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MACROPHOTOGRAPHY AND PHOTOMICROGRAPHY

EXAKTA
Varex



EXAKTA *Varex*

EXAKTA Varex with a set of Bayonet Adapter Rings and Tubes, Autocouple Extension Release and Lens Magnifier with Top Lens (see page 11)

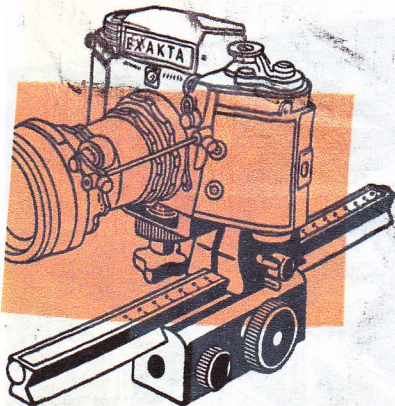


Close-shots of tiny objects

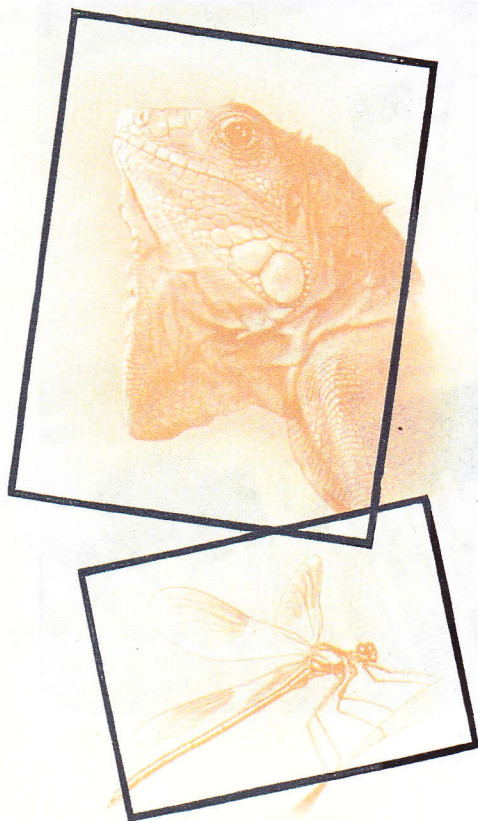
a professional job for the scientist, technician or artist, but great fun to the amateur photographer, will cause no problem, if the EXAKTA Varex or one of its predecessors is chosen for the job. These cameras can be counted on to permit no parallax error; even at extreme close-ups, the picture taken will be a precise reproduction of the one shown on the view-finder. The smaller the object, the shorter the distance between object and lens and the greater the extension of the lens. Such elongation may be achieved quite mechanically. As with any normal photograph the enlarged image remains decisive for picture area, depth of field, colour, aesthetics, etc. The EXAKTA does not require auxiliary optical focusing equipment for close-up work, and this is an important factor for ease of handling, as well as for economical reasons.

A simple increase of extension

will focus beyond the normal range, the helical focusing lens will permit shortest close-ups so that anyone of the desired image scales can be realized. Bayonet Adapter Rings or any number of Extension Tubes can be set between the interchangeable lens of the EXAKTA and the camera body. Thus, the size of the extension can be changed to the required focusing distance at a moment's notice. The helical lens mount will give all the facilities for fine focusing.



EXAKTA Varex with Bayonet Adapter Rings and Tubes, Autocouple Extension Release.



The following accessories are available:

Two-in-One Ring No. 187 for shortest extension: .2" (5 mm). Matches with the bayonet of the camera. Its front component accepts the lens.

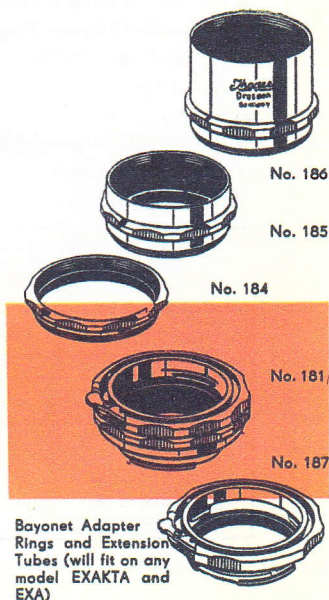
Two Bayonet Adapter Rings No. 181/183. Extension approx. .4" (10 mm). The rear ring fits into the camera's bayonet, the front component accepts the lens. Screwed together they will form one piece. The rear adapter ring is provided with a clamping ring, so that the lens with adapter rings and tubes can be turned to any normal upright position and locked there.

