

9. A flagstaff a feet high stands on a tower $3a$ feet high. An observer on a level with the top of the flagstaff finds the angle subtended by the flagstaff equal to the angle subtended by the tower. Determine in terms of a the distance of the observer from the top of the flagstaff.

Let x = distance of observer from top of flagstaff, and θ = angle subtended by the eye in the two positions. Then

$$\therefore \tan \theta = \frac{a}{x} \text{ and } \tan 2\theta = \frac{4a}{x} = \frac{2 \tan \theta}{1 - \tan^2 \theta} \therefore \frac{4a}{x} = \frac{2 \cdot \frac{a}{x}}{1 - \frac{a^2}{x^2}}$$

$$x = a \sqrt{2}.$$

ASTRONOMICAL NOTES.

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If one looks over the very long lists of interesting telescopic objects in heavens, to be found in various text books, the impression is gathered that the skies have been pretty well scoured; yet the Royal Astronomical Society publishes a list of nearly 100 new nebulae, all discovered by the veteran Dr. Lewis Swift, at Echo Mountain, California, during 1897. These objects are mostly faint, small, cloudy-looking masses, but they afford evidence of the wide diffusion of nebulae, worlds in process of formation, it may be whole systems, in an early stage of evolution. Although the amateur cannot expect to rival the constant observer in a well equipped observatory, it is still possible to add a little, even in the field of nebula discovery, by close attention when there is opportunity. Seeing an object for the first time, the first thought is that some one else must have observed it also, that it is well known. The place for the amateur, however, should be to note the object as provisionally new, and announce it. It is a matter of some regret that Canadians are not more to the front in the line of discovery.

Since Jupiter became so favorably situated for observation there has been considerable discussion regarding the longevity, so to speak, of some of the more conspicuous spots upon the disc. The well known "red spot" has been

observed steadily for 20 years, while occasional observations are recorded here and there for 30 years previous. Other notable spots have been seen continuously for a shorter period, but still long enough to render their final disappearance a curious phenomenon. One change in Jupiter's appearance this year is noticeable even in a small telescope, that is the ill-defined condition of the equatorial belts. They do not stand out so beautifully as they did a year ago; and with difficulty only are two of the belts seen at all, while last year's record was good seeing of four belts in a two-inch telescope.

Towards the end of May we have Saturn in opposition to the sun and in best position for observation. With an angular diameter of 16 seconds of arc, and the rings broadly opened out, the planet will be a beautiful object. He does not attain a greater altitude than about 27 degrees, but in the clear evenings of the summer that is high enough to allow of good definition. There has been some dispute regarding the number of satellites of Saturn visible in a good three-inch telescope. Four of the eight attendants have been reported, and a gain declared impossible. In taking up this work of observing the satellites it is very important to first study the region where Saturn happens to be, as it is very easy to mistake a star for one of the little moons. Their motion is slow, and this adds to the difficulty of identifying them.

Mercury reaches greatest elonga-