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THE TWENTY-THIRD INTERNATIONAL CONGRESS OF AMERICANISTS

THE twenty-third International Congress of Americanists met in New York City during the week of the seventeenth of September, 1928. The meeting was well attended by North American, Central American, South American and European scientists.

By invitation of the American Museum of Natural History, the congress met in the halls of the museum. Wednesday the meeting was held in the Museum of the American Indian, Heye Foundation, on Thursday at Columbia University and on Friday at the Brooklyn Museum.

Professor Franz Boas, of Columbia University, was elected president; Mr. N. C. Nelson, of the American Museum of Natural History, general secretary of the congress, and President Henry Fairfield Osborn, of the American Museum of Natural History, was elected honorary president.

At the opening meeting the president paid a tribute to deceased members, particularly to Dr. Pliny Earle Goddard, secretary of the organizing committee, whose untimely death has cut short a career of great usefulness.

The discussions of the congress related almost entirely to ethnological and archeological questions. The first day was devoted to the question of cultural relations between South America and North America. Dr. Max Uhle, of Ecuador, set forth the theory of an ancient interrelation between early North America and South America and discussed the probable ancient relations between Asia and America. Professor K. Th. Preuss, of Berlin, followed with a more detailed study based on the distribution of the archeological types found at San Agustin. Professor Marshall H. Saville, of the Museum of the American Indian, New York City, also discussed the interrelation between northwestern South America and Central America, while Professor A. L. Kroeber, of the University of California, took up the matter in a broader way and set forth his view of an independent origin of the higher civilization of South America and Central America, both of which he thinks have grown up independently on a similar ancient background. Professor Erland von Nordenskiold, of Göteborg, in discussing this subject pointed out particularly that a number of very specific inventions, like the scales in Peru, have never found their way to Central America

and that, therefore, whatever relation may exist must have been a very early one.

The second day of the session was devoted to the discussion of relations between North America and Asia. Dr. Aleš Hrdlička, of the United States National Museum, spoke of the recent relations between Asia and America around Bering Sea which indicate a constant contact between the inhabitants of the two continents in this area. Professor Waldemar G. Bogoras, of Leningrad, Russia, took up the older relations from an ethnological point of view. He compared particularly the religious practices in Siberia with parallel forms in North America and proved that the Bear Cult, which is widely spread in America, occurs in similar forms in Siberia. On the other hand, he pointed out the peculiar attitude toward shaminism in Siberia, which differs from that found in most parts of America. The Siberian native tries to avoid initiation by the supernatural power, while in many cases the American Indian seeks such power, or at least does not resist it. In this connection he described the important ethnographic work carried on in Leningrad on the small tribes of Siberia, a work that is a continuation westward of the investigations of the Jesup North Pacific Expedition. Mr. Waldemar Jochelson, representing the Geographical Society of Moscow, spoke on the ancient and present Kamchadal and pointed out that their cultural relations to the northwest coast Indians of America are much more intimate than those with the intervening Eskimo.

On the same day the problems presented by the Eskimo and the northwest coast Indians were discussed. Professor William Thalbitzer, of Copenhagen, described Eskimo manners and mentality especially as evinced by their music, songs and ritual customs, while Mr. Kaj Birket-Smith, of Copenhagen, discussed the theories of the origin of the Eskimo based particularly on his observations among the inland Eskimo, west of Hudson Bay. He supported the opinions formerly expressed by Boas and Steensby of an inland origin of the Eskimo in the region between Hudson Bay and the Mackenzie River. The ancient forms of Eskimo culture first described from Southampton Island were fully discussed by T. Mathiasson, of Copenhagen, who described Knud Rasmussen's archeological collections from the western Eskimo. Dr. J. A. Mason, of the University of Pennsylvania, Philadelphia, contributed a description of similar material from Point Barrow. It has now been proved that this ancient culture extended from Alaska to Baffinland. Peculiar forms found in ancient material from Alaska resemble to a certain extent the interesting decorations on Aleut hats which were described by S. V. Ivanoff, of Leningrad.

Mr. C. M. Barbeau, of the National Museum of Canada, tried to prove on the ground of family legends a southward migration of the northwest coast Indian tribes. He also pointed out that the famous totem poles of the northwest coast are a modern development of art which arose towards the middle of the nineteenth century.

The much discussed problem of relations between South America and the islands and continents west of the South Pacific was the subject of a paper by Professor W. Koppers, of Vienna, who based his argument particularly upon the Kulturkreis theory and tried to show that the cultures of Tierra del Fuego and of southeastern Australia have so many fundamental points in common that they must be considered as developments belonging to the same ancient culture. Mr. J. Imbelloni, of Argentina, called attention to the similarity of club forms in South America and Polynesia and to the similarity of words which seemed to him suggestive. Mr. N. I. Shprinzin, of Leningrad, discussed the similarity of the blowgun in America and Indonesia.