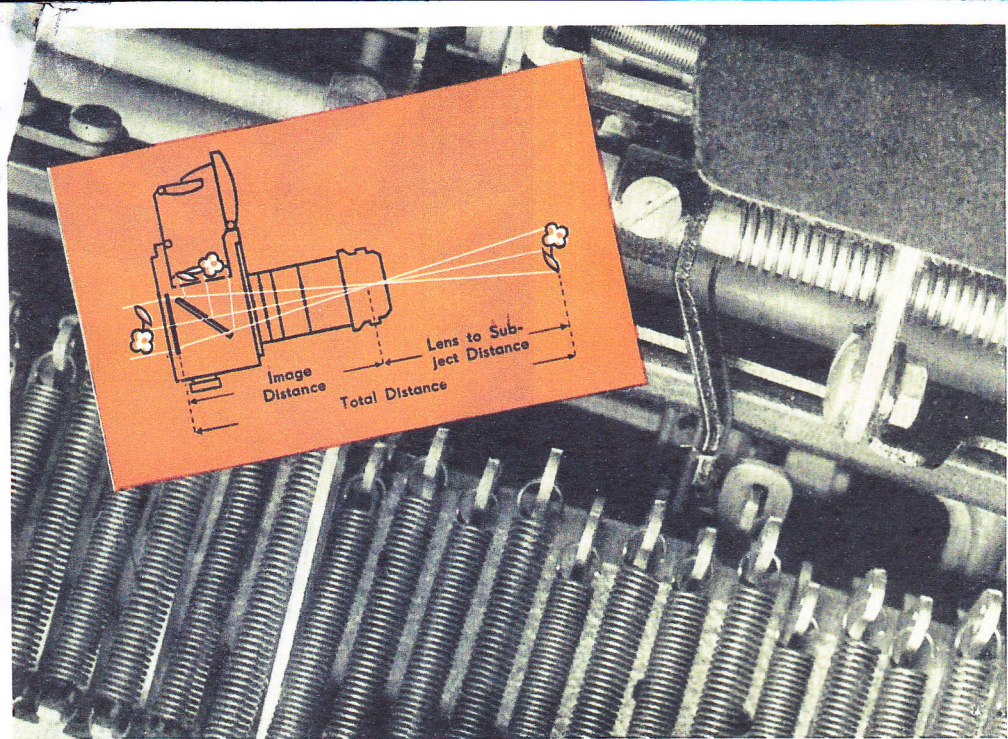
Three Extension Tubes. Available in the following three sizes: No. 184 = .2" (5 mm) extension, No. 185 = .6" (15 mm) extension, No. 186 = 1.2" (30 mm) extension.

Being screw threaded they must be used with the Bayonet Rings No. 181/183. Bayonet Adapter Rings and the three Tubes are available as one set No. 180 only.

The Autocouple Extension Release No. 178 for tripping the automatic diaphragm mechanism when intermediate pieces (tubes and bayonet rings) are employed for close shots.

Swing Angle Attachment No.155.08. It can be screwed on a tripod, its focusing slide permits critical close-up work. Tilting from horizontal to upright position in one simple operation.





Extensions

The table given below contains the focusing data on Total-, Image- and Lens to Subject Distance, as well as the scale of photography that can be obtained with a Two-in-One Ring No. 187 and a set of Bayonet Adapter Rings with Tubes No. 180. With supplementary tubes a still further reduction of the working distance can be obtained, permitting at triple extension (.6" image distance) a twofold magnification on the negative; at quadruple extension, a triple magnification will be obtained, and so on. . . The figures in the table are based on the lens being focused to infinity. The long helical mounts of the modern lenses permit greater overall distances to be covered. An increase in image distance requires an increase in exposure time, and for that reason the exposure data was included on the table. Scale of reproduction 0.8 means image size is 0.8 of subject size.

Extension Tubes and Bayonet Rings (details on page 3)	Extensions Inch.	for f: 2" (50 mm) lenses				
		Total Dist. Inch.	Image Dist. Inch.	Lens to Subject Dist. Inch.	Exposure Factor	Scale of Reproduction
No. 187	.2	24.0	2.16	21.65	1.2	0.1
No. 181/183	.4	14.0	2.36	11.81	1.5	0.2
No. 181/183 + 184	.6	11.1	2.56	8.54	1.7	0.3
No. 181/183 + 184 + 187	.8	9.6	3.75	6.89	2.0	0.4
No. 181/183 + 185	1.0	8.9	2.95	5.90	2.3	0.5
No. 181/183 + 184 + 185	1.2	8.4	3.15	5.23	2.6	0.6
No. 181/183 + 184 + 185 + 187	1.4	8.1	3.34	4.76	2.9	0.7
No. 181/183 + 186	1.6	7.99	3.54	4.45	3.3	0.8
No. 181/183 + 184 + 186 + 187	2.0	7.87	3.94	3.94	4.0	1.0
No. 181/183 + 184 + 185 + 186	2.4	7.95	4.33	3.62	4.9	1.2

Macrophotography

When taking pictures of extremely small objects, it will be necessary to approach the lens as near as possible.

