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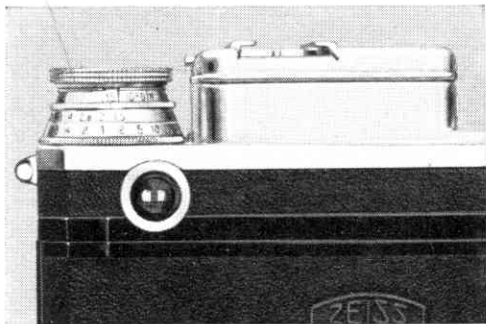
VI. The photo-electric Exposure Meter

Principle

The exposure meter consists of a photo cell, an electric precision measuring instrument and a regulating resistance. The light that falls through the prism window (11) on to the cell produces an electric current, causing the needle of the measuring instrument to deflect to an extent varying with the intensity of brightness. The measuring instrument reacts instantaneously to the slightest change in the lighting conditions. Compensation for the variable brightness of the object, and incidentally the electric current, is obtained by the resistance connected to the exposure time scale (16). In this way, with only one marking position of the needle, it is possible to read off the exposure time for all diaphragms without using any conversion table.

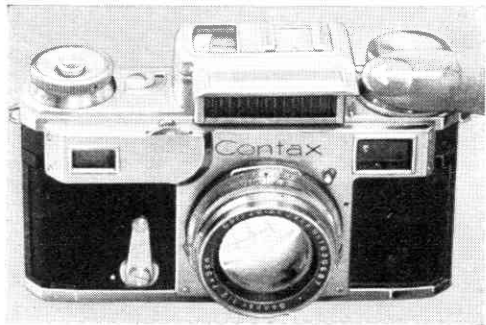
Table of comparison for the most used film speeds

6	9	12	15	18	21	24	$/_{10}^0$ DIN
17	20	23	26	29	32	35	0 Sch.
300	636	1300	2700	5600	11600	22000	H. & D.

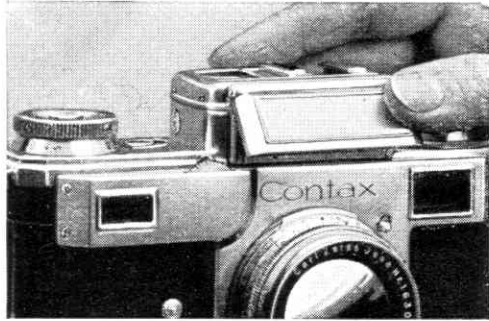


Manipulation

1. Set the black mark below the rectangular opening of the diaphragm scale (15) (between the lens stop Nos. 1.5 and 2) to the number corresponding to the speed of the film. Intermediate values are estimated.

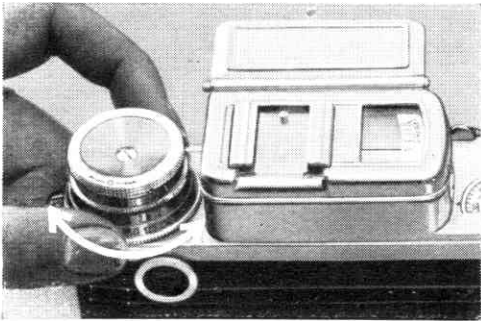


2. To use the exposure meter raise the cover (11) of the prism window by pressing on the knob (13). The cover will then remain in horizontal position.

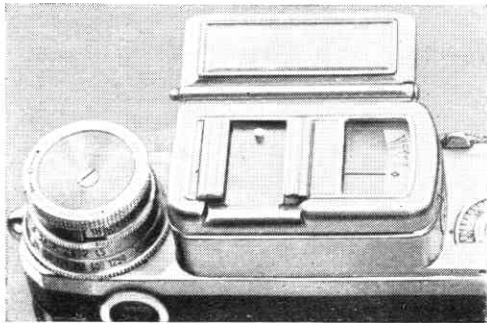


The cover is closed by pressure downwards until it snaps into place.

3. For ascertaining the exposure time, the camera should be pointed towards the centre of the subject to be photographed. If the degree of brightness varies considerably, or if a particularly good rendering of details in the shade is desired, it is advisable to aim the camera at the shaded parts and to approach as near as possible to them.



