

he loses in the urine, only in less amount. The frog does the whole more easily. When sitting in the water it not only absorbs water to supply its needs, but loses at the same time the non-volatile products of its daily metabolism (these diffuse into the water from the skin exactly as the same substances in the mammal diffuse from the kidney cells into the water running down the uriniferous tubules). As I have so frequently insisted, solutions are not absorbed or secretions given off "as such." While a secretion of water and of dissolved substances may occur in the same direction, they may quite as easily take opposite ones. These considerations make it apparent why on *a priori* grounds alone *the frog (and other amphibia) should be able to tolerate a loss of kidney function better than land animals.*

Experiment has justified the conclusion. I tried originally to bring proof in this direction by cutting the kidneys out of frogs. The operation is not only difficult, but fails because of the anatomical peculiarities which characterize the circulation in these animals. Since the venous blood returning from the legs passes through the kidneys, their excision is followed by an edema of the hind legs. To escape this effect and yet to exclude the external function of the kidneys, the ureters were therefore tied. Under aseptic precautions a series of frogs were operated upon through the flanks and the ureters isolated. They were tied with a first ligature close to the kidney and with a second as near the bladder as possible, the connecting segment of ureter being cut out. *These animals have now lived since January 8 of this year and are perfectly normal.*

My technical assistant, Josef Kupka, showed me how to keep these animals in excellent condition. They are housed in glass boxes heavily padded with moist moss. Inverted porcelain dishes with side openings permit them to hide. A shallow enamel pan always filled with fresh water is placed at one end of each cage. Every few days the frogs are fed live meal worms, which they devour ravenously. The wounds heal completely two weeks after the operation. At the present writing the animals thus operated are livelier and in better physical condi-

tion than the winter frogs comprising the stock from which they were chosen.

The kidneys of the frog after ureteral ligation seem to suffer but slight if any change. What has been observed will be discussed at another time.

These experiments prove that *frogs may live for weeks after complete suppression of external kidney function.* If the explanation of why this is possible in the frog is accepted as correct, it not only gives scientific support to long-established empirical clinical practises, but emphasizes the importance of a closer analysis of the conditions which may improve qualitatively or quantitatively the matter of absorption and secretion of water and absorption and secretion of food and the products of metabolism through the skin and bowel in the patient suffering from an inadequate kidney function.

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SOCIETIES AND ACADEMIES

THE CHICAGO ACADEMY OF SCIENCES

THE annual meeting of the Chicago Academy of Sciences, held January 12 at the Academy building in Lincoln Park, Chicago, was an occasion of special interest. The chief speaker was Dr. Albert A. Michelson, of the University of Chicago, who presented in simple, untechnical language the results of his remarkable studies on the rigidity of the earth. Dr. T. C. Chamberlin reviewed the history of the academy during the past eighteen years, during which time he had been president, and the following officers for the coming year were elected:

Professor John M. Coulter, President.
Professor Henry Crew, First Vice-president.
Dr. Stuart Weller, Second Vice-president.
Dr. Wallace W. Atwood, Secretary.
Mr. Henry S. Henschen, Treasurer.

Mr. LaVerne Noyes, president of the board of trustees, spoke encouragingly of the present and future work in the museum. Mr. Noyes is especially interested in the construction of habitat groups illustrating the natural history of Chicago and vicinity, and through his personal supervision and generosity a remarkable series of forty-one new groups was opened for inspection at the close of the business meeting. Dr. Wallace W. Atwood, of Harvard University, who has held the secretaryship of the academy during the last few years, and been associated with the academy boards in the or-

ganization of the museum and in the promotion of educational work, returned to Chicago to address this meeting on the "Progress of the Museum Work during the Past Year."