The reproduction of documents, paintings, stamps, etc. belongs into the field of the macrophotography on which the EXAKTA with its precision attachments for changing the extension will give outstanding results.

Where the scientist will be interested professionally, the amateur photographer may be attracted through the beauty of the subject or by plain curiosity to probe into the unknown secrets of nature and the revelations that a close-up shot may have in store. Insects, flowers, plants, minerals, and crystals can make surprising pictures when taken as extreme enlargements. With the EXAKTA, colour photography will be possible on standard colour film, because the view-finder will show the picture in natural colour. We may add that special lenses with extensions can be used, too. Wide angle lenses permit closer, and long focus lenses, greater working distances. Assuming the scale of reproduction to be equal in both instances either method may prove to be of advantage. Extreme Wide Angle Lenses of a focal length of less than 1.38 inch. (35 mm) are not suitable for close-ups when employing extension. The heavy long focus lenses will be impractical. Focusing and image control is as normal on the type of view-finder best suited for the occasion. We recommend use of the Finder Hood for all deep-seated subjects, and for close-ups, calling for long exposure with the help of a stand; the Penta Prism is recommendable for subjects in motion (dynamic close-ups), whilst the lens magnifier (page 11) will come handy when doing very special jobs requiring extreme magnification.

Special equipment for close-shots

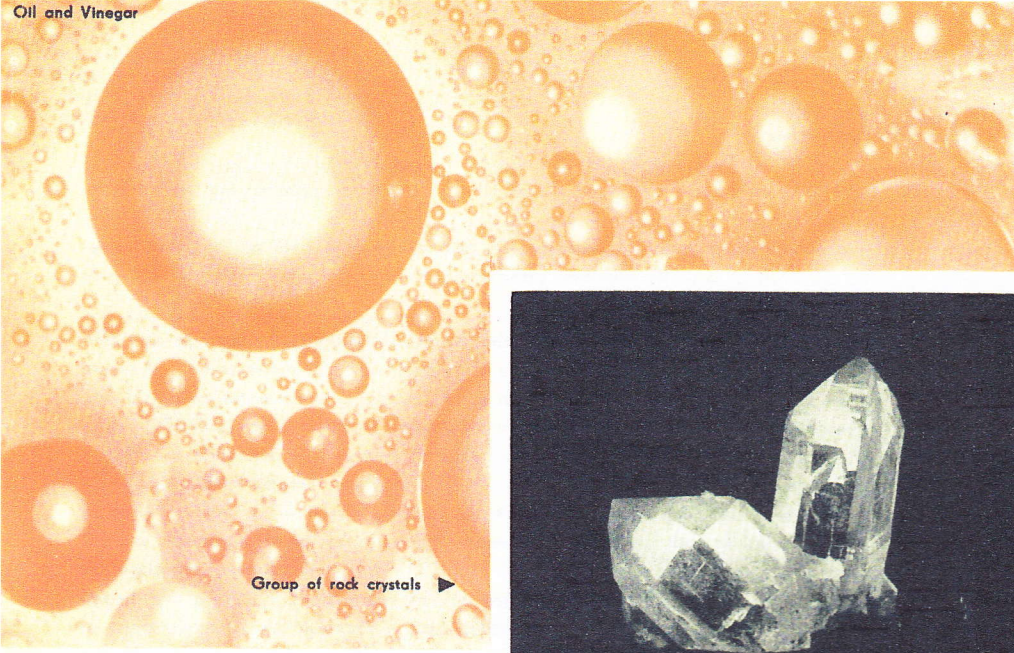
Distance Meter No. 310. It can be employed with all of the view-finder systems, viz. either Penta Prism, Finder Hood or Lens Magnifier. The Distance Meter works on the principle of a split-image range-finder, where, when on rotating the focusing ring the two images in the centre of the focusing screen appear out of alignment until correctly focused. This will prove of special value where unfavourable light conditions prevail, or in case of troublesome eyesight.

