

# Macrophotography

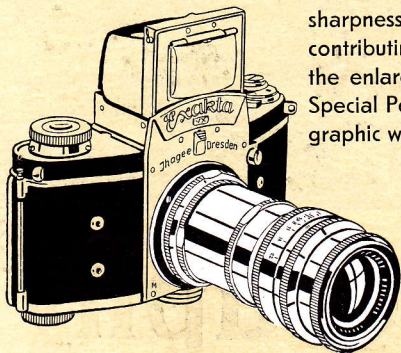


# Photomicrography



### Small Objects in Great Magnification

for scientists: a professional necessity — for amateurs: an instructive variation — for the EXAKTA Varex camera (as well as for all previous models of this miniature reflex  $1\frac{1}{2} \times 1$  in.): no problem whatever as to technique and cost. The ground-glass image which is in every case identical with the future picture, even if close-ups are taken at shortest distances, is a security against any parallax divergencies. Every reduction of camera-to-subject distance — and this holds true for the EXAKTA as well for any other camera — results in an increase in the distance between lens and sharp image without, however, influencing or abolishing the EXAKTA single-lens reflex system. All one has to do is to increase the camera extension by entirely mechanical means. When working with increased extension, picture area and sharpness, depth of field and colour, as well as all æsthetic factors contributing to a carefully composed close-up, can be controlled by the enlarged ground-glass image in the reflex-finder-hood or the Special Penta Prism (see page 5) as is the case for general photographic work. The ground-glass image must of necessity be identical with the picture on the film, since both are formed by one and the same lens. The EXAKTA does not require any auxiliary optical focusing equipment for close-up work, a remarkable feature also from an economic point of view.





### Extension Increase

is effected by the simplest possible means and permits of focusing down from the range of the lens helical focusing mount to any shorter distance and of obtaining any scale of reproduction desired (see Tables page 4). Bayonet Adapter Rings or any number of additional Extension Tubes can be inserted between the interchangeable lens and the EXAKTA body. Consequently, the extension can always be adapted to the working distance at a moment's notice, while the lens helical focusing mount still allows of critical focusing.

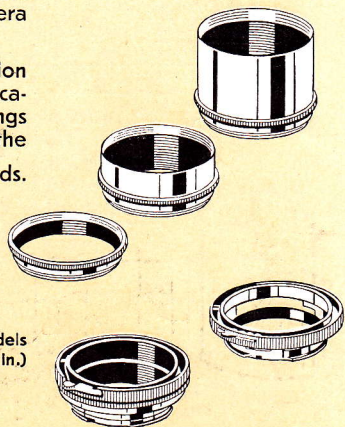
The following accessories are available:

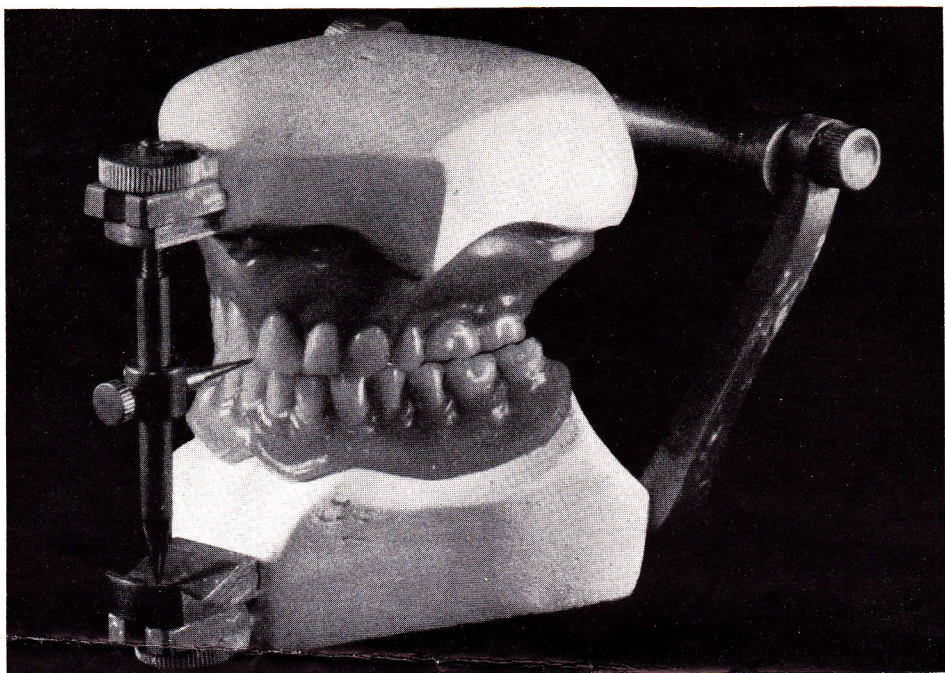
**Two-in-One Ring No. 146:** It permits the shortest possible extension increase of 5 mm ( $=\frac{3}{16}$  in.). It is inserted into the camera lens mounting; its front part accepts the lens.

