See the method of estimating heights by the Barometer by Bouguer, improved by Delue. in the Encyclop. Method. Dict. de Physique. Barometre. pa. 133.

They suppose the column of mercury in the Barometer divided into horizontal lamina say of 1. French ligne each, & a column of the atmosphere, of the same diameter, into lamina of equal weight. mercury being uniformly dense, it's lamina will be of uniform weight as well as height. the air being compressible, the density of any one of it's lamina will be proportioned to the weight of those incumbent on it, & it's height consequently greater as these become fewer. the lamina then of Mercury will form an Arithmetical progression, & those of the Atmosphere a geometrical one: that is to say the former will be the natural numbers, & which the latter are the Logarithms. stating therefore in French lignes the height of the mercury at any two stations of different heights take out their Logarithms to 5 places only, including the Index; subtract the smaller from the greater, and the remainder will be the difference of the two heights in French toises. but this is correct only in a given temperature of air, which Delue says is at 16 $\frac{3}{4}$° of Reaumur's thermometer, Tremblay says at 12°. & by Col°. Roy's observations at 10 $\frac{1}{2}$°. take 14°. then as a Mean. for every degree of temperature higher than this add $\frac{1}{218}$ according to Delue, $\frac{1}{192}$ according to Tremblay, or $\frac{1}{200}$ as a convenient Mean. for every degree below 14. deduct $\frac{1}{200}$ or for every degree above it add $\frac{1}{200}$, the result multiplied by $\frac{\text{Engl. Inches}}{\text{Fr. Lignes}}$ 6 - 5.118 will give the difference in English measures.

For estimating the heights of Monticello & Montalto, we have the observations of 1776. Sep. 15. (ante page 31. and pa. 2.) when the thermom. of Farenheit was from 76°. to 81°. say 78°. = 20 $\frac{5}{9}$ Reaum. on that day the barometer was

	Eng.l	Fr. ligne	
at the base of Monticello (at the foot of the Mill dam falls) at	30.06 =	336.175	(at $\frac{\text{Fr. lignes}}{\text{Eng. Inch}}$ 11.28 = 1 Eng. foot
summit of D°. (a mean of 3. Observations) - -	29.46 =	331.425	
at the spring on the hither side of Montalto (mean of 2. Observ.)	29.50 =	331.875	
at the Summit of Montalto - - - - - - - - - -	29.1633 =	327.859	

the result of the preceding method of operation on these elements is that

	Toises	Eng.l Feet	
the Summit of Monticello is higher than it's base - - - -	98.21 =	589.11	or 578 @ $\frac{\text{Lines}}{\text{Inch}}$ 139.16 = 1 foot
and higher than the spring on Montalto	6.029 =	36.9	
the Summit of Montalto is higher than that of Monticello - - -	48.427 =	311.3	
& higher than the river at the foot of Mill dam falls		892.2	

To ascertain by the same rule, the height of the base of Monticello above the ocean, we have these data. The mean height of the barometer on the seaside in Europe is stated at $\frac{\text{Inches}}{28.3} = \frac{\text{Lignes}}{339}$. Enc. Meth. ubi supra. the extreme range of the mercury in the barometer at Monticello during observn of 3. 5 was.

	Eng.		
ante pa. 19. 1779. Apr. 20.	29.69	Farenheit's Thermom. then being at	33°
pa. 29. 1799. June 8.	28.	- - - - - - - - - - - - - - - - - -	73
a mean of both is	28.845	- - - - - - - - - - - - - - - - - -	53. = 9° $\frac{5}{9}$ of Reaumur.

the Log. of 339 = 2.5301.997
Log. of 324.5 = 2.5112.147 (for 28.845 Eng. = 324.5 lignes)

$\frac{189.85}{100} \times 4\frac{2}{3}$ = 189.85 toises, 9.43, 199.28

deduct the height of Montic°. 90.21

leaves 93. toises = 610.6 as the height of the base of Monticello above the ocean. the several mill-sites on the Rivanna have a fall of 4. ! about 50 f. and the great falls of James river are of about 80. suppose the intervening part of James river 50 miles and to fall 50 f. then 610.5 - 180 = 430.5 height of the tide water at Richm°. above the level of the ocean. suppose the distance 180. miles, and it will give 2.39 descent per mile, which is impossible.