

fully round with a sharp knife, and varnish lightly over, either with the clear stuff used by the instrument makers, or with varnish that can be made on board, by dissolving sealing-wax in spirits of wine.

The glasses of some sextants seem fitted on purpose to invite the damp to penetrate between glass and silvered surface. These will want protection by sticking thin strips of paper along the edges exposed, and well varnishing. In some cases a stopping of thick amalgam, placed between the glass and the frame at the back, where there is one, will answer well, and prevent any damp getting at the back of the glass at all.

Amalga-
mated
Mercury.

The mercury which remains will contain tinfoil in amalgam, and should be preserved in a bottle by itself, draining off the thick of the amalgam by a sharply twisted paper funnel. It can then be used again for resilvering. Care must be taken not to allow any of this to get into the artificial horizon bottles, as the smallest quantity of it will spoil a whole bottle of pure mercury, and the amalgam can only be removed by evaporation.

Notwithstanding, mercury containing tin in amalgam can be used for artificial horizon work, by carefully sweeping the surface after it is poured out, with a piece of paper. Some observers have gone so far as to prefer amalgamated mercury for this purpose, but we do not agree, except when used in connection with the amalgamated trough described on p. 15.

Horizon
Glass

In resilvering an horizon glass, only the portion required should be operated on, leaving one half clear. The edge of the foil must be sharply and smoothly cut before applying the mercury, and not the smallest nick or cut permitted to remain in it.

SEXTANT STAND.

Though a practised observer will get good observations in an artificial horizon, with a sextant without a stand, he will get them far better *with* one, and in all work where accuracy is aimed at, a stand should be used.

Unsteadiness of hand, to which all are so liable, from previous exertion, indisposition, and many other causes, is put out of the question by using a stand.

With star observations this is especially the case, as it is

extremely difficult to hold the instrument in the hand firmly enough to prevent a little vibration of the images.

Sextant stands should be lacquered, not bright, and should have large heads to the foot screws, so as to be grasped easily while observing.

The bearing which carries the sextant should be accurately fitted into the socket in the handle, and should be very slightly conical. If too much so, it is liable to jam.

The counterbalances are usually too heavy for an ordinary sextant. They should be of such a weight as to balance the sextant without the screws at the ends of the pivot being set up too taut. Sometimes one weight is enough, or as much lead can be taken out of each as is necessary to reduce the weights to balance. The weights are now sometimes fitted to slide in and out, thus allowing of adjustment.

There is a great advantage in having the bearing which carries the sextant cut square. The circular motion in this form of stand is given by means of a large disc which is controlled by a clamp and tangent screw with a very coarse thread. The tangent screw enables the sextant to be kept pointed accurately to the Artificial Horizon as the sun or star changes its altitude, without the necessity of actually touching the sextant or moving it on its bearing by hand. This arrangement avoids the liability to jam, and the consequent exertion of force which may cause the sextant to move with a jerk, and throw out of the field the sun or star, thus disturbing the tranquillity of the observer and possibly losing one or two observations in consequence. Sextant stands of this pattern are made by Messrs. Cary and Porter.

Improved
Sextant
Stand.

The threads of the foot screws of the sextant stand should be of fine pitch.

A small level may advantageously be fitted to the arm of the sextant stand, so adjusted that when the arm is horizontal, and consequently the plane of the sextant vertical, the bubble is in the centre of its run. This adjustment is easily made whilst observing the altitude of the sun in artificial horizon, and making the suns cover during the process. This level, used in conjunction with the other level fixed on the Index bar of the sextant, ensures a star whose altitude is known, being found in the field of the telescope, when