reliable test can be made only by exposing the plate.

Care must be taken, however, to place the back and front of the camera accurately parallel with the surface to be copied, or the negative cannot be sharply defined throughout. The more rapid the lens the more sensitive it is to such error. A perfect anastigmat properly placed, forms a flat image. Before making tests your camera must be in alignment as described in article on "Essential for Getting Best Results From Your Lens."

Most views contain objects at different distances from the camera, which cannot all be focused perfectly at once when used at full aperture. One object gains in sharpness at the expense of another, and in case of this kind the sharpest definition is not to be obtained by merely focusing so as to make the objects in the center of the ground-glass sharp, but the secret of good practice is to so focus the view as to divide the sharpness over the principal objects and so obtain a picture which is visually sharp all over.

How to Focus

It is advisable to focus the Anastigmat a little "long," using the diaphragm wide open and afterwards stopping down to secure the requisite depth of focus. In other words, with objects at varying distances from the camera, focus at full aperture upon a point about two-thirds of the way down the occupied space, and then "stop down" until everything appears sharp. Some photographers focus only half-way down, or only one-third, and then blame the lens. There is always difficulty, of course, in focusing at the same time objects both far and near, and in case it is difficult to obtain sharp definition, we would suggest that the article on "depth of focus" be read carefully. This presents the matter in an entirely new light.

It should be clearly understood that "depth of focus," with any given stop, is alike in all lenses of equal focal length, regardless of their construc-

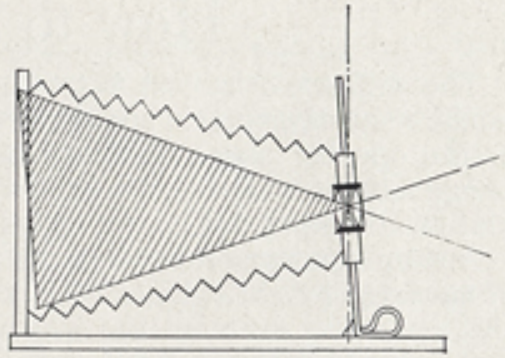
tion. "Depth" can be increased only by using a smaller aperture, and focusing as described in the article on page 33, "What Depth of Focus Really Means."

In connection with this article we recommend the careful reading of the articles on "Essentials for Getting the Most Out of Your Lens." and "How to Decide Quickly."

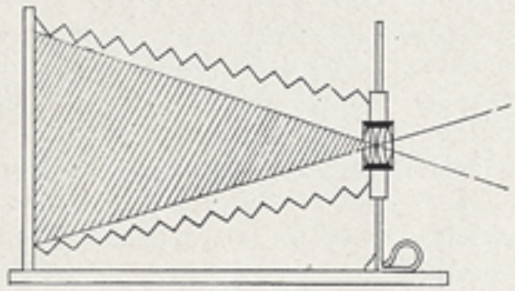
Essentials for Getting the Most Out of Your Lens

To get the best possible results from a high grade anastigmat and for testing lenses, it is very important that your camera and shutter be in good condition.

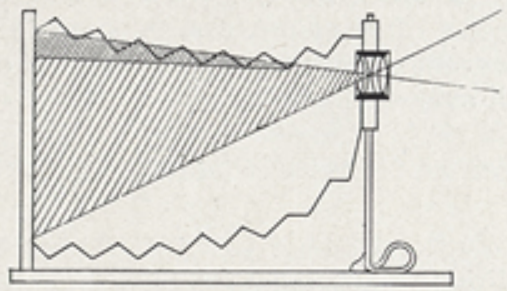
It is useless to expect the best results from any lens when fitted to a poorly constructed camera. Sometimes their fronts are so loose and uncertain in adjustment that the lens is rarely placed true with the plate or film and never twice consecutively at the same distance. Consequently one side of the picture is sharply defined while the opposite side is all out of focus as shown in drawing A. The uninformed worker seldom blames the camera for this obvious trouble, but often blames the lens, which has already passed factory tests of the most sensitive and scientific nature. The lens board and sensitive plate should lie accurately parallel, as shown in drawing B.



Untrue Front A.



True Front B.