The "Celestial Sphere," which was recently installed in the Academy building, was open for inspection, and demonstrations were given at frequent intervals. In this apparatus all of the brighter stars which are ever visible from the Chicago region are represented in their appropriate places and with their appropriate magnitudes. By electrical power the sphere is rotated, so that the stars follow precisely similar courses to the apparent motion of the fixed stars in the heavens. In eleven and one half minutes the sphere completes one rotation.

The policy of the museum during the past few years has been to limit its new exhibits to those illustrating the natural history of the Chicago region. Thus the birds, mammals, insects, reptiles and flowers of Chicago and vicinity have been placed on exhibition. Every pains is taken and no expense spared to make these exhibits of the local material just as attractive as any that could be prepared. Each exhibit is arranged to bring out some feature in the life of the animal rather than to display the mounted specimen as dead. Each habitat group is based on field studies; the background is an enlarged and colored photograph taken in the field where the specimens were collected, and the foreground is so constructed that it blends imperceptibly into the painted background. The animals are either at play, in search of food, quarreling, caring for the young, or in course of flight. These exhibits have already proved to be of unusual educational value to the community, and they are being used regularly by the teachers in the public and private schools of Chicago.

The children's science library and free reading room was opened for inspection. About three hundred members and guests were present.

On the evening of January 15, the board of trustees gave a dinner in honor of LaVerne Noyes. This dinner was given as an expression of the hearty good fellowship in the board, and of the sincere appreciation of the generosity of Mr. Noyes in promoting the work of the academy. Mr. Henry S. Henschen presided as toastmaster. Professor T. C. Chamberlin, Professor John M. Coulter, Dr. Frances Dickinson and Dr. Wallace W. Atwood responded to toasts. At the close of the dinner the toastmaster presented a loving cup to Mr. Noyes on behalf of the board of trustees.

THE BIOLOGICAL SOCIETY OF WASHINGTON

THE 537th meeting of the society was held in the Assembly Hall of the Cosmos Club, Saturday, March 6, 1915, called to order by ex-President Stejneger at 8 P.M., with 60 persons present.

Under the heading Brief Notes, Professor A. S. Hitchcock called attention to the plans and methods of work in preparing a new Flora of the District of Columbia. It is hoped it will be completed within a year. It will contain analytical keys of all the higher plants found within a radius of fifteen miles of the city of Washington. It will not contain descriptions.

The first paper of the regular program was by J. W. Gidley, "Notes on the Possible Origin of the Bears." After the examination of much fossil and living material the speaker had arrived at the conclusion that the bears, constituting a small homogeneous, widely distributed group are not closely related to other living Carnivores. From a consideration of the tooth structure, the bones of the feet, and the basal cranial foramina, Mr. Gidley concluded that the bears were probably derived from the *Clænodon* group of the Creodonts, and that other living Carnivores were descended in part at least from the *Miacidæ*, a family of Creodonts not distantly related to the *Clænodon* group.

The second communication was by the sculptor, H. K. Bush-Brown, "The Evolution of the Horse." The speaker was present by special invitation of the president and introduced to the society by ex-President Stejneger. Mr. Bush-Brown discussed briefly the geological evolution of the horse, and then spoke at considerable length on the evolution of modern breeds of horses, particularly of the Arab and the effects of breeding it with other races, and its development in this country. His paper was well illustrated by lantern slides showing anatomical characteristics of various horses, as well as their external appearances.

On Thursday, March 11, 1915, at 8:30 P.M. the Biological Society of Washington held a joint meeting with the Washington Academy of Sciences in the Auditorium of the National Museum. Mr. Wilfred H. Osgood, of the Field Museum of Natural History and a member of the special commission for investigating the fur-seal question for the Department of Commerce during the summer of 1914, delivered a lecture illustrated by stereopticon and motion pictures on the fur seals and other animals of the Pribiloff Islands. All phases of the life of the seals on the islands, methods of killing, skinning, salting, etc., and

the introduced herds of reindeer, the Steller's sea-lions, and the native birds were shown in motion. About 350 persons were present.

