A NEW FRENCH NAUTICAL SEXTANT.

by

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A new sextant incorporating the most recent improvements known as well as several innovations was brought into practical use towards the end of 1950.

Let it be noted first of all, however, that improvements mainly involve convenience of the instrument in service and its optical system.

The following are the principal characteristics of this new sextant :

TELESCOPE : Astronomical telescope with erected image. The quality of the image and the clearness of the field are consequently better than with the *Galilée* telescope.

The body of the telescope is cylindrical and of lightweight metal; magnifying power : 6. The erectness of the image is obtained by a system of prisms so arranged that, for the greater convenience of the observer, the axis of the objective lens remains in appreciably close coincidence with that of the eyepiece. The optical part of the telescope is treated with magnesium-fluoride to increase the clearness and improve the sharpness of outline of the images. The graticule, engraved on glass, consists of two rectangular lines interrupted vertically by two solar diameters and in width by one only.

The luminosity of the telescope is such that, uniting all the qualities of special instruments, it replaces by itself alone the Galilée, astronomical and night telescopes.

No adjustment of the telescope in elevation is necessary. Practically it remains permanently mounted on the sextant, even when the latter is replaced in its case.

HORIZON MIRROR : The horizon mirror is circular, of large diameter and semi-transparent. Its adjustment and setting are very simple.

The advantage of the semi-transparency lies in the fact that by its means perfect coverage of the image of the celestial body on the horizon is obtained. Celestial body and horizon are thus seen in the whole field of the telescope and the pupil of the observer's eye is no longer compelled to effect the imperceptible but constant lateral movements which were necessary to catch alternatively a little more of the horizon then a little more of the celestial body. The latter procedure, owing to the persistence of the luminous impressions on the retina, permitted a coverage in time, now become unnecessary.

There is therefore no longer any need to adjust the telescope on its stand according to observational circumstances.

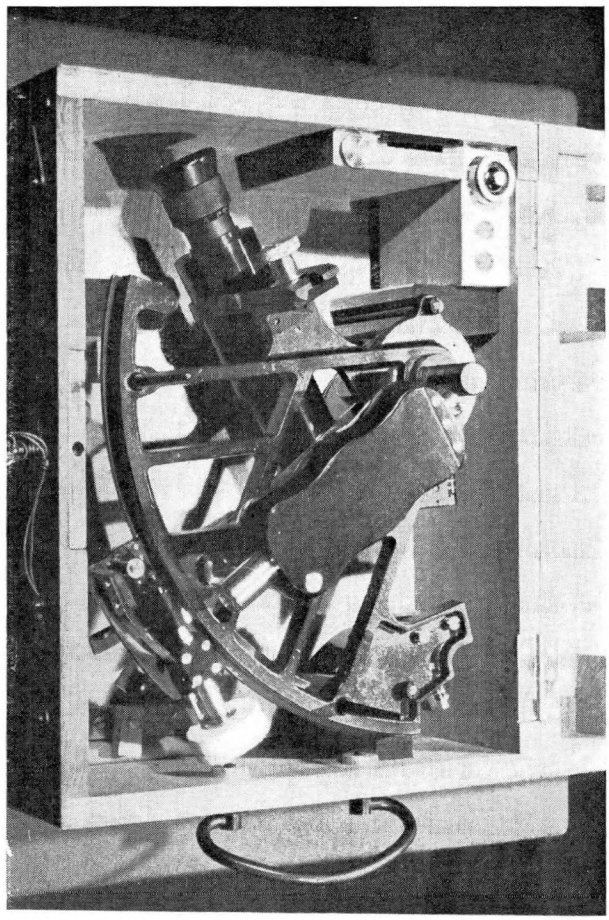

Fig. 1 : New Doniol Sextant.

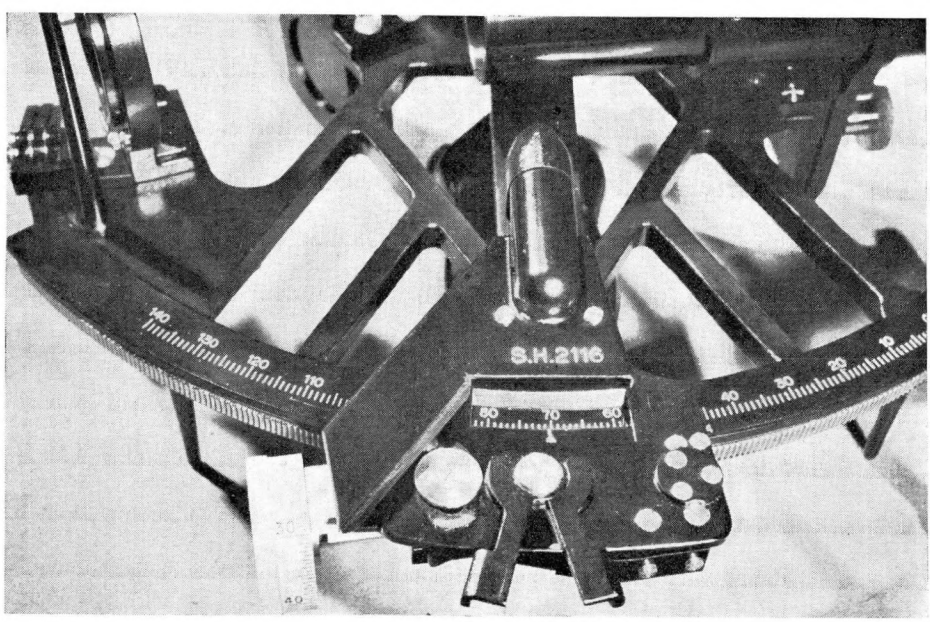

Fig. 2 : Nouveau Sextant Doniol.

