

DR. FRANK THILLY, professor of philosophy at Cornell University, and Professor Madison Bentley, professor of psychology in the University of Illinois, will lecture during the summer session of the University of California.

DR. WILLIAM A. R. TAYLOR, now instructor in botany in the University of Pennsylvania, has been promoted to an assistant professorship.

MR. ARTHUR LEE DIXON, M.A., F.R.S., fellow and tutor of Merton College, University of Oxford, has been appointed Waynflete professor of pure mathematics in succession to Professor E. B. Elliott, fellow of Magdalen, who has resigned.

MR. ARTHUR LAPWORTH, D.Sc. (London), F.R.S., at present professor of organic chemistry in the University of Manchester, has been appointed to the Sir Samuel Hall chair of chemistry and to the directorship of the chemical laboratories.

## DISCUSSION AND CORRESPONDENCE

### GENETICAL ANALYSIS AND THE THEORY OF NATURAL SELECTION

IN my Toronto address I lately referred to John Ray as the first who laid stress on the sterility of interspecific hybrids. I was then writing away from books and must apologise for this slip. The passage in the *Historia Plantarum* 1686, 1, pp. 40 and 42, that I had in mind is probably the first in which anything approaching a genetical definition of species is attempted. Ray there lays down the excellent principle that forms which, though differing from each other, can be bred from seed of the same plant, should be regarded as of the same species. Not till the Linnean period, more than half a century later, did the cognate question of the sterility or fertility of interspecific crosses assume prominence.

Professor Osborn has expressed great vexation at the tenor of my address. After considering his remarks, I do not know that I can add much to what I have said. The divergence between the conceptions to which genetical analysis introduces us and the doctrines

of which Professor Osborn has been so long a distinguished champion is indeed wide.

Paleontological observations have served a useful purpose in delimiting the outline of evolution, but in discussing the physiological problem of interspecific relationship evidence of a more stringent character is now required; and a naturalist acquainted with genetical discoveries would be as reluctant to draw conclusions as to the specific relationship of a series of fossils as a chemist would be to pronounce on the nature of a series of unknown compounds from an inspection of them in a row of bottles. The central tenet of Darwinism that species are merely the culminations of varietal differences, such as we find contemporaneously occurring, is not easily reconcilable with the new knowledge. It was my purpose once more to direct the attention of naturalists, especially geneticists, to this deficiency in the evidence, by no means without hope that it may be supplied.

Professor Osborn, in extenuation, suggests that my tongue ran away with me and that I could not have meant what I said. That defense, however, is not available, for I had taken the precaution which I understand he learned from Huxley, and I had prepared a written text. This, in all important passages, I followed verbatim, and it appears without serious modification in *SCIENCE* for January 20. I may even plead guilty to having spoken and written to the same effect on many previous occasions, and Professor Osborn will find the theme developed in "Problems of Genetics" (New Haven, 1913, and in my presidential address to the British Association in Australia (1914).

W. BATESON

MARCH, 1922

### A SUGGESTION TO MR. BRYAN

I THINK most readers of *SCIENCE* must feel indebted to you as I do for reprinting W. J. Bryan's attack on Evolution. It may be true that only the psychologists will be able to find in it data of value to their science but to them the importance of this contribution of Mr. Bryan's must be large indeed. The rest of us welcome the diversion which it affords. A Don

Quixote of Mr. Bryan's calibre only appears once or twice in a century and the opportunity to study in cold print the celebrated Nebraskan's proposal to resurrect the "special creation of species" myth must be appreciated by our scientific brethren who are interested in studying the mysterious ways in which the human mind sometimes works when it approaches subjects unfamiliar to it.

My principal object in writing you is to suggest that Mr. Bryan should be invited to use the pages of *SCIENCE* to attack an even greater heresy than Evolution. Since Mr. Bryan still gets his biology from the Bible it appears to be a safe inference that he must draw his geography from the same source. Bible geography, or "flat geography" is, I am informed, taught nowadays only in the mountains of eastern Tennessee. Why should not our Bold Knight from Nebraska (or is it Florida?) aim his lance at the teachers of modern or "round" geography and admonish them to hark back to the geography of Joshua? This is perhaps a subject which has been overlooked by this eloquent defender of Biblical science. I can hardly believe it to be lack of courage which has led Mr. Bryan to attack the few and widely scattered teachers of evolution instead of the thousands of teachers of modern geography. Whatever the explanation of Mr. Bryan's neglect to denounce the heresies to be found in the textbooks on geography may be, I beg to suggest that the heretical character of the modern teaching in geography should be brought to the notice of Mr. Bryan.

EDWARD M. KINDLE

CANADIAN GEOLOGICAL SURVEY

#### THE WRITING OF POPULAR SCIENCE

TO THE EDITOR OF *SCIENCE*: Both Dr. Alfred H. Brooks<sup>1</sup> and Dr. Edwin E. Slosson<sup>2</sup> have recently called attention to the fact that relatively few popular scientific works are being now written in this country; and the former expresses the opinion that there is to-day relatively less popular knowledge of science

and less interest in its methods and advancement than there was a generation ago. This opinion will probably be generally accepted as correct. That it should be true in spite of the large amount of scientific work that has been, and is being done, and in spite of the serious attempts of scientific associations and other agencies to create a popular interest in science, indicates that it is high time for scientists to consider seriously themselves, science and the public, in an endeavor to ascertain wherein the difficulty lies. Most scientists will agree with Dr. Brooks that the lack of popular knowledge of science is directly due to the form in which science is presented, and that "what is needed is the presentation of science in a form comprehensible to the educated and thinking man." But to secure such presentation, it is necessary to understand the public, the point of view of those we desire to reach, the mental background with which the science we present must be harmonized; to understand science and ourselves; to keep in mind what constitutes science; to have a clear idea of what we wish to give the public. Otherwise we are in danger of merely groping blindly, and of, perhaps, prostituting the name of science.

We all acknowledge that science is *organized* knowledge. That neither an isolated fact, nor an infinite number of isolated facts, is science; no matter how true and exact the facts may be. It is only when two or more facts are seen to be related, that science comes into existence. Science does not consist of facts, but of recognized relations between facts. Science is essentially a mental phenomenon<sup>3</sup>.

But are there not, only too often, offered under the guise of science mere isolated facts trimmed with sufficient allegory and superficial analogies to fill a respectable amount of space and to attract the layman's attention? This is not science, but merely information—the raw material out of which science is made.

<sup>3</sup> Since this was written Dr. F. L. Hoffman's admirable vice-presidential address (*SCIENCE*, March 10), entitled "The Organization of Knowledge" has come to my attention. In this, the essential distinction between mere facts and science is strongly emphasized.

<sup>1</sup> *Journal Wash. Acad. Science*, 12: 73-115, 1922.

<sup>2</sup> *SCIENCE*, 55: 241, 1922.