It seems unlikely, to say the least, that on three occasions at widely separated intervals and with different instruments to make the settings for place, the same error should be made, and the same pair, or one very similar, should be found without any trouble whatever. No entry appears in my observing book for 1878 to indicate any difficulty in finding H 165, or any correction to his place, and the same is true of the observation twenty-three years later. But after all, the trouble may be due to a series of some sort of mistakes hard to understand now, but perhaps easily explained when the star is again found. It is possible of course that this may turn out to be the long looked for variable double, and found in the recorded place where it should be according to the previous observations, and if so, it will be a most interesting pair for measurement hereafter.

Should anyone find this lost, strayed or stolen member of the universe he will please return it to the writer, and no questions will be asked. I expect to find it myself sooner or later. I am anxious that this should be done in some way in order to ascertain how many different kinds of blunders I have committed in my dealings with this star.

YERKES OBSERVATORY,
April 23, 1903.

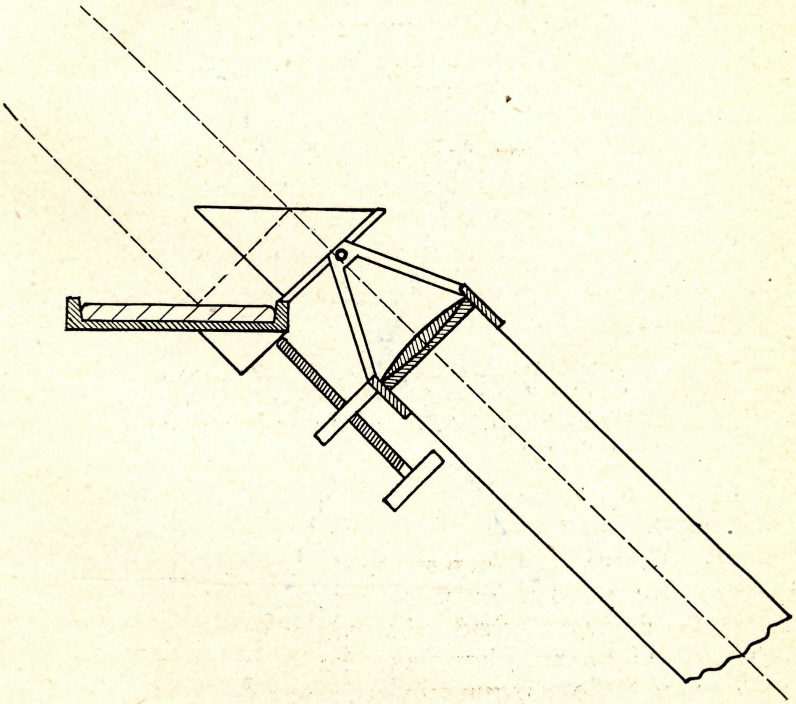
A NEW ALMUCANTAR.

A. E. DOUGLASS.

May 1903

FOR POPULAR ASTRONOMY.

The recent publication of W. E. Cooke's new and accurate method of making time, latitude and azimuth observations with a surveyor's transit, suggests a new form of Almucantar. In this new form an artificial horizon replaces the spirit level of Cooke's method and the large mercury cistern of Chandler's. The new plan is a simple one and can be applied to any telescope that rotates about a vertical axis. An adjustable right angled prism (or a mirror) is attached to the telescope tube and covers a portion of the lens. This receives the star's light reflected in an artificial horizon; so that two images of the star may be seen at the same time. If, now, the prism be adjusted on the pole star, for example, so that the two images (the direct and twice reflected) exactly coincide, then at whatever azimuth the telescope is pointed, it will mark a zenith distance the same as the pole star's when the two images of any star are made coincident. Therefore after adjusting it on the pole star at a known time, the instrument is turned to the approximate place of the star whose transit across the horizontal thread is to be observed; and as soon as the star comes into the field, the elevation of the telescope is changed by a slow motion screw until the two images coincide, and the transit observed. Or, if the two images are not too far apart the transit of each may be taken and the mean time of the two used.



It is not difficult to understand that this device accomplishes this result. When the two images of any star are in coincidence, the reflecting surface of the prism must be parallel to the surface of the mercury and therefore perfectly horizontal. Hence at any azimuth the coincidence of the stellar images indicates that the reflecting surface of the prism is perfectly horizontal and therefore that the telescope is pointing at the zenith distance for which the instrument is adjusted.

So much for the principle. In its application, we need some simple device for holding the prism so that it can be adjusted to any desired zenith distance and we need a support for the mercury basin. The first may be accomplished by a simple hinge motion and a butting screw working against a spring or the weight of the mercury. And as the prism and mercury basin are always in the same relative position, the second result can be achieved by attaching these together and mounting them on the objective end of the telescope tube with a counterpoise at the other end. The mercury basin may have its sides enclosed by metal and a cover glass at the outer end to exclude the wind.

Furthermore, if a graduated arc be attached to the prism, the instrument may be used to measure altitudes by the artificial horizontal method.

Such an apparatus as this, for determining altitudes, latitudes, time and azimuth could therefore be made to fit on the end of any telescope that rotates about a vertical axis.

FLAGSTAFF, Arizona,
April 13, 1903.

A RELATION BETWEEN THE MEAN SPEED OF STELLAR MOTION AND THE VELOCITY OF WAVE PROPAGATION IN A UNIVERSAL GASEOUS MEDIUM BEARING UPON THE NATURE OF THE ETHER.*

LUIGI D'AURIA.

In the *Philosophical Magazine* for August, 1901, Lord Kelvin pointed out that an infinite ether must of necessity be *imponderable;* that is a substance outside the law of universal gravitation, leaving the alternative, however, that a gravitational ether may be admitted, occupying only a finite volume of space. Such an ether could exist only as an immense gaseous globe, and if w denotes the density of this globe at any distance z from the center; w_0 the mean density of the concentric sphere of elementary gas of radius z; S the distance which separates the solar system from the center of the universal gaseous globe; σ the density of the gas in this system; k the constant of gravitation; then, on the supposition that the gaseous globe is in equilibrium of temperature, so that the mean square speed u of the elements of matter throughout its volume is constant, we would have the equation

$$\tfrac{1}{3}u^2 d\mathrm{w} = \tfrac{4}{3}\pi z^3 w_0 \times \frac{kwdz}{z^2},$$

* Reprinted from Journal of Franklin Institute, May, 1903.