**Pair of Bayonet Adapter Rings Nos. 140/141:** Extension increase of 10 mm ( $=\frac{3}{8}$  in.). The back ring is inserted into the camera, the front ring accepts the lens. Screwed together, the two Rings can be used by themselves; they must be separated in order to use the

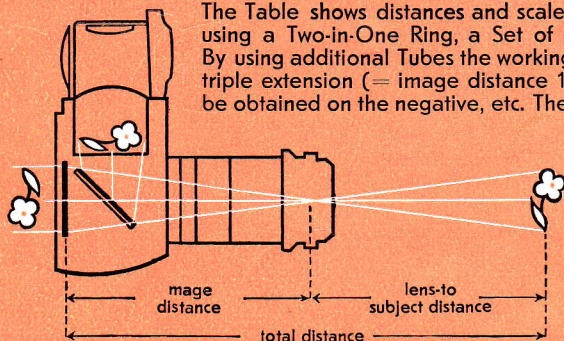
**Three Extension Tubes**, which have screw threads at both ends. They are supplied in three sizes: No. 142 — 5 mm =  $\frac{3}{16}$  in.; No. 143 — 15 mm =  $\frac{19}{32}$  in.; No. 144 — 30 mm =  $1\frac{11}{64}$  in., and can be used in any combination, but not without the Bayonet Rings Nos. 140/141. — **The Bayonet Adapter Rings Nos. 140/141 and the Extension Tubes Nos. 142-144** are therefore supplied only as a **complete set**.

(The above accessories can be used unconditionally with all previous EXAKTA models  $1\frac{1}{2}\times 1$  in.)





Arrangement (signification of Nos see page 3)	extension dist. mm	for 50 mm lenses					for 58 mm lenses				
		total dist. mm	image dist. mm	lens-to- subject dist mm	expo- sure factor	scale of repro- duction	total dist. mm	image dist. mm	lens-to- subject dist. mm	expo- sure factor	scale of repro- duction
No. 146	5	605	55	550	1,2	0,1	794	63	731	1,2	0,09
Nos. 140/41	10	360	60	300	1,5	0,2	462	68	394	1,4	0,17
Nos. 140/41 + 142	15	282	65	217	1,7	0,3	355	73	282	1,6	0,26
Nos. 140/41 + 142 + 146	20	245	70	175	2,0	0,4	304	78	226	1,8	0,35
Nos. 140/41 + 143	25	225	75	150	2,3	0,5	275	83	192	2,1	0,43
Nos. 140/41 + 142 + 143	30	213	80	133	2,6	0,6	258	88	170	2,3	0,52
Nos. 140/41 + 142 + 143 + 146	35	206	85	121	2,9	0,7	247	93	154	2,6	0,60
Nos. 140/41 + 144	40	203	90	113	3,3	0,8	240	98	142	2,9	0,69
Nos. 140/41 + 142 + 144	45	201	95	106	3,6	0,9	236	103	133	3,2	0,78
Nos. 140/41 + 142 + 144 + 146	50	200	100	100	4,0	1,0	233	108	125	3,5	0,86
Nos. 140/41 + 143 + 144	55	200	105	95	4,4	1,1	232	113	119	3,8	0,95
Nos. 140/41 + 142 + 143 + 144	60	202	110	92	4,9	1,2	232	118	114	4,2	1,03



