SCIENCE

VOL. LXXI FRIDAY, APRIL 25, 1930 No. 1843

International Cooperation in Geographical Work: DR. WILLIAM BOWIE 425

Obituary:
Arthur McQuiston Miller Memorial Services; Memorials; Recent Deaths 429

Scientific Events:
A Chemistry House in London; A Scientific Advisory Board for the Westinghouse Research Laboratories; The Twenty-fifth Anniversary of the Illinois State Geological Survey; The American Philosophical Society 430

Scientific Notes and News 432

Discussion:
The Future of Taxonomy: DR. CLARENCE E. MICKEL. *Pressure Potential in a Fluid:* DR. W. H. PIELEMEIER. *Conglomerite, A New Rock Term:* PROFESSOR BRADFORD WILLARD. *Banana Stowaways Again:* DR. ROBERT K. ENDERS. *When Believing is Seeing—an Optical Illusion:* RUTH FULLER STEVENS 436

Reports:
The Western Cooperative Oil Spray Project: R. H. ROBINSON, D. F. FISHER, ANTHONY SPULER 440

Scientific Apparatus and Laboratory Methods:
Sedimentation Tube for Mechanical Analyses: DR. PARKER D. TRASK. *Stock Cultures of Ameba:* DR. H. W. CHALKLEY 441

Special Articles:
The Chemical Control of Splenic Contraction: PROFESSOR J. M. D. OLMSTED and DR. S. F. COOK. *The Chemical Nature of Cypridina luciferin:* DR. SAKYO KANDA 442

Science News x

SCIENCE: A Weekly Journal devoted to the Advancement of Science, edited by J. MCKEEN CATTELL and published every Friday by

THE SCIENCE PRESS

New York City: Grand Central Terminal

Lancaster, Pa. Garrison, N. Y.

Annual Subscription, $6.00 Single Copies, 15 Cts.

SCIENCE is the official organ of the American Association for the Advancement of Science. Information regarding membership in the Association may be secured from the office of the permanent secretary, in the Smithsonian Institution Building, Washington, D. C.

INTERNATIONAL COOPERATION IN GEOGRAPHICAL WORK[1]

By Dr. WILLIAM BOWIE

U. S. COAST AND GEODETIC SURVEY

IN my capacity as a delegate from the United States I am representing the National Geographic Society of Washington, D. C., as well as the Department of Commerce of the United States government.

The officials of the National Geographic Society requested me to extend to this assembly their most cordial greetings and their best wishes for a bright and distinguished career for this institute which we are now bringing into existence.

The officials of the National Geographic Society are deeply interested in all phases of geographical science. They have done much to bring the nations of the world into closer touch with each other by the dissemination of accurate geographical information supplemented by a remarkable series of pictures in their splendid *National Geographic Magazine* that is known to every educated man in the world. The officials have expressed to me the hope that they may have very close contact with the officials of the Pan-American Institute of Geography and History in order that the science of geography may be carried even further than it has been in the past.

They expressed the hope that the government agencies of the various American nations which are engaged in any phase of geographical science will receive the support of those officials of the government who have to do with the allotment of funds for these official geographical services. They also expressed the hope that non-official agencies, such as geographical societies or geographical departments of universities, may be stimulated by the organization of the Pan-American Institute of Geography and History to

[1] Address delivered before the Pan-American Institute of Geography and History, meeting in Mexico City, September 17, 1929.

carry on their operations on a wider and grander scale than may have been the case in the past.

The officials of the National Geographic Society are not unmindful of the fact that this institute is to cover history as well as geography. In fact, they realize that there is a close association between historical research and the geographical environment of those regions for which the historical studies are undertaken. It is, in fact, impossible to divorce geography from history. The historian can not properly discover or interpret the motives that impelled large or small groups of people to act in a certain way unless he knows the geographical conditions which prevailed at the time such action was taken. Surely the character of the climate and of the terrain, as well as the presence or absence of rivers and streams or ocean fronts, has tremendous bearing on the development of the civilization of a tribe or a nation.

However, my ability to discuss history in its broad and technical phases is limited, and I will leave to our delegates who are historians the task of properly setting forth the place that historical research will have in our new institute.

The officials of the National Geographic Society wish me to convey to you their earnest desire that the efforts of the people in the western hemisphere, acting under the leadership of our institute, should be successful in discovering the historical facts and in setting them forth in books or papers in order that the data secured may be used for the purpose of making the life of the dweller in the western hemisphere fuller and richer. With knowledge comes power, and with power we have the means of raising the scale of living and increasing the happiness of the citizens of each of the American nations.

We have heard much in recent decades of the application of scientific principles to agriculture and other great industries, in exchange of goods and in communication. But science can only go a certain distance towards bettering the condition of humanity and making civilization grander and nobler without having geographical facts. It is here that the geographer must supplement the work of the physicist, the chemist and the engineer, for without the geographical information and background the other sciences can not well be efficiently employed in the utilization of the resources which nature has given abundantly to the nations of the world.