Special attention was paid to the problem of the survival of ancient Indian elements in the modern culture of American tribes and also to the assimilation of European elements in apparently primitive cultures. The former subject was treated particularly by Dr. Franz Termer, of Würzburg, who described the snake dance of the Quiché Indians in Guatemala, and by Mr. O. La Farge, of Tulane University, New Orleans, and Mr. S. K. Lothrop, of the Museum of the American Indian, Heye Foundation. They described the survival of the ancient ritual calendar among the modern Maya. The influence of modern European culture upon American tribes was the subject of a paper by Mr. C. M. Barbeau, who traced historically the origin of the floral designs among the Canadian and neighboring tribes to the influence of the French religious orders who trained the Indians in needlework. Dr. Elsie Clews Parsons, of New York, presented the many important Spanish elements which she discovered in the kachina cult of the pueblos. The kachina cult contains many elements of the Catholic ritual and the prolific development of masks is evidently a new feature, in many ways analogous to the European use of masks in folk-ritual. The dances of the Pueblos are in form analogous to the Spanish dances. Mr. Stewart Culin in a paper on Pueblo masks also emphasized their recent origin. Miss Frances Toor, of Mexico, showed textiles of the Otomí Indians which are based upon Spanish patterns.

The last day of the session was devoted to the discussion of the antiquity of man in America. While Professor Capitan, who was not present, defended the typological study of remains, the principal discussion

was based on the finds in Folsom, which were fully described by Dr. Barnum Brown, of the American Museum of Natural History. Professor Albrecht Penck, of Berlin, who examined the Folsom site, expressed the view that the deposits in which the remains were found are ancient, but postpleistocene. He also discussed the possibility of migration from Asia to America in late pleistocene times. A number of new finds which indicate that man and the mastodon were contemporaneous in South America were briefly referred to.

There was also a discussion on the problem of linguistic relations of American Indian languages. This subject was presented by Professor Edward Sapir, of the University of Chicago, who insisted on the necessity of a rigid application of the principles of Indo-European linguistic science to American problems and defended the grouping together in larger groups of many languages which are considered so far as distinct linguistic stocks. This view was opposed by Professor Franz Boas, of Columbia University, who held that the differentiation is so great and conditions of linguistic contact are so different from those of more recent times in Europe and Asia that the problem of mutual influence of linguistic stocks can not be ruled out.

Besides these general subjects, a considerable number of interesting papers were presented. Dr. Melville J. Herskovits, of Northwestern University, spoke of the culture of the modern Bush Negroes in Surinam, who present a peculiar, well-integrated mixture of African, European and Indian elements. Many of their customs are almost identical with those of the west Sudanese tribes.

Mexican archeology received particular attention. Unfortunately, owing to serious accidents, the Mexican delegation did not arrive until the last day of the congress and their contributions were presented in a special meeting. Mr. J. Reygadas Vertiz reported on the excavations in the pyramid of Tenayuca and Mr. A. Caso reported on the hieroglyphics found in Tenayuca. Mr. I. Marquina presented his elaborate study of the architecture of ancient Mexico and Mr. J. Palacios spoke on his archeological investigations in the state of Chiapas. Mr. G. C. Vaillant, of the American Museum of Natural History, discussed the early so-called archaic cultures of middle America which antedate the more highly developed Maya and Toltec. Other papers read were by A. Toro, of Mexico, on the sacred plants of the Aztecs and their influence upon the pre-Spanish art. Dr. H. Beyer, of Tulane University, spoke of a deity common to the Teotihuacan and Totonacan culture. Mr. E. Noguera discussed the characteristics of Mexican ceramics, Mrs. Zelia Nuttall spoke about Mexican picture writing and Professor A. M. Tozzer, of Harvard University, discussed the Maya and Toltec figures occurring at Chichen Itza.

Most interesting were the illustrated lectures given by Dr. Sylvanus G. Morley, of the Carnegie Institution of Washington, on the important excavations and restorations made in Yucatan, and that by Dr. Frans Blom, of Tulane University, in which he reported on his recent explorations.

In another section of the congress the ethnological problems of South America were discussed. Professor E. von Nordenskiold, of Göteborg, gave an account of the remarkable picture writing of the Cuna Indians. The mythology of South America was discussed by P. M. Gusinde, of Vienna, who pointed out the differences in the concepts of the twin heroes prevailing in the extreme south and in other parts of the continent. Other papers were read by Mr. W. McGovern, of Evanston, on the cultural areas in South America and Dr. Max Uhle on the Sun temple of Cuzco. Mr. A. Simoens da Silva, of Rio de Janeiro, described interesting specimens from Brazil and Mr. I. B. Strelnikov, of Leningrad, reported on the expedition of G. I. Langsdorff, 1821–1829, based on manuscripts which up to this time had been unknown, and which are being prepared for publication. He also reported on some of the results of his own expedition in 1913–1914.