The Table shows distances and scales of reproduction which can be obtained when using a Two-in-One Ring, a Set of Bayonet Adapter Rings and Extension Tubes. By using additional Tubes the working distance can be still further reduced so that at triple extension (= image distance 15 cm or 17.4 cm) a two-times magnification will be obtained on the negative, etc. The above figures are based on the use of 50 mm and 58 mm lenses focused at infinity. Intermediate values can be obtained by the lens helical focusing mount. — Increase in image distance requires increase in exposure time; consequently the above exposure factors. — Scale of reproduction 0.8 = ratio of size of subject on film (0.8) to its actual size (1).



### The Scope of Macrophotography

All the things which it is usual to look at very closely or even with a pocket lens, require photographic reproductions taken at shortest distances. With its extension tubes the EXAKTA camera must meet a wide variety of important requirements for scientific and industrial fields as well as for the practical work of professional photographers of every description. All copy work (pictures, documents, stamps, etc.) is basically but simple close-up work. Things that may interest the scientist from a professional point of view, attract the amateur photographer on account of their pictorial qualities: insects, flowers, plants, minerals, coins. Nor should the thrilling table-tops be omitted in this connection. And, finally, the original part of this kind of work: well-known tiny and insignificant objects will assume a new and striking appearance when taken at close range and greatly enlarged. With the EXAKTA 1½ × 1 in. colour macrophotos can be successfully taken without any effort, since the reflex image shows the true natural colours of the subject.

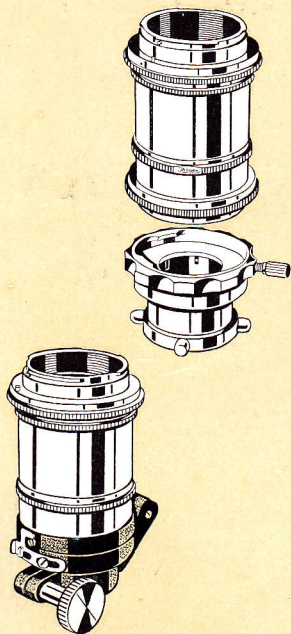
It goes without saying that any special lens may be used with the Extension Tubes. Wide-angle lenses permit shorter working distances, long-focus lenses longer ones; provided that the scale of reproduction remains unaltered. Both possibilities may be important. As usual, the image can be controlled, according to choice, by the two alternative viewing and focusing systems: the finder-hood for subjects near the ground and tripod work (static macrophotography), the Special Penta Prism for subjects at eye-level and for moving subjects (dynamic macrophotography).



