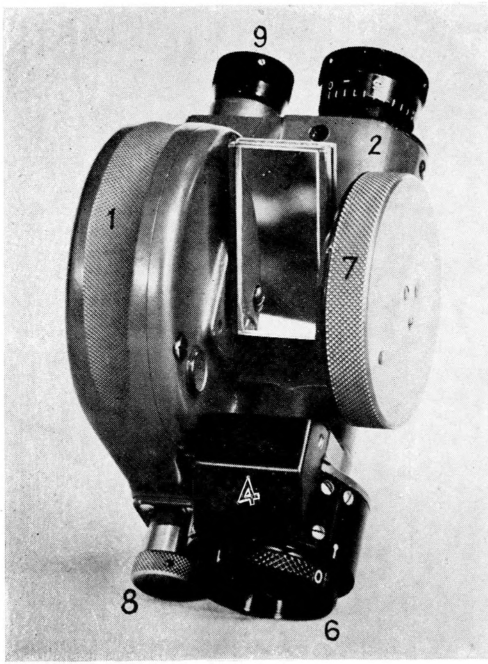



Fig. 2

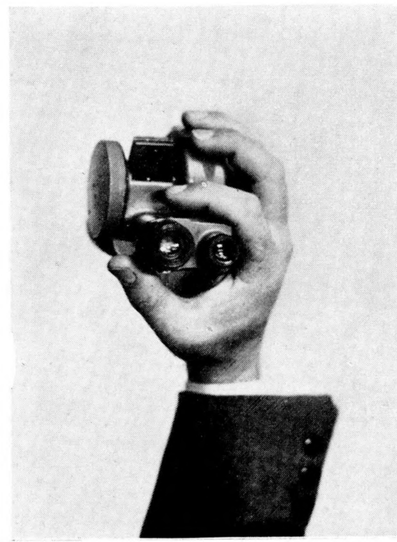


Fig. 3

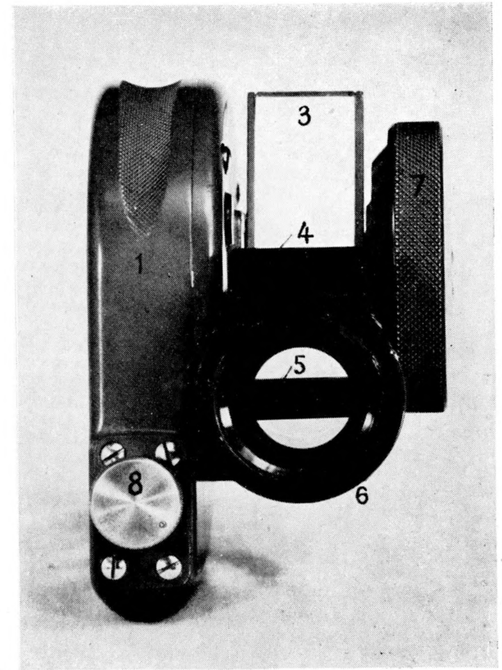
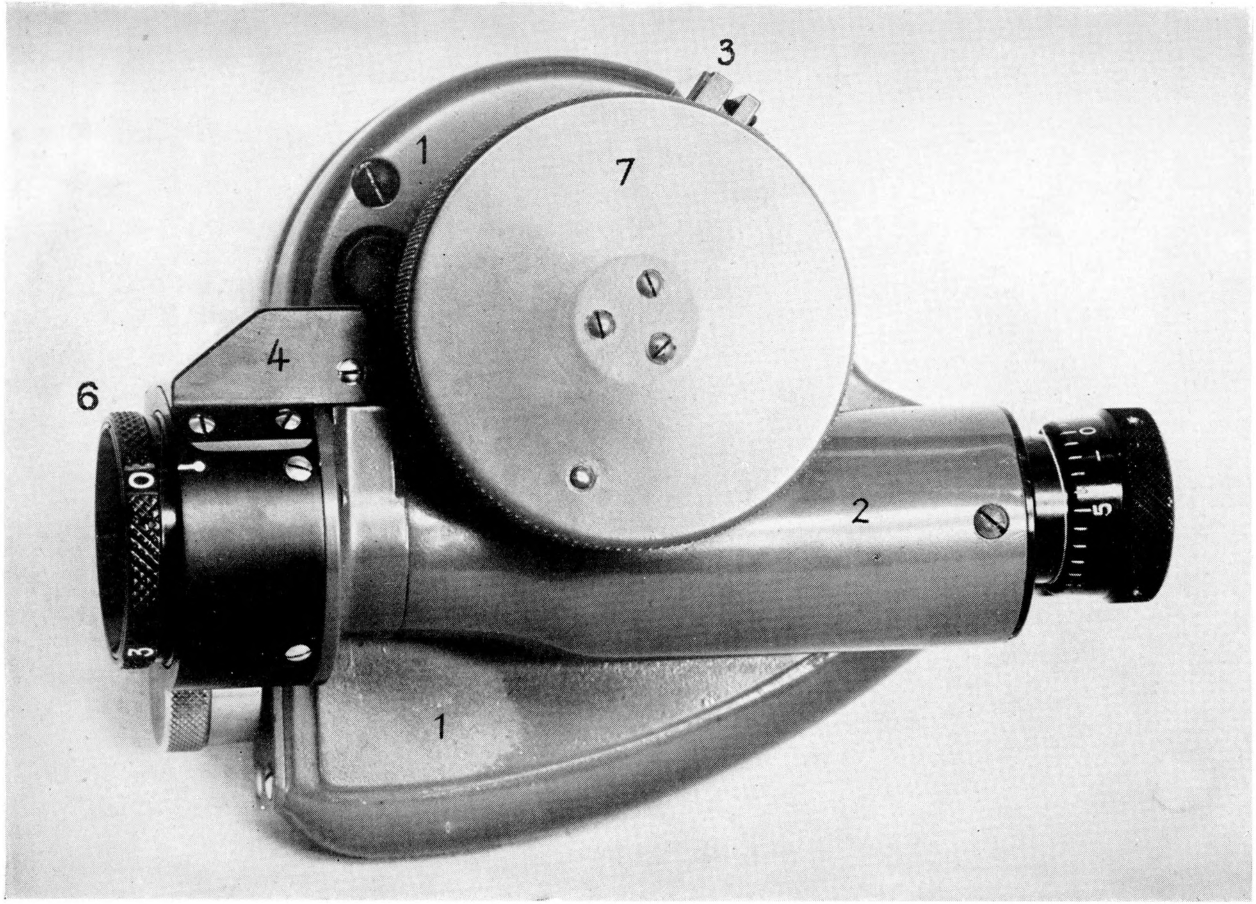