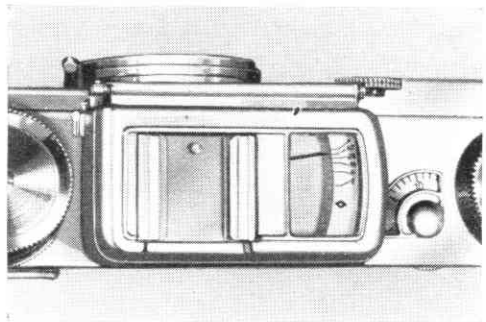
4. Rotate the ring (16) on which is engraved the exposure time scale, until the needle in the window (10) of the exposure meter is opposite the diamond-shaped mark ♦.



5. The exposure time corresponding to any lens stop, or the lens stop for any pre-selected exposure time can now be read off on the scale of the ring (16). The black numbers on the scale denote fractions of a second, e. g. $25 = \frac{1}{25}$ th second, $2 = \frac{1}{2}$ sec.; whereas the red numbers signify full seconds. Intermediate values can be obtained by setting the iris diaphragm accordingly.



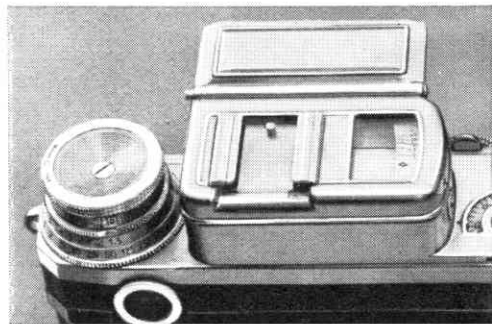
6. Where the intensity of brightness is very low, the needle cannot be brought to the indicating mark \blacklozenge even when the ring (16) has been turned to the left (in anti-clockwise direction) as far as it will go. With the ring in this position, the exposure time indicated on the scale (16) must be multiplied by a factor which is determined by the position of the needle on the scale visible in the window (10) of the measuring instrument between the zero point and the diamond mark.



The numbers 2, 5, 10, 20 and 40 on the scale denote that the indicated exposure times must be multiplied by 2, 5, 10, 20 or 40, as the case may be.

If the needle happens to be between the “multipliers”, the factor may be estimated. Example: If the needle is between the numbers 5 and 10, the factor = 8, or if the needle is between the diamond mark \blacklozenge and 2, the factor = $1\frac{1}{2}$.

A condition for the accuracy of all measurements with “multipliers” is that the ring (16) must be turned in anti-clockwise direction to its left limit stop.



Example: If the needle points to the number 5 as in the accompanying illustration, and the exposure time shown for a film $18/10^0$ DIN at $f/5.6$ is $\frac{1}{5}$ th sec., it is necessary to multiply 5 by $\frac{1}{5} = 1$ sec.; or at $f/16$, the time shown on the scale, viz. 2 seconds, would have to be multiplied by the factor 5 = 10 seconds.

The principal conversions with the “multipliers” are given in the following table:

Readings on the exposure time scale	M u l t i p l i e r				
	2	5	10	20	40
50	$\frac{1}{25}$	$\frac{1}{10}$	$\frac{1}{5}$	$\frac{1}{2}$	1
25	$\frac{1}{10}$	$\frac{1}{5}$	$\frac{1}{2}$	1	2
10	$\frac{1}{5}$	$\frac{1}{2}$	1	2	4
5	$\frac{1}{2}$	1	2	4	8
2	1	2.5	5	10	20

Compensation values for special conditions

In daylight the exposure times indicated are equally correct for orthochromatic and panchromatic films.

In artificial light, when using Pan films, it will be found satisfactory in practice to apply exposure times shorter by one or two degrees than those indicated on the scale*. Since it is usual to make exposures in artificial light in quick succession, the trouble of converting the exposure time in every single instance may be avoided by altering the adjustment of the film speed. This is done by setting the index on the diaphragm scale, not to the daylight speed of the Pan film used, but to a speed that lies one or two degrees higher, e. g. instead of $15/10^0$ DIN, set to $18/10^0$ or $21/10^0$ DIN.

If, by way of exception, orthochromatic film should be used in artificial light, multiply by 4 the exposure time obtained when setting to the normal daylight speed of the film, or better still, set to a speed about one or two degrees lower than that given by the manufacturers of the film in question.

When photographing interiors in daylight, but not against the light (i. e. window at the rear), it is advisable to reduce the exposure time by one or two degrees.

