

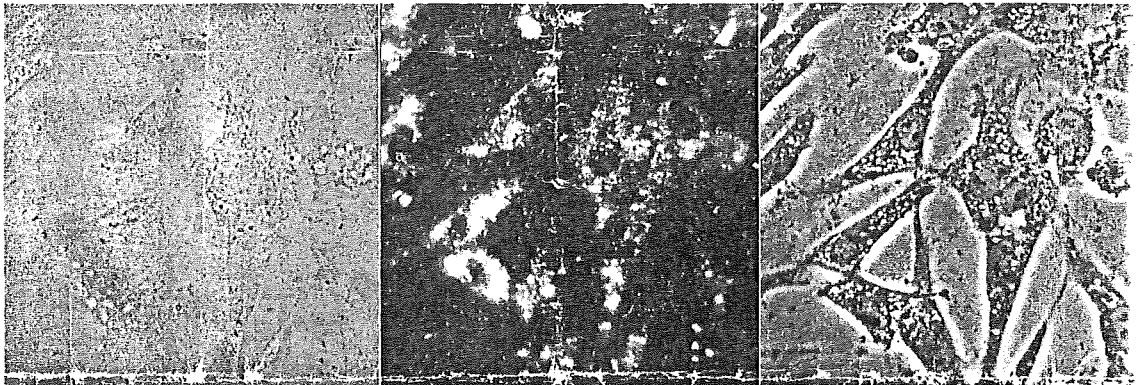


## C. BAKER INSTRUMENTS LTD

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### Trilux Condenser

for Light Field, Dark Field and Phase Contrast with one condenser.



LIGHT FIELD

DARK FIELD

PHASE CONTRAST

*Tissue Culture. Chick Heart Fibroblasts about X200*

*(By courtesy of Mr. K. G. Moreman, Chester Beatty Research Institute, London)*

These photographs were taken within seconds of each other.

For years microscopists have used light field and dark field, and in more recent years phase contrast illumination in their work and have learned to use the form of illumination which suits their specimen best. There are, however, many occasions when the microscopist is uncertain which technique is the best to apply, and when he would like to try out more than one method to see which is best, and there are some specimens which must be examined in more than one way in order to appreciate fully the detail in them. In the past this could only be done by changing condensers, which caused delay. With the Trilux Condenser Baker's have made it possible to do light field, dark field and phase contrast with the same condenser, and it is possible to change from one form of illumination to another in a few seconds.

## How to set up the Trilux Condenser

### Centring

It is most important with the Trilux Condenser, as with all condensers, especially dark field condensers, that it should be accurately centred. The preferred way of doing this is to screw into the microscope nosepiece, in place of one of the objectives, the Pin Hole Mount which is provided with the Trilux. The condenser is removed from the substage of the microscope. When the light has been approximately set up the field iris diaphragm, *i.e.* the iris on the lamp, is closed down, and a shadow of it will be seen on looking into the eyepiece. The mirror is now adjusted, or the microscope moved about on the Projectolux, until the shadow is central. The light is now central, and the pinhole mount can be removed and the condenser inserted. A specimen is now focussed up and the condenser focussed until the image of the lamp iris is as sharp as possible. This image may not appear in the centre of the field. It is brought central by adjusting the lower pair of centring screws on the Trilux, not by adjusting the microscope mirror.

### Changing the Illumination

The condenser is now central. For light field it is used in the ordinary way, *i.e.* with the diaphragm in position which allows a full cone of light to enter the central part of the condenser. This is in position when four red marks are visible on the front of the diaphragm wheel. On turning the wheel anti-clockwise until three red marks show, the diaphragm of the X.100 objective phase annulus is brought into position. This is also the position for the X.100 and X.50 Fluorite Objectives. The next click position is that of the phase contrast X.40 objective annulus, two red marks. The

next is the position of the X.10 phase contrast annulus, one red mark. The next is dark field, no red marks.

### Phase Contrast

When phase contrast microscopy is to be carried out the stop appropriate to the objective to be used is brought into position. The eyepiece is removed and the auxiliary microscope provided is put in its place. This is focussed until the phase plate in the back of the objective is seen. This will appear as a grey ring. The substage annulus will appear as a bright ring. The *upper* pair of centring screws on the condenser is adjusted until the grey ring superimposes the bright ring. The auxiliary microscope is now removed, and the eyepiece replaced, and the specimen will be seen in phase contrast.

### Dark Ground

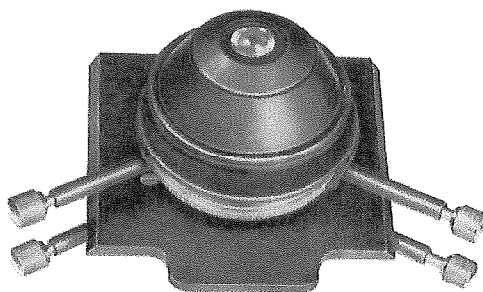
For dark ground the condenser focus is critical. Close down the lamp iris and focus the substage until the spot of light seen in the field is small and intense. If it is not quite in the centre of the field trim the adjustment on the *lower* centring screws on the Trilux. Now open the diaphragm until the field is filled with light. If it is desired to use the X.100 or X.50 objectives the condenser will have to be oiled to the specimen slide. This is best done by removing the specimen, putting a large drop of immersion oil on the top lens of the condenser and replacing the specimen. Check that the condenser focus is correct. High aperture objectives will have to have their N.A. reduced to 1.10 by means of a funnel stop. The X.100 objectives supplied with Trilux condensers will be already equipped with a funnel stop.

