five fathoms, that is, thirty to fifty meters; however, Ascherson regards this as the extreme limit for plants of this type and possibly this depth has never been reported elsewhere.

That the two species of *Halophila* described above may have been growing in these Florida waters in Pleistocene times or even an ancestral type of *Halophila* we can have no means of ascertaining, but taking into consideration the clarity of the water at present and the ease with which light can penetrate it, it is not unreasonable to suppose that enough light can be secured by the assimilative tissues of the plants for photosynthetic activities at great depths. Now even though the plants experience some difficulty in their synthesis due to a lessened intensity of light, a change so gradual as the depression of a great area of sea bottom would seem to give a plant belonging to so plastic a group as the Hydrocharitales an ideal opportunity to react to the changing environment.

To summarize briefly, then, the occurrence of these two species of *Halophila* at an unusual depth, probably illustrates the adaptability of the genus and supplements the geological evidences for a depression of the Florida key region. In conclusion the writer wishes to express his gratitude to Professor Van Ingen, of Princeton, for suggesting that these observations might be of general interest.

HOWARD H. M. BOWMAN
UNIVERSITY OF PENNSYLVANIA

THE AMERICAN ASSOCIATION FOR THE ADVANCEMENT OF SCIENCE SPECIAL MEETING[1]

IT will be remembered that the Council of the American Association for the Advancement of Science at its Columbus, Ohio, meetings held from December 27, 1915, to January 1, 1916, voted to permit the association to hold a special meeting on January 3 and 4, 1916, in Washington as an indication of the interest of the association in the meetings of the Second Pan-American Scientific Congress which were held in Washington from December 27, 1915, to January 8, 1916.

[1] Held on January 3 and 4, 1916, in cooperation with the Second Pan-American Scientific Congress.

The opening meeting was held on Monday night, January 3, in the Memorial Continental Hall and was largely attended by members of the association and by delegates to the Pan-American Congress.

Dr. R. S. Woodward, past-president of the American Association, presided and introduced Mr. John Barrett, director general of the Bureau of American Republics and secretary general of the Second Pan-American Scientific Congress, who made an address of welcome as follows:

"I consider it a great honor and privilege to say a word this evening. While I may not be classed as a scientist in the same way as we would classify Dr. Campbell and Dr. Woodward, I can frankly say that I have learned more during the past ten days about the science of international congresses than I ever dreamed could be discovered in a lifetime.

"Speaking as the Secretary General of the Second Pan-American Scientific Congress, I extend to you all congratulations upon the holding of this joint session of the American Association for the Advancement of Science and the Second Pan-American Scientific Congress. I bring to you from the latter an expression of profound interest in what your organization is achieving and we feel flattered that you should have arranged this special meeting.

"It may interest you to know that this Second Pan-American Scientific Congress is the largest official international gathering which has ever assembled in the history of the national capital, and, at the same time, the largest Pan-American official gathering which has ever been called together in any capital of the Western Hemisphere. It is indeed fortunate, moreover, that it should meet at this remarkable time in the world's history, when the harmonious meetings and discussions of the representatives of the twenty-one American Republics should stand out so strongly in contrast to the divided conditions of Europe. The silver lining of the European war cloud, if its terrible blackness can have any such brightness hidden in its folds, is the development of Pan-American solidarity, Pan-American community of interest and Pan-American friendship and peace.

"It is also most appropriate that we should now have a great Pan-American scientific assembly. Last May there met in Washington a Pan-American Financial Conference that attracted the attention of the world. Through many years we have had Pan-American political and commercial con-

gresses and conferences and now we hold in Washington a Pan-American intellectual congress which, in some respects, is more important than all the others.

"Ideal Pan-Americanism can only be achieved through cooperation in science, in education and in intellectual effort as well as in finance and commerce. Particularly is this true of the relations of the United States with the Latin-American countries, where so much attention and prominence are given to science and education.

"The American Association for the Advancement of Science is as well known throughout Latin America as it is in the United States and I am gratified to see so many of the Latin-American delegates here to-night to manifest their interest in this meeting and to give a worthy hearing to Dr. W. W. Campbell, director of the Lick Observatory and president of the association. It is also a pleasure to note that you are to be briefly addressed by Dr. Ernesto Nelson, Inspector General of Education of the Argentine Republic and a member of the Argentine delegation to the Pan-American Scientific Congress. I have known him for many years and can assure you that he stands in the forefront of the educators of South America. I am always glad, moreover, to assist at any gathering presided over by my friend, Dr. Woodward, who is your past-president and also a member of the United States delegation to the Pan-American Scientific Congress."

