

having come across, somewhere or another, the statement that a particular biological process is not a physical-chemical process. Such a statement, while frequent enough, in one guise or another in the literature, leaves certain things to be desired. One of these unfulfilled—but not suppressed—desires is the failure to designate just what shall be done with this reaction which is not a physico-chemical reaction, particularly when the author has somewhere or another stated that his position is not that of vitalism. Suppose that we say, as the second division of our dichotomy, that the processes in living organisms are natural processes, nowhere crossing the border into the supernatural, but frequently lying over the border of the unknown. It seems possible to state two possible alternatives of this second category. The first possibility would appear to be that the reactions in living organisms, being physico-chemical in nature, are the same in quality and direction that they would be in an inorganic system if such a system could be placed under the same conditions. We might designate this as the strictly mechanistic position. Our second alternative might be stated as follows: the reactions in living organisms are physico-chemical in nature and not supernatural; but they do not always occur in the same direction as they would in an inorganic system under the same conditions, or are not qualitatively the same. This appears to be the clearest statement which I can make of the organicist position, and I believe that it is logically sound. The main point of debate, then, between mechanist and organicist would not be whether the processes in living organisms spill over into the realm of the mysterious at times, but whether they are, or are not, exactly the same in nature and direction in living organisms as they would be in inorganic systems under the same conditions. And if we can now and then show that a reaction in a living organism is not the same in direction as it would be in an inorganic system, under the same conditions, I, personally, see no need whatever for invoking vitalism.

When we reflect that, since the appearance of living organisms upon the earth, every stratum of the earth's crust which has been exposed to the same environmental conditions as the living organism has been changed, sometimes almost beyond recognition, while living organisms have persisted, we seem driven to the conclusion that the processes in living organisms have not always been the same in direction as in the inorganic systems of the rocks. There seems to be a facility of adaptation in living organisms which is not present, to the same extent at least, in inorganic systems. Treviranus regarded this facility of adaptation as one of the most characteristic prop-

erties of living organisms. I<sup>1</sup> have presented elsewhere the argument that at least some phases of adaptation can be considered as a special case under the theorem of Le Chatelier. Such a view seems consistent with the position of the organicist, and needs no entelechy.

F. H. PIKE

COLUMBIA UNIVERSITY

### A NEW DISEASE OF MOOSE. III

#### A NEW BACTERIUM

IN a recent paper, the first of this series, Thomas and Cahn<sup>1</sup> have described a new disease among the moose (*Alces americana americana*) in northeastern Minnesota and the adjacent region of Ontario, Canada. The disease is described as appearing in the early spring, coincident with the final metamorphosis of the tick *Dermacentor albipictus* into the adult stage, which tick heavily infests the moose of this area. The symptoms are described as marked activity shown by blind, aimless wandering, followed by a paralysis of the limbs and death in a great many cases. Ticks taken from animals dying of the disease transmitted the disease to guinea pigs and rabbits in the laboratory, these dying with symptoms similar to those exhibited by the moose. The blood picture accompanying the disease is described and the presence of bacteria noted. An organism was isolated which, when inoculated into experimental animals, produced the symptoms of the moose disease and caused death. In a second paper, Wallace, Thomas and Cahn<sup>2</sup> discuss further experiments with this isolated organism and emphasize its extreme virulence. Guinea pigs and rabbits were killed in an hour by inoculating the organism or a filtrate of the organism. This virulent organism was pronounced a bacterium, and was placed tentatively in the Klebsiella group. It is a capsulated rod form with a tendency to assume a coccoid shape; it grows as an excessively mucoid colony on agar, and produces Beta hemolysis on blood agar. Its growth is extremely rapid, covering an agar slant in five hours, and it apparently produces an extra-cellular toxic substance. Since this paper was published a great deal of work has been done upon the organism, involving its life history, pleomorphic behavior and physiological reactions. With much of this completed, the writers are convinced that it is a new organism not hitherto described, and because of the seriousness of the disease which it

<sup>1</sup> F. H. Pike, *Ecology*, iv, 129, 1923.

<sup>2</sup> Thomas, L. J., and Cahn, A. R. A New Disease of Moose. I. Preliminary Report. *Journ. Parasit.*, XVIII: 219-231, 1932.

<sup>3</sup> Wallace, G. I., Thomas, L. J., and Cahn, A. R. A New Disease of Moose. II. *Proc. Soc. Exp. Biol. and Med.*, XXIX: 1098-1100, 1932.

causes, together with its astonishing virulence, they believe it should be named. This organism is therefore designated as *Klebsiella paralytica*, because of the paralysis it causes. A detailed report, covering all experimental and cultural work to date, is about to go to press.

