133. From the top of a mountain, h miles high the visible horizon appeared depressed a degrees; it is required to show that, if d be the distance of the boundary of the visible horizon, and D the diameter of the earth, $d = h \cot. \frac{1}{2} a$; $D + h = \cot^2 \frac{1}{2} a$. Let A B be the height of the mountain, BC the diameter of the earth; $\angle$ DAF the dip, and AF the distance of the horizon. Join CF and FB, and produce them to meet a line through A at r$\angle$s to ABC in D and E. Now the $\angle$ D is common to the

r$\angle$d triangles D F E and D E C; $\therefore$ $\angle$ C = $\angle$ E; but $\angle$ A F E = $\angle$ C; $\therefore$ A F E = E; hence A F E and A E F are each = $\frac{1}{2}$ D A F = $\frac{1}{2}$ a, and A F = A E. Again $\angle$ D is the complement of $\angle$ E, and A F D the comp. of A F E; hence $\angle$ A F D = D and A F =