M. W. LYON, JR.,
Recording Secretary

ANTHROPOLOGICAL SOCIETY OF WASHINGTON

At the 478th meeting of the society held December 1, 1914, in the Public Library, Dr. George S. Duncan delivered an address on "The Sumerian People and their Inscriptions." Their oldest inscriptions antedate 3,000 B.C., and the Enlil temple in Nippur dates back probably to 6,000 B.C. The Semites from Arabia conquered the Sumerians before 2,100 B.C. Of the Sumerian cities, only Lagash and Nippur have been thoroughly excavated. Scholars agree that the Sumerians were neither Semites nor Indo-Europeans, but were probably Mongolians. Their language was agglutinative. Their only garment was a rough woolen skirt. Various cereals were grown; also the date palm. There were many occupations, including weavers, smiths, boat-builders, jewelers and carvers in wood and ivory. There were priests, librarians, notaries, physicians, astronomers and musicians. The country was divided into city states ruled by kings. The age of Gudea, about 2,600 B.C., was one of high artistic development. The chief divinities were Anu, god of the sky, Enlil, god of the earth, and Enki, god of the water. Their religion was nature worship. The inscriptions consist mainly of historical records, laws, contracts, epics and religious texts. The tablets contain the oldest records of a paradise, a fall and a flood.

At the 480th meeting of the society, held January 5, 1915, in the Public Library, Dr. John R. Swanton read a paper on "Ethnologic Factors in International Competition." He showed that the factors which tend to disunion between human societies have been operative in all parts of the world and were probably necessary to the best development of the race. At the same time, the end of warfare may be confidently predicted from the constant increase in size and decrease in number of political units, from the progressive weaving of the world more closely together by means of transportation facilities and other means of communication, and because of the gradual international bankruptcy which war entails. A standing army goes with an aristocratic ruling class. There can be no permanent peace until exploitation of one nation or class by another ends.

At the 481st meeting of the society, held January 19, 1915, Prince Sarath Ghosh delivered an address on "The Ancient Civilization of India." The Aryans settled in India between 6,000 and 4,000 B.C. and there adopted agriculture, the beginning of civilization. Here also man passed from promiscuity to monogamy. The government was first patriarchal, then a republic, then an oligarchy, then a monarchy. With the latter began the caste system. Man first worshipped tools and weapons; later, nature. By 2,500 B.C. the Hindus worshipped a supreme deity and the language in the Vedas had reached its highest perfection. Deity was regarded in its gentler qualities as feminine. With religion began the arts and sciences. The age of life on the earth was estimated at four million years. An exalted code of warfare was evolved. By 600 B.C. Hindu civilization had reached its zenith. The Aryan invaders conquered the Turanian or Dravidian races they found in India and made of them subordinate castes. India taught the arts and religion from Java to Japan.

DANIEL FOLKMAR,
Secretary

ACADEMY OF SCIENCE OF ST. LOUIS

At the meeting of March 15, Professor Nipher gave a brief account of work done in his laboratory. During the summer of 1914 he detected what appeared to be an effect of the fog-horn of a steamer on the magnetic field of the earth.¹ In his recent work a large bar magnet in a room containing an influence machine, and in contact with one terminal, served as a deflecting magnet upon a magnetic needle in an adjoining room. The deflecting effect of this magnet was balanced by another bar magnet, on the opposite side of the needle. The needle was made very sensitive by means of compensating magnets. A musical note from an organ pipe, operated by means of compressed air, produces effects precisely like those attributed to the fog-horn. Here also the effect is superposed on disturbances of the same order of magnitude due to other causes. Professor Nipher remarked that any disturbance of ionized air appears to be the origin of electro-magnetic waves in the ether. When we talk to each other in air ionized by solar radiation, we are perhaps sending wireless messages through the ether of space.

C. H. DANFORTH,
Recording Secretary

¹ SCIENCE, January 15, 1915.