these angles being all less than 1′. Show that $p = \frac{1}{2}\alpha\left(\frac{AD}{VD} - 1\right)$.

22. In Ex. 21, if $\left(\frac{AD}{VD}\right)^2 = \left(\frac{365}{224}\right)^2$, find p when $\alpha = 46''.8$.

(p is the sun's horizontal parallax, *i.e.*, the angle subtended at the sun by the earth's radius).

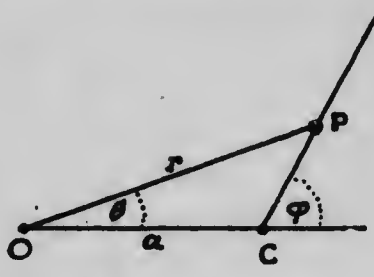
23. $OC = a$ and $OP = r$ are fixed lengths, and θ, φ are variable angles, θ being generated uniformly. Show

(i) $\cot \varphi = \cot \theta - \frac{a}{r} \operatorname{cosec} \theta$.

(ii) If $a > r$, φ can never be a right angle.

(iii) If $a = r$, $\varphi = \frac{\pi}{2} + \frac{\theta}{2}$.

These enter into the theory of eccentric motion.



24. Prove the following:

(*a*) $r_1 r_2 r_3 = s \triangle = rs^2$.

(*b*) $r r_1 r_2 r_3 = \triangle^2$.

(*c*) $a = 2R \sin A$, where R is the circumradius.