animals and infects, which are hurtful or troubleſome to mankind, beaſts, or fruits, &c. as worms, lice, fleas, cater­pillars, ants, flies, &c.

VERNACULAR, a word applied to ſomething that is peculiar to any one country.

VERNAL, ſomething belonging to the ſpring-ſeaſon.

VERNIER Scale, a ſcale excellently adapted for the graduation of mathematical inſtruments, thus called from its inventor Peter Vernier, a perſon of diſtinction in the Franche Comté. See Nonius.

Vernier’s method is derived from the following prin­ciple. If two equal right lines, or circular arcs, A, B, are ſo divided, that the number of equal diviſions in B is one leſs than the number of equal diviſions of A, then will the exceſs of one diviſion of B above one diviſion of A be compounded of the ratios of one of A to A, and of one of B to B.

For let A contain 11 parts, then one of A to A is as 1 to 11, or 1/11. Let B contain 10 parts, the one of B to

I I I II IO

B is as 1 to 10, or -. Now -- - = =

I I I

10 × **II** 10 **II’**

Or if B contains *n* parts, and A contains *n* + 1 parts ; then I/n is one part of B, and --~ is one part of A. Andl--±-1 ×-L-.

n n+1 n×n+l « n÷l

The moſt commodious diviſions, and their aliquot parts, into which the degrees on the circular limb of an inſtrument may be ſuppoſed to be divided, depend on the radius of that inſtrument.

Let R be the radius of a circle in inches ; and a degree to be divided into *n* parts, each being 1/pth part of an inch.

Now the circumference of a circle, in parts of its diame­ter 2 R inches, is 3,1415926 × 2R inches.

Then 360⁰: 3,1415926 × 2 R : : 1⁰ : ~~6~~ × 2Rinches.

Or, 0,01745329 × R is the length of one degree in inches.

Or, 0,01745329 × R× p is the length of 1⁰, in pth parts of an inch.

But as every degree contains *n* times ſuch parts, there­fore *n* = 0,01745329 × R × p.

The moſt commodious perceptible diviſion is ⅛ or ⅒ of an inch.

*Example.* Suppoſe an inſtrument of 30 inches radius, into how many convenient parts may each degree be divi­ded ? how many of theſe parts are to go to the breadth of the vernier, and to what parts of a degree may an obſervation be made by that inſtrument ?

Now 0,01745 × R = 0,5236 inches, the length of each degree : and if *p* be ſuppoſed about ⅛ of an inch for one division ; then 0,5236 *× p* = 4,188 ſhows the number of ſuch parts in a degree. But as this number muſt be an integer, let it be 4, each being 15': and let the breadth of the ver­nier contain 31 of thoſe parts, or 7¾, and be divided into 30 parts.

Here n = ¼, n = 1/30; then ¼ *× 1/30* = 1/120 of a de­gree, or 30', which is the leaſt part of a degree that inſtru­ment can ſhow.

If n = 1/5, and *m = 1/36 ;* then 1/5 × *1/36* = of a minute, or 20''.

The following table, taken as examples in the inſtruments commonly made from 3 inches to 8 feet radius, ſhows the diviſions of the limb to neareſt tenths of inches, ſo as to be an aliquot of 60’s, and what parts of a degree may be eſtimated by the vernier, it being divided into ſuch equal parts, and containing ſuch degrees as their columns ſhow.

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| Rad. inches | Parts in a deg. | Parts in vernier. | Breadth of vernier. | Parts obſerved. | |
| 3 | I | 15 | 15¼ | 4' | 0" |
| 6 | I | 20 | 20¼ | 3 | 0 |
| 9 | 2 | 20 | 10¼ | I | 30 |
| 12 | 2 | 24 | 12¾ | I | 15 |
| 15 | 3 | 20 | 6¾ | I | 0 |
| 18 | 3 | 30 | 10¼ | 0 | 40 |
| 21 | 4 | 30 | 7¼ | 0 | 30 |
| 24 | 4 | 36 | 9¾ | 0 | 25 |
| 30 | 5 | 30 | 7½ | 0 | 20 |
| 36 | 6 | 30 | *5¼* | 0 | 20 |
| 42 | 8 | 3° | 37/8 | 0 | 15 |
| 48 | 9 | 40 | 45/9 | 0 | 10 |
| 60 | 10 | 36 | 37/10 | 0 | 10 |
| 72 | 12 | 30 | 27/12 | 0 | 10 |
| 84 | 15 | 40 | 2⅔ | 0 | 6 |
| 96 | 15 | 60 | 4 | 0 | 4 |

By altering the number of diviſions, either in the degrees or in the vernier, or in both, an angle can be obſerved to a different degree of accuracy. Thus, to a radius of 30 inches, if a degree be divided into 12 parts, each being five minutes, and the breadth of the vernier be 21 ſuch

parts, or 1¾⁰, and divided into 20 parts, then 1/12 × 1/20 ≡ 1⁰/240⁰ = 15'' : or taking the breadth of the vernier 27/12⁰

and divided into 30 parts ; then — × — = 7—, or 10*" :* -1230360IIιo

Or 1/12 × — = 7— = *6"* ; where the breadth of the vernier is 4¼⁰.

VERONA, a city of Italy, capital of the Veroneſe, in the territory of Venice, ſituated near the mountains, on the river Adige, in E. Long. 11. 24. N. Lat. 45. 26. It is seven miles in compaſs ; and has been ſo fortified by the Ve­netians, that it is now looked upon as impregnable. It con­tains 57,400 inhabitants.

VERONESE, a territory of Italy, in the republic of Venice, bounded on the north by the Trentino, on the eaſt by the Vicentino and Paduano, on the ſouth by the Mantuano, and on the west by the Breſciano. It is about 35 miles in length, and 27 in breadth ; and is one of the moſt fertile countries in Italy, abounding in corn, wine, fruits, and cattle.

Veronese. See Cagliari.

VERONICA, in botany : A genus of plants of the claſs of d*iandria,* and order of *monogynia* ; and in the natural ſyſtem arranged under the 40th order, *Personatae.* There are 40