GRATICULE FOR MEASUREMENT OF X-RAY FILMS FOR INTRA-OCULAR FOREIGN BODY LOCALIZATION*†

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THE key to successful removal of an intra-ocular foreign body is good localization. Where this is dependent on *x* rays, accurate measurement of the films is essential. This graticule‡ was designed particularly for the method in which a ring marker is attached to the globe, whether by sutures or by suction. Postero-anterior (P-A) and lateral views are taken with the plane of the ring respectively parallel to, and perpendicular to, the *x*-ray film; if necessary, further films are taken until a true orientation of the ring to the film is achieved. The films should then be marked with a firm pin-prick through the centre of the intra-ocular foreign body shadow, so that damage to the film by scratching, etc., will not destroy its value.

The graticule is photo-etched on the underside of a glass plate, so that it can be placed in direct contact with the film to eliminate parallax. The figure shows that it consists essentially of two scales at right angles. When used for measurement the longer of these, OC, is always so placed that the pin-prick marking the intra-ocular foreign body centre is exactly on it. The shorter is divided into two parts, OA above, and OB below, OC. The markings are in millimetres.

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‡ The graticule is made by Keeler, 21-27 Marylebone Lane, London, W.1.

LATERAL VIEW

The scale AOB is set to coincide with the long thin rectangle which is the ring shadow, equidistant from the front and back edges of the ring, and so that the pin-prick lies exactly on scale OC. The distance of the intra-ocular foreign body behind the plane of the ring is read directly on OC, and its height above or below the centre of the ring is obtained by noting where the ends of the ring shadow fall on OA and OB (*i.e.* the intercepts on OA and OB). The magnification, if any, is also obvious if the size of the ring is known.

POSTERO-ANTERIOR VIEW

For every purpose the graticule is so placed that the point O coincides with the centre of the ring. To achieve this it is set so that the ring shadow makes equal intercepts on all three scales OA, OB, and OC. The quarter-circles in one quadrant assist in this setting. Again, any magnification is apparent.

If the ring shadow is a true circle, setting is easy. If, however, the x-ray film was taken when the plane of the ring was not parallel with the film, there will be ovality in the ring shadow, and exact setting will generally be impossible. In such a case the best result will be achieved if the intercepts on OA and OB are equalized, while making one of the quarter-circles appear to fit the ring shadow as closely as possible. If the quarter-circles are a good fit, the discrepancy between the intercepts on OC and OA gives some indication of the degree of obliquity. But it is possible for the intercepts on OC, OA, and OB to be equal while obliquity is present: in this case, the quarter-circles will not at the same time fit reasonably well.

In effect, therefore, the joint use of the two criteria, equal intercepts on the three axes and an adequate fit of the quarter-circles, provides a check upon the acceptability of a given P-A film. It is obvious that a film which does not reasonably satisfy these criteria must be discarded. There is, however, a further requirement. The height of the intra-ocular foreign body above or below the centre of the ring shadow should be identical in the two films, and this provides a further check upon possible obliquity of the P-A picture.

Having accepted the films after checking in this way, the meridian in which the intra-ocular foreign body lies is easily determined with fair accuracy. One of the scales, AOB or OC, is set parallel with the (presumed) most accurately vertical shadow in the P-A film, so that the pin-prick lies in the protractor quadrant of the graticule. In this position, too, an estimate of the height of the intra-ocular foreign body above or below the point O may be made, as a check against the lateral view.

Finally, the measurement of the distance of the intra-ocular foreign body from the centre of the ring is made, by setting the point O at the centre of the ring while the axis OC covers the pin-prick. The measurement is again read directly from the scale.