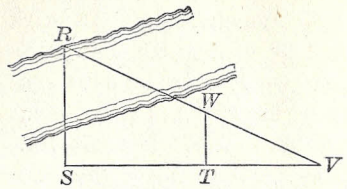
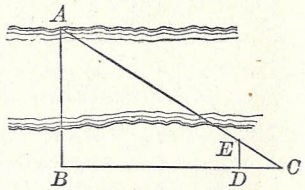
3. Wishing to ascertain the distance between two houses, R and S, on opposite sides of a stream, I measure a line SV, at right angles to SR, 200 feet. At T, 90 feet from S, the perpendicular TW measures 60 feet. Required the distance SR.



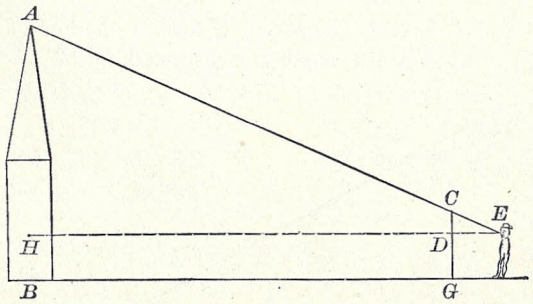
$VT : TW :: VS : SR$ $\quad VT = VS - ST.$

4. Beginning at B, 100 feet from the bank of a river, a line, BC, is measured 1,200 feet long. At D, distant from C 50 feet, the perpendicular DE is found to measure 90 feet. What is the distance from B to A, a tree on the opposite bank? How wide is the river?

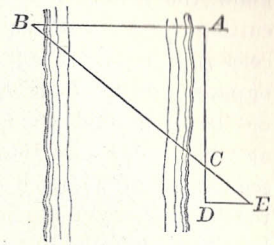


5. A boy, whose eye (E) is 4 feet from the ground, can just see the top (A) of a steeple when he stands back 3 feet from a fence (CG) 6 feet high. The distance from the foot of the fence to the center of the base of the steeple is 177 feet. Find the height of the steeple AB.

$CD = ?$ $\quad EH = ?$ $\quad ED : CD :: EH : AH$

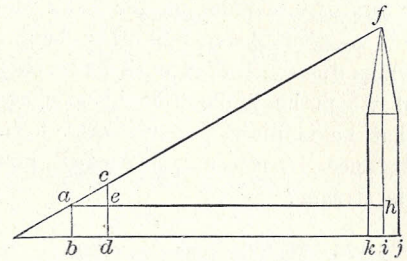


6. Wishing to ascertain the distance AB, I measure a line, AD, at right angles to AB, 12 chains; DE, at right angles to AD, 5 chains; and find that a line sighted from E to B intersects AD at C, distant from D 3.25 chains. What is the distance from A to B?



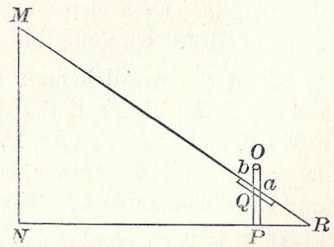
NOTE. — The triangles DCE and ACB are similar. Why?

7. Wishing to find the height of a tower fi, I set up a pole, cd, 12 feet long above the ground. Another pole ab, $4\frac{1}{2}$ feet above ground, is set up at such a distance that the tops of the two poles and of the tower are in a line. The distance between the poles (ae or db) is $10\frac{1}{2}$ feet. The distance from d to the foot of the tower is 195 feet. The width of the tower (kj) is 30 feet.



The similar triangles aec and ahf give us the proportion $ae : ah :: ec : hf$. What is the distance ec? $ah = bi = bd + dk + ki$. $ki = \frac{1}{2}\, kj$. When fh is found, what must be added to get the height of the tower?

8. To determine the height of a building, MN, a person attached a strip of wood, ab (a tin tube or a piece of narrow pipe would be better), to a post, OP, in such a manner that sighting from a, he could just see M, the top of the building. He then sighted down from b, and marked on the ground the point R, on a line with ab.



PQ was found by measurement to be 4 feet, RP 6 feet, PN 120 feet. Required MN.