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THE electors to the Waynflete professorship of physiology at Oxford, vacant by the death of Dr. Francis Gotch, have elected Dr. Charles Scott Sherrington. Dr. Sherrington succeeded Dr. Gotch as Holt professor of physiology at the University of Liverpool in 1895, when Dr. Gotch was called to Oxford.

#### DISCUSSION AND CORRESPONDENCE

##### MATHEMATICAL DEFINITIONS IN THE NEW STANDARD DICTIONARY

FUNK and Wagnall's "New Standard Dictionary of the English Language," 1913, has many merits and will doubtless be used very extensively. It is, therefore, of special importance to direct public attention to the fact that this dictionary is not reliable as regards definitions of mathematical terms. Some of these definitions will doubtless interest even those who remember only a little of their mathematics, as they relate to elementary matters and are so evidently incorrect. The following list of examples could easily have been extended, but it is believed that it will not require many examples of this type to convince the reader.

Under the term *algebra* it is stated that the infinitesimal calculus and the theory of functions may be classed among "the principal branches of algebra." A hundred years ago such a statement might have appeared proper, but it is not in accord with any of the classifications which have been extensively adopted in recent years, such as those employed in the International Catalogue of Scientific Literature and in the large mathematical encyclopedias which are in the course of publication. In fact, the infinitesimal calculus and the

theory of functions are generally regarded as branches of analysis.

The explanations which follow the term *arithmetic* include the statement that the early Pythagoreans first studied arithmetic. On the contrary, it is well known that the ancient Babylonians and Egyptians made considerable use of elementary arithmetic, as may be seen from the extensive mathematical tables of the ancient Babylonians and the large collection of examples by the Egyptian scribe Ahmes. Possibly the early Pythagoreans might be regarded as the first workers in higher arithmetic or the theory of numbers.

An instance of a statement which is more evidently incorrect appears under the term *dimension*. It is here stated that four-dimensional space may be regarded as a hypothetical conception to explain equations of the fourth degree in analytical geometry. As a matter of fact an equation of any degree in two variables may be represented geometrically in the plane. It is the number of the variables and not the *degree* of an equation which corresponds to the number of dimensions required for its representation.

Under the term *equation* it is stated that an abelian equation is an equation "all of whose roots are rational functions of one or more of the roots." It is well known that the roots of non-abelian equations may also be rational functions of each other. In an abelian equation we must have the additional condition that its group is commutative.

A fractional function is defined, under the term *function*, as one whose variable appears only in its denominator; and a *Galois resolvent* is said to be "that resolvent of an equation whose roots remain the same when the group of the equation is permuted in any way whatever." It would be interesting to know something about the new theory of permuting the group of an equation. Unfortunately there seems to be no clue in this dictionary as regards the possible meaning of this term.

The most original definitions seem to appear under the term *group*. A complete group is defined as one in which no self-conjugate operations are possible besides the iden-

tity. According to this definition every alternating group whose degree exceeds 3 is complete, while none of these groups is complete according to the definitions of this term given elsewhere. A still more original and more mysterious definition under this term relates to the regular group. It is stated that this is "a transitive group whose order is the same as that of the letter on which it is made."

It is very difficult to see how any one can discover any meaning whatever in such a definition. To make a group on a letter is a process which seems to have been foreign to the literature of this subject. A large number of almost equally vague statements occur under other terms. For instance, under the term *number* it is stated that an irrational number is "a definite number not expressible in a definite number of digits," and a congruence group is defined as a group made up of replacements.

It may probably be assumed that all mathematicians who read these few citations will agree that American mathematicians have good reason to protest against such a butchery of their subject in a popular work of reference. Those who desire more evidence can easily obtain it by consulting this dictionary for the definitions of the following terms: analogy, angle—especially angle of elevation and angle of depression, automorphic, fraction, matrix, mathematical and variable.

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#### A REPLY TO DR. HERON'S STRICTURES

THE all-too-familiar "blessings" of Professor Karl Pearson upon "Mendelians" have recently been continued by his understudy, Dr. David Heron, and directed toward American work in eugenics in general and that of the undersigned in particular. Like my colleagues in this country I should have remained silent under the attacks, knowing that discriminating men of science in this country as well as in England recognize their true animus and that they lie outside the pale of science. But the notoriety given in a daily paper to the publication of Heron and to a

"defence" based upon an interview with me by a reporter of the paper lead me to make a brief reply.

I shall not attempt now to answer all the scores of trivial points of criticism made by Dr. Heron, but shall consider only the paper on heredity of epilepsy by Dr. David F. Weeks and myself, which he singles out for special attack. The numerous "errors" to which he calls attention fall for the most part into three categories, based on misunderstanding so gross on the critic's part as to render it difficult to believe that they are not intentional. First, Dr. Heron seems to assume that whenever a symbol in a pedigree chart is not accompanied on the chart by some special description it stands for a person about whom nothing is known. He calls attention to numerous cases where, notwithstanding, the corresponding individual is described in the text. The assumption is a gross error. The chart shows mainly the interrelationship of individuals and indicates only certain traits. Second, Dr. Heron catalogues, with infinite pains, "errors" in citing the case number. Here he has fallen into a trap which the authors unconsciously prepared for him. To avoid the possibility that a person who is not authorized should connect an individual at the institution with his family history it was decided to apply alterations to the case numbers which enable the authors, but not the ordinary reader, to identify the case. None of the "errors" are such as would prevent the use of the numbers by the authors and they could be of no scientific use to others. Dr. Heron used them merely for criticism. Had we anticipated that there was anywhere a man of science with such abundant leisure, we should have published a warning that the reference numbers were for the sake of identification by the authors and not for scientific study. Third, in our tables we analyzed the traits of the "children" into ten columns, but condensed those of the father's sibs, etc., into 5 columns to save space; in some cases father and father's sibs, etc., appear as "children" and the classification is accordingly expanded from 5 to 10 categories. This, of course, is obvious to any intelligent