Lens Reversal Ring No. 159. For critical definition, when doing macro-photos at exceptional short distances and a magnification calling for more than 1.5 times, when the rear lens is turned upon the subject. This ring serves as a means to install the lens invertically, and is equipped with a thread for the acceptance of extensions. When placing your order please give full details about the lens you are working with.

Special collar No. 193/1 and 193/2. They are needed for intersection when close shots requiring a useful magnification that surpasses 5 times is required. These collars have a thread in their middle part. Collar No. 193/1 can take up the lens "JENA M" and other lenses having a thread measuring $W 0.8'' \times 1/36''$. Collar No. 193/2 takes up the lens "JENA M" and other lenses featuring a thread of the type $M 26 \times 0.5$.

Assisted by the joint of the rear bayonet, both collars can be used with our Bellows Attachments.

Front Adapter Ring with outside Bayonet Joint No. 192. This adapter, singly available, is used for the extension of long-focus lenses with outside bayonet. When applying the Bellows Attachments (page 6) the rear bayonet ring must be added. Then the entire unit is fixed on. We recommend the use of two stands to give better support.



Group of rock crystals ▶



The IHAGEE Vielzweck

as the name implies, can be used to solve many interesting problems in macrophotography. It can be employed either as one unit, or, being made on the principle of unit construction, it can be built up after the add-on method. Important parts are:

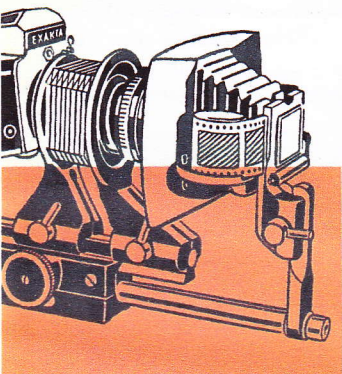
Swing Angle Attachment No. 155.08 mentioned on pages 2 and 3. Tubes and Bayonet Adapter Rings will be the supplementary needed for the required lens extension.

Bellows Attachment No. 155.10 extending from 1.38" to 8.66" (3.5 to 22 cm), permitting rapid changes from one image scale and distance to another. The equipment can be screwed on a stand; the camera can be used in horizontal or vertical position. When applying the special lens Jena T 2.8/2" (50 mm) with sunk mount (No. 128), infinite focusing will be possible.

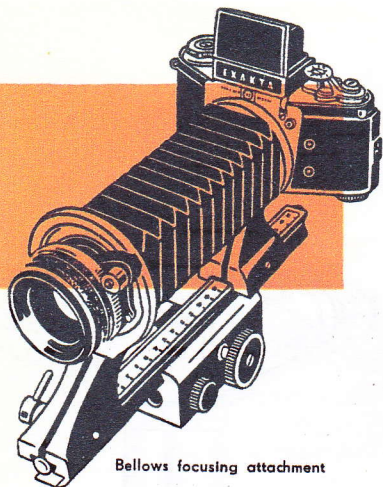
Both Swing Angle Attachment and Bellows Attachment will give a decided advantage in that the image distance is variable over a wide range by means of the ratchet drive mechanism of the focusing slide allowing critical focusing to be achieved with ease and precision.

Miniature Bellows Attachment No. 176 easy to carry, is especially welcome for close shots to be taken by hand, but it can also be fixed on a stand. Extension from 1.38" to 5" (3.5 to 12.5 cm). For infinity focusing we recommend the special lens Jena T 2.8/2" (50 mm) with sunk mount.

Transparency Copying Equipment No. 155.04 an invaluable supplement to the Miniature Bellows Attachment when making transparencies from black-and-white or reversal material.



Bellows Attachment with Transparency Copying Equipment



Bellows focusing attachment



Repro Attachment (No. 155.20) and Copying Stand (No. 155.16).

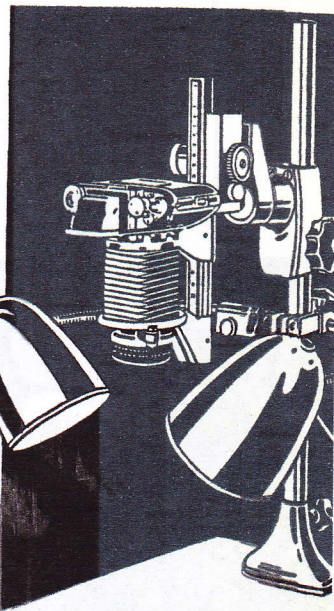
With the aid of these you can easily reproduce paintings, drawings, periodical or magazine illustrations, documents, etc., etc., in the simplest possible manner. For close-ups of stamps, coins, and similar objects, this equipment is also well suited. Generally, one would employ a vertical working position, but the equipment may also be used horizontally, in the form of a rigid table tripod. Equipment: Repro attachment with bellows attachment, or Copying Stand (extensions on directly fixed camera by means of Bayonet Adapter Rings and Tubes or Miniature Bellows Attachment) both with metal column and wooden baseboard measuring 34 x 50 cm. (for papers up to DIN A 4). For both accessories there is available a lighting equipment fitted with two reflectors (No. 155.05).

