

*The Observations Mr. Robie made on the Solar Eclipse, Nov. 27, 1722, were as follows:*

H.	'	"	
7	27	00	He saw the Sun rise eclipsed about four Digits on his supreme Vertex; to the S W the greatest Part of the Shade lay.
			Then we could observe no more 'till
8	30	00	The Sun began to appear, and six Digits, or thereabouts, were eclipsed.
8	55	15	The Sun was eclipsed $4\frac{1}{2}$ nearest; and then the Sun's Diameter was to the Moon's, as 1000 to 972.
9	00	15	Were hid $4\frac{1}{2}$ nearly; and the Sun's Diameter was to the Moon's as 1000 to 975.
9	19	45	A little Spot on the Sun emerged.
9	25	45	I saw the Moon go off the Sun, and Mr. <i>Danforth</i> at the same Time: And Mr. <i>Appleton</i> at
9	25	20	

II. *The Description of a new Quadrant for taking Altitudes without an Horizon, either at Sea or Land. Invented by Mr. John Elton.*

**T**HIS Instrument contains four principal Parts, viz. a Frame, an Index, a Label, and a Shield; and these consist of several Parts. (*Vid. Tab.*)

The

The Frame has two Parts, one a graduated Arch of 30 Degrees, each Degree being subdivided into six equal Parts; the other a Chord of an Arch of 60°, divided into two equal Parts (at the Extremities and in the Middle of which are Holes or Stops for the Label) together making 90° or a Quadrant.

The Index turns upon the Center of the Frame the whole Compass of the Arch, and has three Parts; *viz.* a *Nonius* Plate, an Eye-Vane, and a Tube. The *Nonius* Plate moves with the Index, and subdivides each of the small Divisions of the Arch into ten equal Parts or Minutes. The Eye-Vane is to look through in forward Observations. The Tube is to shew, when the Index is horizontal.

The Label moves upon the Center of the Frame the whole Compass of the Chord of the Arch of 60°, having three fixed Stations thereon, at 30°, 60°, and 90°, and contains two principal Parts; *viz.* a Lens, and a Lanthorn. The Lens is to form the Sun's Image upon the Shield. The Lanthorn is necessary in Nocturnal Observations.

The Shield is fixed in the Center of the Frame, and has three Parts; *viz.* an Azimuth Tube, a Horizontal Tube, and an Axis, or in Backward Observations a Ray-Plate. The Hole in the Shield is to receive the Sun's Image. The Azimuth Tube is to direct the Plane of the Instrument perpendicular. The Horizontal Tube is to shew when the Label is level. The Axis is to cut the Object in forward Observations.

*Rule for either backward or forward Observations.*

If the Altitude does not exceed  $30^{\circ}$ , the Label must be placed at the Station on the Radius or longest Limb of the Quadrant; if the Altitude is between  $30^{\circ}$  and  $60^{\circ}$ , at the middle Station; and if the Altitude exceed  $60^{\circ}$  at the uppermost Station.

*To take the Sun's Altitude by a backward Observation.*

This is done without using the Sight-Vane or Horizontal Tube on the Shield. Hold the Quadrant with both Hands in such a manner as is aptest for keeping it steady, the Back of the Arch being turned toward the Sun. When the Bubble of the Azimuth Tube is brought under the Hole in the Shield, cause the Sun's Image to fall on the Hole in the Shield, so that it may rest in the Center of the Sun's Image; the Instant the Azimuth Tube and Sun's Image are thus regulated, see if the Bubble in the Horizontal Tube on the Index (which 'till then is disregarded) leaves the open End of the Tube, or stops any where clear of the Ends of the Tube: If these happen at the same Juncture, the Altitude is then truly taken; but if the Bubble had remained in the enclosed End of the Tube, when the Azimuth Bubble and Sun's Image were regulated, the Index must have been slid up; and if tarried in the open End, moved down, until the Horizontal Bubble on the Index quit the open End of the Tube, or stop between the Ends, as was before observed; and then is the Quadrant set. In continuing the Observation for a Meridian Altitude, the Quadrant being

being set, as the Sun rises, the Horizontal Bubble on the Index will not quit the open End of the Tube, or stop between the Ends, but hang there, or leave it after the Azimuth Bubble and Sun's Image have been regulated, which will require the Index to be continually moved down in order to keep the Quadrant set. When the Sun is up, or on the Meridian, the Quadrant will remain set for some time ; and on the Sun's falling, the Horizontal Bubble will have a reverse Tendency inclining or running wholly to the enclosed End of the Tube.

