

as to make noteworthy contributions to the science of industrial hygiene. Dr. T. M. Legge's section on Arsenic Poisoning is the best brief treatment of this subject known to the reviewer. Dr. E. R. Hayhurst's discussion of brass and zinc poisoning, Dr. G. L. Apfelbach's treatment of carbon monoxid poisoning, Dr. Hamilton's review of lead poisoning in the United States and Dr. Louis Casamajor's section on manganese poisoning all embody in compact form original researches of the authors which have been made under American conditions and with such thoroughness as to be of substantial and permanent value. Professor F. S. Lee's chapter on Fatigue and Occupation is a notable contribution to the subject, and Dr. J. T. Bowen's discussion of occupational affections of the skin contains much valuable material. Dr. L. Devoto's account of his famous clinic for occupational diseases at Milan, Professor G. C. Whipple's brief discussion of the use and the fallacies of statistics, and the sections on factory legislation by Mr. John B. Andrews, by the late Professor C. R. Henderson and by Mr. C. H. Crownhart, are deserving of specially favorable mention.

With the virtues of an encyclopedic work prepared by many authors there necessarily goes a certain lack of balance and proportion, aggravated in this case by the somewhat artificial separation of the diseases themselves from their etiology and prophylaxis which leads to the discussion of arsenic poisoning, brass poisoning, etc., in two different places in the book and often by different authors, with some consequent repetition and confusion. The sections on etiology and prophylaxis, as a whole, show a painstaking study of the literature but do not suggest an intimate first-hand contact with the inside of a factory.

Perhaps the most striking evidence of this academic attitude is the small amount of space devoted to dust, ventilation and general factory sanitation as compared with the industrial poisons. The most serious problems of industrial life are accidents and tuberculosis, the industrial poisonings (except plumbism) being by comparison relatively unimportant. Accidents

presumably fall outside the scope of this work but certainly industrial tuberculosis does not; yet dust removal and factory ventilation are scantily treated, while pages are devoted to rare intoxications, of interest only as medical curiosities.

Dr. Gilman Thompson's "Occupational Diseases" while preeminently medical in its viewpoint, includes excellent chapters on factory sanitation and dust removal, is in general far better balanced and should prove more valuable for the physician and the average worker in industrial hygiene; Dr. Price's "Modern Factory," while much more elementary and necessarily superficial in certain details, gives by far the clearest picture for beginning students of the entire subject, including accident prevention, and remains the best text-book for social workers, factory superintendents and others who may be interested in the general aspects of the question. "Diseases of Occupation and Vocational Hygiene" contains much material which will make it a valuable reference book for the specialist; but it is not likely to supplant either of the two earlier works, each of which so well fills its special field.

C.-E. A. WINSLOW

YALE UNIVERSITY

PROCEEDINGS OF THE NATIONAL ACADEMY OF SCIENCES

THE twelfth number of Volume 2 of the *Proceedings of the National Academy of Sciences* contains the following articles:

The Origin of Veins of the Asbestiform Minerals: Stephen Taber, Department of Geology, University of South Carolina. Cross-fiber veins are formed through a process of lateral secretion; the fibrous structure is to be attributed largely to the mechanical limitation of crystal growth through the addition of new material in only one direction.

A New Test of the Subsidence Theory of Coral Reefs: Reginald A. Daly, Department of Geology and Geography, Harvard University. Existing coral reefs are new upgrowths on platforms which have been formed before, and independently of, the reefs. The sub-

marine topography of each reef-platform structure as a whole and the elementary principles of oceanography declare against the assumption that the forms and spatial relations of atoll and barrier reefs are due to the sinking of the earth's crust.

A New Thermometer Scale: Alexander McAdie, Blue Hill Observatory, Harvard University. It is suggested that the absolute zero and the melting point of ice be designated as 0 and 1,000.

On the Immunity Coloration of Some Nudi-branches: W. J. Crozier, Bermuda Biological Station for Research, Agar's Island, Bermuda. The coloration of *Chromodoris zebra* is a metabolic accident, at least in relation to its protection.

Some Effects of the Continued Administration of Alcohol to the Domestic Fowl, with Special Reference to the Progeny: Raymond Pearl. Confirmation of previous calculations that the progeny of alcoholized parentage in poultry, while fewer in numbers, are made up of individuals superior in physiological vigor and that this result is due to a selective action of the alcohol upon the germ-cells.

An Ionization Manometer: O. E. Buckley, Research Laboratory, American Telephone and Telegraph Company and Western Electric Company. Use is made of the ionization of gas by an electron discharge. The range of the apparatus is from 10^{-3} mm. to as low pressures as can be obtained.

Physiological Studies on Rhizophora: Howard H. M. Bowman, Department of Botany, University of Pennsylvania, and Tortugas Laboratory, Carnegie Institution of Washington. The rate of transpiration varies directly with the concentration of the medium in which the *Rhizophora* plants grow.

On the Hydrogen Ion Concentration of Sea Water, and the Physiological Effects of the Ions on Sea Water: J. F. McClendon, Department of Physiology, University of Minnesota, and Tortugas Laboratory, Carnegie Institution of Washington. It is concluded that OH' , Na' and K' increase the permeability of the plasma membrane by causing it to swell and that Ca'' , Mg'' and H' (at least on the

alkaline side of the isoelectric point) inhibit increase in permeability by inhibiting swelling.