* Pan films with normal sensitivity to red—one degree shorter
Pan films with ultra-sensitivity to red—two degrees shorter

“Against the light” pictures, e. g. directed towards the sun or window, require one or two degrees longer time of exposure.

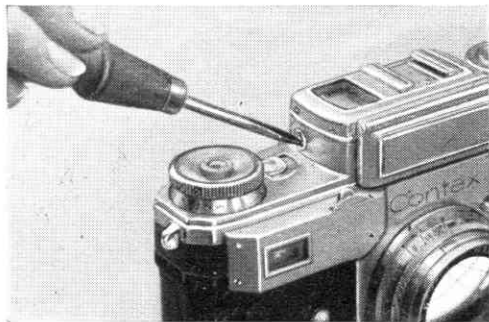
The exposure times of the Contax III exposure meter are adjusted for a normal exposure and development. In cases where shorter times of exposure are necessary, such as when taking rapidly moving objects, one half of the times indicated will be found just barely sufficient in order to get printable negatives, provided a rapid developer is used. If the films are developed in one of the special fine grain developers, it is essential to give at least double the time of exposure when taking the picture; in other words, one should set the indicator to the film speed one degree lower on the scale.

Manipulation

The exposure meter is a precision measuring instrument and must consequently be treated with care. It should not be subjected to knocks or jolts, and articles containing iron must be kept away from it. In order that the photo cell may preserve its high degree of sensitiveness, always protect it from light when not in use by closing the cover (11) of the prism window. Do not attempt to measure the brightness of the sun; it serves no purpose and the photo-electric cell will not be better for the experiment.

Adjustment

The zero point is the point at the beginning of the measuring instrument scale next to the multiplier 40. Through improper handling it might happen that the zero point position of the needle becomes displaced. In such an eventuality, the exposure meter can be put right by a special adjustment which anyone can effect without difficulty.



The scale can be displaced by turning the screw at the side of the exposure meter casing with a screw driver; adjust the scale until the zero point lies exactly opposite the needle.

When carrying out the zero point adjustment, take care that no light whatever strikes the cell, so as not to impart any current to the measuring instrument. It is only under such conditions that a perfect adjustment of the zero point position can be effected. The exposure meter is so sensitive that the cover (11) does not suffice to shield the cell completely from light. The stray light that penetrates through the hinges and at the sides, although minute, is nevertheless sufficient to cause a slight deflection of the needle. When carrying out the adjustment, it is therefore necessary to take the instrument to some dark spot, on no account in the sun, and place a dark coloured cloth over the protecting cover (11). At the same time it is recommended to turn the ring (16) in clockwise direction to its limit stop.

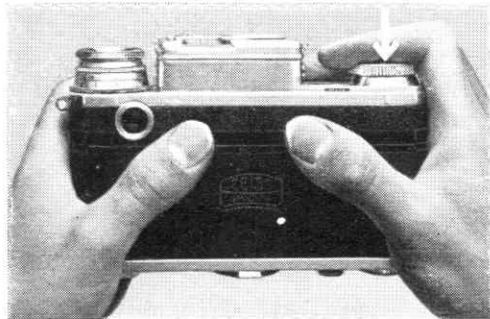


VII. Making the Exposure

In the open air, the ever-ready carrying case protects the Contax from dirt and moisture. If it is desired to hang the camera round the neck without using this case, the eyelets (4) may be used to attach the strap.

The camera should be held firmly, but not so firmly that the arms become cramped, in the hollow of the hands. Focussing is done by the middle finger of the right hand, while the forefinger of this hand operates the shutter release. This should be practised until one's technique is perfect, if only because the method given above does away with the hasty change of the forefinger from the focussing wheel to the shutter release, which is necessary if one finger is used for both controls. With practice and care it is quite possible to hold the camera still for the longer exposures of $\frac{1}{10}$ th, $\frac{1}{5}$ th, and even $\frac{1}{2}$ a second without incurring camera shake.

The illustrations show the correct way of hold-



ing the camera for both horizontal and vertical pictures. The illustrations also show that the shutter should be released, not with the tip, but with the ball of the finger, or better still, with the top joint (see illustration below). The person with large hands will find it more advantageous to release the shutter with the uppermost joint of the finger. In this position the camera can be held very steady when operating the shutter. It is also advisable to rest the camera on the palm of the hand.