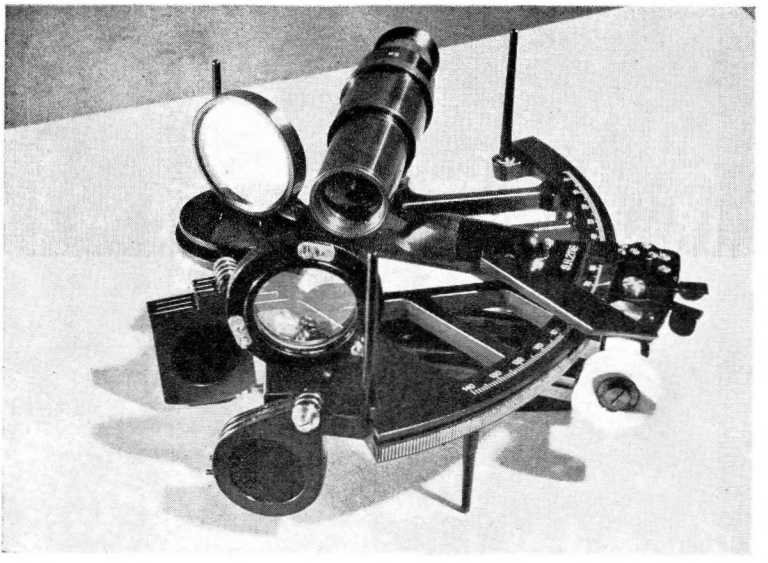

Fig. 3 : New Doniol Sextant

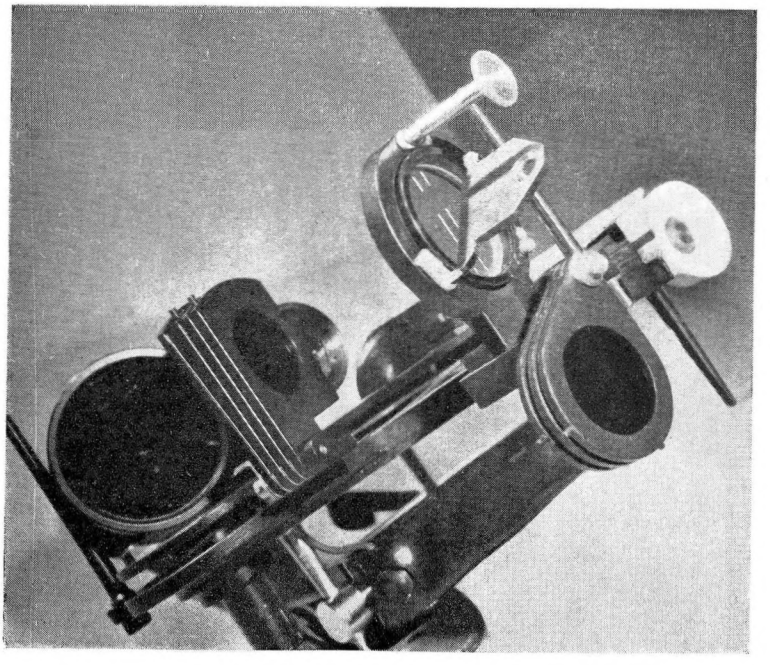

Fig. 4 : Nouveau Sextant Doniol.

The diameter of the horizon mirror corresponds to the field of the telescope.

LARGE MIRROR : The large mirror is also circular and of large diameter. It is rigidly mounted on the alidade, so that no adjustment of perpendicularity need be made.

SHADED GLASSES : The shaded glasses are of the standard type. On certain sextants, however, the shaded glasses of the large mirror are replaced by a « progressive » screen consisting of two thin polarizing plates; the desired shading is instantaneously and very exactly obtained by rotation of the movable plate. This system is of particular interest when observing with a constantly changing sky.

Moreover, each of the two mirrors is furnished with a lightly smoked glass so that perfect equality of the two images can be obtained in accordance with the respective day, night, or twilight degrees of luminosity of the sky surrounding them.

BODY OF THE INSTRUMENT : The body of the instrument is of lightweight metal specially treated to resist corrosion and particularly the effects of spray.

The alidade moves on a brass rack fitted to the body of the instrument.

The limb is divided in degrees and the drum of the tangent screw is divided in half-minutes of arc. The index does not carry a vernier but it is easy to estimate from it 10 or 15 minutes of arc.

Illumination for night readings is by an electric bulb held in a special recess; replacement of the bulb is immediate. The light, supplied by a cylindrical battery lodged in the handle on which contact is established, is flush with the limb and is very discreetly diffused both to the limb and the drum by means of an encased translucid plate. There are no projecting parts and it is of very workmanlike appearance.

By means of three supplementary stands fitted on the body of the sextant, the instrument may be placed on a table without both hands having to be used to turn it over. This convenient arrangement has the added advantage of partially ensuring protection of the more delicate parts, especially the mirrors.

Placing the sextant in its case, handle uppermost, involves the use of only one hand. Since the telescope remains fixed on its stand it suffices, when an observation is to be made, to open the box and withdraw the sextant using the right hand, and in this way an altitude may immediately be taken without even re-setting the telescope.

Packing of the instrument in the case has been studied with a view to ensuring excellent rigidity without danger of strain to the plane of the limb.

Accessories are reduced to a minimum and there is no cramping of space inside the case.

The principal innovations are protected by patents.