Medical Close-ups

a field in which the EXAKTA Varex has given complete satisfaction. The accessories presented on the previous pages will suffice for a vast variety of tasks, however, for photographing cavities of the human body, we recommend the following supplement:

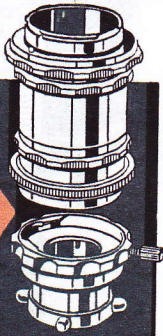
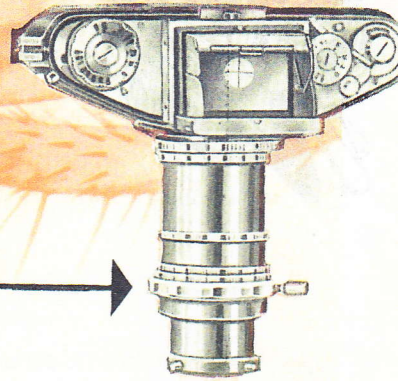
Kolpofot No. 155.11. This approved Ihagee equipment employs electronic flash, thus guaranteeing pinpoint sharpness of all cavities accessible from outside the body (vagina, mouth cavities, pharynx, etc.) in addition to photographs of the skin, the eyes, and numerous other external medical uses. Equipment of the KOLPOFOT comprises bellows attachment, special lens Jena S 135 mm. f 4, with diaphragm scales to f 45 and central flash equipment ZB 3.

Endoscope Adapter No. 154 offering to the physician a means to take pictures of otherwise inaccessible cavities, as for instance the human bladder. The adapter connects the EXAKTA Varex with the surgical controlling instruments.



Repro attachment with lighting equipment

Proboscis of the common fly
Scale of reproduction on the negative
image 80:1
Fast magnification on the print up to 400:1

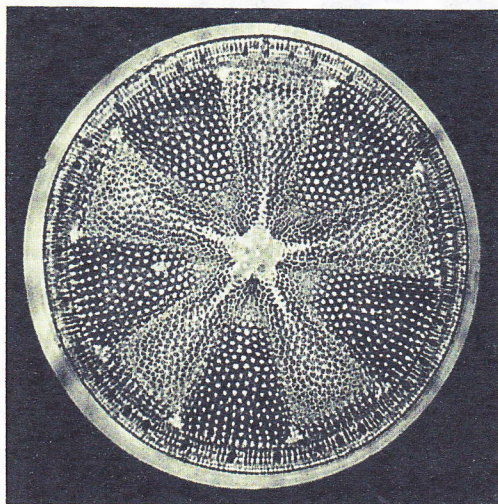


Microscope Attachment

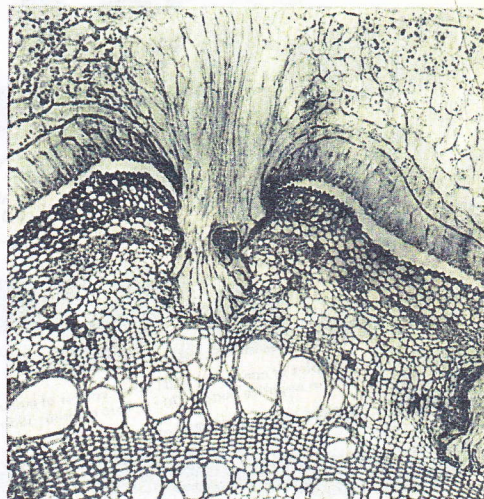
In microphotography the EXAKTA Varex,

working with standard black-and-white or colour film, can tackle any job usually reserved for more expensive equipment. The camera is connected to the microscope with the Microscope attachment and this will be all the supplementary equipment needed to do a focusing job allowing no error in parallax. In this case the lens of the camera is not employed. The picture originating from the microscope goes straight into the camera; it will be visible on the focusing screen. Here the selection as to detail, moment of shooting (most important when taking life subjects) is made, the quality of the image is regulated; here, the special magnifier glasses described on page 12, will come into good use – and, we may repeat, the image shown on the view-finder will be an exact reproduction of the subject about to be taken. It stands to reason that the microscope in question must be equipped with the right kind of lenses. Those commonly in use suffer a curvature of image field that must be flattened with correcting objectives and oculars.