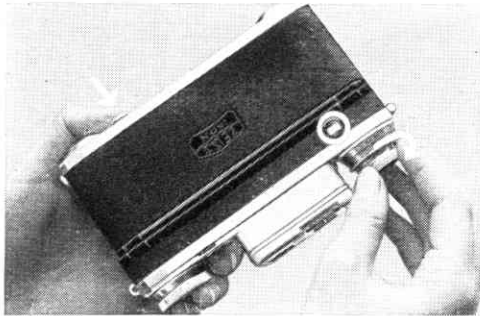
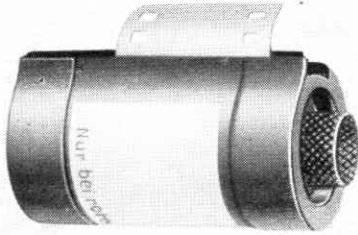
The important points to observe for each exposure are:

1. Adjust the lens aperture to the desired number.
2. Set the time of exposure by the shutter winding knob.
3. Focus the object to be taken with the distance meter.
4. After each exposure wind up the shutter immediately, so that the camera is always ready for use.

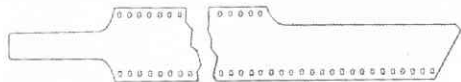
VIII. Using Films made up in other forms than the Contax Spool

In addition to the Contax spool, a variety of other different forms of perforated cinema film may be obtained that are intended for use in miniature cameras, and which may be used with the Contax III. Only those kinds of chargers, cassettes, or cartridges can however be used that are small enough to fit the spool chambers of the camera comfortably, as otherwise it may happen that the film jams in the camera instead of winding on correctly. In particular, the knob of such spools or chargers must have a hollow in it that will fit the projecting stud in the revolving keys that lock the back of the Contax III into place.

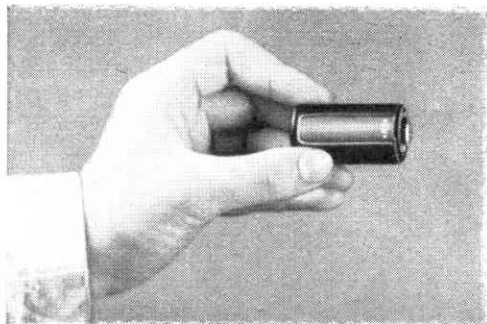
All film cartridges need to be rewound after the 36 exposures have been made. For this purpose, the rewind release knob (28) is pressed inwards and the film rewound into the



cartridge by turning the rewinding knob (14) in the direction of the arrow (see lower ill. page 37). Since nearly every kind of film made for miniature cameras is now available in the form of Contax spools, these should be used if possible, in order not to have to wind the film twice through the picture aperture of the camera.



Naked cinema film may be obtained in lengths of approximately 16 feet, 32 feet, 50 feet, and 82 feet, from which lengths may be cut and loaded into the camera. The ends of the film must be cut to the correct shape with the Zeiss Ikon cutting guide (No. 541/16) and a length of $62\frac{1}{2}$ inches will give 36 exposures in the Contax III. Ready-cut lengths of film for 36 pictures are also on the market, and these may be loaded into the cassette in the dark-room.



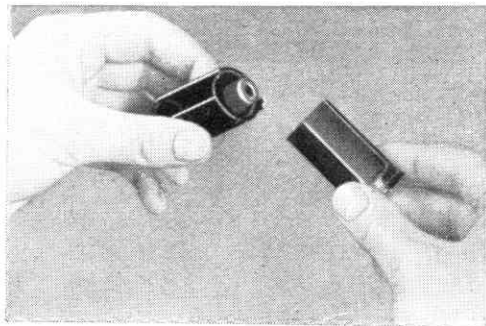
IX. Loading the Contax III with Cassettes

A. Loading the cassette with film

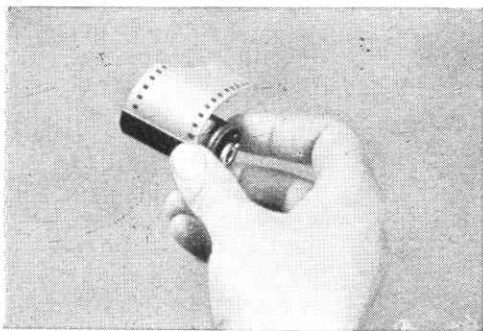
1. Cassette, empty, and closed.