The North American field was treated in a number of papers, among which may be mentioned the report by Dr. Frans M. Olbrechts, of Belgium, on Cherokee divination. The ethnological conditions among the Algonquian tribes of the east were discussed by Dr. A. I. Hallowell, of the University of Pennsylvania; Dr. Truman Michelson, of the Smithsonian Institution, and Father J. M. Cooper, of the Catholic University. Mr. Alexander Lesser discussed the principles of kinship classification among various Siouan tribes. Mr. George Herzog spoke on the distribution of musical styles in North America. A number of papers were devoted particularly to the ethnology and archeology of the southwest. Dr. A. V. Kidder, of the Carnegie Institution, gave a survey of southwestern archeology covering the period beginning 1900. Dr. Ruth F. Benedict and Dr. Ruth L. Bunzel described the psychological background of the cultures of the Pima and of the Pueblos. Dr. Gladys A. Reichard discussed the methods of studying art styles. Professor C. Tagliavini, of Bologna, reported on the Indians of South California, based on early manuscripts which he discovered in Italian libraries.

On Thursday afternoon the congress was entertained by the honorary president, Professor Henry Fairfield Osborn, at his residence in Garrison-on-Hudson. The journey was made on a private steamer furnished by

the American Museum of Natural History. On Friday the congress enjoyed the hospitality of Mr. Frederick B. Pratt, at Glenn Cove.

At the closing meeting it was voted to hold the next session of the congress in 1930 in Hamburg. Professor G. Thilenius, Professor W. Küchler and Dr. A. Warburg were appointed the organizing committee.

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PHOTOSYNTHESIS[1]

THERE is no process within the confines of chemistry which is of greater interest and importance than that by means of which the living plant prepares the food on which its life and growth depend. This food consists of starch and sugars, together grouped under the general name of carbohydrates, and of certain nitrogen-containing compounds known as proteins. The material from which the plant starts is carbonic acid, or a solution of carbon dioxide, which it obtains from the air, in water which it obtains through its roots from the soil. From this substance alone the plant is able to prepare its supply of carbohydrates, and it is true to say that this chemical process is the fundamental basis of the whole of terrestrial life. This may truly be asserted because the production of the proteins is very closely associated with it and the initial stage is common to the two.

The formation of carbohydrates from carbonic acid when expressed by a chemical equation looks simple enough. There is no doubt that the first product of the process that can be recognized in the plant is a simple sugar, and thus the equation can be written

$$6H_2CO_3 = C_6H_{12}O_6 + 6O_2$$

where the simple carbohydrate is either glucose or fructose. These simple sugars undergo condensation immediately they are formed to give cane sugar or one of the starches, and these changes can readily be written as simple chemical equations.

The mechanism by means of which the plant achieves the synthesis of these complex compounds from carbonic acid has long been a mystery to chemists and to botanists. It is known that the agency used by the plant to effect its purpose is sunlight, and thus the term photosynthesis has been applied to the operation. It is also known that the plant makes use of certain pigments, such as chlorophyll, and it is to these that the color of the leaves is due. The mystery of it all lay in the fact that no one knew what actually takes place, and, indeed, the more chemists and botanists explored, the more puzzling did the problem seem to be.

Perhaps the most puzzling fact of all is that the plant only makes use of sunlight, when all our previous knowledge of light reactions leads us to believe that such light is quite incapable of inducing photosynthesis. This may readily be understood if the amount of energy involved in the synthesis is considered. It has been proved experimentally that in order to synthesize one gram molecule (180 grams) of glucose or fructose there must be supplied to the carbonic acid a minimum quantity of energy equal to 673,800 calories. Whilst it is known that the plant manages in some way to absorb the necessary energy in the form of light, the physicist tells us that it can not directly absorb enough energy from sunlight. Thus the photosynthesis can be brought about by red light of the wave-length 660 $\mu\mu$ when the energy directly absorbed can only be 260,000 calories, which is far below the minimum quantity required.

The experience gained from the ordinary reactions of photochemistry leads to the belief that if it is required to convert carbonic acid into sugars by means of light alone, it will be necessary to use ultra-violet light which is absorbed by carbonic acid, that is to say, light of wave-length 210 $\mu\mu$. It is obvious from this that some unknown factor is operating in vital photosynthesis.

In any endeavor to elucidate the mystery, it is evident that the first line of inquiry must be to study the action of the short wave ultra-violet light upon carbonic acid. This was first investigated by Moore and Webster in 1913, who found no evidence of any reaction taking place. They found, however, that in the presence of certain catalysts, such as colloidal iron hydroxide, small quantities of formaldehyde were produced. Since these results appeared to be at variance with general experience in photochemical investigations, they were again examined some years later in Liverpool, and it was then found that when a stream of carbon dioxide was passed through water irradiated by the light from a quartz mercury lamp, small quantities of formaldehyde were produced. This result seemed to be very satisfactory, since the formaldehyde could be looked upon as an intermediate stage on the way to carbohydrates, especially in view of the fact that Moore and Webster had proved that formaldehyde was converted by light into a substance with properties similar to the simple sugars.

Our observations were criticized by Porter and Ramsperger, who stated that if rigid precautions were taken to guard against the presence of every trace of impurity, no formaldehyde was produced. The suggestion was implied by them that the origin of the formaldehyde was to be found in some unknown im-

[1] Address given before the Royal Institution of Great Britain, on February 3, 1928.