

# SCIENCE

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## THE THEORY OF RESPIRATION.\*

I ASK you to consider with me a topic which is of fundamental interest to physiologists, whether they concern themselves primarily with animals or with plants. I take it the basal identity of the living matter in all organisms and of its metabolism needs neither demonstration nor emphasis at my hands. Nor do I need to lay stress upon the importance of respiration as one of these metabolic phenomena, since it has been recognized from the earliest period as indispensable to life. The phlogiston theory of the composition of the atmosphere had scarcely disappeared below the scientific horizon, before the fact was discovered that there occurs, in animals and in plants alike, an intake of oxygen and an output of carbon dioxide which is intimately related to their existence. This became obvious to man, of course, in his own experience, a very superficial study of the composition of the air inspired and expired from the lungs showing that it had lost oxygen and gained CO<sub>2</sub>. This much of respiration was early recognized to occur also with the larger animals, and a few years later like observations were made upon plants by Priestley, and more accurately by Lavoisier and Ingenhous. Even this knowledge of respiration was not possible before Priestley's discovery of oxygen in 1774, and the very remarkable revolution in chemistry that followed in the closing years of the eighteenth century. Yet

\* Address of the retiring president before the Botanical Society of America, Philadelphia, December 28, 1904. Published simultaneously in the *Botanical Gazette*.

MSS. intended for publication and books, etc., intended for review should be sent to the Editor of SCIENCE, Garrison-on-Hudson, N. Y.

most primitive. The most important factors in the development of the various forms are temperature and isolation.

*A Preliminary Note on the Snake's Tongue:* EDITH M. BRACE, Western Maryland College.

The chief function of the snake's tongue seems to be connected with a sense of feeling that does not require the stimulus of contact, and may be a finer development of the sense that enables some people to avoid obstacles in the dark without touching them. The bifid tip and the numerous folds that lie behind the forking of the tongue serve to greatly increase the surface exposure. Beneath the epidermis and extending out into the folds there is a deep nerve plexus composed of multipolar cells whose ends are frayed out into extremely fine fibrils that interlace in every direction. From this plexus nerve fibers extend out between the cells of the epidermis.

C. JUDSON HERRICK,  
*Secretary.*

DENISON UNIVERSITY.

#### SCIENTIFIC JOURNALS AND ARTICLES.

*Palæontologia Universalis.*—The third fasciculus of this important republication of old or obscure species of fossil organisms has arrived. These three parts of 75 species, figured and described on 161 sheets. This completes the first annual subscription, which is eight dollars. The first fasciculus of the second series will soon appear, and subscriptions should be sent to G. E. Stechert and Co., 129-133 West 20th Street, New York City. The editorial work is in the hands of D.-P. Cehlert, of Laval, France, secretary to the International Commission appointed by the International Geological Congress, at its eight meeting.

CHARLES SCHUCHERT.

The contents of *The Journal of Comparative Neurology and Psychology*, for January, is as follows:

'On the Areas of the Axis Cylinder and Medullary Sheath as seen in Cross Sections of the Spinal

Nerves of Vertebrates.' By Henry H. Donaldson and G. W. Hoke.

'On the Number and Relations of the Ganglion Cells and Medullated Nerve Fibers in the Spinal Nerves of Frogs of Different Ages.' By Irving Hardesty.

Editorial: 'Psychology and Neurology,' 'The International Commission on Brain Research.' Literary Notices.

#### SOCIETIES AND ACADEMIES.

##### THE NEW YORK SECTION OF THE AMERICAN CHEMICAL SOCIETY.

The New York Section of the American Chemical Society held its fourth regular meeting of the season at the Chemists' Club, Friday evening, January 6. The following papers were presented before the section:

*The Application of Bismuth Ammonium Molybdate to Gravimetric Analysis:* F. V. D. CRUSER and E. H. MILLER.

Portions of a standardized bismuth nitrate solution were precipitated by acid ammonium molybdate, under varying conditions. In order to get the solution barely acid, the use of congo red was found to be preferable to methyl orange. In washing the precipitate of bismuth ammonium molybdate, ammonium nitrate gave better results than ammonium sulphate. It was found that bismuth may be determined correctly by the ignition of bismuth ammonium molybdate to  $\text{Bi}_2\text{O}_3$ :  $4\text{MoO}_3$ , when the temperature of ignition is kept below a dull red heat, and that this method gives as good results as those obtained by the reduction and re-oxidation of the molybdenum by potassium permanganate.

In determining bismuth by the evaporation of a nitric acid solution of bismuth nitrate, the operation must be conducted in porcelain, otherwise some bismuth trioxide is reduced by unburned gases passing through the platinum.

*Recent Progress in the Chemical Department of the Geological Survey:* F. W. CLARKE.

*The Work of the Bureau of Standards:* W. A. NOYES.

The work of the National Bureau of Standards is organized under three divisions and the first two of these divisions are subdivided into six sections each. The bureau is, first of