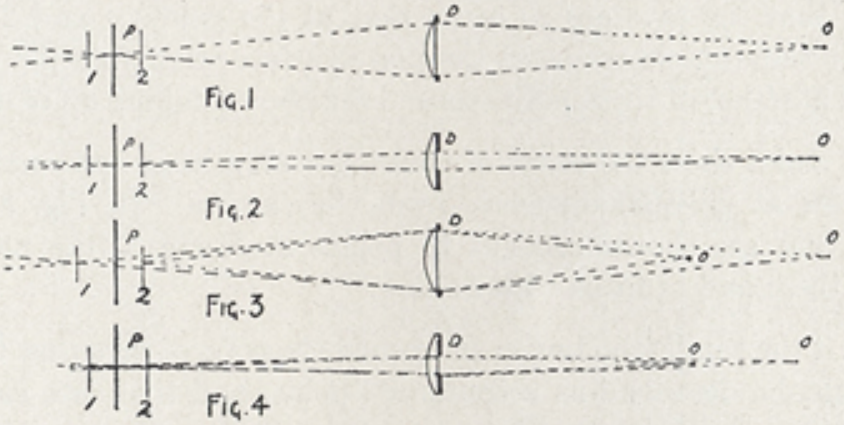
Sagging Bellows C.

In the same way, lenses are sometimes rejected because it is supposed that they do not cover the extreme corners of the plate, especially when used with the rising front of the camera. The bellows of many old cameras sag downwards, and so cut off the rays of light passing from the lens to the top of the plate or film, as shown in drawing C.

Sagging bellows or other obstructions can easily be detected as follows: Focus the lens upon a distant object, and raise the lens board 1 or 2 inches above the center. Then stop the lens to its smallest aperture, and remove the ground-glass. Now look through the camera from the open back, placing one eye at the extreme corner. If the lens aperture is not visible, there is obviously some obstruction. The photographer must then decide to remove this obstruction. All this is of special importance to photographers making wide angle views with lenses of relatively short focus.

What Depth of Focus Really Means and What Happens When We Stop Down

When a lens is focused on a near object with a large stop the distant object is blurred, but by stopping down to a small opening both objects can be brought into sharp focus at the same time. If the next object happens to be beyond a certain distance this is not the case, as with every lens there is a certain distance beyond which all objects are equally in focus with any stop; this distance is called the "infinity point," and depends entirely on the focal length of the lens, and **not** on the Type or Quality.



P represents plate. D. diaphragm. O object. dotted lines pencil of light

The infinity point can be brought very much nearer by stopping down; for instance, with a lens of 5-inch focus the infinity point at F/8 is 26 ft., but with F/64 it is 3¼ ft. only.

It is the amount of latitude in getting near and far objects in focus at the same time that is spoken of as the "depth of focus," and as the diaphragm, or stop, is the means by which this is achieved, it may interest some to know what actually takes place when one stops down.

In the first place, some rough idea of how a lens works is necessary. From every portion of the object in front of the lens, points of light emanate; these pass through the lens, and in so doing are refracted and concentrated to a point at the surface of the plate, called the focal-plane. It is the mass of these points which makes up the picture.

What Depth of Focus Really Means and What Happens When We Stop Down—Continued

As the diaphragm is circular, and the beam or pencil of light which passes through it becomes a point by the time it reaches the focal-plane, it might be described as a cone, the base of which is formed by the opening of the diaphragm.

The smaller the opening the more acute the angle of the rays at the point. Fig. 1 represents a point of light on the object (O), passing through the diaphragm (D), and culminating on the plate (P).

Now, it is obvious that if the plate be placed at either of the positions 1 or 2 it will intercept the rays before or after they have come to a point, and there will be a confusion of images, causing the picture to be blurred. Fig. 2 shows the same, but with a small stop inserted.

Notice that the rays are so acute that at the points 1 and 2 they are nearly the same thickness as at the plate surface; therefore the plate can be placed at either of these positions and not show a falling off of definition.

Figs. 3 and 4 show the result of focusing with a large and small stop on two objects at unequal distances from the camera. In Fig. 3 the two objects (OO) are shown brought to points at 1 and 2, the plate being between them and in focus with neither.