For more detailed information, please contact our Publicity Department or read about it in the technical literature listed on page 12. When writing to us, please be good enough and mention details on the microscope in use, illuminating equipment and the task to be accomplished.



Shell of a diatom
Scale of reproduction on the negative image 90:1,
Post magnification on the print up to 270:1



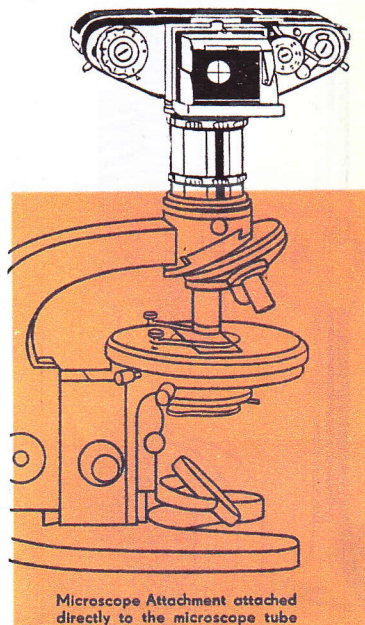
Suckers of the Cuscuta (parasite)
Scale of reproduction on the negative image 30:1,
Post magnification on the print up to 90:1

Microscope attachment No. 153

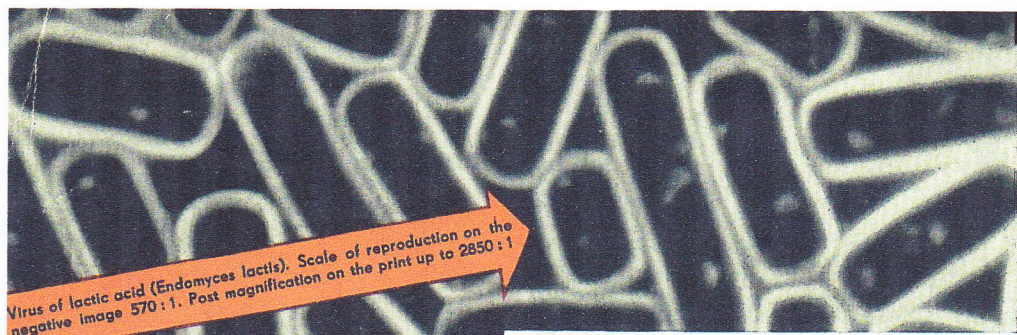
will link the microscope to any one of the EXAKTA models and to the EXA II, also, with some reservation as to vignetting, to the EXA I.

Equipped with Microscope attachment No. 153 the camera can be quickly removed so that a direct examination of the specimen can continue. This attachment is 1" (25mm) wide, it can be connected to the ocular tube. The procedure is, as follows: remove the ocular, install the attachment, replace the ocular and clamp on the Microscope attachment.

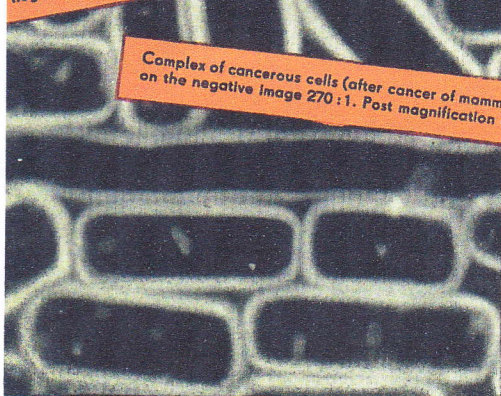
The ocular can be severed into two pieces, so that the camera can be removed rapidly. The lower part of the attachment being clamped on the ocular tube, the upper portion can be removed after loosening the knurled-headscrew. Some of the microscopes of latest design (for instance model Jena L- and N-stands) will take up directly with their tubes and this will prove most advantageous when taking extreme close-ups. Here again, tube and ocular of the microscope are not employed, it suffices to use a special lens, for instance Jena M. The Microscope attachment No. 153 has been built to permit installation of an analyzer and the compensators needed for shots with polarized light.



