THE PRINCIPLE OF THE GEOMETRIC SQUARE

MEASURING

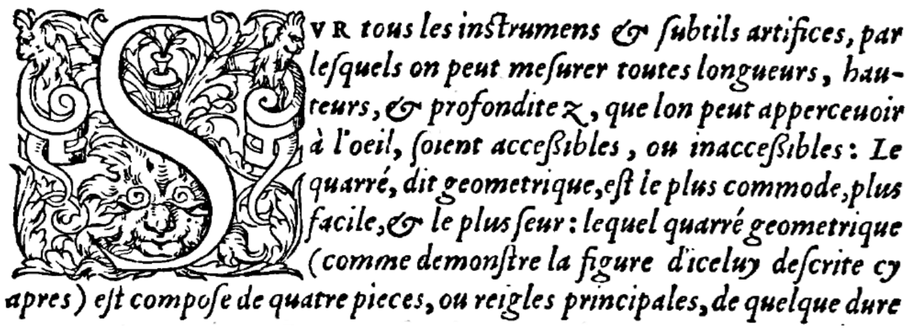
ORONCE FINE (1494-1555)

was a French mathematician, astronomer and cartographer. He was also a prolific inventor and manufacturer of mathematical instruments and sundials

Excerpt from the

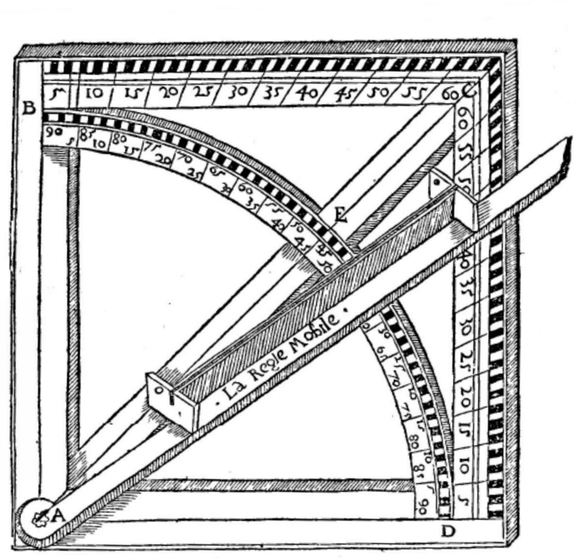
"*Composition and Use of the geometric square*"

