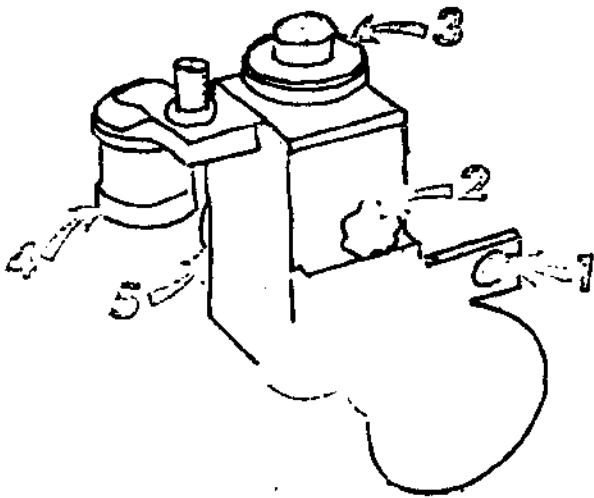


## INSTRUCTIONS FOR USE OF BUBBLE ATTACHMENT

### PLATH SEXTANT



1. Remove telescope from sextant and mount the bubble attachment. The mounting bracket (1) on the telescope and on the bubble attachment are identical, and fit the telescope holder on the sextant frame.

2. Plug the light wire into either light socket on the sextant handle. The bubble in the attachment cannot be seen without the light being turned on by pressing the light switch on the sextant handle. This prevents the light from accidentally being left on. A rheostat (2) on the bubble attachment adjusts the light intensity. If the light does not work clean the plug on the end of the wire and the unpainted area on the mounting bracket where the thumb screw on the telescope holder makes contact. The

light must be grounded to the sextant frame at this point in order to operate. The light bulb is located in the cap (3) which can be unscrewed for changing the bulb. Standard penlight batteries are used in the sextant handle.

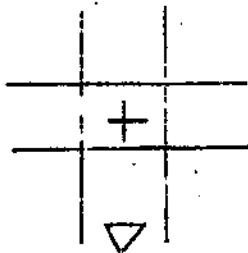
3. Hold the sextant in the normal vertical observing position and adjust bubble size. The knurled adjusting knob (4) is used to insert and remove the bubble in the field of view and to adjust its size. Turn the knob to the right to increase bubble size, and to the left to decrease. The bubble mechanism is delicate, and adjustments should be made slowly, never with a fast twist on the knob. For adjusting the bubble it must always be located in the triangle on the graticule in the field of view. This is accomplished by raising the front of the sextant. As will be noted on the attached leaflet there is a pressure compensating vessel containing air. Occasionally, especially if the bubble attachment has been stored with a large bubble in it, too much air will be in the bubble chamber causing the bubble to be excessively large. In this case the bubble will not always completely disappear when the adjusting knob is turned all the way out counter clockwise. In this case, it may be necessary to slowly turn the adjusting knob all the way in, as when enlarging the bubble, then back it off again. Repeating this procedure several times will reduce the bubble to proper working size.

4. The sextant is operated exactly as when using the natural horizon except that the bubble rather than the horizon is visible and the celestial body is placed in the center of the bubble rather than tangent to the horizon. Many observers prefer to use an elongating lens (astigmatizer) mounted on the index sunshade holder when making star observations as this elongates the star image from a point source of light into

a thin line. It is easier to judge when a line passes through the center of the bubble than when the point source of light star image is in the center.

5. The field of view through the bubble attachment is less than that of the standard 4 x 40 or 6 x 30 scopes on the Plath sextant. Most observers prefer to pre-compute the approximate star altitudes by using a star finder or sight reduction tables. This approximate altitude is set on the sextant readout and the star located in the field of view by searching at the approximate azimuth of the star.

6. When observing the celestial body the bubble should be approximately in the center of the field of view.



The graticule has a cross in the center to assist in this centering. In the field of view illustrated at the left this cross will be located above the triangle described above. If the bubble is vertically above or below the center of the field of view no appreciable error is introduced. The bubble located to either side of the cross will introduce a tilt error. This is the same as a tilt error which is avoided in regular sextant observations by rocking the sextant.