Fig. 4

New Wild Sextant — Nouveau Sextant Wild




New Wild Sextant
*Actual size*

Fig. 5.

Nouveau Sextant Wild
*Grandeur naturelle*

# INSTRUMENTS.

## NEW WILD SEXTANT (*)

The firm of WILD of Heerbrugg (Switzerland), which has acquired a world-wide reputation for the construction of the levels and theodolites well known to all hydrographers, has just completed the design of a new sextant. This little instrument differs from old-time sextants just as the WILD theodolites differ from the old-time theodolites. The delicate parts, such as the arc, reading micrometer etc., are contained in a protective casing. The graduated scale is of glass, without silvering, and it is read by means of an optical micrometer. The principle and methods of construction used have enabled the dimensions to be considerably reduced, so much so that it has been possible to make use of a complete circle, exact centring for which is much easier to obtain than for a sector of a circle.

The figures show clearly the compactness of the instrument. The casing *1* encloses the circle and the optical reading system, the latter's micrometer screw *8* and the eye-piece of the microscope *9* being visible in the figures; the telescope *2* is rigidly fixed to this casing *1*. The movable mirror *3* is worked by the milled head *7* which makes it pivot round an axis common to the mirror and to the graduated scale. The fixed mirror of ordinary sextants is replaced by two prisms *4* and *5*, which arrangement helps to reduce the dimensions of the instrument. The ring *6* contains the different smoked glasses which, by rotating this ring, are brought into the path of the rays reflected by the movable mirror.

The telescope, of × 6 magnification, transmits a high proportion of light; the available aperture of the objective is 20 mm. The image appears upright, thanks to a system of prisms. Its angular field is 7½°, which greatly facilitates picking up the direction. The prism *5* occupies the central part of the objective; the two exit pupils corresponding to the two beams are thus situated symmetrically one within the other.

Angles from 0° to 145° can be measured. To cover this field of 145° from one end to the other, only four turns have to be made with the head *7*. Consequently, it has been possible to abolish the set-screw and to simplify considerably the operation of getting the images into coincidence.

The actuating knob of the optical micrometer *8* is fixed at the side of the objective, where it can be easily worked with the left hand without fear of touching the actuating head *7* by mistake.