*To take the Altitude of the Sun or Stars by a forward Observation.*

In this Method, the Lens and Tube on the Index are disregarded. Hold the Quadrant vertical, and looking through the Eye-Vane, direct the Axis or upper Edge of the Shield to the Sun or Star ; if the Axis cut the Sun or Star at the same Instant that the Bubble in the Horizontal Tube on the Shield quit the open End, the Altitude is then truly taken, and the Quadrant set. But if it should leave the open End of the Tube before the Axis or upper Edge of the Shield cut the Sun or Star, then the Eye-Vane (or which is the same, the Index) must be slid down ; and if it remain at the open End, or quit it when the Axis is above the Sun or Star, moved up until the Quadrant is set. In continuing the Observation for a Meridian Altitude, as the Sun or Star rises, the Bubble in the Horizontal Tube will always quit the open End of the Tube before the Axis cut the Object ; so that to keep the Quadrant set, the Eye-Vane must on every such Alteration be constantly moved down ; while the  
Sun

Sun or Star is on the Meridian, the Quadrant will remain set; and when the Sun or Star falls, the Bubble will act contrary to what it did in the rising, resting wholly in the open End of the Tube.

*To take the Sun's Altitude with the Horizon.*

Turn the Back of the Arch towards the Sun, and cause the Sun's Image to fall on the Hole in the Shield, at the same time looking through the Eye-Vane, cut the Horizon with the Axis.

*N.B.* In taking the Altitude of the Stars, a small Light must be fixed in the Lanthorn; the less the better. It will be best in forward Observations of the Sun, to take the Altitude of the upper Limb, allowing for the Semidiameter; and when the Sun is very clear, take his Altitude by a backward Observation, the forward Method being chiefly intended for Nocturnal Observations, and when the Sun is too much obscured to give any Shade or Image.

There was at the same time laid before the *Society*,  
 “ An Extract made by Mr. *Elton* of Observations of  
 “ the Latitude from the Journal of Capt. *Walter*  
 “ *Hoxton*, Commander of the Ship *Baltimore* from  
 “ the River of *Thames* to *Maryland* on the Conti-  
 “ nent of *America*, by *Davis's* (or the common)  
 “ Quadrant with the Horizon, and by Mr. *Elton's*  
 “ (a new invented Quadrant) without the Horizon,  
 “ *Anno Dom. 1730.*”

From this Extract it is observable, that in moderate Weather the Difference of the Observations, made

by the two Sorts of Quadrants, was commonly no more than 1'; with strong Gales and a large Sea 5'; in fair Weather; in hard Squalls; the Sea running high, 6'; in easy Gales 9'; in fair Weather and a large Swell 16'; once in smooth Water 16'; and the greatest Difference of all was, with fresh Gales, 21': And this Difference was constantly found to give the Latitude more Northerly by Mr. *Elton's* Quadrant than by *Davis's*; as in this last mentioned Instance the Latitude appears to be 35° 39' N. by *Davis's*, when Mr. *Elton's* makes it 36° N. There is a Note added by Capt. *Hoxton* at the End of this Journal; *viz.* *That the Difference at different Times between Davis's and Elton's Quadrants is occasioned by shifting the Shade-Vane of Davis's.*

To this Journal were annexed some "Observations of the Latitude by the fixed Stars in the foresaid Voyage by Mr. *Elton's* Quadrant, without using the Horizon."