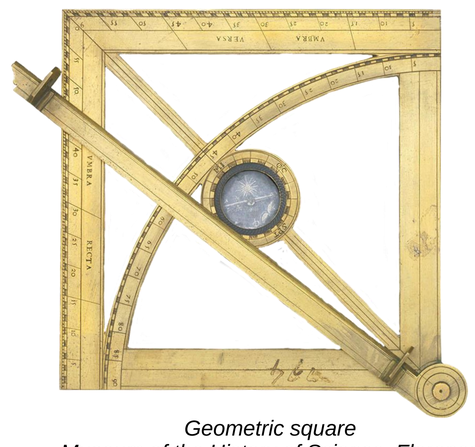
by Oronce FINE



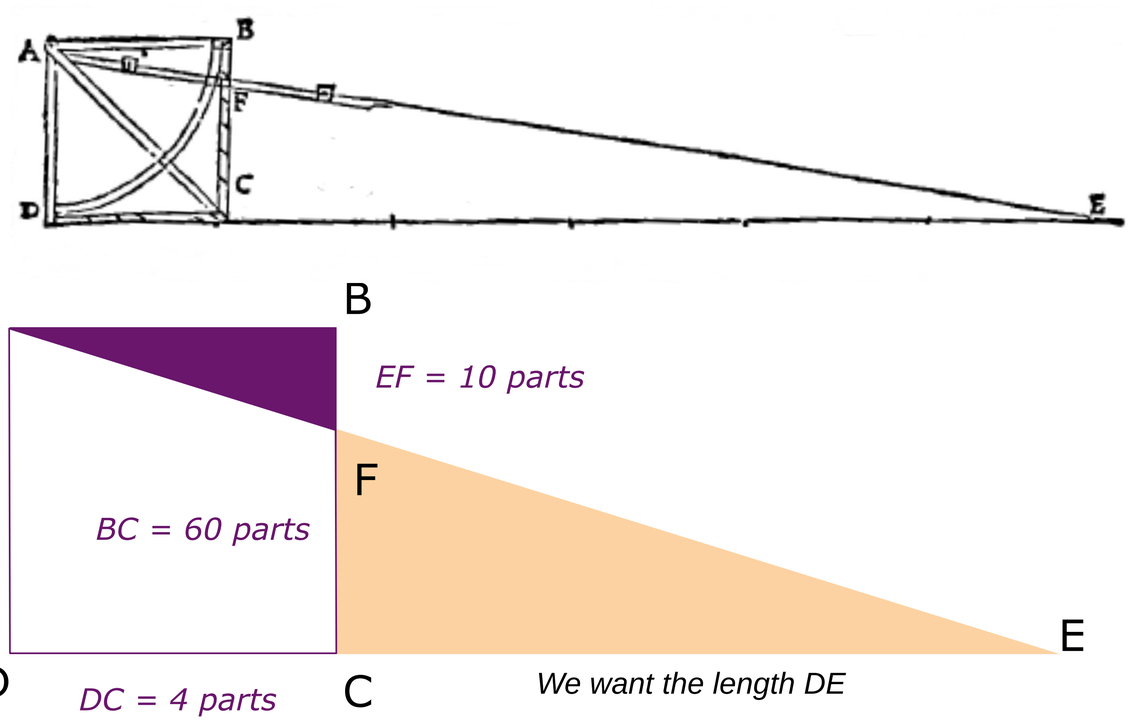
SVR tous les instrumens & ſubtils artifices, par leſquels on peut meſurer toutes longueurs, hauteurs, & profondite z, que lon peut apperceuoir à l'oeil, ſoient acceßibles, ou inacceßibles: Le quarré, dit geometrique, eſt le plus commode, plus facile, & le plus ſeur: lequel quarré geometrique (comme demonſtre la figure d'iceluy deſcrite cy apres) eſt compoſe de quatre pieces, ou reigles principales, de quelque dure

Of all the instruments and subtle devices with which one can measure all lengths, heights and depths that can be seen by the eye, be they are accessible or inaccessible: the square, called geometric is the most convenient, the easiest and most sure, which geometric square (as shown in the diagram subsequently described) consists of four parts or principal rulers ...





Geometric square
Museum of the History of Science, Florence



Now consider the following case, by way of example: we want to measure the length DE of the following figure. Make the corner D of geometric square ABCD coincide with it.

With the mobile ruler, target the point E which cuts the side BC at F.

In this example the side BC is divided into 60 parts and the length of BF is 10 units. Taking into account that the length of the side of the square is 4 feet, the length DE is then 24 feet

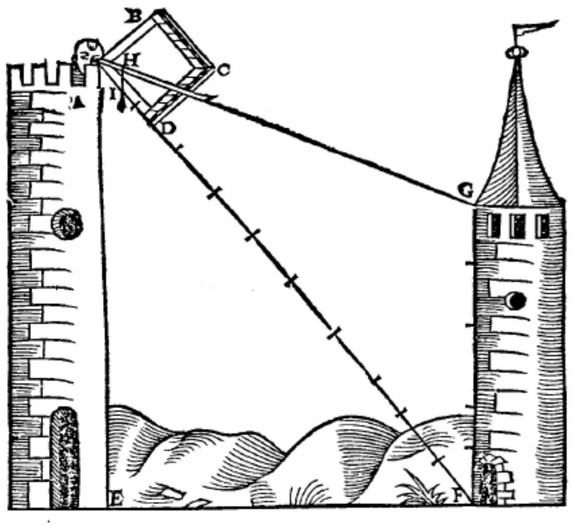
Applying the property of Thales, we have:

