From whatever point in our allegorical web we may choose to commence, whether geophysical, chemical or biologic, if we proceed far enough in our exploration we are inevitably led into the province of the geologist (and *vice versa*), for the oceanographer, if he is to be anything of an architect (not a mere bricklayer) must equally concern himself with the shapes and with the structure of the basins that hold the oceans.

As truly as the character of the bottom of the sea largely determines what kinds of animals live thereon (which every fisherman knows to be the case), biological processes going on within the water as largely determine what sorts of sediments shall accumulate in any given place to make up this bottom, except around the coasts, where these processes are masked by silt washed down from the land. Consequently the problems of sedimentation in the ocean fall as much within the province of the biologist as of the geologist. Thus the oozes that accumulate over the greater part of the sea floor consist of the skeletons of animals and plants that sift down after death from the upper layers.

Where, when and in what quantity these skeletons start to sift down is a problem as strictly biologic as any, for it depends in part on the geographic distribution, equally on the birth and death rate of the particular plants and animals concerned. But whether and in what quantities these skeletons do actually reach the bottom is a physical-chemical question, as is the ultimate fate of such of them as do arrive there. So, too, is their effect upon the bottom water of the ocean when they go back into solution, for given time enough anything will dissolve in normal sea water. But at the same time, the alterations caused in the sediments by the entrapped water offer very important and far-reaching geological problems, for while we know that the limestone and shale rocks were originally laid down under the water under conditions comparable to those of to-day, they differ greatly in their present state from the muds and oozes that are now accumulating under the seas. Two of the most pressing problems in this field concern the method of formation of petroleum and of iron ores. In fact, no one will dispute that the study of the modern sea bottom is a geologic necessity, for only by this means can geologists hope to understand how the different classes of sediments now solidified into rock were originally accumulated and subsequently metamorphosed.

The shapes of the oceans, too, confront the oceanographer at every step, whatever be his particular chosen field of research, because it is the contours of the coast lines and of the submarine slopes that confine and control the whole system of submarine circulation, however it may be kept in motion. And as every oceanographer realizes, this circulation is in the end the life blood of all the events that take place in the sea.

There is, I think, no need to quote more examples to show that the different disciplines of oceanography inevitably interlock, or to prove the intellectual necessity of not only recognizing but indeed acting upon this unity, if we hope ever to gain a thorough understanding of the sea and its inhabitants. Any attempt (conscious or unconscious) to hold them apart can result only in frustrating this high aim and in setting us backward to the stage of simply gathering and accumulating facts in unrelated categories.

OBITUARY

WILLIAM A. ORTON

DR. WILLIAM A. ORTON, scientific director and general manager of the Tropical Plant Research Foundation for the past five years, and formerly senior pathologist in charge of the office of cotton, truck and forage crop disease investigations at the Bureau of Plant Industry, U. S. Department of Agriculture, died at his home in Takoma Park, D. C., on January 7. He was in his fifty-third year, having served slightly more than twenty-five years in the department at the time he resigned to take up the tropical research work. Funeral services were conducted at the Takoma Park Presbyterian Church on January 9, and interment was in Rock Creek Cemetery, D. C.

The death of Dr. Orton closed a brilliant career, one marked during its later years by a courageous struggle against ill health which was a marvel to his associates. In spite of these limitations, he was a leader in the field of plant pathology and tropical agriculture, and has accomplished results of outstanding importance in the thirty years since he entered the Department of Agriculture.

Dr. Orton was born on February 28, 1877, at North Fairfax, Vermont, and was graduated from the University of Vermont with the B.S. degree in 1897. After a year of graduate work in the University of Vermont, specializing in botany and plant pathology, he received his M.S. degree in 1898. In 1915 the degree of D.Sc. was conferred upon him by the University of Vermont. He entered the Department of Agriculture on June 1, 1899, two years before the establishment of the Bureau of Plant Industry, and

was prominently associated in a constructive way with the activities of the department, particularly in lines related to plant pathology, for a little more than a quarter of a century.

