COMMUNICATIONS FROM THE OXFORD MINERALOGICAL LABORATORY. No. XIII.

# *An attachment to the goniometer for use in the measurement of crystals with complex faces.*

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[Read March 17, 1908.]

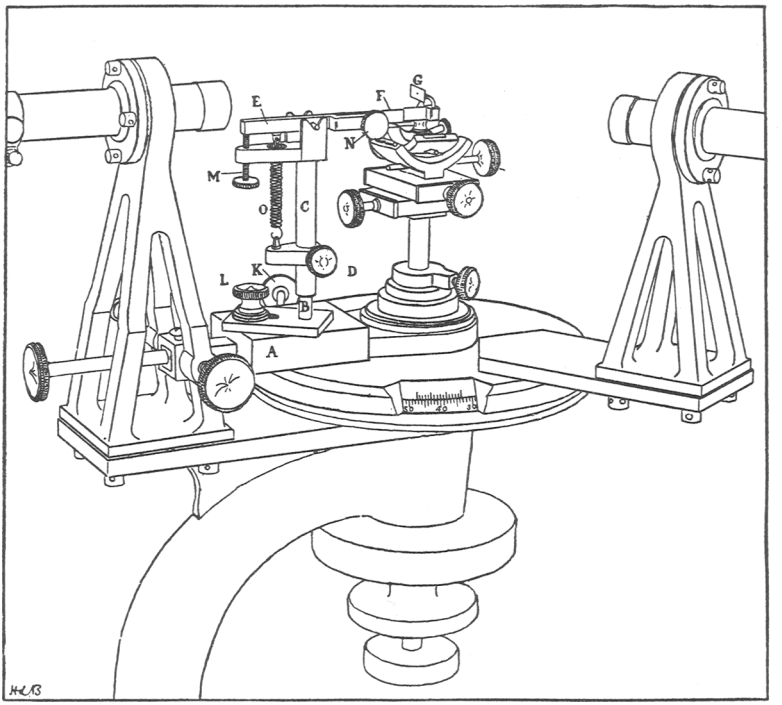
WHEN mounted for measurement on the goniometer, the faces of the perovskite crystals described in the preceding paper yield, owing to the complex lamellated structure, a confused mass of images of the signal which cannot be analysed by the ordinary methods (such as using a lens in front of the eyepiece or shading portions of the face with a screen held in the hand), on account of the number and extremely small size of the reflecting surfaces. The apparatus described below was designed to give the means of identifying with certainty the image reflected from any given portion of such a face, and has been found to answer this purpose satisfactorily.[1]

It consists of an adjustable support carrying a perforated diaphragm between the collimator and the crystal, so as to cut off the light from all except the desired area. Since in order to isolate minute lamellae the aperture must be very small, the screen must be placed close to the crystal, so that it may not cut off the extremities of the image. On this account also it is convenient to use a small square or circular hole as signal, instead of the usual slit.

The support consists of a flat base *A*, clamped to the frame of the goniometer in any convenient manner. (In the drawing it is shown in position on the goniometer figured in Professor Miers's 'Mineralogy' (1902), p. 105, on which it is fixed to the arm of the telescope-clamp by the screw *K*.) Upon the base rests a slotted plate,

[1] The instrument was constructed for me by Mr. S. W. Bush, of the University Museum.

which carries the vertical rod *B* and can be clamped in any position by means of the screw *L*. This, with a sleeve *C* sliding on the rod, to which it is clamped by *D*, gives means of rough adjustment in horizontal and vertical directions. Fine adjustment in height is provided for by the arm *E*, which is supported in the centre on trunnions turning in Y's at the top of *C*, and at the end on the point of the fine screw *M*, and is kept in place by the spring *O*. Fine adjustment in the horizontal plane is given by the flat spring *F*, which forms a prolongation of the




arm *E*, and carries at its end a socket to receive the shank of the screen *G*. The spring rests against the point of the fine screw *N*, which passes through the slightly bent end of *E*.

The screen is made of thin metal foil, in which holes of the required size have been made with a fine needle. It is placed as near as possible to the crystal (with a small crystal it may be within a millimetre or less), and the screws *M* and *N* then enable it to be moved about with perfect steadiness or held in any position.

Using holes of $\frac{1}{10}$ to $\frac{1}{20}$ mm. diameter sharp images can be isolated from a confused blur, which are due to a lamella whose thickness is no greater than this, provided the surface of this is plane. The exact position of the illuminated area giving the reflection can be readily determined when the crystal is examined with the help of the lens in front of the object-glass, since the reflection of the aperture in the crystal face is in focus practically at the same time as the latter. The small angle between the faces of adjacent lamellae may be easily found on traversing the screen by means of the slow-motion-screws.