Some Interrelations between Diet, Growth and the Chemical Composition of the Body: Lafayette B. Mendel and Sarah E. Judson, Sheffield Laboratory of Physiological Chemistry, Yale University. Changes in the water, ether extract, and ash content of the body have been determined under various conditions.

Further Study of the Atomic Weight of Lead of Radioactive Origin: Theodore W. Richards and Charles Wadsworth, 3d, Wolcott Gibbs Memorial Laboratory, Harvard University. Atomic weight of four different examples of isotopic lead not hitherto tested was determined, with the results varying from 207.00 to 206.08.

On Some Anomalies in Geographic Distribution of Pacific Coast Mollusca: William Healey Dall, Smithsonian Institution, Washington, D. C. Observations in regard to long-continued studies by the author.

Some Psycho-Physiological Processes as Affected by Alcohol: W. R. Miles, Nutrition Laboratory, Carnegie Institution of Washington. The percentile effects of the ingestion of alcohol upon a related group of processes, such as the patellar reflex latency, lid reflex latency, patellar reflex amplitude, were studied.

The Influence of the Marginal Sense Organs on Metabolic Activity in Cassiopea Xamachana Bigelow: L. R. Cary, Department of Biology, Princeton University, and Department of Marine Biology, Carnegie Institution of Washington. Muscular activity is a relatively unimportant factor in determining the metabolic activity of *Cassiopea*.

New Evidence in Regard to the Instability of Human Types: Franz Boas, Department of Anthropology, Columbia University.

A Revision of the Atomic Weight of Tin: Gregory Paul Baxter and Howard Warner Starkweather, Coolidge Memorial Laboratory, Harvard University. The value $\text{Sn} = 118.703$ ($\text{Cl} = 35.457$) is found.

Further Studies of Nerve Conduction in Cassiopea: Alfred Goldsborough Mayer, Department of Marine Biology, Carnegie Institution of Washington.

The Earliest Fresh-Water Arthropods: Charles Schuchert, Peabody Museum, Yale University. If the eurypterids and limulids arose in the fresh water we can explain why they and the terrestrial scorpions do not pass through a crustacean stage. It may well be that the trilobites retaining the nauplius stage do not give rise to these stocks. We may look for this ancestral stock in one still more primitive, which seems to have permanently invaded the rivers of the land either in Proterozoic time or in Walcott's Lipalian time.

Observations upon Tropical Fishes and Inferences from their Adaptive Coloration: W. H. Longley, Goucher College, Baltimore. The observations here presented undermine many speculative explanations of animal coloration in terms of natural selection.

Report of meetings of the National Research Council and of its Executive Committee.

Address by Lieut. Colonel George O. Squier, on Scientific Research for National Defense as Illustrated by the Problems of Aeronautics.

Research Grants from the Trust Funds of the Academy.

Report of the Autumn Meeting.

We may summarize the articles in Volume 2 of the *Proceedings* as follows: Mathematics, 20; Astronomy, 29; Physics and Engineering, 23; Chemistry, 15; Geology and Paleontology, including Mineralogy and Petrology, 33; Botany, 9 (see also Genetics); Zoology, including General Biology, 20 (see also Genetics); Genetics, 10; Physiology and Pathology, 13; Anthropology, 10; Psychology, 4; a total of 186 articles.

The division of these articles between members of the Academy and non-members is 63 and 123, respectively.

The list of institutions which have contributed three or more articles is as follows: Harvard, 31; Carnegie Institution, 29, divided as follows: Solar Observatory 19, Marine Biology 3, Station for Experimental Evolution 3, all other departments 4; University of Chicago, 12; Johns Hopkins University, 11; University of California, 7; Yale University, 7; Princeton University, 5; Maine Agricultural Experiment Station, 5; Brown University, 5;

Massachusetts Institute of Technology, 5; U. S. Geological Survey, 4; University of Illinois, 4; Smithsonian Institution, 4; Rockefeller Institution for Medical Research, 4; Observatorio Nacional Argentine, 3.

EDWIN BIDWELL WILSON

MASS. INSTITUTE OF TECHNOLOGY,
CAMBRIDGE, MASS.

NOTES ON METEOROLOGY AND CLIMATOLOGY

EVAPORATION MEASUREMENT

Loss of moisture from plant and animal surfaces and from the soil interests the plant physiologists, plant and animal ecologists, and students in agriculture and forestry; but evaporation from a free water surface appeals to irrigation and hydraulic engineers. On this account, a type of instrument satisfactory to the one group will not meet the requirements of the other. Although the rate of evaporation depends primarily on temperature, wind-velocity, humidity, it is a function of the nature of the atmometer as well. For instance, the size, shape, material and color of the pan, the height of the projecting rim, and sediment, color and depth of the water, and the nature of the evaporating surface, affects strongly the evaporation. This being the case, Dr. B. E. Livingston says:¹¹

The ratio of the rate of the evaporation from one kind of atmometer pan to that from another kind remains constant only for some single set of surrounding conditions. Thus the evaporation rate from any atmometer varies with the relation between the internal complex of conditions (nature of the instrument) and the external complex (the surrounding conditions of the atmosphere). . . . The exposure of several evaporating surfaces must be alike if their readings are to be comparable.

The readings of one instrument, therefore, can not be reduced to terms of another.

Although many evaporation observations of various sorts have been taken in the United States,¹² this lack of comparability prevents

¹¹ *Mo. Weather Rev.*, 43, pp. 126-131, 1915, "Atmospheric Influence on Evaporation and Its Direct Measurement."

¹² T. Russell, "Depth of Evaporation in the