In Fig. 4 the small stop has so sharpened the cone of rays that they form what might be described as a continued point, and the plate can receive both.

Made with Cooke Aviar F/4.5

How to Find the Angle Covered by Your Lens

Divide the Diagonal of the Plate by the Equivalent Focus:

If the Answer is	The Angle in Degrees	If the Answer is	The Angle in Degrees	If the Answer is	The Angle in Degrees
0.282	16	0.748	41	1.3	66
0.3	17	0.768	42	1.32	67
0.317	18	0.788	43	1.36	68
0.335	19	0.808	44	1.375	69
0.353	20	0.828	45	1.4	70
0.37	21	0.849	46	1.427	71
0.389	22	0.875	47	1.45	72
0.407	23	0.89	48	1.48	73
0.425	24	0.911	49	1.5	74
0.443	25	0.933	50	1.53	75
0.462	26	0.954	51	1.56	76
0.48	27	0.975	52	1.59	77
0.5	28	1.0	53	1.62	78
0.517	29	1.02	54	1.649	79
0.536	30	1.041	55	1.678	80
0.555	31	1.063	56	1.7	81
0.573	32	1.086	57	1.739	82
0.592	33	1.108	58	1.769	83
0.611	34	1.132	59	1.8	84
0.631	35	1.155	60	1.833	85
0.65	36	1.178	61	1.865	86
0.67	37	1.2	62	1.898	87
0.689	38	1.225	63	1.931	88
0.708	39	1.25	64	1.965	89
0.728	40	1.274	65	2.0	90

Example: Angle on 5x7 plate with 8-inch lens; 8.6 divided by 8 gives 01.07, corresponding to 56 degrees.

(The approximate angle of view is obtained by using the long side of the plate instead of the diagonal.)

DIAGONALS OF COMMON PLATES

(For Use with Table of View Angles)

3¼x4¼ diagonal 5.3 inches
3¼x5½ diagonal 6.5 inches.
4 x5 diagonal 6.4 inches.
5 x 7 diagonal 8.6 inches.
6½x 8½ diagonal 10.7 inches.
8 x10 diagonal 12.8 inches.

How to Preserve Lenses

Lenses should be kept in a dry atmosphere, away from dust and damp. These impair the perfect polish of a high-class instrument, and by scattering some of the light which passes through, produce a degree of fog in its images and negatives. Use a clean soft linen handkerchief to remove dust. Never rub the glass or use whiting, leather, flannel, paper or anything likely to contain a particle of grit; but only brush it lightly with such a smooth, soft duster as an old linen handkerchief. Hold the lens inverted and wiped the under side so that the dust may fall away from it.

A visible speck on the lens is of less importance than an invisible and general imperfection of polish, or a film of fine dust or moisture.

All the lens surfaces of Taylor-Hobson Cooke Anastigmats are accessible by unscrewing the front and back cells and may be cleaned in the above manner safely and easily by anyone.

Bubbles in Optical Glasses

In order that the various glasses should possess the necessary refractive and dispersive powers, a large variety of materials is employed by the makers to modify or temper the fusible earths which form the chief constituents of the glass.

The perfect incorporation of these materials in the production of the glass, and the avoidance of discoloration is a highly delicate task.

When the optical glass maker has prepared a mass of glass, it is allowed to cool and then broken into fragments. Of these, the most perfect only are selected for remelting.

In melting as the pieces fuse together, bubbles of air become imprisoned in the viscous mass, and only the largest of these quickly rise to the surface and escape.

The smaller bubbles remain suspended, and can be removed only by waiting until their feeble force carries them to the surface.

But in the course of waiting, more serious harm arises. For the same force of gravity which expels the bubbles works other changes within the body of the glass.

Its heavy constituents sink, and the resulting lack of homogeneity, although invisible to the eye, is far more hurtful to the action of a lens than is the presence of tiny bubbles, which **do not affect the defining power of the lens in the slightest degree.**

Like the uncut leaves of a book, which are a guarantee of the book being new or unused, bubbles in certain optical glasses are proof that the glass has not been spoiled by long continued heating; and the wise accept a moderate number as the inevitable accompaniment and mark of good quality.

COOKE ANASTIGMATS