These Observations are generally taken from two Stars, and the Latitude calculated from each Observation; and so they are found to agree commonly within 4' or 5'. The greatest Difference arose once to 13'. When by an Observation taken by \* *Syrius*, the Latitude was found to be

Course inter	42° 46' N.	by * <i>Procyon</i> 42° 56' N.	
Obf. SSW.		Where the Dif- } 13' N.	
S 3' ½	0° 3'	ference is } 13' N.	
	42° 43'		

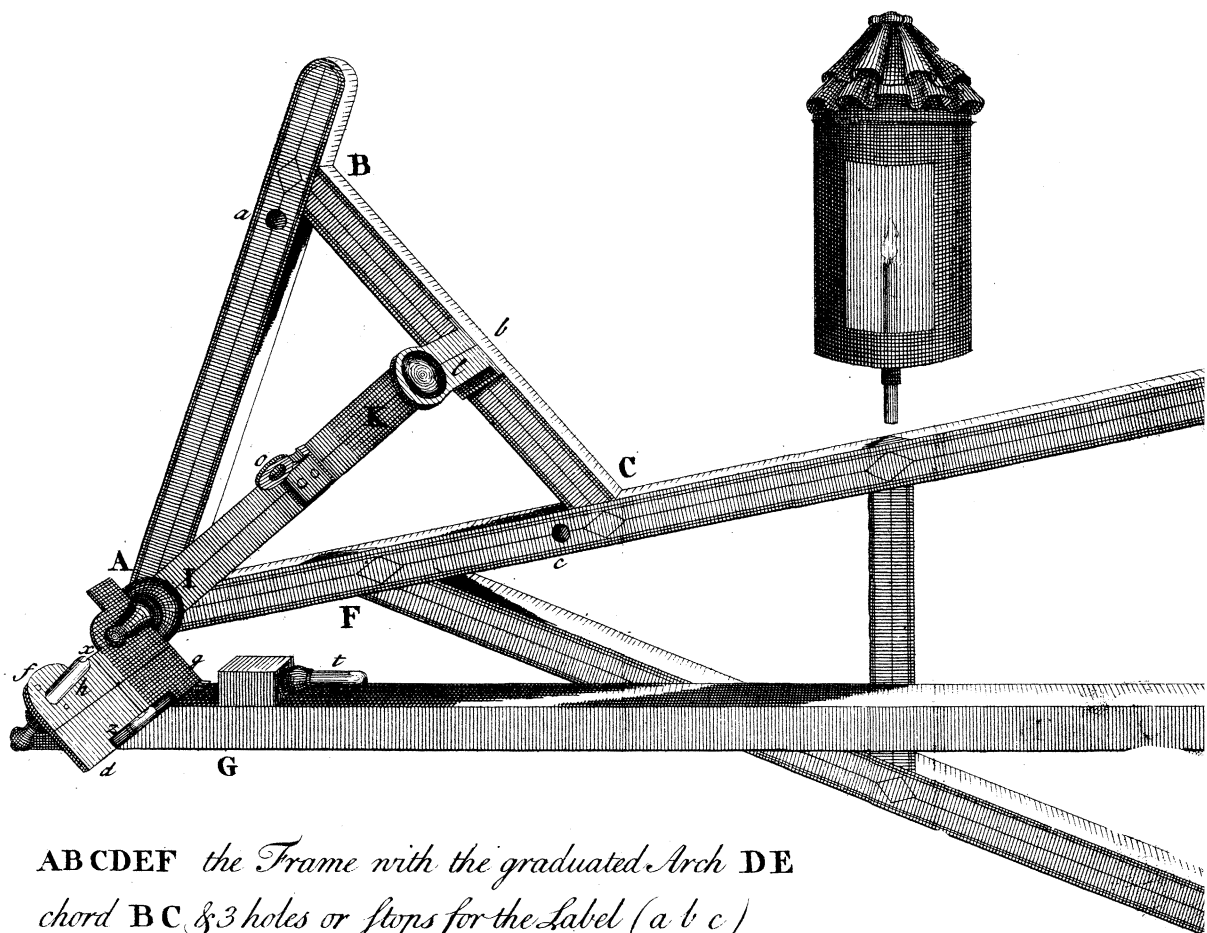
Capt.