### High Efficiency

The Trilux achieves this with full efficiency of all forms of illumination and it is in no sense a compromise. The light field illumination is full cone and *not* annular, and the substage iris diaphragm can be used in the normal way. The phase contrast is the annular type and gives a very high standard of performance. Phase contrast objectives must of course be used and these are normally fitted with phase plates with 70% absorption which is the most suitable for most objects, but objectives can be fitted with phase plates with higher absorption for objects with low phase retardations if required. The dark field part of the condenser is a system employing reflecting and refracting surfaces and is very highly corrected, and gives a performance comparable in every way with the usual bicentric or cardioid dark field condensers. It will give dark field with objectives up to N.A.0.70 when dry and up to N.A.1.10 when oil immersed. For light field or phase contrast the condenser can be used with or without oil immersion.

### Ease of Operation

The changeover of illumination with the



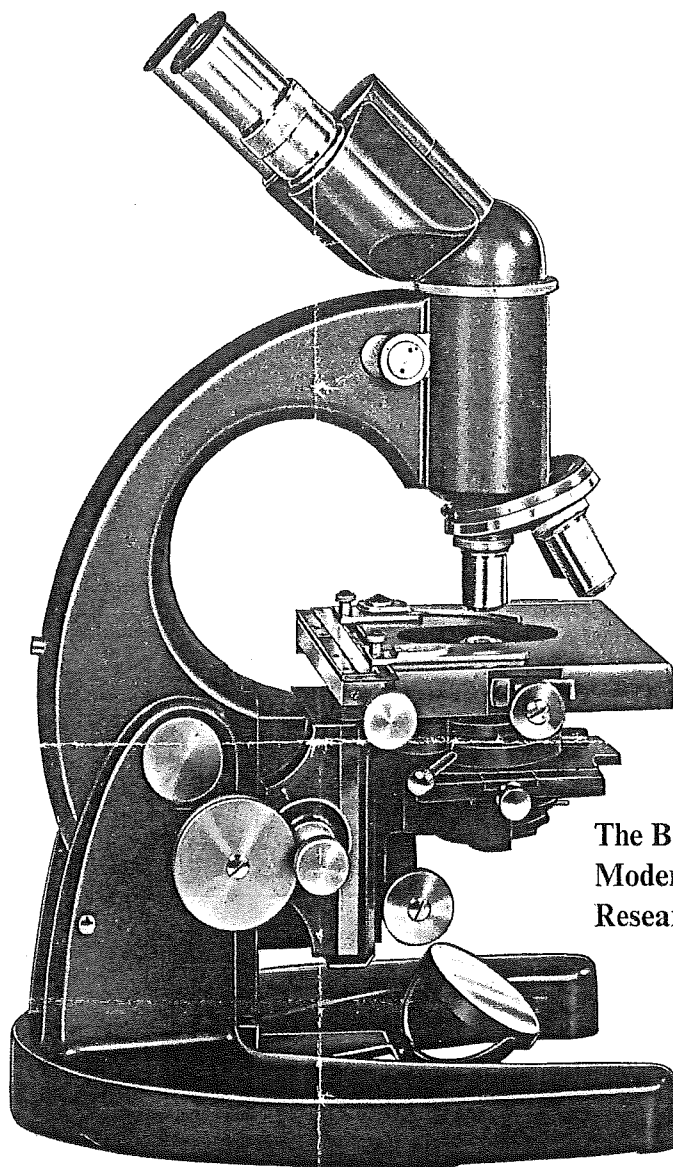
*The Trilux Condenser*

Trilux is done by rotating a wheel of stops below the condenser which introduces the appropriate form of illumination. For light field, light is allowed to enter the central part of the condenser. For phase contrast a ring of light appropriate to the aperture of the phase ring for each objective enters the central part of the condenser. For dark field a ring of light enters the outer reflecting part of the condenser. Each diaphragm registers in position with a click.

The Trilux Condenser will fit the W. substage of the Series 4 Microscope. It is not applicable to Series 3 Microscopes. Older 4 B.W. microscopes will need a minor modification to the stage.

Trilux Condenser complete with pin hole mount and auxiliary microscope. Phase contrast objectives. X.100, oil. imm. X.40, X.10. 089.

Research Microscope 4B.W. with mechanical stage, binocular tubes, pairs of eyepieces X.5, X.8 and Trilux Condenser and objectives as above. 0113/089.



**The Baker Series 4  
Modern  
Research Microscope**

The Baker Series 4 Modern Research Microscope is the instrument with which the Trilux Condenser will be used, as the condenser is on a slide which fits the Akehurst type substage of this microscope.

The Series 4 Microscope is a particularly versatile instrument as it can be adapted for interference microscopy as well as light field, dark field and phase contrast.

Trilux Condenser complete with pin hole mount and auxiliary microscope. Phase contrast objectives X.10, X.40 X.50, fluorite oil immersion, X.100 fluorite oil immersion. 090.

Research Microscope 4BW, with mechanical stage, binocular tubes, pairs of compensating eyepieces X.6, X.8, Trilux Condenser and objectives as above. 0113 090.