Dr. Woodward then called upon Dr. Ernesto Nelson, director general of Secondary Industrial and Commercial Education, Buenos Aires, Argentina, and Commissioner of Education, Panama-Pacific International Exposition, who addressed the meeting on behalf of the Latin-American delegates to the Scientific Congress. Dr. Nelson's remarks were as follows:

"As a member of the Latin-American representation to the Second Pan-American Scientific Congress, I have been invited to welcome you to-night to the American Association for the Advancement of Science. My presence here, therefore, emphasizes the delightful spirit of internationalism which characterizes scientific activities where no international boundaries exist.

"In these days, when we are busy telling one another how much stranger we are to each other, how much we have neglected to buy of or sell to each other, it is only fitting that we should also meet on a field on which we can recognize one another as old acquaintances; on a field in which considerable cooperation has been taking place steadily and inconspicuously. I refer not only to the fact that science is a common good, a merchandise whose importation is subjected to no duty and is not dependent upon treaties to gain possession of markets, but to the fact that, through the efforts of agencies like the Carnegie Institution, the universities of Harvard, Leland Stanford, Michigan, Princeton, to say nothing of American museums, a successful work of scientific cooperation is helping to make Americans at large better acquainted with each other.

"The fact that we have come here to-night with our minds prepared to learn heavenly things gives me particular pleasure to recall that it was one of the most illustrious members of the American Association for the Advancement of Science, Dr. Benjamin Apthorp Gould, of Cambridge, Mass., who started in Argentina the work of cataloguing the stars of the Southern Hemisphere, a work which, since then, has enlisted American men of science to the extent that to-day the observatory of the University of Michigan and that of La Plata in Argentina are practically a single institution, carrying a perfectly coordinated work under the same head.

"I am aware that science alone does not make civilization, although it is the chief ingredient of it; but I do believe, as you all believe who are here, that science is the human activity that most surely helped in bringing about mutual understanding among different peoples. We may feel differently, we may act differently, but we must, necessarily, seek truth along the same lines and have the same attitude before scientific facts.

"Let me conclude, therefore, by hoping that, as time goes on, further and further opportunities of quiet scientific cooperation will present themselves before the learned men of the three Americas."

The main feature of the evening was the address by Dr. William Wallace Campbell, director of the Lick Observatory of the University of California and president of the American Association, on the subject of the "Evolution of the Stars." This was a beautifully illustrated address covering for the most part the Hale lectures by Dr. Campbell, given before the National Academy of Sciences and printed in *The Popular Science Monthly* for September, 1915, and *The Scientific Monthly* for October, November and December, 1915.

The meeting concluded with interchanges of courtesies between the members of the American

Association and the delegates to the Scientific Congress.

On Tuesday, January 4, 1916, two sessions of the association were held in the large lecture room of the U. S. National Museum—the first at 10 A.M. and the second at 2 P.M. President Campbell presided.

Abstracts of the papers presented are as follows:

Some Phases of the Origin and Evolution of the South American Fresh-water Fishes: CARL H. EIGENMANN.

The freshwater fish fauna of tropical America is very rich in species. It is entirely distinct from the fauna of Patagonia to the south of it and to the fauna of North America. The fishes of Patagonia have their nearest relatives in Australia and New Zealand. The tropical fauna does not extend south of the La Plata basin. In degrees of latitude it extends much further south of the equator than north of it. Northward it has filtered into western Colombia and thence through Panama into Central America, Mexico and in representatives of two genera into the southern United States and Cuba.

The tropical American fauna has its nearest relatives in Africa, while many of the elements of Africa and South America may be leftovers from faunas formerly extending over much larger portions of the globe, or may have been independently derived from the ocean. The Characidæ and the Cichlidæ seem to demand fresh waters for their migration from place to place. Inasmuch as these families are not found in Europe and evidently only intrusively in the southern United States and Mexico they seem to demand the presumption of a former land bridge or land wave connecting South America and Africa.

Aside from minor expeditions several notable expeditions collected fishes in various parts of South America during the last century. Between 1817 and 1820, Spix and Martins collected in eastern Brazil. John Natterer, between 1817 and 1835, collected in Brazil from Rio de Janeiro to Cuyaba, down the Guapore and Madeira and in the Rio Negro. In 1843, Castelnau made an extensive journey through South America. All of these expeditions were "Natural History" expeditions and devoted as much or more time to other things as they did to fishes.

In 1865, Louis Agassiz led the Thayer expedition to Brazil and devoted over a year, with numerous assistants, primarily to the collection of fishes. During the current century, Mr. John Haseman traveled more extensively than any other expeditions in Brazil, Uruguay, Argentina and Paraguay and devoted himself almost exclusively to the fishes. The present speaker collected fishes in British Guiana and Colombia while Charles Wilson collected in western Colombia, Mr. Arthur Henn in western Ecuador and Messrs. Meek and Hildebrand in Panama.