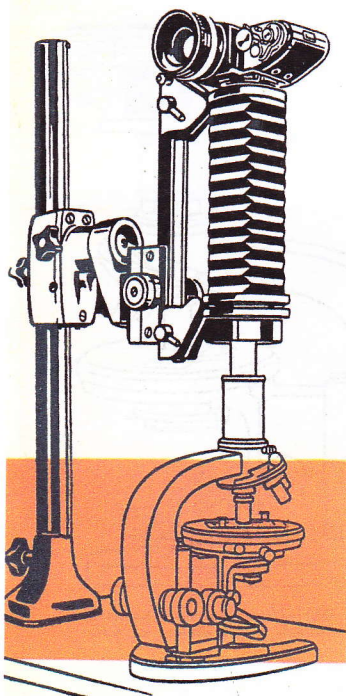
Microscope Attachment attached directly to the microscope tube



Virus of lactic acid (*Endomyces lactis*). Scale of reproduction on the negative image 570:1. Post magnification on the print up to 2850:1



Complex of cancerous cells (after cancer of mamma). Scale of reproduction on the negative image 270:1. Post magnification on the print up to 810:1



Repro Attachment for Photomicrography

Photomicrography with the aid of Repro Attachment (No. 155.20)

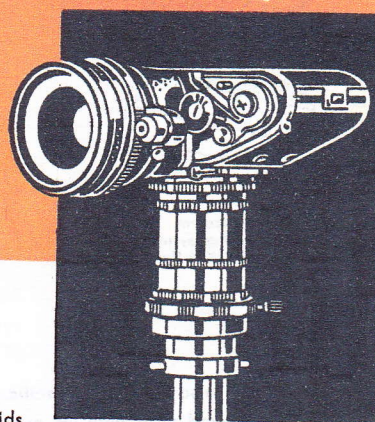
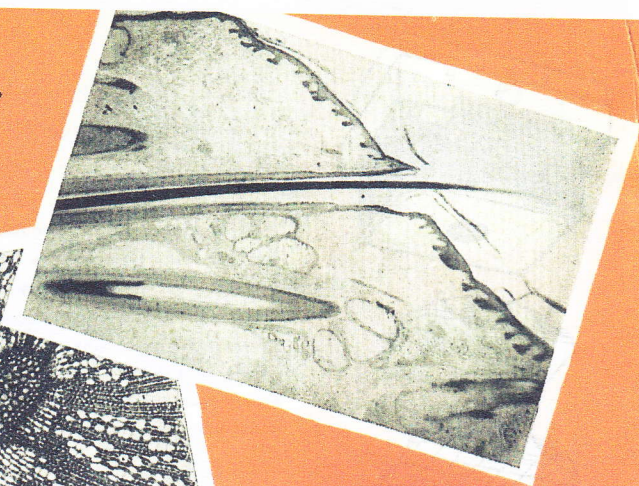
The Repro Attachment will prove most appropriate in such cases where a mechanical connection between microscope and camera is undesirable. The EXAKTA Vorex is placed above the microscope, and this arrangement will be most suitable where extra large magnification is required. Two light baffle tubes will give ample protection against outside light. The bellows extension will be a help to vary the scale of photography. Extreme close-ups calling for little magnification should be made with the aid of microscope protective ring II No. 157; thus it will be possible to do the work without an ocular and tube, a suitable lens only is required, e. g. the Jena M.

Determination of the precise time of exposure

For the determination of the precise time of exposure we recommend the IHAGEE Macro-Micro Photometer No. 167. The device is fitted over the faceplate of the EXAKTA Vorex. A selenium barrier layer photo-electric cell inserted into the path of the light rays serves for measuring the effective picture-producing light existing inside the camera. Further needed, a micro-ammeter or galvanometer indicator (useful range of measurement 5 to 30 μ A, impedance 1000 to 5000 ohms). The exposure data, determined through trial shots, can be compiled with the above results for the picture-producing light. During this time, the release button is locked, so that unintentional exposures are prevented. Exposure factors arising when using Bayonet Rings and Extension Tubes will have been taken care of with the above measuring process. (The IHAGEE Macro-Micro Photometer will bring an extension of .8" or 20 mm).

