If, on the contrary, we prepare this colt's foot with due allowance for the superior rapidity of growth of horn at the toe, if we put it in such a shape as will bring the foot to the natural position by the end of the second week; we shall have had, for the first and second week an irregularity on one side gradually correcting itself; we shall then have a perfect position of the foot; and during the third and fourth weeks, we shall have an irregularity on the dangerous side, only so great however as what would have taken place, at so early a period as the end of the second week, under the other system of management. If the existence of that due proportion between the masses of horn, in the different parts of the hoof, for which I contend, is destroyed by the existence of too small a quantity in the forepart of the foot, during the first fortnight, the evil consequences to be dreaded therefrom will be counteracted during the fortnight ensuing, and an equilibrium will thus in a manner be maintained.

But as every forced change, in the position of the foot, from that for which nature adapted the various joints and tendons, must be an evil dangerous in proportion to its extent; it will appear, that the greater the frequency with which the foot is brought into its natural position, and the oftener the equilibrium of the masses of horn is restored, the fewer will be the chances of injury, either to the joints, or the form of the hoof. In place then, of a change of shoes every month, as assumed above for illustration's sake, let us suppose them to be shifted every fortnight; and the hoof being trimmed each time, with reference to the change of form, from the unequal growth of horn, which the hoof must undergo during the interval, always aiming at having the foot in its proper shape and position during the middle of the term; and we make as near an approach to what appears, in theory at least, perfection in shoeing, as can be obtained; because by so doing we keep the relations of the different parts of the hoof more nearly in their natural state, and the extremity of the limb more nearly in its natural position, than we can do by any other mode of treatment.

The above are crude thoughts and conclusions, grounded upon what appear to be true and obvious principles. They are offered, not as the result of well conducted experiments, made with reference to the determination of the truth of the views submitted; but because the necessity for keeping the masses of horn in some sort of equilibrium does not appear to have occurred to any of those writers who have treated the subject scientifically, as being a desideratum in the treatment of the horse's hoof, and because it is still unfortunately found, that the majority of hoofs, after being in the hands of the farrier, do lose their natural shape, however smoothly they may be pared out and trimmed, with whatever skill the semblance of natural bars along the sole may be created by the dexterous use of the drawing knife, and with whatever art the heels may be made to assume the appearance of that width, which nature intended they should in reality possess.

III.—*Onthe Calculation of Heights, determined by Barometrical Measurement.*

To the Editor of Gleanings in Science.

Sir,

The method of measuring the heights of mountains by the barometer is well known. The formula generally employed when a book ofl ogarithms is at hand is sufficiently short, and (to those acquainted with the principles on which it is founded,) simple. Nevertheless I have found that to some it appears perplexing; add to which, a table of logarithms may not be immediately procurable in many cases. At all events I have thought that a simple method of deducing the results of barometric measurements, which, besides being independent of logarithms, should be entirely free from ambiguity, might prove acceptable to some of your readers. If you are of this opinion, you will oblige me by giving insertion to this communication in one of your early numbers.

I am,
Sir,
Yours obediently,
D.

Given the height of the column of mercury at two stations, with the temperature both of the air and of mercury; the former being shown by the detached, the latter by the attached thermometer. Required the difference of level of the two stations.

It is first necessary, if the columns of mercury be not of the same temperature, to reduce them to it. This is done by adding to the colder, or subtracting from the warmer $\frac{1}{10000}$ of its length for every degree of difference between the attached thermometers*.

The columns being reduced to the same temperature, the calculation of the difference of level is sufficiently easy, by attending to the following practical rule.

1st.—Take half the difference of the columns, and remove the decimal point five places to the right, adding as many ciphers as may be necessary. Divide by the sum of the columns †, the quotient is the approximate difference of level in English feet.

2dly.—Divide the sum of the columns by the difference, rejecting 100ths and 1000ths of inches. With the quotient, divide continually the approximate height found as above, reserving the alternate quotients, i. e. the 2d. 4th. 6th, &c. Then these quotients divided by the odd numbers 3. 5. 7. &c. give the 1st. 2d. 3d. &c. corrections which are in every case additive to the approximate height.

3dly.—Correct the result thus found for the temperature of the air in the following manner. From the sum of the detached thermometers, subtract 16°.3, multiply the approximate height by this remainder, and divide by 1000 ‡. The quotient increased by $\frac{1}{10}$ of itself is the correction for the temperature of the air: it is additive. If we wish to be scrupulously accurate, we may subtract from this correction $\frac{3.5}{1000}$ of itself.

