school of medicine of Leland Stanford Junior University. Upon his resignation from the medical faculty at Western Reserve, a dinner in honor of Dr. Hanzlik was given at the University Club of Cleveland.

AT Oberlin College, Mr. F. E. Carr has been promoted to an assistant professorship of mathematics, and Dr. C. H. Yeaton, of Milwaukee College of Engineering, has been appointed assistant professor of mathematics.

DR. PAUL THOMAS YOUNG, of the University of Minnesota, has been appointed associate in psychology in the University of Illinois.

HARRY F. LEWIS, A.B., A.M. (Wesleyan), Ph.D. (Illinois), at present with the National Aniline and Chemical Company of Buffalo, has been elected associate professor of chemistry at Cornell College, Mount Vernon, Iowa.

DISCUSSION AND CORRESPONDENCE

AN ANALOGY BETWEEN THE THEORIES OF NATURAL SELECTION AND ELECTROLYSIS

1. IN a recent reading of the "Origin of Species" I was struck by a marked similarity of the theory, to Clausius's views of the nature of electrolysis. In the latter one begins with ions produced by causes quite outside of the electrical forces. Their presence is a phenomenon on a scale of forces totally beyond the compass of the relatively feeble electric field. They are usually an essentially rare occurrence among molecules. The period of existence of each ion, moreover, is relatively short; but their virtues are at once retrieved, I might say inherited, by the progeny of some other molecule, so that the phenomenon is practically continuous. The familiar result is that the presence of an apparently inadequate field gives us a continuous supply of anions and cations at the electrodes.

2. Now replace ionization by variation, also an essentially independent phenomenon. Consider the positive ion a favorable variation and the negative ion an unfavorable variation. Let the electric field be replaced by natural selection, which embodies a sort of tendency or draft of the same nature as a physical field of force. At least, reciprocally with the individual, it amounts to that, as is evidenced by the term "struggle." Physical forces, moreover, are in a similar way doubly specific. Finally, let the cathode be the goal of survival and let the anode denote extinction. Then the two mechanisms would function in the same way.

3. I have drawn inferences from the model; but these are beyond the mark here. It is merely my purpose to indicate that a mechanism which functions so efficiently in the laboratory, can not under a wider interpretation, fail to function in the economy of nature, and that you have in electrolysis an ocular and approachable demonstration of the result. The thing works. Of course the model represents only an infinitesimal element (as it were) in the continuity of Darwinian evolution. Nevertheless given ionization (however rare among millions of molecules) or an available variation; given also an electrical field (however feeble) or natural selection, you can not have stagnation; irremediably you will have to accept development, appreciable within a period commensurate with the two factors.

CARL BARUS

BROWN UNIVERSITY,
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NATIONAL TEMPERAMENT IN SCIENTIFIC INVESTIGATIONS

TO THE EDITOR OF SCIENCE: In Professor Carmichael's paper on "National temperament in scientific investigations" in SCIENCE for April 1, 1921, occurs the sentence:

> They (the British) have *no university eager to nurse and develop new talent,* so that the new thinker becomes devoted to nature.

In Merz's "European Thought in the Nineteenth Century," in the first volume, part one, "on the growth and the diffusion of the scientific spirit in the first half of the nineteenth century," we find the statement on page 286:

> The rare genius, gifted with the power of original thought, who found no academy ready to call him, no schools where he could be trained, *no university eager to nurse and develop his talent,* did not retire into the depths of his own

consciousness, or surround himself with the artificial atmosphere of erudition. . . . In England the isolation from society and the solitariness of genius threw him into the arms of Nature. . . .

Again on page 276:

But it is a fact that no Academy existed in this country which was zealous in collecting and arranging all the best labours of scattered philosophers, no university which was anxious to attract and train promising intellects. . . .

Most of the phrases in Professor Carmichael's paragraph on British science and also in the paragraph contrasting the temperaments of the three European nations will be found in this chapter of Merz's on pages 250, 252, 279, 281 and 300.

I wish to point out that what Merz wrote in 1896 about English science and English universities in the first half of the nineteenth century does not necessarily apply to British science and British universities at the present time. As Merz remarks on page 300:

During the second half of the century a process of equalisation has gone on which has taken away something of the characteristic peculiarities of earlier times. The great problems of science and life are now everywhere attacked by similar methods. Scientific teaching proceeeds on similar lines, and ideas and discoveries are cosmopolitan property.

Whether or not this is a fact, and whether or not, if it is a fact, the final paragraphs of Professor Carmichael's paper are sound, I do not pretend to judge. But I do protest that the statement that the British have no university eager to nurse and develop new talent is not true to-day, even if it was true in 1850.

It may also be proper to note that Merz's statement definitely applies to *English* rather than to *British* universities; and on page 271 the Scottish universities of that day are contrasted with their English sisters.

J. W. Clawson

To the Editor of Science: The criticisms of my article on "National temperament in scientific investigations," offered by Mr. J. W. Clawson, are essentially the following two: It is implied that I have made an improper use of Merz's "European Thought"; it is claimed that I have been unjust to the British in a certain particular. I appreciate the opportunity to say a word about them.

With respect to the first of these I prefer to leave it to the reader, who makes the comparison between the two paragraphs named by Mr. Clawson and the passages in Merz referred to by him, to determine whether my practise is justifiable, calling his attention to the fact that the statements in one of these paragraphs were given as what seemed to me to be "the impartial verdict of history" rather than as an expression of judgment independently formed by me.

With regard to the question of injustice to the British I have the following to say: The main burden of my paper was to urge upon my own countrymen the desirability of realizing in their own scientific activity the characteristics of spontaneity and individuality which have particularly marked the work of the British and which have led (as it was pointed out) to a greater fruitage of the larger things among them than has fallen to the lot of any other people; in the particular (and somewhat unfortunate) phrase criticized I had no intention to say anything particularly harmful to the British nor had I supposed that I had done so; one of my correspondents has expressed his pleasure in what he was pleased to call my just emphasis of the value and importance of the British methods and results; Mr. Clawson now appears to think that I am quite unjust to the British (at least in a certain particular); another has already belabored me for being unjust to the Germans; if still another shall accuse me of a like injustice to the French, I shall begin to think that I have held a fair balance among the three nations in my attempt to point out certain values realized by them which I wish to see attained by the scientists of America in fuller measure in the future than in the past.

R. D. Carmichael

University of Illinois