

and fats is apparently large enough even to keep up a steady luxurious surplus. For the supply of proteid we find in the actual conditions of life that man and beast, if they can afford, provide themselves with quantities which physiological chemists call liberal. This may or may not be the quantity which nature requires and approves of. Experiments have shown that a number of men subsisted on the half of such quantities. This latter might be an indispensable minimum, just as there is an indispensable minimum for all other luxuriously endowed provisions of the animal organism, and the liberal ingestion of proteid might be another instance of the principle of abundance ruling the structures and energies of the animal body. There is, however, a theory that in just this single instance the minimum is meant by nature to be also the optimum. But it is a theory for the support of which there is not a single fact. On the contrary, some facts seem to indicate that nature meant differently. Such facts are, for instance, the abundance of proteolytic enzymes in the digestive canal and the great capacity of the canal for absorption of proteids. Such luxurious provision for digestion and absorption of proteids is fair evidence that nature expects the organism to make liberal use of them. Then there is a fact that proteid material is stored away for use in emergencies, just as carbohydrates and fats are stored away. In starvation nitrogenous products continue to be eliminated in the urine which, according to Folin, are derived from exogenous sources, that is from ingested proteid and not from broken-down organic tissues. An interesting example of storing away of proteid for future use is seen in the muscles of the salmon before they leave the sea for the river to spawn. According to Miescher the muscles are then large and the reproductive organs are small. In the river

where the animals have to starve the reproductive organs become large while the muscles waste away. Here in time of affluence the muscles store up nutritive material for the purpose of maintaining the life of the animal during starvation and of assisting in the function of reproduction. This instance seems to me to be quite a good illustration of the rôle which the factor of safety plays also in the function of the supply of the body with proteid food. The storing away of proteid, like the storing away of glycogen and fat, for use in expected and unexpected exceptional conditions is exactly like the superabundance of tissue in an organ of an animal, or like an extra beam in the support of a building or a bridge—a factor of safety.

I therefore believe that with regard to the function of supply of tissue and energy by means of proteid food nature meant it should be governed by the same principle of affluence which governs the entire construction of the animal for the safety of its life and the perpetuation of its species.

Before concluding I wish to add the following remark. It seems to me that the factors of safety have an important place in the process of natural selection. Those species which are provided with an abundance of useful structure and energy and are prepared to meet many emergencies are best fitted to survive in the struggle for existence.

S. J. MELTZER

ROCKEFELLER INSTITUTE FOR
MEDICAL RESEARCH

SCIENTIFIC BOOKS

SOME RECENT BIBLIOGRAPHIES OF GEOLOGY

Two very valuable bibliographies of interest to all workers in geology have recently been issued. The first is Mr. F. B. Weeks's 'Bibliography and Index of North American Geology, Paleontology, Petrology and Mineralogy' for the years 1901-5, inclusive. It constitutes

Bulletin 301 of the U. S. Geological Survey, and includes approximately 6,400 titles. This certainly speaks well for the industry, at least, of American geologists. In glancing through the pages of the book one is struck with the large number of papers relating to economic geology. At the same time the amount of work done in paleontology, petrology, and the various abstract branches of the science, seems to have been only relatively and not actually less than in any preceding period of equal length. The bibliography follows in style Mr. Weeks's previous and well-known annual contributions.

The second report constitutes Bulletin 6 of the new (fourth) series of the Ohio Geological Survey. It consists in the main of a subject index to the publications of the various geological surveys of Ohio and is the work of Alice Greenwood Derby. It is supplemented by a brief and incomplete bibliography of publications relating to the geology of Ohio, other than those of the State Geological Survey, prepared by Mary Wilson Prosser. There is an unusually interesting preface prepared by the late state geologist, Edward Orton, Jr.

The Ohio bibliography differs entirely in character and scope from Mr. Weeks's paper noticed above. It is none the less well conceived and will be exceedingly useful. It is one of the unfortunate features of state geological survey work that the investigations are rarely continuous, and the publications are issued in various different forms and series from year to year. It is exceedingly difficult to keep track of them, and even more difficult to secure complete sets. In Ohio publication began in 1836, and there have been four successive and distinctly organized surveys. The reports have been prepared, printed and distributed under laws which have been changed from time to time, and despite the large aggregate sum spent in publications, many important libraries find it impossible to purchase full sets of the reports. Under the circumstances a complete index of the reports is particularly welcome. If it had included even brief abstracts, such as Mr. Weeks includes in his bibliographies, it would have

been even more welcome. As it is, the bulletin will be of great service pending the publication of a complete dictionary catalogue, which will doubtless be some time necessary.

H. F. BAIN

URBANA, ILL.,

February 19, 1907

Mars and its Canals. By PERCIVAL LOWELL. Illustrated. New York, The Macmillan Company. 1906. Pp. xv + 393. 8vo.

