illustrated by several slides, showing the locality and stages in the excavation of the specimen.

Professor Osborn then gave a brief description of the Cretaceous section in Montana in which the skeleton of *Tyrannosaurus* was found last summer, pointing out the sharp faunal distinction between the true Cretaceous and the Eocene part of the section.

Discussion: Professor Lull inquired whether this specimen throws any further light upon the supposed aquatic habits of *Trachodon.*

Professor Osborn replied that in general the view that these animals were waders rather than truly aquatic, appeared to be the most probable.

Dr. Williston inquired as to whether any carbon was preserved in the skin, as it is in so many instances in the Kansas chalk. He also recalled that in the excavation of the type specimen of *Morosaurus grandis* in 1878, considerable parts of the skin were found to be present in the form of a rather thick carbonaceous sheet. Owing to the unfavorable conditions, it was not then possible to preserve any part of the skin. He pointed out additional reasons against believing that the Dinosaurs were aquatic animals.

The problem of the habitat of the Sauropodous Dinosaurs was further discussed by Dr. Matthew, Dr. Williston, Mr. Riggs, Professor Lull and Mr. Gidley. Dr. Williston and Mr. Riggs advocated a terrestrial, Dr. Matthew and Mr. Gidley a wading, habit for this group.

In absence of Professor Osborn, Dr. Matthew then reported briefly upon the *Bison latifrons* skull recently acquired by the American Museum. This is believed to be the finest fossil bison skull on record. It measures nearly six feet from tip to tip of the horn-coves; the skull is but slightly larger than that of *B. americanus,* but shows several differences in form. It was discovered some years ago near Hoxie, in northwestern Kansas.

Discussion: Dr. Case mentioned a fine fossil bison skull in the collection of Iowa University. Dr. Williston observed that there was a very fine skull in the Leland Stanford University collections. It had not, he believed, been mentioned in print. He further discussed the characters of the different species of *Bison* and the geological horizon of *B. alleni,* reported by Marsh as Pliocene but probably Pleistocene. The living species *B. americanus* is also found in the late Pleistocene.

The program of papers being completed, the business meeting of the society followed.

The nominating committee reported that they had agreed upon the names of Dr. J. C. Merriam for president and Mr. E. S. Riggs for secretary and treasurer. These nominations were accepted by the society and Messrs. J. W. Gidley, Barnum Brown and F. B. Loomis were then nominated as executive committee, and there being no further nominations, the secretary was instructed to cast a ballot for the nominees, and they were duly elected.

It was further resolved that the secretary with an assistant from the executive committee should have charge of the arrangement of program for the ensuing meetings, to avoid conflict with the programs of related societies whose meetings the members might wish to attend.

The following gentlemen were then proposed for membership: Professor E. R. Branson, Oberlin College, Ohio; Dr. Roy L. Moodie, Kansas University; Mr. W. H. Reed, University of Wyoming; Mr. C. H. Sternberg, Lawrence, Kansas; Professor C. E. McClung, Kansas University. After each name had been individually balloted upon, the president declared the unanimous election of all to membership in the society.

On motion of Dr. Loomis the following resolution was passed:

Resolved, That the American Society of Vertebrate Paleontologists, having found the "Bibliography and Catalogue of Fossil Vertebrates of North America," issued as a bulletin of the U. S. Geological Survey, of the greatest service in expediting research, do hereby request the director of the survey to prepare and publish a supplement to the same, to include the bibliography from 1900 to 1910, and do respectfully tender all assistance possible.

It was then resolved that the society express its appreciation and thanks to Professor Clarke and the Johns Hopkins University for their courtesies and efforts which had done so much to promote the success of the Baltimore meeting.

After which the society adjourned.

W. D. Matthew,
Secretary

Societies and Academies

The Geological Society of Washington

At the 209th meeting of the society, held at the Cosmos Club, on Wednesday evening, November 11, 1908, Mr. Willis T. Lee spoke informally on an occurrence of coal changed to coke and graphite in the Raton, New Mexico, coal field.

During some period of volcanic activity after the coal beds had been formed igneous rock was

intruded into the beds. In some places this took the form of dikes, such as the "stone wall" at Raton; in other places it formed intrusive sheets thrust in between the beds. Where a comparatively small amount of this melted rock came in contact with the coal it changed the coal to coke, but where a large amount was injected the greater heat transformed the coal into graphite. This transformation was effected over an area of several hundred acres in Red River Valley.

Regular Program

Results of a Geodetic Study of the San Francisco Earthquake: Mr. JOHN F. HAYFORD.