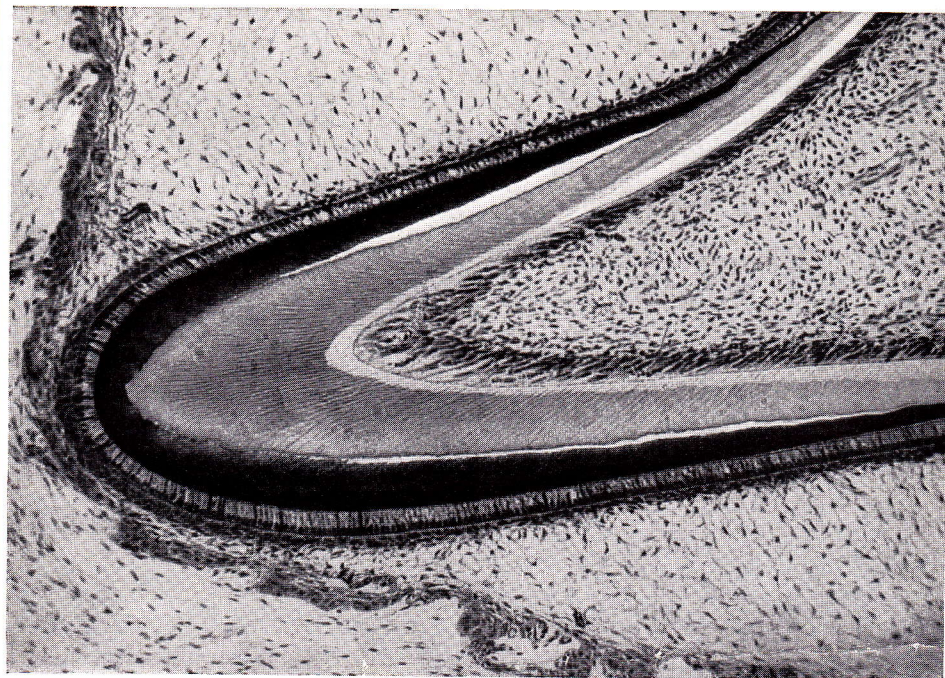


### Microphotography with the EXAKTA 1 1/2 x 1 in.

The EXAKTA 1 1/2 x 1 in. replaces an expensive special equipment, since the economic 35 mm cine film (black-and-white as well as colour film), on account of the short exposure times required, is being widely used for serial shots in photomicrography. By means of either of the two Microscope Attachments the camera is attached to the microscope, and all the advantages of the EXAKTA (true reflex focusing, freedom from parallax) can be utilized unconditionally. Photomicrographic work is done without the camera lens, i. e. the original microscope image is projected into the EXAKTA where it is visible on the ground-glass screen for viewing and focusing. The ground-glass image permits the determination not only of the exact picture area, but also of the decisive moment for exposure (essential for photographs of living objects). It goes without saying that the image is focused on the ground-glass. There are several special focusing glasses available (see page 8) which represent an invaluable aid in photomicrography. Let us stress the basic fact again: The ground-glass image of the EXAKTA and the future picture are in every case identical also when taking photomicrographs!



Successful photomicrographs require, as a matter of fact, a microscope whose optical equipment is adapted to the new field of work. The usual objectives and oculars of compound microscopes generally have a curved field which, in order to obtain uniform definition, must be flattened by using more suitable oculars. For more detailed informations on this subject consult the pertinent technical literature or apply to our "Export Department". When writing us, specify the kind of work you are interested in, and indicate all technical data concerning the microscope and the type of illumination used.



### The two EXAKTA Microscope Attachments

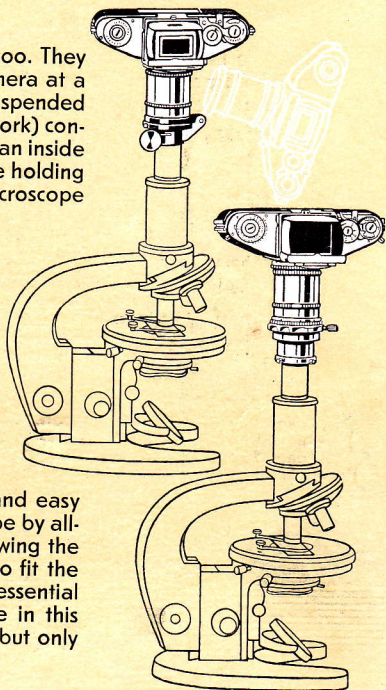
can be used with all previous EXAKTA  $1\frac{1}{2} \times 1$  in. cameras too. They have been constructed so as to permit of removing the camera at a moment's notice whenever the photographic work is to be suspended while the routine work at the microscope (visual microscope work) continues. The metal tubes of the Microscope Attachments have an inside diameter of 25 mm ( $=\frac{63}{64}$  in.). They fit around the drawtube holding the ocular of average microscopes: remove ocular, slip on Microscope Attachment, replace ocular, fasten Microscope Attachment to microscope tube by a slight turn of the clamping screw.