The fish fauna of tropical America consists of many intrusives from the ocean, like the stingaree, the flounders, the puffer and various sciænids. Of a few relicts, like *Osteoglossus* and *Lepidosiren,* of Cichlids, Pœcilids and an abundance of catfishes and their relatives, the Loricariidæ, and Callihethyidæ, etc., and above all, a host of Characids which have paralleled, both in habits and in form, most of the other freshwater fishes of the world.

Botanical Explorations in South America: JOSEPH NELSON ROSE.

Dr. Rose gave an account of his two exploring trips to South America, the first one being on the west coast, when Peru, Bolivia and Chile were explored, and the second one being on the east coast, in Brazil and Argentina. He called attention to the need for natural history exploration in South America and the unusual opportunities for the carrying on at the present time of this work by naturalists from the United States. He spoke of the kindly feeling shown by the South American scientists, and their willingness to assist him in his work, and of their interest in scientific work generally as carried on by the institutions of this country.

Mention was made of the interesting biological problems awaiting investigation, and of the fact that many new plants and animals are being found by collectors, and that there is great need of a restudy of the species already described.

Dr. Rose stated that North American collections, especially of plants, unfortunately contain very poor representations of South American material.

The various cactus deserts of South America were described, special attention being called to the remarkable display of epiphytic cacti which are to be found in the region of Rio de Janeiro.

The lecture was illustrated by lantern slides showing the desert and mountain types of vegetation.

The Distribution of Bird Life in Colombia: A Contribution to a Biological Survey of South America: FRANK M. CHAPMAN.

In conformance with a plan for zoological exploration designed eventually to cover all of South America, the American Museum of Natural History began, in 1910, field work in Colombia. Since that time, eight expeditions have been sent to that country and thousands of specimens of birds and mammals and pertinent information in regard to the country they inhabit have been secured. The identification of this material having now been nearly completed data are for the first time available to determine the life-zones of the Colombian Andes and the faunal areas of each zone. Four zones can be defined with surprising definiteness: A tropical, extending from sea-level to approximately 5,000 feet; a subtropical, extending from 5,000 to 9,000 feet; a temperate, extending from 9,000 to 12,500, or the upper limit of tree-growth, and an alpine or Paramo zone, extending from the timber line to the lower limit of snow, or approximately 15,000 feet.

Having determined these zones on the basis of collections and field studies, the investigator is now prepared to consider the problem of their faunal areas and of the origin of the forms occupying the zones above the basal or tropical zone. A detailed report on these and allied questions, together with an outline of the distribution in Colombia of each of the over 1,300 species and subspecies of birds secured is now approaching completion.

General Aspects of Zoological Exploration in South America: WILFRED H. OSGOOD.

Zoological exploration with particular reference to the higher vertebrates has to-day a greater significance than even a very few years ago. Aside from the increased importance it has owing to its reciprocal relations with advances in other sciences than zoology, it differs from earlier work in that it follows a definite plan and applies itself consistently to a particular region. Moreover, methods of preserving specimens and keeping records are such that the subsequent study of the material has infinitely greater possibilities than formerly. It is evident also that results rapidly become cumulative, for as collections grow larger and more comprehensive the problems on which they may be brought to bear become broader and more far reaching.

Until recently, knowledge of the fauna of South America has depended upon scattered data gathered sporadically and variously isolated in different parts of the world. Detailed systematic study and explorations continued over a period of years opens up a host of problems not only in classification and distribution, but also in phylogeny, ecology, evolution and relations to human affairs. Especially in the study of mammals there is a wide field promising important results. No general work in the mammals of South America has even been attempted and there is scarcely a single genus of which the geographic distribution is known in detail. Ignorant of the facts of distribution, we are of course still far from a knowledge of their causes. Among problems of great interest are those dealing with the derivation of the fauna and recent work is throwing considerable light upon the relations of living and extinct types. From the economic standpoint, faunistic work in South America may prove to be of even greater importance than it has been in northern countries, as for example in the control of disease and in the advance delimitation of regions naturally suited for agricultural development.

The Corals and Coral Reefs of the Gulf of Mexico and the Caribbean Sea: THOMAS WAYLAND VAUGHAN.

After calling attention to the three bathymetric zones represented by the corals in coral reef areas, the factors which determine the locus of corals of different growth facies in the shoal waters of such areas were indicated. The discussion of the factors determining the lower bathymetric limit of shoal water corals included an account of the relative capacity of corals to remove sediment from their surfaces, their mechanisms for catching food, the nature of their food and their relations to light and to temperature. The relations to salinity and atmospheric exposure were considered. Experiments on rearing corals, on the determination of the length of the free-swimming larval stage and on the growth rate of corals were described.