The officials of the National Geographic Society have expressed frequently, and do on this occasion through me, their opinion that civilization will be greatly advanced by an early completion of the mapping of the world. We are all familiar with the sheet of paper on which are drawn the margins of the continents which are equally the limits of tidal waters. How frequently these maps are totally inadequate to convey accurate information as to the geographical locations of points within the country, their elevations, the accurate location of mountain ranges, rivers, streams and highways, nor do they show the slope of the ground. Without all these essential geographical data the map user can not form accurate and detailed pictures of the conditions within the area covered by the map.

On the other hand, there are in existence for certain portions of the area of each country topographical maps which do carry these essential data. The officials of the society would like to see the day when there is an adequate topographical map covering the area of each of the countries in the western hemisphere. Much mapping has been done in my country, but only 44 per cent. of its area has as yet been topographically surveyed, and many of the map sheets are inadequate, owing to age or deficient methods employed in the survey, to meet the needs of agriculture, mining, the development of hydroelectric power and extension of transportation systems and systems for the transmission of power and communication.

The engineers and other leaders in industry are making their wants known in regard to topographic mapping, and it is practically certain that within the next few years each country of the world which is not already supplied with topographic maps will increase its activity in the mapping line. It has truly been said that only a rich nation can afford to develop its natural resources and its industries without previously having executed the topographic surveying and mapping.

I have expressed to you the opinions and wishes of the officials of the National Geographic Society, and I hope I have made it clear that they wish to help the Pan-American Institute of Geography and History in every way that is possible for them and that they stand ready to cooperate with the institute and the geographical services of the American countries in developing the western hemisphere in the interests and the welfare of humanity.

The western hemisphere is new to civilized man. It is less than 450 years since Columbus discovered the new world and opened up a vast area which was destined to have such a great influence on the development of civilization. We, in this generation, have a great responsibility thrust upon us. We must hand down to posterity our countries with their natural resources. If we are wise we will develop and utilize these resources for our present needs, but we will do so in such a way that we shall not impoverish those generations which are to follow us. In this development and utilization the geographer should

and must play a leading and important rôle. It is here that the Pan-American Institute of Geography and History can exert a great influence for good by outlining geographical problems that should be attacked and solved and in disseminating geographical principles and data which may have been discovered. A fact is of no value if locked in the mind of a single geographer. It is useful only when he has published the results of his investigation and research in order that every one may have the benefits of his work.

I am sure you will be interested in knowing more intimately the National Geographic Society and the scope of its activities. It is organized on the democratic principle that each of its 1,200,000 members has a share in supporting the magazine that it publishes and the exploration work to which it has given financial support. Also the membership supports financially the various lines of educational work which are carried on by the society.

Each member is, on the other hand, entitled to know just what have been the results of the explorations that have been conducted under the society's auspices. He must be kept informed of changed geographical positions which may occur in widely separated parts of the world. He is entitled to have the maps which are compiled and printed by the society and he is also entitled to the results of the world-wide photographic survey of matters of geographical interest which the staff of photographers of the society is making.

All these data are furnished to every member through the society's *National Geographic Magazine* and in special technical publications which are issued from time to time and give the results of geographical explorations.

The society is independent of governmental control. It is a private institution and receives no funds from the government of our country. However, it cooperates with governmental agencies which are carrying on geographical research or investigations, and it from time to time will finance a project which may be advocated by a government official who has not at hand governmental funds for carrying on work. There are two notable examples of this. First, the exploration of the Carlsbad Caverns in New Mexico by the late Dr. Willis T. Lee, who was a member of the U. S. Geological Survey. Another was a reconnaissance survey of the active and extinct volcanoes along the Alaskan Peninsula and the Aleutian Islands by Dr. Thomas A. Jaggar, also a member of the U. S. Geological Survey.

The society has done a noteworthy service to science in disclosing the history and art treasures of pre-Columbian civilization both in North and South America.

Seven expeditions of the society to Chaco Canyon, under the leadership of Neil M. Judd, unearthed and explored the remains of America's finest prehistoric communal dwellings. One of these pre-Columbian "apartments," Pueblo Bonito, housed some 1,500 people, had 350 rooms on the ground floor and yielded an amazing array of utensils, art objects, ceremonial appurtenances and other evidences of their daily life.

You are familiar with the Pedregal area, south of Mexico City, with its mass of unweathered lava from the volcano Xitli. Beneath that "Stony Place" is a blanket of soil, and underlying the soil is another lava flow of the remote past. There an expedition of the society led by Dr. Byron Cumming found encased remains of a people who flourished at a period variously estimated at from 3,000 to 6,000 years ago. Clay images, bone awls, ear ornaments and other objects of this earliest known American civilization, which flourished in your country, are seen by thousands of the National Geographic Society's members when they visit its headquarters in Washington, D. C.

