Leaflet No. 45.

THE CAMBRIDGE SCIENTIFIC INSTRUMENT COMPANY, LTD., CAMBRIDGE, ENGLAND.

PARALLEL GLASS AND PRISM TESTER.

Designed by Mr S. D. Chalmers, M.A., and Mr H. S. Ryland.

(See *Trans. Optical Society, London*; Session 1904–5, p. 34.)

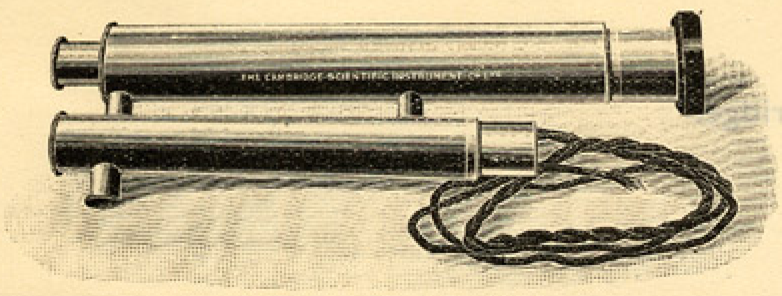

Fig. 1. $\frac{2}{9}$ full size.

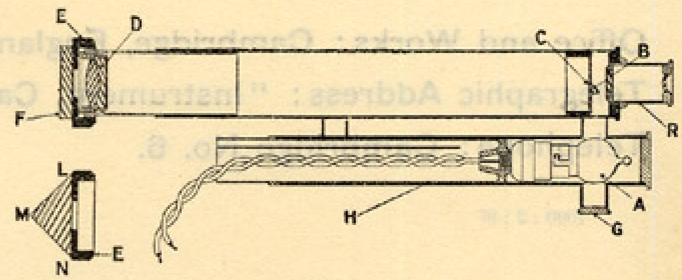

Fig. 2.

This instrument provides a ready means of testing the parallelism of mirrors or flat glasses, as well as the correctness of right-angled prisms. In each case an illuminated sight-mark within the instrument is viewed by reflection at the surfaces to be tested, and the separation between the images appearing in the field shows instantly any deviation from correctness in the relation of the surfaces in question.

The working of the instrument will be understood from Fig. 2. Light proceeding from a small electric lamp A is deflected through a right angle by the reflecting prism B, immediately below which, at C, is a small transparent sight-mark. On passing through the collimating lens D, the beam is rendered parallel, and returned as a parallel beam by any flat reflecting surface held in contact with the ebonite cap E. The reflected beam is again converged by D to a focus close to C, where a real image of the sight-mark C is seen on looking through the eye-piece R. If a piece of plane parallel glass F is held in contact with the ebonite cap E, there will be a parallel beam reflected from the first face of the glass, and a second parallel beam, coincident with the first, reflected from the back surface. If, however, the two faces of F are not truly parallel, the two reflected beams will not be coincident, but will be inclined at a small angle to one another, and two distinct images will be formed in the neighbourhood of C.

Now in place of the parallel plate F, let an isosceles and nearly right-angled prism LMN be held with its hypotenuse face LN in contact with the ebonite E. Three images of the sight-mark C will now be seen; one comparatively faint, due to reflection at the face LN, the other two much stronger, and due to successive reflections at the faces LM, MN. If LMN were truly a right angle, the parallel beam formed by reflection first at LM and then at MN would coincide in direction with that formed by reflections in the reverse order; but any small deviation from the value 90 degrees causes a corresponding inclination of the two reflected beams, and a separation of the images seen near to C. If the right angle M is exact, so that the two images in question coincide, and form a single image, this is readily distinguished from the image due to reflection at the face LN; firstly by its greater brightness, and secondly by its property of rotating when the prism LMN is rotated.

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In the case of a nearly right-angled prism, where a slight separation is observed between the two internally reflected images, it will generally be desirable to know whether the angle of the prism is a little greater or a little less than a right angle. The distinction is readily made by passing a thin opaque screen, such as a card, between the eye-piece and the eye, and as close to the eye as possible. As the screen is gradually advanced, it will be seen that one image disappears before the other: *if the first image to disappear is that towards the side from which the screen advances, the angle is less than a right angle.* In the contrary case the angle is greater than a right angle.

The lamp A is made to work on 4 volts. Where it is not convenient to supply current to the lamp, this latter can be drawn a little way down into the tube H, so as to allow light from the sky, or from any bright diffused source, to enter the instrument at G.

Price complete (without battery) ... ... £6 0*s.* 0*d.* *c* *Limy*

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