



THE DOZENAL SOCIETY OF AMERICA

PLAYFAIR ON DOZENALISM*

JOHN PLAYFAIR

IN treating of this reform [the French revolutionary reform of the metric system], however, we cannot help remarking that the French academicians, though freed at the moment we now speak of, like the rest of their countrymen, from the dominion of that *inertia* which reigns so powerfully both in the natural and moral world, and gives the time that is past such influence over that which is to come; though delivered from the action of this force, in a degree that was perhaps never before exemplified, they may be accused, at least in one instance, of having innovated too little, and of having been too cautious about departing from an established practice, though reason was by no means on its side. What we allude to, is the system of arithmetical computation, in which they resolved to adhere to the decimal scale, instead of adopting the duodecimal, which, from the nature of number, is so evidently preferable. This preference, we believe, is generally admitted in theory; and there can be no doubt, that a rational being, conversant with the nature of number, if called on to choose his own arithmetical system, and having no bias from custom, prejudice, or authority, would not hesitate a moment about adopting the duodecimal system in preference to the decimal, and, as we think, in preference to all other systems whatsoever. The property of the number twelve, which recommends it so strongly for the purpose we are now considering, is its divisibility into so many more aliquot parts than ten, or any other number that is not much greater than itself. Twelve is divisible by 2, by 3, by 4, and by 6; and this circumstance fits it so well for the purposes of arithmetical computation, that it has been resorted to, in all times, as the most convenient number into which any unit either of weight or of measure could be divided.

The divisions of the *As*, the *Libra*, the *Jugerum*, the *Foot*, are all proofs of what is here asserted; and this advantage, which was perceived in rude and early times, would have been found of great value in the most improved state of mathematical science. Ten has indeed no advantage as the radix of numerical computation; and has been raised to the dignity which it now holds, merely by the circumstance of its expressing the number of a man's fingers. They who regard science as the creature of pure reason, must feel somewhat indignant, that a consideration so foreign and mechanical should have determined the form and order of one of the most intellectual and abstract of all the sciences.

The duodecimal scale would no where have been found of greater use than when applied to the circle, the case in which the decimal division is liable to the strongest

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objections. The number by which the circumference of the circle is expressed, ought not only to be divisible into four integer parts, (as in the French system), but also into six; for the sixth part of the circumference, having its chord equal to the radius, naturally falls, in the construction of instruments, and in the computations of trigonometry, to be expressed by an integer number. According to the decimal division of the quadrant, the sixth part of the circumference not only is without an integer expression, but the decimal fraction by which it is measured is one that runs on continually without any termination. This is at least a deformity that arises from the rigid adherence to the decimal division; and it is probably the main cause why that division has been found so difficult to introduce into trigonometrical and astronomical calculation. In astronomical tables, we believe it has never been adopted.*

The adopting of twelve for the radix of the arithmetical scale, would have obviated all these difficulties; it could have been extended with equal ease to quantities of every kind; and the introduction of it would not have been accompanied with any present inconvenience, of such magnitude as should have deterred geometers from making the attempt. We have lately seen a manuscript containing the system of duodecimal arithmetic pursued into all its detail. Two new names are necessary for the numbers eleven and twelve; and the whole arithmetical language for the numbers above ten, is consequently changed, but in a manner so analogical, as to remove all difficulty, whether in the contrivance or in the acquisition of this new vocabulary. The arithmetical characters must also undergo an entire change; the first eleven letters of the Greek alphabet are adopted in the scheme to which we refer; and by means of them and the cypher [zero], which is still retained, the notation proceeds by rules that are easy, and well known.

We regret, therefore, that the experiment of this new arithmetic was not attempted. Another opportunity of trying it is not likely to occur soon. In the ordinary course of human affairs, such improvements are not thought of; and the moment may never again present itself, when the wisdom or delirium of a nation shall come up to the level of this species of reform.

*Supposing the decimal division to be extended to the circle, instead of dividing the quadrant into 100, and the circumference into 400 as the French have done, it would have been better, perhaps, to have divided the sixth part of the circumference into 100, the quadrant of course into 150, and the whole circumference into 600. This would have given an easy expression for the three great *natural* divisions of the circumference into 6, 4, and 2; and would have denoted the whole by a number (600), which does not violate the strict rule of dividing by the powers of 10, any more than 400 does. The advantages of the decimal and sexagesimal systems would by this means have been in a great measure united.