7. A small bubble should be used when making star observations as it is easier to estimate the center of a small bubble in the field of view. For observations of the sun or moon many observers prefer to use a bubble approximately the same size as the image of the body and superimpose one on the other.

8. The bubble attachment can be used as a regular three-power telescope using the natural horizon by removing the dark shade (5) which is snapped over the objective lens. When used as a regular telescope the light in the bubble attachment is not required.

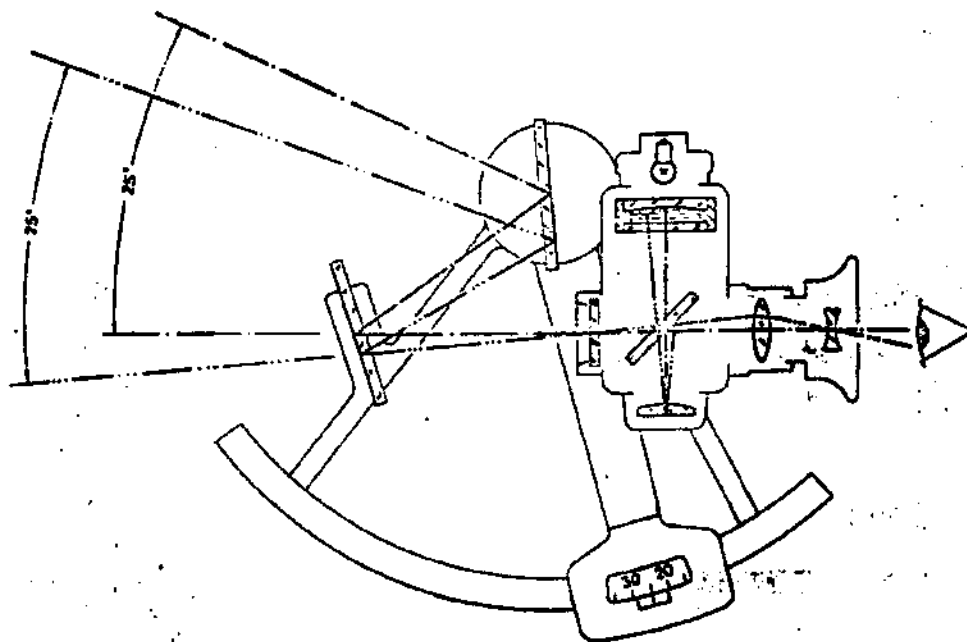
9. An adjusting screw is located on the bottom of the bubble attachment. The regular sextant adjusting key is used if adjustments are necessary. This adjusts the reflecting glass within the bubble attachment in the same manner as removing index error by adjusting the horizon mirror on the sextant. It should not be moved unless a large error is present. The attachment is factory adjusted when supplied on a sextant. If the attachment is purchased separately it may have to be adjusted to the sextant on which it is used. Alignment of the bubble attachment to the sextant can be checked using the natural horizon if the height of eye is known. To accomplish this the index arm is moved to near zero and an actual sight of the horizon is taken, placing the straight line of the horizon through the bubble. The reading on the sextant should then equal the dip of the horizon at that height of eye taken from tables. Any difference between the computed dip and that read on the sextant can be used as a correction.

10. Sights obtained with the bubble attachment are reduced in the same manner as observations except that dip correction is not applied, and semidiameter correction for the sun and moon is not applied. Do not expect as much accuracy with a bubble horizon as with the natural horizon as the roll and pitch of the vessel creates accelerations on the bubble. It is best to average or graph several sights, at least six, taken in rapid succession on each body. The greater number of observations that are averaged the better. This eliminates the large random error

of a single observation of a body.

11. The bubble attachment should be stored with the adjusting knob in a neutral position, not screwed all the way in or out.

12. The Plath bubble is designed for marine use and although it does not produce the accuracy obtainable with a clear natural horizon, it does permit the taking of observations at night or when the horizon is obscured by fog or haze, and the celestial body is visible. As in the case of any observing instrument accuracy will increase with practice and familiarization with the instrument.



Bubble attachment; principle of operation

WEEMS & PLATH, INC.  
Annapolis, Maryland 21401