Dr. Ernest G. Holt is now leading one of the society's expeditions which is exploring the haunts of birds in the southern parts of Venezuela. Bird life is the principal objective, but observations of the terrain, the animals and other life forms and the amazing variety of tropical plants are being made.

The National Geographic Society has a research committee whose chairman is now Dr. F. V. Coville, botanist of the Department of Agriculture of the federal government. This committee investigates carefully every project for which financial assistance is asked. There have been many cases where the committee has recommended and the trustees have made grants of funds for worthy projects. The most recent one was the appropriation of $50,000 from its research fund and the assignment of certain scientific personnel for the expedition of Commander Byrd to the Antarctic Continent.

Somewhat earlier it supported financially Admiral Peary's expeditions to the Arctic regions. It contributed financial aid and scientific guidance to the Wellman Polar Expedition, which went to Franz Josef Land in 1898 and made biological and geological collections and in addition observed atmospheric temperatures and other conditions. The data collected were of high scientific value and also an aid to later explorers in that region.

A technical representative was detailed by the society to accompany the Ziegler polar expedition of 1903–05 to direct the scientific work. In 1925 it sent out an expedition to northern Greenland and Ellsmere Island during which Commander Richard E. Byrd gained his first flying experience in polar regions.

One of the most notable pieces of geographical work done by the National Geographic Society was in the Mount Katmai region in Alaska. As is well known, that mountain erupted in 1912, and the ashes from the eruption covered a wide area. The primary purpose of the studies undertaken by the society was observation of the rejuvenescence of the flora which had been obliterated. The exploration party to Mount Katmai observed that the eruption had left a crater almost as large as the one in Vesuvius. When they crossed the mountains towards Bering Sea they discovered a vast area from which were rising innumerable columns of steam. This area, which was investigated intensively by four subsequent expeditions under the direction of Dr. Robert F. Griggs, was called the Valley of Ten Thousand Smokes. The funds necessary to finance these expeditions all came from the treasury of the National Geographic Society. Accounts of these explorations at Katmai have been published in the magazine of the National Geographic Society and also in a series of technical papers.

It would take too much time to tell you of each of the explorations or pieces of geographical research that have been carried on by the society or financed from its treasury, but what I have told you is, I am sure, sufficient to convince you of its high standing, and of the vast scope of its activities. It will, I am sure, encourage you to know that this great organization, through its officials, has expressed such deep interest in the future of the Pan-American Institute of Geography and History. The society is an ally that the institute will be glad to welcome in its efforts to advance geographical science and knowledge in the western hemisphere.

The officials of the National Geographic Society are thoroughly convinced that geographical information, if properly prepared and disseminated, should be as interesting to the child as it is to the adult. With this idea in view the society undertook and is successfully carrying on a great work in connection with the public schools of my country. About 35,000 school teachers obtain daily illustrated lessons in geography from the society conveying information too recent to be found in text-books. These lessons and pictures are used by the teachers in disseminating geographical knowledge to the children. Geography is to-day one of the popular subjects taught in the elementary schools, while a decade or more ago it was considered to be very dull and stupid.

Not only is the society issuing bulletins to school teachers throughout my country but at the request of the editors of about six hundred newspapers they are furnished daily bulletins on geographical subjects. I can not imagine any greater help in the stimulation of the interest of people in geography than this news service of the National Geographic Society.

While not one of the really old geographical societies of the world, the National Geographic Society may yet claim maturity or at least vigorous youth. It was founded in 1888 and has continued its existence from that time. It sends its greetings to the youngest geographical organization, the Pan-American Institute of Geography and History, which begins its existence on September 16, 1929.

The society has been a pioneer in the line of making geographical information valuable and interesting. There are few persons in the world who will read a dull statement no matter how accurate or valuable the data contained therein may be. There is so much literature in the world to-day that we instinctively are drawn towards that portion of it which is prepared in an attractive way, an article or a book that will hold our attention until we have completed it. Dr. Gilbert Grosvenor, president of the National Geographic Society, has reached almost the point of genius in the geographical field by making the magazine of the society carry the message of geography to even the humblest homes. His magazine is read by the highest officials of the national government and in the humblest fisherman's dwelling along the sea-coast, by the miner in his mountain camp and the farmer in his cottage. This is truly a great accomplishment and is a tribute to him.

The officials of the National Geographic Society are not strangers to the citizens of the other American nations. There have appeared many articles, beautifully illustrated, in its magazine depicting certain phases of the geography and history of the countries lying to the south of the United States. We may expect that the society will continue to publish these most interesting articles from the other countries of the western hemisphere which I can assure you are read with the greatest interest by the people of my country.