'To G. V. Schiaparelli, the Columbus of a new planetary world, this investigation upon it is appreciatively inscribed'—so reads the dedicatory page of this handsomely printed volume, which is a storehouse of observation and theorizing concerning those features whose study Schiaparelli was so instrumental in inspiring. Whatever may be any astronomer's opinion regarding the degree of credibility to be assigned to various observations of the surface features of Mars, and whatever may be that astronomer's opinion of the validity of Lowell's deductions from those observations; no reader of this book can fail to recognize the serious earnestness of its author and his sincere belief in the scientific conclusiveness of all the varied arguments advanced to account for surface markings and phenomena that they present.

While this book is published as a popular exposition of the most recent investigations, it presents practically all that is known, or thus far suspected, presumably, concerning this planet and its inhabitants. It is divided into four parts.

Part I. is a description of its *natural features*, *i. e.*, those bearing closest resemblance to the earth in form and development. Here are outlined the advantages of good-seeing and the need to go to out-of-the-way parts of the earth to find transparent atmosphere: a bird's-eye view of past Martian discovery; a description of the polar caps, the white spots, the climate and weather, mountains and clouds, color-tinted areas, and vegetation. This part closes with a summary, occupying pages 159-170, in which are explicitly laid down and numbered 'thirty-nine articles of Martian scientific faith' presented as definite,

undeniable facts of accurate observation. The rest of the summary is devoted to showing how these articles dove-tail together in mutual confirmation.

Part II. describes what the author calls 'Non-natural Features,' by which he means those which have the least analogy to features on the earth, and which differ most from what our terrestrial experience would lead us most naturally to expect. In this category he places the canals, and describes their system and their gemination, and presents arguments to substantiate their objectivity as opposed to the diplopic, or the interference, or the illusion theory. A full account of the double canals is given, also of the canals in the dark regions, of the oases, of the 'carets' on the borders of the great diaphragm; and a description of Lampland's success in photographing thirty-eight canals, the doubling of Nilokeras and a snowfall, together with the more prominent 'continents,' 'seas' and 'oases.'

Part III. deals with the 'Canals in Action,' under the headings Canals: kinematic, Canal Development Individually Instanced, Hibernation of the Canals, Arctic Canals and Polar Rifts, Oases: kinematic. The purpose of this section and also of Part IV. is to show that the canals are real water arteries for the distribution of the melting polar caps to the arid equatorial regions, and to the constitution and purpose of the canals and oases in this scheme, with arguments in support of the hypothesis that life, sentient and vegetable, does exist on Mars.

The book is copiously illustrated, and closes with an index of nine pages.

HERMAN S. DAVIS

SOCIETIES AND ACADEMIES

THE TORREY BOTANICAL CLUB

THE second stated meeting for the year 1907 was called to order at the Museum Building of the New York Botanical Garden at 3:30 o'clock P.M. on January 30, 1907, with Vice-president Professor L. M. Underwood in the chair. Twenty-three persons were present.

The scientific program was as follows:

Experiences on the Island of Jamaica during the Earthquake of January 14, 1907: Dr. M. A. HOWE.

A trip for the collection and study of marine algæ and other plants brought Dr. Howe to the island of Jamaica on December 14, and he was on the island during the recent earthquake. An interesting account was given of his experiences at that time.

New or Rare Mosses from Jamaica: Mrs. N. L. BRITTON.

Mrs. Britton exhibited some of the most interesting mosses collected in Jamaica, showing several genera and subgenera, not heretofore known in the West Indies, and several new species, and also indicated some reductions of names to synonyms. Specimens of types of Jamaican species were also shown from the Mitten Herbarium and one of Miss Taylor's drawings of a new species and subgenus.

The Probable Function of Tannin in Galls: Dr. MELVILLE T. COOK.

The origin, chemistry and uses of tannin have been studied very extensively, but other phases of the subject have received comparatively little attention. This is especially true concerning the functions which it serves in the plant. It is usually very abundant in diseased tissues, such as insect galls, fungus galls, fungus spots, etc. In insect galls it is developed very early and in some cases it appears to result in the gall-makers moving to other parts of the plant. It is also formed in fungus-galls, frequently completely surrounding the point of rupture. In such fungus spots as those produced by *Cercospora* the successive circles are due to the depositing of tannin within the tissues. The author has made extensive studies on the anatomy of both insect and fungus galls and is now conducting a series of physiological experiments.

C. STUART GAGER,
Secretary

SPECIAL ARTICLES

THE LIMITATIONS OF ISOLATION IN THE ORIGIN OF SPECIES

ANY adequate consideration of the bearing of the geographical distribution of organisms