Reading the circle is so clear and so easy that it seems impossible to make a mistake. Two images are seen in the reading microscope: to the right, that of the graduated circle; to the left, that of the micrometer drum. The circle is graduated in degrees, and every fifth degree is numbered. By turning the knob *8* the image of the circle is moved by the rotation of a parallel-faced glass wafer interposed in the beam which forms this image (a similar arrangement to that of the optical micrometers of the WILD theodolites) until one of the divisions is exactly in the middle of the stationary double thread. This line gives the reading of the whole degrees. During the movement of the image of the circle, the circle itself remains immovable. The image of the drum

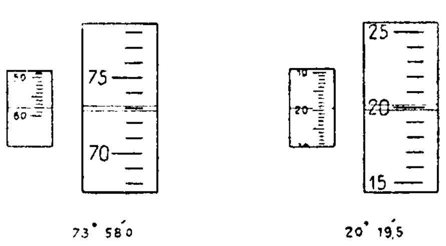



Fig. 1

(*) *Communicated by the Société Anonyme des Instruments de Géodésie H. Wild, Heerbrugg, Switzerland.*

moves at the same time as that of the circle; this movement is due to an actual movement of the drum, since the latter is rigidly connected with the parallel-faced glass wafer. The drum is read against the index formed by a line across the image; its graduation — in minutes, with every tenth minute numbered — is such as to enable an estimation to within a tenth of a sexagesimal minute to be made.

The sextant can be fitted with a coincidence level, visible in the field of the telescope.

This new sextant, while very compact and very robust, has been designed without losing sight of the importance of ease of adjustment and the possibility of replacing the different optical or mechanical parts.

The complete instrument weighs only 900 grammes (2 lbs.); its handy shape ensures an easy grip and perfect steadiness.

---

# THE COOKE 45° PRISMATIC ASTROLABE

by

COOKE, TROUGHTON & SIMMS, LTD (1)

---

The 45° Prismatic Astrolabe was designed by Instructor-Captain T. Y. BAKER, R. N., of the Admiralty Research Laboratory. So successful is this Astrolabe that the Hydrographic Department of the British Navy has adopted it as the standard equipment for the determination of position by astronomical means. The instrument is also being used successfully for this purpose in many other countries.

*General Description.* — The fundamental principles of the 45° Astrolabe are shown in Fig. 1. A pentagonal, or Prandl, prism *ABCDE* is held in the position shown. The faces *AE* and *CD* are silvered, but on the former a circular area of the silvering is removed. To this face *AE* is cemented a second prism *AEF* in which the angle *AEF* is 22½°, so that the faces *FE* and *BC* are parallel. Below, and in front of, the prism block is a mercury pool.

Light from a star at 45° altitude can enter the prism block: (*a*) after reflection at the mercury pool, when it passes through the face *FE*, through the opening in the silver of the interface *AE*, and then out through the face *BC*; (*b*) through the face *AB* and then, after reflection at the face *CD* and in the silvered part of *AE*, it also emerges through the face *BC*. The first beam has undergone one reflection, the second two. As the star rises or sets, the two emergent beams move in opposite directions, one upwards, the other downwards. The measurement is made when the two emergent beams coincide exactly in direction. If the prism could be made with absolute accuracy of angles and the observation made without error, the star would, at that instant, have an altitude of 45°. In practice, however, the zenith distance is not exactly 45° but, except for errors of observation and variations of refraction, it is a constant angle for all stars observed. The method of working out the observations automatically takes account of the fact that the angle, though constant, is not exactly 45°.

The instrument has a telescope for observing purposes and it is to be noted that this telescope acts merely as a magnifier and permits the instant of "contact" to be noted with higher precision. There is no requirement of accurate alignment of the telescope axis on the line of the emergent beam as there is, for example, in observations made with a theodolite where the inclination of the optical axis of the telescope with the vertical axis of the instrument must remain constant to a fraction of a second of arc. The light grasp of the telescope is sufficient to allow observations of stars of the sixth magnitude and generally a programme will be made of selected stars of this magnitude.

Various optical accessories are added to this fundamental arrangement in order to improve the ease of making observations. Contact between two bright stars is not an

---

(1) *Buckingham Works, York, England.*
15 & 17 *Broadway, Westminster, London, S.W.* 1.
See also *The Hydrographic Review*, Vol. IX, N° 1, May 1932, p. 218.