

not only to measure inaccessible distances on the earth's surface, but also the distances to the sun and moon and planets, culminating in our knowledge of latitudes and longitudes and of the figure of the earth and how to find our way about it and trace out the trajectory of a comet on the celestial concave, with the same facility the engineer makes proof of in running a straight or curved road amidst the forests and waters of the earth.

And with other curves than the circle, as the parabola; there is nothing so beautiful as to entrance one at its mere appearance or on considering its properties in the abstract; but how all this warms into admiration, when we find that a study of its form permits us with unerring accuracy to throw a shell into the fortress of the enemy—to calculate how high, how far a jet of water from a reservoir, from a fire hose will reach; and when applied to a speaking trumpet will concentrate the voice and allow it to be projected to a distance; or the curve suited to a reflector which in a light house gathers the rays of light and sends them off together on their errand of humanity.

And on a smaller scale, a more modest and elementary; if you would interest the pupil in the describing of a circle in a triangle, tell him how this will or may be some day utilized by him in his trade of tin or copper smith or plumber, in cutting from a triangular piece of metal the biggest bottom of an oyster can or water pail, the piece may be susceptible of; or a milliner the crown of a hat or bonnet from a three cornered piece of paste board, or the bottom of a basket.

No adequate idea can be formed of the difference in the time of learning a thing by doing it oneself instead of merely being told how to do it. No doubt the mere looking at the figure of what is to be done as, to describe a triangle of which the three sides are given, to bisect an angle, to erect or let fall a perpendicular, the following up the process with eye intent is a step toward the full understanding of the thing to be done; but how much more thoroughly is the thing not understood, when you put your hands to it, your own hands; as had you in joinery to so match two boards as to make a perfect joint, no amount of telling, nothing but an oft repeated trial at the thing could render you successful in its accomplishment.

This system the writer during his long career in the education of his fellows has always carried out. Having for years had as many as a dozen students in his office, in preparation as Technologists, in Engineering, Architecture, Land Surveying, every one of them was made to do the thing required. It did not suffice for one of them to look on while another held the ruler, another the dividers and a third the pencil; no! each of them had to perform the operation. In this way three months sufficed for the whole teaching of plane and spherical geometry and trigonometry, the mensuration of all areas and the