The society's work is substantially aided by its 3,700 members in Mexico and by 10,260 other members in Central and South American countries. This total of 13,960 members of this great geographical body from the Latin-American countries is a gratifying token of the interest and support you are tendering the advancement of geography.

I have brought with me a series of maps which have been published by the National Geographic Society which I have been asked to give to the director of the Pan-American Institute of Geography and History with the compliments of Dr. Grosvenor.

Upon my return to Washington I shall report to

the officials of the National Geographic Society with a great deal of pleasure the proceedings which have led to the formal organization of the Pan-American Institute of Geography and History and I shall assure them that in my judgment the institute is built on a broad foundation and that its future should be a bright one. Also that its work will undoubtedly result in a vast stimulation of geographical and historical research in the western hemisphere and that the results of such activities should redound to the benefit of the citizens of each of the countries which is adhering to the institute.

OBITUARY

ARTHUR McQUISTON MILLER MEMORIAL SERVICES

ARTHUR MCQUISTON MILLER, for thirty-five years professor of geology and archeology in the University of Kentucky, author of "The Geology of Kentucky" and other works, fellow of the Geological Society of America since 1897, died in Florida on October 28, 1929, of heart failure. The members of the society are invited to join in a meeting to be held in his memory on Memorial Day, Friday, May 30, at Lexington, on the lawn of his home, Maxwelton, adjoining the grove which he gave to the university. The chief speaker on the occasion will be Professor Collier Cobb, of the University of North Carolina.

Dr. Marion M. Miller, brother of Professor Miller, extends the hospitality of Maxwelton to all members of the society who can arrange to be present on the occasion. There are ample accommodations in this fine old mansion for a large group of scientific men and their families.

A committee of the leading citizens of Lexington, representative of the civic bodies of which Professor Miller was an active member, will have charge of the memorial and dedicatory exercises. Judge Samuel M. Wilson, Security Trust Building, is chairman, and to him tributes may be sent by members of the society who wish to pay their respects in this manner to Professor Miller's memory. Those who plan to attend should notify Dr. Marion M. Miller, Maxwelton, Lexington, Kentucky.

It is hoped by Dr. Miller that his guests will come prepared to spend the week-end in the Bluegrass country. A trip will be taken on Saturday to the Kentucky River Gorge, the great Dix River Dam, and to old Shakertown near the dam, where a banquet will be held in the Shakertown Inn. A memorial volume containing the addresses and tributes will be published during the summer and will be sent to members of the society.

MEMORIALS

THE Connecticut Agricultural Experiment Station has issued *Bulletin* 312 as a memorial to Dr. Thomas B. Osborne, who died in January, 1929. Dr. Osborne joined the station staff in 1886 at the invitation of Professor Samuel W. Johnson, director, and professor of agricultural chemistry in Yale University. Two years later he began his studies of the vegetable proteins that were to continue uninterrupted for forty years in the same laboratory. More than two hundred and fifty papers bear his name. The bulletin, entitled "Thomas B. Osborne: A Memorial," opens with an appreciation by Dr. E. H. Jenkins, director emeritus of the station. Dr. Osborne's work is described at length in an article, reprinted from SCIENCE, by Dr. H. B. Vickery, who succeeded Dr. Osborne as head of the station biochemistry laboratory, and Professor Lafayette B. Mendel, of Yale, who for many years collaborated with Dr. Osborne in nutrition experiments. This is followed by six of Dr. Osborne's papers, biographical notices and a complete bibliography of his work.

OFFICIAL notice has been received from the United States Geographic Board that the south arm of Port Snettisham, in southeastern Alaska, near latitude 57° 59′, longitude 133° 44′, has been named Gilbert Bay; and that the lake about 5 miles long lying to the eastward of that bay and about 10 miles inland from Stephens Passage has been named Gilbert Lake, in honor of the late Dr. Charles H. Gilbert, the ichthyologist, who was connected with the Bureau of Fisheries for many years. *The Fisheries Service Bulletin* writes: "It is fitting that tribute is thus paid to the memory of one who attained world-wide distinction in the field of ichthyology; and whose untiring investigations concerning the salmon fisheries, especially those of Alaska, contributed largely to the knowledge of these important fishes, both from a scientific point of view and from the standpoint of practical conservation."

RECENT DEATHS

DR. JOSEPH L. MARKLEY, professor emeritus of mathematics at the University of Michigan, died on April 20 in his seventy-first year.

DR. JOSEPH M. PATTON died on April 17 at the age of seventy-eight years. Dr. Patton had been a professor of clinical medicine at the College of Medicine of the University of Illinois and professor of internal medicine at the Chicago Polyclinic.

PROFESSOR C. KELLER, of the University of Zurich,