Capt. *Hoxton*, when at Anchor in *Chefeea-Peak* Bay, found the Latitude  $37^{\circ} 29'$  N. Off *Cedar Point* in *Potuxon* River  $38^{\circ} 7'$  N. Off *Cape Henry*  $37^{\circ} 6'$  N. And in a Letter to Mr. *Elton* he declares, " That he observed with his Quadrant both " by the Sun and Stars, in all the various Sorts of " Weather he met with in his late Voyage to and " from *Maryland*, without regarding the Horizon, " with as great Exactness, as with *Davis's* Quadrant " when the Sun and Horizon were clear."

There was likewise put into the Hands of the Publisher, another Letter from one Mr. *John Walton* to Mr. *Elton*, containing some Observations of the Latitude in *Leghorn* Road, and several of the Ports of *Spain*, which were found, after repeated Experiments, exactly to agree with the known Latitudes of those Places: Mr. *Walton* adds, That he made several Observations in his Passage Home, in hard Gales, and a great Sea, and when it was so hazy, that the common Quadrant was of no use, for want of an Horizon.

III. *A remarkable Case of a Gentlewoman who died of a Hydrops Ovarii, in the Thirty-third Year of her Age, after having been tapped Fifty-seven times. By Mr. John Belchier, Surgeon.*

IN the Year 1725, the Wife of Mr. *Newberry*, a Merchant in this City, complained of a Pain in her Left-Side, near her Groin, internally, which sensibly



**ABCDEF** the Frame with the graduated Arch **DE**

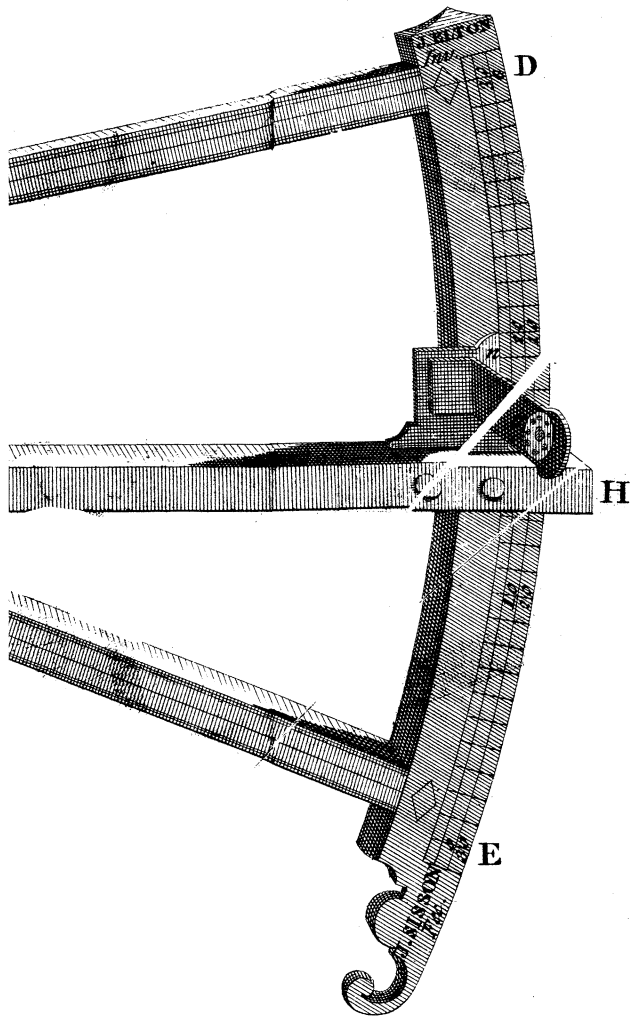
chord **BC** & 3 holes or stops for the Label (*a b c*)