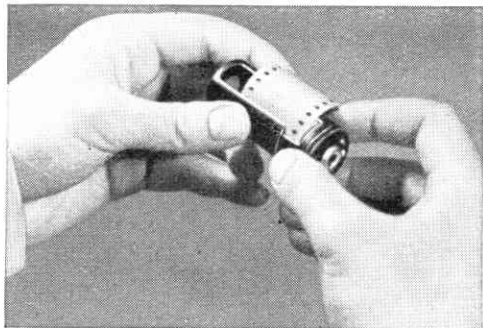
2. Press down the small nicked button and turn in direction of the arrow until the apertures in the two containers are over each other.



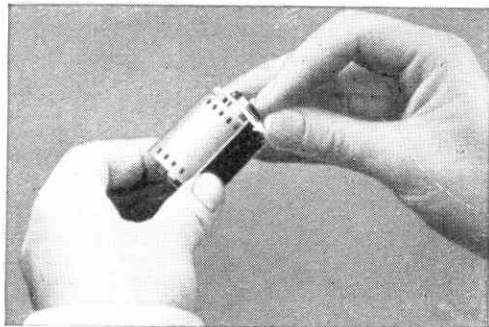
3. Draw the two containers apart.



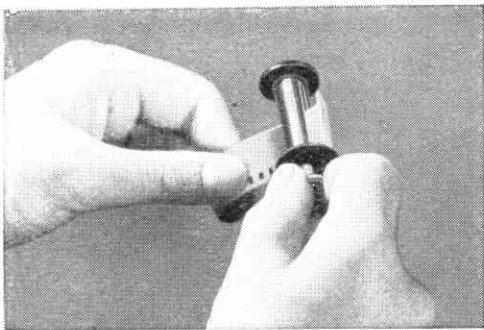
4. To attach the film to the core of the cassette bend it slightly (emulsion side inwards) and push it through the slot in the latter. This makes it easy for the film to run out of the core when unwinding. Wind the film completely on to the core, and place the latter in the inner container of the cassette.



5. Slide the two containers together, with the end of the film outside.

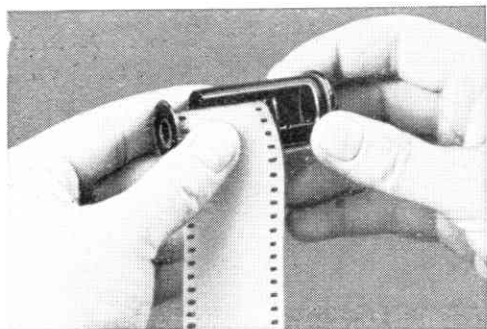


6. Close the cassette by giving half a turn in direction of the arrow. The word "zu" (= shut) should then be visible.

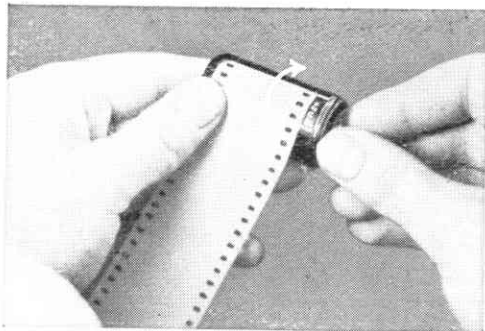


B. Attaching the film to the take-up cassette when loading the camera

1. Open and separate the containers as in A, 1 to 3.
2. Insert the end of the film in the core, bending over about $\frac{1}{10}$ th of an inch on the other side of the slot.



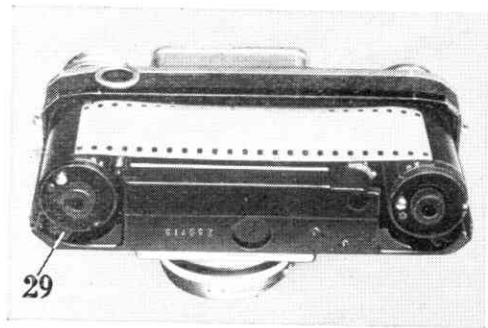
3. Slide the inner and outer containers over the core once more.



4. Close the cassette by turning until the word “zu” (= shut) is visible.

C. Loading the cassette into the camera and shutting the latter

Place the cassettes into the spool chambers so that the outer small projecting piece (29) lies in the channel cut in the spool chamber to receive it. (It is preferable to use two cassettes in the camera rather than one only.) When loading, the cassettes must always be shut—the word “zu” must be visible on them. When the camera back is replaced and the locking buttons (19) are turned, the action will open the two cassettes, and the film will run freely through the picture aperture and over the sprocket teeth.