$$DE = DC \times \frac{BC}{BF}$$

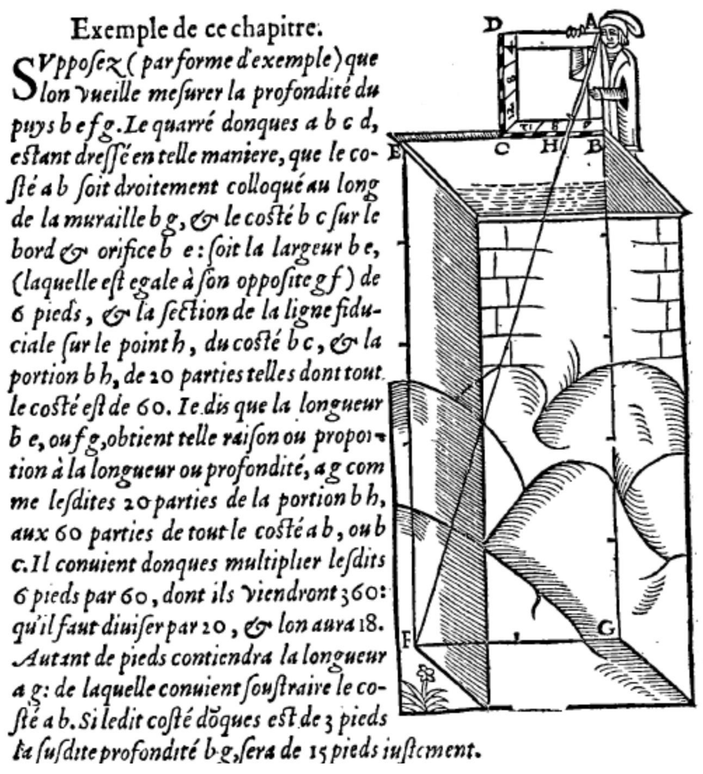
and thus

$$DE = 4 \times \frac{60}{10}$$

DE measures **24 feet**



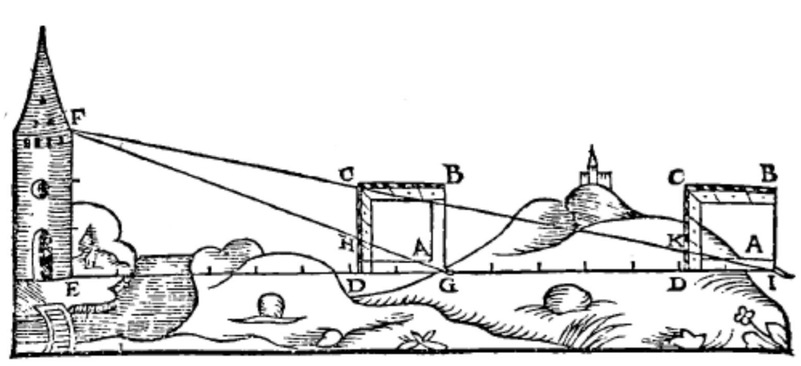
Using the square to measure the height of a building erected on a mountain without providing



Exemple de ce chapitre.

SVppoſez (par forme d'exemple) que lon vueille meſurer la profondité du puys b e f g. Le quarré donques a b c d, eſtant dreſſé en telle maniere, que le coſté a b ſoit droitement colloqué au long de la muraille b g, & le coſté b c ſur le bord & orifice b e: ſoit la largeur b e, (laquelle eſt egale à ſon oppoſite g f) de 6 pieds, & la ſection de la ligne fiduciale ſur le point h, du coſté b c, & la portion b h, de 20 parties telles dont tout le coſté eſt de 60. Ie dis que la longueur b e, ou f g, obtient telle raiſon ou proportion à la longueur ou profondité, a g comme leſdites 20 parties de la portion b h, aux 60 parties de tout le coſté a b, ou b c. Il conuient donques multiplier leſdits 6 pieds par 60, dont ils viendront 360: qu'il faut diuiſer par 20, & lon aura 18. Autant de pieds contiendra la longueur a g: de laquelle conuient ſouſtraire le coſté a b. Si ledit coſté dõques eſt de 3 pieds la ſuſdite profondité b g, ſera de 15 pieds iuſtement.

Using the square to measure the depth of a well



Using the square to measure the height of a tower by double targetting