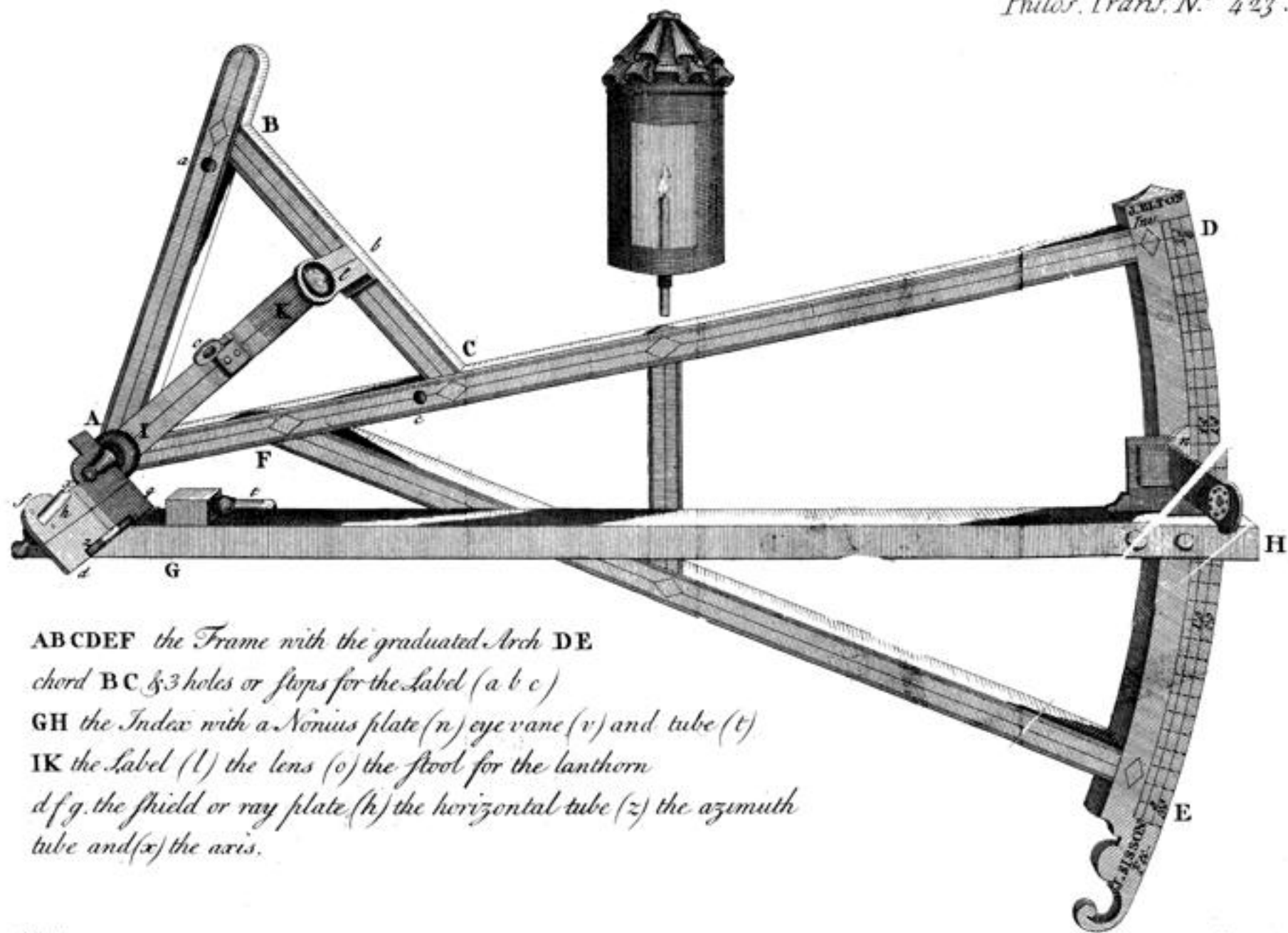
**GH** the Index with a Nonius plate (*n*) eye vane (*v*) and tube (*t*)

**IK** the Label (*l*) the lens (*o*) the stool for the lanthorn

*d f g* the shield or ray plate (*h*) the horizontal tube (*z*) the azimuth tube and (*x*) the axis.







*ABCDEF the Frame with the graduated Arch DE  
 chord BC & 3 holes or stops for the Label (a b c)  
 GH the Index with a Nonius plate (n) eye vane (v) and tube (t)  
 IK the Label (l) the lens (o) the stool for the lanthorn  
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 tube and (x) the axis.*