X. Accessories for the Contax III

1. The fourteen lenses:

Wide-angle Tessar $f/8 =$ focal length $1\frac{1}{8}''$ (2.8 cm)

	focal length
Biotar $f/2$	$= 1\frac{9}{16}''$ (4 cm)
Biogon $f/2.8$	$= 1\frac{3}{8}''$ (3.5 cm)
Tessar $f/3.5$	$= 2''$ (5 cm)
Tessar $f/2.8$	$= 2''$ (5 cm)
Sonnar $f/2$	$= 2''$ (5 cm)
Sonnar $f/1.5$	$= 2''$ (5 cm)
Triotar $f/4$	$= 3\frac{3}{8}''$ (8.5 cm)

	focal length
Sonnar $f/2$	$= 3\frac{3}{8}''$ (8.5 cm)
Sonnar $f/4$	$= 5\frac{3}{8}''$ (13.5 cm)
Tele-Tessar $f/6.3$	$= 7\frac{1}{8}''$ (18 cm)
Tele-Sonnar $f/2.8$	$= 7\frac{1}{8}''$ (18 cm)
Tele-Tessar $f/8$	$= 12''$ (30 cm)
Long-distance anastigmat	
$f/8 =$ focal length	$20''$ (50 cm)

2. Filters, either push-on or screw-in pattern:

white (ultra-violet), yellow, orange, yellow-green, green, light red, red, deep red, black-red (infra-red).

3. Push-on and screw-in lens hoods for all types of lenses.

4. Proxar supplementary lenses of one or two dioptries, for push-on or screw-in fitting, to enable exposures to be made on distances nearer than 3 feet. The focussing distances involved are given in the following table:

Proxar lenses on Contax III at stop $f/8$

Camera lens set to	Focus obtained with Proxar 1*	Focus obtained with Proxar 2*	Camera lens set to	Focus obtained with Proxar 1*	Focus obtained with Proxar 2*
	Distance measured from the object to the supple- mentary lens			Distance measured from the object to the supple- mentary lens	
∞	3' 2'	1' 8'	10	2' 5 $\frac{1}{4}$ "	1' 5''
100	3' 1 $\frac{1}{4}$ "	1' 7 $\frac{3}{4}$ "	9	2' 4 $\frac{1}{4}$ "	1' 4 $\frac{3}{4}$ "
60	3' 1 $\frac{1}{2}$ "	1' 7 $\frac{1}{2}$ "	8	2' 3 $\frac{1}{2}$ "	1' 4 $\frac{1}{2}$ "
50	3' 1 $\frac{1}{4}$ "	1' 7 $\frac{1}{2}$ "	7	2' 2 $\frac{1}{2}$ "	1' 4''
30	2' 10 $\frac{1}{2}$ "	1' 7''	6	2' 1''	1' 3 $\frac{1}{2}$ "
20	2' 9''	1' 6 $\frac{1}{2}$ "	5	1' 11 $\frac{1}{2}$ "	1' 3''
15	2' 7 $\frac{1}{2}$ "	1' 6''	4	1' 9 $\frac{1}{2}$ "	1' 1 $\frac{3}{4}$ "
12	2' 6 $\frac{1}{2}$ "	1' 5 $\frac{1}{2}$ "	3	1' 6 $\frac{1}{4}$ "	1' 3 $\frac{1}{4}$ "

* Push-on supplementaries are made for lenses of 27 and 42 mm diameter, and screw-in supplementaries for 25.5 and 40.5 mm diameter.

5. Plate back adapters and single dark-slides for exposures on plates in the 3×4.5 cm ($1\frac{1}{4} \times 1\frac{3}{4}$ '') size.
6. View-finders for various focal lengths of lens.
7. The Contameter—an optical near-focussing device for exposures at distances of 8 inches, 12 inches, and 20 inches without measurement of distances being required.
8. Reproduction devices of various kinds for all scales of reproduction between 1:1 and 1:18.
9. Micro-attachments for photo-micrography.
10. Enlargers: fixed focus, variable enlargement (hand adjusted), and variable enlargement (automatic focussing).
11. Developing tanks and accessories.
12. Various devices for printing transparencies.
13. Projection lanterns for monochrome and colour projection.
14. Various special accessories for scientific photographs.

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