and thus a uniform response of individuals to environment is rendered impossible.[18]

A. E. Ortmann.

Carnegie Museum, Pittsburg, Pa.,
September 22, 1906.

DISCONTINUOUS VARIATION.

Dr. Jordan's kindly comment upon my Wood's Hole lecture would place me at a great disadvantage if I were inclined to be controversial (Science, 24: 399, 1906). This, however, is farthest from my purpose, and in fact is unnecessary since I find myself in agreement with him on most of the points brought up.

Too much emphasis can not be put upon some of the statements reiterated or advanced by Dr. Jordan, and he has certainly performed a very useful service by approving the principle that the students of a group, or of any phase of life are more likely to acquire better first-hand knowledge of it, and to render truer interpretations of the facts obtained than other writers. As vividly obvious as this may be, it has been necessary to be unpleasantly insistent upon it upon various occasions during the last few years, and to reassert that botanists are better fitted by opportunities and training for the comprehension of the nature and behavior of plants than any other class of naturalists. The dictum of Darwin so aptly quoted has never been more strictly applicable than at the present time, and an intimate and accurate acquaintance with a large number of species constitutes a very important share of the competency for profitable study of evolutionary problems. Whether or not the investigator publishes his descriptions is purely incidental.

On the other hand, it is not to be granted (and happily it is not) that a keen critical sense in nomenclature, or a zeal for the acquisition, making or conservation of type specimens forms a suitable equipment for the intelligent consideration of genetics, although when coupled with detailed studies in life-histories, cultures and field observations, the activities in question become of very great value in this connection.

During the last few years I have had occasion to discuss the species-idea with several of the more active systematic botanists, and find that the theoretical conceptions of species formulated by them vary widely, although overlapping in many essential points in all instances. Now these differences of opinion by no means lead me to deprecate species-making, or to distrust the value of the species erected by these workers, although known to apply differing standards. This knowledge and this confidence are shared by the general botanical public. The difficulty in delimiting in so many words the difference between continuous and discontinuous variation is of a similar character, and was recognized by myself in the earliest review of the work of de Vries on the subject published in an American journal in the following words: "From the reviews and discussions which have already been made of de Vries' papers it is to be seen that the greatest misunderstanding which may likely arise in the consideration of his results will be that founded on the error of confusing fluctuating variability and mutability." In this as well as in the consideration of species it is found that our difficulties disappear when we deal with concrete examples, especially if embraced in a pedigreed culture. To be able to examine a number of organisms in the field and determine which are continuous and which are discontinuous variants is not possible, for numerous reasons, although many botanists have assumed to do so.

What the actual origin of *Œnothera Lamarckiana* may have been can not be said: we can vouch for the actual origin of but few species. If records are to be trusted, however, it was in cultivation in the Paris Garden a century ago. My own breeding experiments have included a number of crosses involving various combinations of species from eastern

[18] See Brooks, 'Heredity and Variation: Logical and Biological,' in *Pr. Amer. Philos. Soc.*, 45, 1906, p. 75. 'The species is * * * in that reciprocal interaction between the living being and the natural world, of which it is a part.' This paper of Brooks is quite interesting and important. Although largely written in terms rather unusual in the discussion of evolutionary matters, it brings out ideas, which, if I correctly understand them, are essentially in agreement with my own views.

North America as indicated, have been under way for several years, have been visited by perhaps a dozen zoologists interested in problems of heredity as well as by a large number of botanists. When the major purpose of the cultures shall have been accomplished it will be possible to publish the account of the whole to some advantage.

In re hybrids I venture to suggest that if I were a 'Mendelist' of the strictest sect I would welcome a challenge to bring the oak and walnut hybrids under the chess-board diagrams for the exposition of the possible combinations. The unflinching advocates of the Mendelian formulæ are confronted with much more serious difficulties than the examples in question. The enormous accretions being made in the range of authenticated facts of inheritance in hybridization have thrown the whole subject into a state of flux and not for a long time may we hope to work under such simple generalizations as those which contented us a decade since.

It is not intended to maintain that the horse has climbed up on his tiptoes, the bacterium settled into its highly specialized medium and that the orchids have come by their intricate flower-mechanism by the same process. Selection undoubtedly plays an important part, although we seem unable to agree upon the manner in which it operates. One can not be a field student of plants to any great extent without coming upon striking facts in segregation and isolation. This is found especially in the studies now being made of the distribution of the components of the flora of the Bahamas and West Indies. Until we see further around the bend of the road, however, we may make but futile guesses as to the direction of the straight-away beyond. The great amount of energy now being put on detailed studies in this subject at the Desert Laboratory and elsewhere is yielding a great range of diverse data, and affords the hope that some definite conclusions may be expected, within a time comparatively brief, when contrasted with the long barren period in which nothing of definite value as evidence in evolutionary problems has been produced.

In this and other phases of the subject we are confronted with the necessity of placing ourselves alongside some of the organisms which share the earth with us, in order to follow with them along their devious trails for what distance we may, and thus gain some clue as to the rate, direction and character of their movements.

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October 8, 1906.

THE PUBLIC HEALTH DEFENCE LEAGUE.

TO THE EDITOR OF SCIENCE: With the object of devising ways and means for the preservation of the public health and morals there was held in New York City on November 15, an important conference, which should be of interest to readers of SCIENCE. Several hundred delegates from over a hundred well-known organizations then gathered in the Hudson Theater and launched the Public Health Defence League. The inclement weather without did not in any way dampen the enthusiasm of those who were enlisting themselves in a fight to down quackery in any of its various forms and to enforce existing laws for the securing of pure food and drugs, for the suppression of the criminal abortionist, and for other lines of work of a similar nature.

The conference committee consisted of: Dr. Wendell C. Philips, Silas F. Hallock, Dr. Floyd M. Crandall, Dr. Henry W. Cattell, Walter F. C. Tichborne, Albert M. Austin, Dr. Walter Lester Carr, Mr. Howard J. Rogers, Dr. Ernest J. Lederle, Mr. J. M. Rice, Harold P. Brown, Dr. Henry S. Stearns, Livingston Farrand, Rev. J. J. Wynne, Dr. William M. Polk, O. E. Edwards, Gaylor S. White, Dr. Frank Van Fleet, Eugene O'Dunne, Rev. Thomas R. Slicer, Dr. Thomas Darlington, Austen G. Fox, Dr. William L. Browning, Robert E. Belcher, John S. Cooper and Champe S. Andrews, much credit being due to the latter gentleman for his work in organizing the meeting.

Mr. Austen G. Fox, who did such good work as attorney for the committee of fifteen some years ago in regard to the social evil, presided at the meeting. The delegates were welcomed by President McGowan, of the Board of Alder-