During the first decade of his service in the U. S. Department of Agriculture he carried on researches on diseases which were causing serious losses to cotton, cowpeas and watermelons in the southern states, and he was a pioneer in the work of breeding and selection which resulted in the development of disease-resistant varieties that have been such great factors in reducing wilt and root-knot losses in these crops.

In 1907, soon after the organization of the Bureau of Plant Industry, he was made head of the office of cotton, truck and forage crop disease investigations, and held that position continuously until he resigned from the department in November, 1924. During this period the work under his charge gradually grew until it included research projects on the diseases of most of the important vegetable and forage crops. Potato diseases especially received major attention and largely as a result of work done under his direction the infectious nature of the numerous virus diseases of potatoes was discovered and methods of control through the use of certified seed were worked out. Dr. Orton was instrumental in initiating and promoting the now accepted methods of potato seed certification which have been of enormous value to the potato industry of this country.

Dr. Orton organized and for several years carried on the plant disease survey of the Bureau of Plant Industry, which has become of great importance in connection with work on the control of crop diseases. During the World War he was active in organizing research work on diseases causing losses of vegetables in transit, market and storage, which was developed in close cooperation with the food products inspection service of the Bureau of Agricultural Economics and very materially increased knowledge of the causes of losses in shipment and marketing. As a result of this work methods for the reduction of disease losses in the process of marketing have been developed.

He was also active in the work leading up to the passing of the plant quarantine act, and for the last twelve years of his departmental service he was vice-chairman of the Federal Horticultural Board.

In addition to his plant pathology investigations, Dr. Orton privately carried on studies of food plants with a view to providing a more varied and suitable diet for invalids, especially diabetics and neurotics, whose range of foods is restricted.

He was very active in the organization of the American Phytopathological Society. He was its president in 1921, and for several years editor-in-chief of its official journal, *Phytopathology*. Also he was a charter member of the American Horticultural Society organized in 1922 and a member of the following scientific societies and clubs: The American Association for the Advancement of Science, the Botanical Society of America, the Botanical Society of Washington, the Washington Academy of Science, the Society of Horticultural Science, the American Society of Agronomy, the American Genetics Association, the American Society of Naturalists, the International Society of Soil Science, the Société de Pathologie Végétal, the Society of Foresters, International Society of Sugar Cane Technologists, the World Agricultural Society, the Cosmos Club and Phi Beta Kappa.

In November, 1924, he resigned from the department to become scientific director and general manager of the Tropical Plant Research Foundation, an organization initiated by a committee of the National Research Council, of which he was chairman, for the purpose of promoting the study of the plants and crops of the tropics and their disease and insect enemies. The principal projects under way are those on sugar-cane production problems in Cuba with the support of the Cuba Sugar Club; a survey of sugar-cane and cotton industries of the west coast of Peru; an investigation of chicle production problems of British Honduras, a forestry survey of portions of Cuba and a survey of the timbers of tropical America. He was also technical adviser to the division of agricultural cooperation of the Pan American Union. In connection with the establishment and carrying on of this work of the foundation Dr. Orton made numerous trips to Cuba and one trip to Brazil in the interest of the development of a national forest service in the Brazilian Department of Agriculture.

The Inter-American Conference on Agriculture, Forestry and Animal Industry, which is to be held in Washington in September, 1930, under the auspices of the Pan American Union, grew out of recommendations which were presented by Dr. Orton through the Pan American Union to the sixth International Conference of American States, which met at Havana in 1928. He has worked actively in the preparation of the program which will be followed at this conference.

Dr. Orton was a man of unusually broad vision and clear judgment as to the needs of agricultural science in the United States and tropical America. Coupled with this was outstanding, original ability in the formulation of sound workable plans for the accomplishment of desired results. He recognized the value of cooperation for the attainment of scientific results, and had the personality to make and keep friends, so essential in such an undertaking. His influence on young men entering the field of scientific endeavor

has been outstanding, and has left with them lasting inspiration. He was always kindly and considerate of others, of even temperament and easy to work with and his optimism was unbounded. His acquaintance was broad and his friends are many.