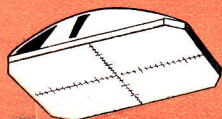
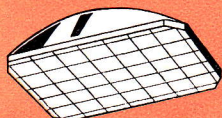
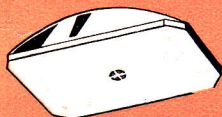
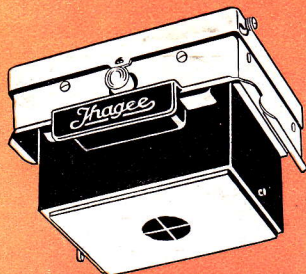
#### Microscope Attachment Type I (No. 147)

is fitted **with a hinged clamp** so that the camera can be tilted to side, but need not be taken off when photomicrographic work is suspended.

#### Microscope Attachment Type II (No. 153)

**with bayonet fitting:** Top part and bottom part of Microscope Attachment can be separated so that the camera can be taken away from the Microscope in one quick and easy operation. The bottom part is fastened to the microscope tube by all-around pressure. The top part can be removed after unscrewing the clamping screw and it has been designed in such a way as to fit the tube mounting of modern ZEISS microscopes. This feature is essential when taking photomicrographs in slight magnification, since in this case neither tube nor ocular of the microscope are used, but only the camera lens.





## Focusing Aids for Photomicrography and Macro-photography

When using the two-system camera EXAKTA VX featuring two alternative viewing and focusing systems, it is even possible to adapt the ground-glass to the various types of work. Especially when taking photomicrographs it will very often be found desirable to view the image on the ground-glass, but to focus by the more brilliant microscope image. That is the reason why different kinds of focusing glasses with clear centre spot and hairline cross are supplied for the EXAKTA VX models. The bright microscope image is visible through the clear centre spot, and the hairline cross prevents the eye from accommodating. As soon as the image seen in the microscope and the hairline cross are equally sharp, the subject is in focus. Yet it is by no means necessary to use these special focusing glasses permanently, for they can be interchanged with the standard or any other kind of focusing glass. The finder-hood must be interchanged as a whole, but the glasses of the Special Penta Prism can be changed by the EXAKTA owner himself.

Types available:

**Reflex Finder-Hood with Ground-Glass with Clear Centre Spot** 3 mm  $\phi$  No.30103; 10 mm  $\phi$  No.30104 or **with Clear Glass** No.30102. (All three types with hairline cross!)

**For Special Penta Prism: Ground-glass with clear centre spot** 3 mm  $\phi$  No.30203; 10 mm  $\phi$  No.30204; **Clear Glass** No.30202. (All three types with hairline cross!)

For close-up and copy work further special focusing glasses are available by special order, e.g. glass with hairline cross divided into cm. or mm., with lines intersecting at right angles etc.

Practice has shown that often questions relating to problems of photomicrography or macrophotography will arise which have not been dealt with in this short leaflet. If so, please write us. We shall be pleased to give you any assistance you may require.

### Data of Illustrations:

#### Macrophotography:

- page 1 (top): Woollen fabric . . . . . W. Graf, Berlin  
 page 2: Head of cockchafer . . . Dr. Commer, Koeln  
 page 3: Queen of the Night . . . C. Michel, Nossen  
 page 4: Set of artificial teeth . . . W. Wurst, Dresden  
 page 5: A Gulnea-pig? No! Potato buds  
 W. Berke, Dresden

#### Photomicrography:

- page 1 (bottom): Ground metal . . . . . H. Paufler, Dresden  
 page 6: Head of Ephemera larva. Dr. Koelling, Jena  
 page 7: Formation of teeth In cat's upper jaw  
 H. Paufler, Dresden



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