REMARKS.

This rule will give the difference of level with the same degree of precision as the logarithmic calculation, by attending to the corrections mentioned in the second part of it. In barometrical measurement, however, it would seem to be expecting more accuracy than the method is capable of, in the present state of our information, to be solicitous about such small differences as 10 or 12 feet. This being the case, the 2d part of the rule may be safely disregarded, in the calculation of heights that do not exceed 4 or 5000 feet; by which, the operation is reduced to a division by three places of figures. Even in differences of level amounting to 10000 feet, one correction will be found sufficient for every practical purpose.

As to the 3d part of the rule it is not peculiar to this method, being equally necessary when that by logarithms is resorted to. So that, upon the whole, to those not well versed in the use of those numbers, this method may be preferable. Certainly, for small elevations, it seems both shorter and easier.

Perhaps I should not omit to mention, that I have taken the rate of expansion for air as $\frac{1}{480}$ of its volume at 32° for each degree of Fahrenheit's thermometer. This is the determination of MM. Dulong and Petit, and, it is said, of Mr. Dalton and of M. Gay-Lussac. Puissant's formula is vitiated by his using a co-efficient, equal to 450 when reduced to Fahrenheit's scale.

I shall now take, as an example, the difference of level of the "Pic du Midi" above Tarbes, as measured trigonometrically by M. Ramond and barometrically by MM. Ramond and Dangos, the particulars of which may be seen in Puissant's Geodesie.

	Metres.	*Temp. Merc.*	*Temp. of air.*
Barometer summit of the Peak.	.537203	49.5 (F.)	39.2
Do. at M. Dangos.	.735581	65.6	66.4
		Diff. 16.1	Sum 105.6

* This operation is easily performed by prefixing two ciphers and the decimal point to the height of the barometer to be corrected, and multiplying by the difference of the thermometers. The product is the correction subtractive if the barometer be the warmer.

† When great accuracy is not required, it will tend to the materially shortening this division to reject 1000ths and 100ths of inches from the division. The error in heights of 10,000 feet can hardly exceed 10 feet.

‡ This is done by merely removing the decimal point, three places to the left.

The height of the barometers being expressed in metres makes no difficulty. It is of no consequence in what linear measure they are given, provided they be both given in the same. The rule requires, however, that the temperatures should be expressed in Fahrenheit's scale, and accordingly the indications of the centigrade thermometer, as given by Puissant, have been reduced to that scale as above.

1. To reduce the mercurial columns to the same temperature we have,

$$\frac{,735 \times 16,^{\circ}1}{10,000} = ,0000735 + 16,1 = ,001176$$

And ,73558 —, 00118 = ,7344 the corrected length of the mercurial column. The correction is subtracted because the barometer ,73558 was the warmer.

The two barometers being ,7344
,5378

Their sum is 1,2716

Their difference ,1972

Half their diff. = ,0986 and removing decimal point 5 places to the right it will be 9860

Dividing by the sum 1,2716 we get 7754 feet, the approximate height or difference of level.

2. For the corrections.

Divide 1,2716 the sum by ,1972 the difference, the quotient is 6,45.

Now divide the approximate height 7754 continually by 6,45 the quotients are,

1047 1st.
163 2d.
25 3d.
4 4th.

Now divide the 2d. 4th. 6th. &c. quotients by 3.5.7. &c. for the 1st. 2d. and 3d. &c. corrections.

3)163 2nd quotient

54,3. 1st. correction.

5)4, 4th quotient

,8 2d. correction.

These corrections are always *additive*.

Approximate height 7754
1st. Correction 54.3
2d. Ditto 8

Corrected height 7809.1

3. Correction for the temperature of the air.

From the sum of the detached thermometers, ... 105.6
Deduct, ... 16.3

Remains 89.3

Now the corrected height 7809, multiplied by 89°.3, and divided by 1000 gives 697,2, adding to this, 69,72 = $\frac{1}{10}$, it becomes 766,9 = the correction for the temperature of the air. Applying this correction to the approximate height 7809, the sum is 8575.9 the true difference of level by barometrical measurement. By geometrical methods it was found to be 8573,3.

IV.—*Remarks on Elasticity.*

When we say that a body is elastic, we simply mean, that on compressing it, if the pressure be removed, the body regains its original volume.