The relations of off-shore reefs to the submarine platforms around the Gulf of Mexico and the Caribbean Sea, viz., Mosquito Bank, Compeche Bank and the Floridian Plateau, and to the submerged terraces of the Virgin Islands, the Saint Martin Plateau and Antigua, were briefly discussed. It was shown that in Recent geologic time the margins of the Gulf of Mexico and the Caribbean Sea have been submerged by the sea overflowing the marginal land areas, which in Pleistocene time stood higher with reference to the sea-level than at present. Of the living off-shore reefs those of the continents have grown up on recently submerged or more deeply submerged

portions of the continental platforms, while those off the islands are growing upon submarine terrace flats which either stood above water level previous to the last submergence or which have undergone deeper submergence in Recent geologic time.

The Distribution of Igneous Rocks in South America: HENRY STEPHENS WASHINGTON.

The paper presented a very brief correlation between the distribution of petrographic provinces in North and South America. Our knowledge of the chemical petrography of the southern continent is very imperfect, but suffices to give some approximate ideas of some of the main features.

The lavas of the long line of huge Andean volcanoes belong, almost without exception, to very common and widely distributed types, dacites, andesites and basalts, which are, chemically, clustered around the average igneous rock, without prominent dominance of any one chemical constituent. These correspond to, and are a continuation of, the volcanic rocks of the Rocky Mountains and the Cordilleras, from Alaska to Panama. The central part of South America is scarcely known, but here, as in North America, there would seem to be few igneous rocks. Near the east coast, as in Brazil and Paraguay, are highly sodic rocks, corresponding to a similar zone parallel to the east coast of North America, from Ontario to Texas. There are also some indications in Brazil of rocks of a very distinct chemical type, like some found in Ellesmere Land, Ontario and New York. It would appear, therefore, that the two continents much resemble each other in the general distribution of the igneous rocks.

L. O. HOWARD,
Permanent Secretary

THE FEDERATION OF AMERICAN SOCIETIES FOR EXPERIMENTAL BIOLOGY

THE third annual meeting of the Federation formed by the American Physiological Society, the American Society of Biological Chemists, the American Society for Pharmacology and Experimental Therapeutics and the American Society for Experimental Pathology, was held in laboratories of the Harvard Medical School, Boston, on December 27, 28 and 29, 1915.

Only two joint sessions could be arranged, the large number of papers offered and the limited time forbidding other combined meetings. The first one was held on Monday morning, December 27, and this session opened the scientific meetings. The following papers were read and discussed:

Symposium: "Food Accessories." Discussion opened by T. B. Osborne and L. B. Mendel, E. V. McCollum, Carl Voegtlin.

"The Formation and Structure of the Fibrin-Gel," by W. H. Howell.

"Experiments on the Mechanism of Osmosis," by Jacques Loeb and Hardolph Wasteneys (by invitation).

"Further Observations on Over-activity of the Cervical Sympathetic," by W. B. Cannon and R. Fitz (by invitation).

"Some New Observations on the Uric Acid Content of the Blood," by Otto Folin and R. D. Bell (by invitation), with the assistance of G. Le B. Foster.

"On Continuous Insufflation Through the Humerus in Fowl," by A. L. Meyer (by invitation) and S. J. Meltzer.

"The Influence of the Adrenals on the Kidney," by E. K. Marshall and D. M. Davis (by invitation).

"Heredity and Internal Secretion in the Origin of Cancer in Mice," by Leo Loeb.

"The Effect of X-Rays on Cancer Immunity," by James B. Murphy.

"The Presence of Posterior Lobe Secretion in the Cerebro-spinal Fluid," by Harvey Cushing and Gilbert Horrax (by invitation).

The second joint session took place on Tuesday afternoon, December 27, and was devoted entirely to demonstrations. These demonstrations were given partly in a large amphitheater and partly in three laboratory rooms. The program was as follows:

DEMONSTRATIONS

"Demonstration of the Agglutination of Bacteria in Vivo," by Carroll G. Bull (by invitation).

"A Method of Obtaining Suspensions of Living Somatic Cells of the Higher Animals," by Peyton Rous and F. S. Jones (by invitation).

"Analogous Antagonistic Effects Exerted by Electrolysis and Anesthetics on Physical Systems and Living Cells," by G. H. A. Clowes.

"The Action Current of Glands," by W. B. Cannon and McKeen Cattell (by invitation).

"A New Type of String Galvanometer and Accessory Apparatus," by Horatio B. Williams.

"Apparatus for the Investigation of Cardiodynamics," by Robert Gesell.

"A Circulation Model," by A. L. Prince (by invitation).