

Photomicrography of Living Matter with the Micro Ibsa Attachment

When using the Micro Ibsa attachment, the regular Leica lens must be removed from the camera. That means that this attachment cannot be used with Leica Model A. The attachment, shown in figure 236 is to be adapted to the camera body like a regular Leica lens. At its lower end it is equipped with a microscope eyepiece. This eyepiece has a magnifying power of 10x when used for visual observation. Used in connection with this device, however, this power is not fully developed because the small negative of the Leica camera is placed so close to the eyepiece. The microscopist knows that

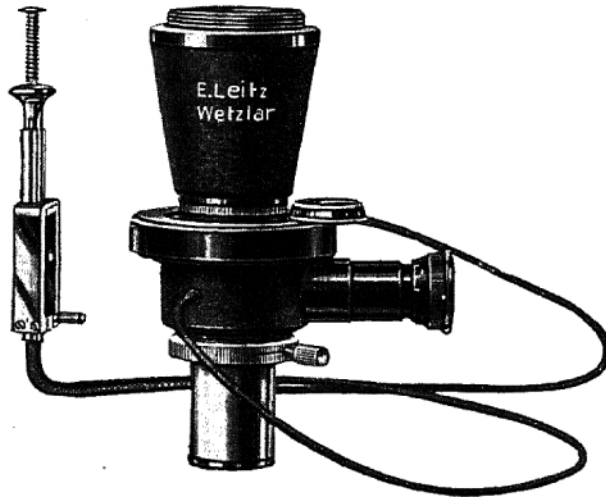


Fig. 236 Micro-Ibsa Attachment with synchronized cable releases: one activating the Compur Shutter, the other throwing the prism out of the path of light rays

only if the negative is placed 10 inches from the eyepiece, the magnification of the latter in photomicrography will be equal to that which prevails in visual observation. With the Ibsa attachment the eyepiece does only one-third of its performance for visual observation. But this is just enough to spread the detail conveniently over the area of the Leica negative. That means that a Leica negative, enlarged to the size of 3 x 4½ inches will represent a photomicrograph with the same magnification as that which prevailed if the same objective and eyepiece would have been used for visual observation.

The eyepiece can be removed from the Ibsa attachment by unscrewing the knurled adapter ring with which the entire device is clamped to the microscope tube. It is not advisable to use eyepieces of different magnifying power. It must be realized that the field seen through the microscope is circular whereas the shape of the negative is rectangular. On the other hand we find in photomicrography that it is

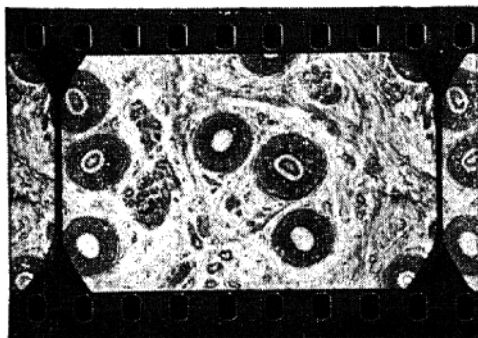


Fig. 237 Leica Photomicrograph made with the Micro-Ibsa Attachment

often next to impossible to have the entire field appear uniformly sharp in focus. Especially at higher magnification the outer portion of the field is more or less out of focus. The eyepiece with which the Ibsco attachment is equipped has such magnifying power that the most valuable portion of the field is utilized. How the image of the specimen fills the frame of the Leica negative is shown in figure 237.

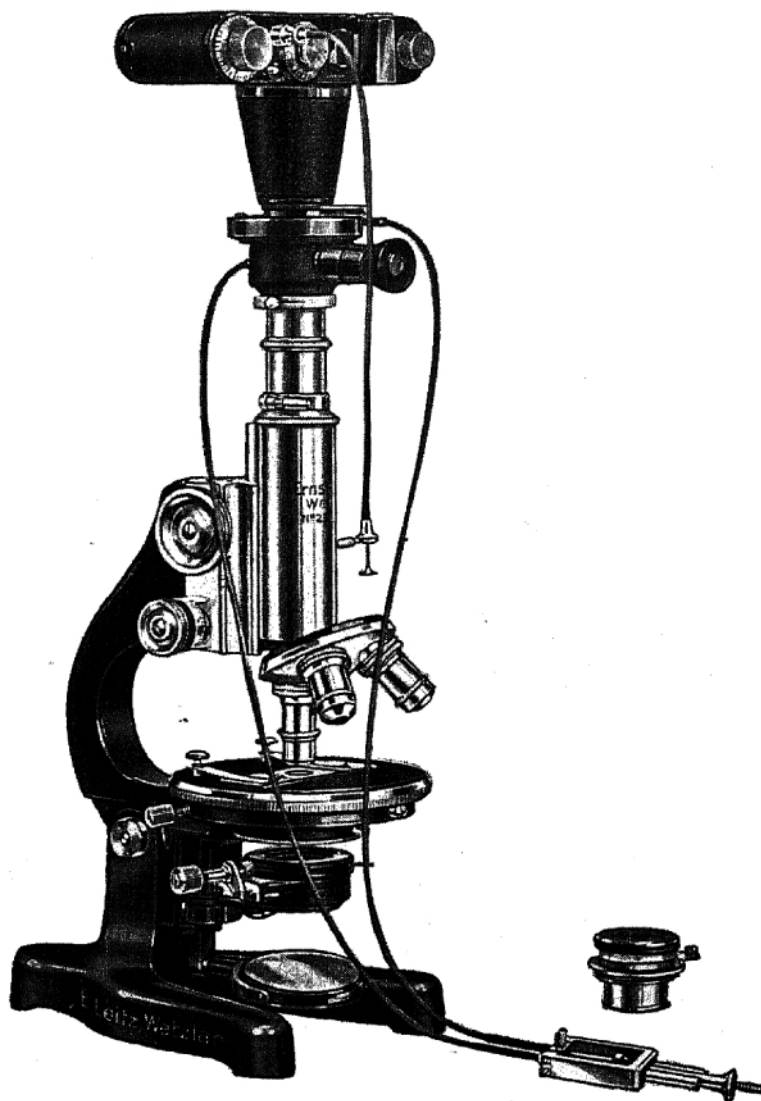


Fig. 238 Micro-Ibsco Attachment with Leica camera placed upon Microscope—ready to use