A. R. CAHN,  
G. I. WALLACE,  
L. J. THOMAS

UNIVERSITY OF ILLINOIS, URBANA

#### CRYSTALLINE d-MANNURONIC ACID

CRYSTALLINE d-mannuronic acid has recently been isolated in my laboratory by Mr. Eugene Schoeffel. Heretofore, d-mannuronic was known only in the form of its lactone. The lactone m. p. 140–141°

( $\alpha$ )  $\frac{25}{D} + 89.8^\circ$  was isolated for the first time by Nelson and Cretcher,<sup>1</sup> and subsequently by Schoeffel and Link.<sup>2</sup>

The free acid was obtained by decomposing barium d-mannuronate, prepared from the algin of *Macrocystis pyrifera* and *Fucus serratus* after the procedure of Schoeffel and Link,<sup>2</sup> at –10° in the presence of ethyl alcohol. The acid melts at 165°, has an initial specific rotation of –50° and a final value of –20° (after 2 hours) in water. Dr. C. S. Hudson, of the National Institute of Health, Washington, D. C., has calculated that the specific rotation of the beta form should be –37° (private communication). It appears, therefore, that the form of d-mannuronic acid which we have in hand is the beta variety. Ex-

periments are under way by my collaborator, Mr. Carl Niemann, to synthesize d-mannuronic acid by the reduction of d-mannosaccharic acid. The details of this work will be published elsewhere.

KARL PAUL LINK

DEPARTMENT OF AGRICULTURAL  
CHEMISTRY  
UNIVERSITY OF WISCONSIN

#### TWO BUSTS OF GREAT SCIENTIFIC MEN

DURING the past summer I happened upon two life-size marble busts that I am sure would be of interest to all physiologists and medical men—one of Johannes Müller, the biologist, and teacher of R. du Bois-Reymond, Helmholtz and Virchow, the other of the great Graefe, father of scientific ophthalmology. The sculptors, Drake and Siemering, respectively, are of hardly less renown. Their artistic and historical creations to-day adorn salons, public buildings or parks not only in Europe but also in America.

These two busts are now in the possession of Frau Professor Engelmann, of No. 52 Knesebeck Strasse, Berlin, W15, Germany, who must sell them at once on account of straitened circumstances. These busts would be a lasting adornment of historical value to any library of medicine, or to any medical school. Persons interested in the purchase of one or both statues should correspond with Frau Engelmann directly or with the undersigned.

CHARLES D. SNYDER

710 N. WASHINGTON STREET,  
BALTIMORE, MD.

### SCIENTIFIC BOOKS

*Chemical Embryology.* By JOSEPH NEEDHAM, M.A., Ph.D., fellow of Gonville and Caius College, Cambridge, and university demonstrator in biochemistry. Three volumes, 2021 pp., 1931. Cambridge: at the University Press; New York: The Macmillan Company. Price, \$35.00.

THIS book, which, as its title indicates, marks a turning-point in the mode of approach to the traditional biological problems, is one of the most remarkable among recent works of biological scholarship—remarkable alike in its comprehensiveness, its critical and philosophical spirit, its excellence of style and arrangement, its clearness and lack of bias in discussion, its prevailing good sense and fairness in the appraisal of fact and theory. The treatment is ex-

tended and detailed, even leisurely. The author aims at giving an exhaustive account of our existing knowledge with regard to the chemical and physico-chemical aspects of embryonic development. He is well aware of the provisional nature of his undertaking, which is largely to clear the ground for the future; his main purpose is the furtherance of the study of embryology as an exact science, and he is conscious of the limitations of our present knowledge and of the need of advance in new directions and by new methods. The variety and range of material reviewed—not merely summarized but discussed with a keen sense of its general significance—are impressive. The bibliography alone occupies 242 pages, the reference to each treatise or paper being accompanied by a statement of the page where it is cited in the book. A feature of the treatment is the large number of original tables, graphs and diagrams. Wherever possible the material is presented quantitatively; in his final paragraph the author emphasizes the advantage,

<sup>1</sup> W. L. Nelson and L. H. Cretcher, *SCIENCE*, 67: 527, (1928); *Jour. American Chemical Society*, 51: 1914, (1929); 52: 2130 (1930).

<sup>2</sup> E. Schoeffel and K. P. Link, *Jour. Biol. Chem.*, 95: 213 (1932).