Dr. Orton's publications, largely on subjects related to plant pathology, comprise some forty or more bulletins and circulars of the Department of Agriculture and many published in outside journals and magazines and by the Tropical Plant Research Foundation.

Dr. Orton is survived by his widow and two daughters, Alberta and Alice, and by two married sisters, who reside in Vermont.

W. W. GILBERT

SCIENTIFIC EVENTS

SINANTHROPUS PEKINENSIS

THE Peking correspondent of the London *Times* reports that at an open meeting of the Geological Society of China held on December 28 the closely guarded details of the finding in North China of the skull of a man hundreds of thousands of years old were officially revealed. The discovery, which is claimed to be the most important of its kind, was made on December 2, in a limestone cave deposit at Choukoutien, forty miles from Peking.

The find is said to be a unique specimen, and consists of the greater part of an uncrushed adult skull belonging to an entirely new genus, known to science as *Sinanthropus Pekinensis,* which is definitely placed above the Java ape-man in brain capacity, but below Neanderthal man. The Peking man is considered to antedate Neanderthal man and is held to be nearer the genus *Homo* than the Piltdown and Java types. Estimates of the age of the skull vary greatly. Dr. Grabau, adviser to the Chinese Geological Survey, states that the Peking man lived at the beginning of the Quaternary Period and gives his age as 1,000,000 years, but Père Teilhard Dechardin, president of the Geological Society of France, and also adviser to the Chinese Survey, favors an estimate of 400,000 to 500,000 years.

The credit for the actual discovery of the skull goes to a young Chinese geologist, Mr. W. C. Pei, in charge of the field work of the Geological Survey at Choukoutien last season. Excavations there had previously yielded the major parts of the two lower jaws and numerous teeth and skull fragments of "Peking Man," as well as four tons of fossil remains, including the sabre-toothed tiger, which flourished at the same time as "Peking Man." The skull is still largely embedded in hard travertine, which will require a couple of months of difficult and delicate work to remove, but the vault from the massive brow ridges to the occiput and the whole of the right side have already been freed from the relatively soft matrix, showing that while most of the facial region seems lacking, the brain case is almost completely preserved. The massive jaw sockets are also visible.

Compared with the Java skull which is approximately the same length, the Peking skull is said to possess characteristics which point to relatively greater brain capacity.

CANADIAN NATIONAL RESEARCH LABORATORIES[1]

TENDERS have been invited by the Government of Canada for the construction of a National Research Laboratories building that will cost, when finished, approximately three million dollars. Appointments of chiefs to two of the laboratory divisions has been announced.

Dr. H. M. Tory, formerly president of the University of Alberta, and now the president of the National Research Council, has expressed the view publicly that the new home for research in Canada will be one of the finest to be found in any country. It is being built on the banks of the Ottawa River in the capital city. Designed in the form of a giant figure "8," it will stand 60 feet (four stories) high, 418 feet long, and 176 feet deep. Two hundred and fifty thousand feet of floor space will be provided. Library accommodation will be for 300,000 volumes. An assembly hall and associated rooms will be capable of accommodating the staff and the various scientific societies of the Dominion.

Plans call for the development of the following divisions: The divisions of physics and engineering physics, to the head of which Dr. Robert William Boyle, dean of the faculty of applied science at the University of Alberta, has already been appointed; the division of industrial chemistry, to the head of which Dr. George Stafford Whitby, professor of organic chemistry at McGill University, has been appointed; the division of economic biology and agriculture, to which Dr. Robert Newton, professor of field crops and plant biochemistry at the University of Alberta, is the acting head; the division of industrial engineering, the division of textiles, the division of standards, and such other divisions as improvement in industrial processes, the development of natural resources, and the utilization of waste require.

Dr. Boyle was graduated from McGill University in 1906, and from then until 1909, when he received the Ph.D. degree and the 1851 scholarship, he did research

[1] From *Nature.*