The middle section of the Ibsco attachment contains a beam-splitting prism which can be removed from the course of rays by operation of a wire release. So that this prism may also be held outside of the course of rays, the wire release is equipped with a clamping screw. A certain portion of the light which has passed through

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the microscope is reflected by the prism into a side telescope where the micro image can be visually observed and focused. The balance of the light passes onto the film. Above the telescope there is a Compur shutter with which the actual exposure is made. A conical housing is attached to the middle section and this is of such length that the image will fill the negative as shown before. This housing also contains a lens system for the purpose of correcting the passage of the rays so that at this short distance a sharp image can be produced.

It is the beam-splitting prism and the side telescope which make the Ibsco attachment so valuable for photomicrography of living objects. When the specimen is in motion it is essential that we have a method of observing and focusing continuously until the very instant before the exposure is taken and these two features enable us to do so.

And in order to shorten the time of exposure as much as possible we do not only benefit from the small negative size of the Leica but also from the fact that during the (general instantaneous) exposure the beam-splitting prism is removed from the course of rays, thus conveying the entire available amount of light onto the film.

The side telescope is equipped with an adjustable eyelens. This is an important device which is often overlooked. When focusing visually we must realize that there are differences in the eyesight of different observers. When the image appears in focus for one observer, it may not be sharp for another; yet the image must **always be sharp in the plane of the film.** These differences are compensated by the adjustable eyelens. In looking through the side telescope a cross hair ruling is visible. Before focusing the microscope the observer must turn the mount of the adjustable eyelens until the cross hairs appear in perfect focus. Only when this is done should the microscope be focused with the coarse and fine adjustment. In this case there will always be coincidence of focus in the side telescope and in the plane of the film. If a different observer looks through the side telescope and finds the micro image out of focus, the cross hairs will likewise lack in sharpness. But simply by turning the mount of the adjustable eyelens crisp focus can be established for both, the image and the cross hairs.

It may appear strange that a Compur shutter is required to take the photo inasmuch as the Leica camera has a focal plane shutter. This shutter, however, when released, moves in a direction which would create a lateral momentum and cause vibrations which would affect the sharpness of the picture. The Compur shutter avoids this

danger. But since the transporting of the film is coupled with the winding of the Leica shutter, the procedure of taking successive photomicrographs is somewhat complicated and the photomicrographer will have to accustom himself to the following sequence of manipulations.

1. Remove the lens from your Leica camera and adapt in its place the Micro Ibsa attachment to the camera body of Leica models C, D, E, F, FF, or G.
2. Remove the regular eyepiece from the microscope tube, set the tube to the correct mechanical tubelength prescribed by the manufacturer (some microscopes are equipped with draw-tubes, others have stationary tubes; the manufacturers have different standards as to the length of the tube and when the microscope is equipped with a draw tube, this must be correctly set) and place a rubber ring or metal clamp around the draw-tube so that the weight of the camera with Ibsa attachment will not change the tubelength. A rubber ring is supplied with the Ibsa attachment.
3. Adapt the Ibsa attachment with Leica camera to the microscope by inserting the eyepiece of this attachment into the microscope tube. Then tighten the clamping screw on the knurled ring at the lower end of the Ibsa attachment.
4. Fasten the two wire releases to the Ibsa attachment. The one with clamping screw is for the beam-splitting prism, the other one is for the Compur shutter.
5. Attach the regular wire release to the Leica camera. Wind the focal plane shutter of the Leica camera and set it for time exposure.
6. Adjust the eyelens of the side telescope so that the cross hairs appear in sharp focus.
7. Focus the image of the microscope with coarse and fine adjustment while looking through the side telescope.
8. Set the Compur shutter for the correct time of exposure.
9. Press the wire release of the Leica camera and clamp the wire release in this position so that the focal plane shutter will remain open. You are now ready to take the exposure by pressing the wire release of the Compur shutter. If you wish to have as much light as possible for the exposure, you can also swing the beam-splitting prism out of the course of rays. Thus you will have to operate two wire releases simultaneously. But you must also operate the fine adjustment of the microscope continuously and since we have only two hands, you may wish to make use of an automatic release attachment which permits with one motion to swing out the prism and immediately afterwards to take the exposure. This attachment is likewise shown in fig. 238.
10. After the exposure has been taken, loosen the clamping screw of the Leica wire release, thus closing the focal plane shutter. Wind to the next frame, press the Leica release again, clamp it in this position and you are ready for the next picture.

Whereas the Ibsa attachment can, of course, be used for every task in photomicrography with the Leica camera, regardless of whether the object is moving or stationary, other devices may be preferred in the latter case. The Ibsa attachment, after all, is not inexpensive and other Leica accessories may be used equally well, having the added advantage of the possibility of other applications.