Longitudinal section hair across on skin
 Scale of reproduction on the negative
 image 10:1,
 Post magnification on the print up to 25:1

Alder Twig (cross cut)
 Scale of reproduction on the negative
 image 56:1,
 Post magnification on the print up to 112:1



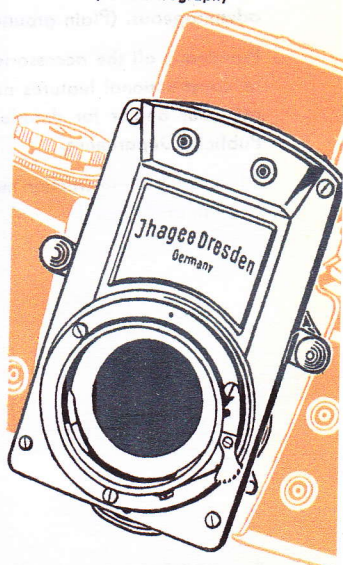
The Lens Magnifier at photomicrography

Lens Magnifier No. 308.01

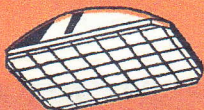
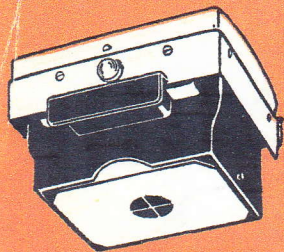
The Lens Magnifier No. 308.01 will prove to be one of the best aids for precision focusing in Macro and Micro Photography. It will take the place of the Finder Hood or of the Penta Prism. As magnifier it will take one of the precision corrected standard or special lenses of the EXAKTA Varex focused at infinity, and a distortion-free picture of microscopic sharpness over the entire screen up to the border will be the result. When using an objective of more than 50 mm focal length and providing the front element is not too deeply sunk into the mount and the eye can be placed close to it, then the entire surface of the focusing screen will show a clear picture of the subject to be taken. The shorter the focal length the larger the magnification, the middle of the picture area only will be enlarged when using wide angle magnifiers.

The relative magnification of the focusing screen image amounts to:
 focal length 1.38" (35 mm) - 8.1 x, focal length 2" (50 mm) - 5.7 x,
 focal length 3.14" (80 mm) - 3.6 x, focal length 3.94" (100 mm) - 2.8 x,
 focal length 5.32" (135 mm) - 2.1 x.

Should there be no actual lens available for this purpose, or should you possess only the former lenses which owing to design do not permit a sufficiently close proximity of the eye to the front component, then we recommend the Top Lens No. 312 (see illustration page 2) designed especially for the Lens Magnifier. This Top Lens produces with the focusing screen system an overall magnification of five times. One can survey the whole screen image comfortably and owing to the good optical performance of the Top Lens, achieve critical focusing.



The IHAGEE Macro-Micro Photometer



Special screens for the viewing systems of the EXAKTA VAREX

Special adjustable magnifiers for photomicrography and macrophotography

When using the EXAKTA VAREX and the many interchangeable focusing systems it is possible to adapt the focusing screen glasses to the many varying types of specialised work particularly photomicrography. For this latter type of work it is desirable to view the image on the ground glass focusing screen but focus by means of the brilliant microscope image. For this reason there are varying patterns of focusing screens with clear centre spot and hairline cross. It is through the clear centre spot that the brilliant microscope image is visible, the hairline cross preventing the eye from subsequent accommodation. We also supply a perfectly clear glass with hairline cross.

In photomicrography and macrophotography all the special screens with clear glass or with ground glass and clear centre spot can be used at extremely short lens to subject distances (including endoscopic photographs) but for normal photographs with the usual lens to subject distances (landscapes, architecture, etc.) they are not suitable. In this context we refer you again to the distance meter (see page 5).

Types available: For Penta Prism, Lens Magnifier and Finder Hood of the EXAKTA VAREX II a/1961: ground glass with clear centre spot 3 mm \varnothing No. 302.03, 10 mm \varnothing No. 302.04, or with clear glass No. 302.10 (all these types with hairline cross).

For the former Finder Hood: big screens with ground glass and clear centre spot 3 mm \varnothing No. 301.03, 10 mm \varnothing No. 301.04, or with clear glass No. 301.10 (all these types with hairline cross).

We can also deliver to specific order special pattern focusing screens for close-up and copy work, e.g. ground glass with cm or mm divisions, or with subsidiary lines intersecting at right angles, etc. For meticulously accurate screen observation and focusing in copy work a plain ground glass is advantageous. (Plain ground glass No. 308.22, also with divisions or subsidiary lines).

Practically all the accessories represented by this prospectus can be used on the EXA I or II, as far as constructional features permit (e.g. built-in Penta Prism of EXA II or vignettings in EXA I). Please ask your dealer for detailed information on the applicability or please get in touch with our Publicity Department.

The invaluable instruction manual we recommend is: "EXAKTA Manual" by Werner Wurst (published by Fountain Press, London).

IHAGEE KAMERAWERK AG DRESDEN A 16

There may be slight deviations between the camera models and the illustrations in this booklet.