The report of the California State Earthquake Investigation Commission is now being published by the Carnegie Institution. It includes a paper prepared by Messrs. Hayford and Baldwin, of the Coast and Geodetic Survey, giving the permanent displacements detected at sixty-one old triangulation stations, by new triangulation after the earthquake.

The permanent displacements to the northward on the west side and to the southward on the east side of the fault are greatest at the fault, and are nearly or quite parallel to it. On either side of the fault the permanent displacements decrease with increase of distance from the fault in such a way that lines on the surface of the ground and at right angles to the fault, which were straight before the earthquake, became curved lines after the earthquake, concave to the southward east of the fault and concave to the northward west of the fault.

At corresponding distances from the fault, especially near it, the displacements on the western side of the fault are twice as great, on an average, as those on the eastern side.

Mr. Hayford presented some considerations which lead him to believe that in such an earthquake the fault along which the displacements take place should not be expected to lie in the middle of the area which was under stress before the earthquake and the displacements should not be expected to be equal on the two sides of the fault.

Ordovician Paleogeography: Mr. E. O. ULRICH.

Mr. Ulrich exhibited paleogeographic maps of North America showing four stages of the Mohawkian epoch. Their explanation was preceded by a brief discussion of the classes of evidence available in paleogeographic studies. Roughly divided the facts bearing more or less directly upon paleogeography comprise two main classes: (1) organic (composition and distribution of faunas and floras) and (2) physical (phenomena of stratigraphic overlap, character and distribution, with respect to known lands and seas, of the various kinds of deposits, marine and non-marine).

The presence and direction of ancient marine currents is determined primarily by organic criteria, but in a few cases their evidence is materially corroborated by facts falling under the physical class. It was pointed out, on the other hand, that the physical criteria of stratigraphic overlaps are but rarely sufficiently conclusive by themselves. As a rule they require the corroborative evidence of organisms before the overlaps may be accepted as established. In many cases also the overlap was originally suggested by purely paleontologic evidence, the physical evidence being so obscure that it is easily overlooked.

Further, it was pointed out that the physical criteria indicating coasts, especially of Paleozoic lands, are often exceedingly inconspicuous. Indubitable instances were cited of near-shore sedimentation, in seas submerging old lands, the true significance of which might perhaps never have been recognized if the beds had been unfossiliferous.

The first step in the preparation of paleogeographic maps is the solution of approximately synchronous facts. These must be primarily only organic. With such parts as a basis and check we may use orogenic movements which resulted in the emergences or submergences of large epicontinental areas. These movements are chronicled by the rocks and fossils, but it is the paleontologist alone who is responsible for their chronologic classification. Indeed, the determination of the relative age of geologic phenomena, hence the solutions of facts that may be reasonably assumed to be approximately synchronous, is the paleontologist's principal excuse for being. Considering his long training he may justly claim to have become an expert in such solution; and it is an undeserved reflection on his intelligence and attainments when a non-paleontologist says that a "New York formation can not be narrowly correlated with an equivalent in the Mississippi Valley," and that "the data of paleogeography do not admit of refined definition."

In the speaker's estimation the relative competency of the two classes of evidence, organic and physical, is, respectively, as four is to one; and that the latter without the support of highly

refined paleontologic data is as a ship devoid of rudder and skipper. It was further asserted that the "autocratic dicta" of the successful stratigraphic paleontologist of to-day are not based solely on comparisons of lists and collections of fossils but upon every physical fact that may have a bearing on the variation, horizontal and vertical, of faunas and floras. Obviously then, only an up to date paleontologist is equipped to produce a good paleogeographic map.

RALPH ARNOLD,
Secretary

THE SOCIETY FOR EXPERIMENTAL BIOLOGY AND MEDICINE

THE thirty-first meeting of the society was held at the Rockefeller Institute for Medical Research, December 16, 1908, with President Lee in the chair.

Members present: Atkinson, Auer, Beebe, Burton-Opitz, Calkins, Carrel, Clowes, Elsberg, Emerson, Ewing, Famulener, Foster, Gies, Halsted, Hatcher, Jacobs, Janeway, Joseph, Kast, Lee, Levene, Levin, Lewis, Lusk, Meltzer, Meyer, Morgan, Noguchi, Opie, Pearce, Sherman, Terry, Torrey, Van Slyke, Wadsworth, Weil, Wood.

Members elected: Albert C. Crawford, W. H. Schultz and Thomas A. Storey.

Scientific Program[1]

John C. Hemmeter (by invitation): Reply and explanation to recent criticism of Dr. Hemmeter's experimental study on effects of extirpation of the salivary glands upon the gastric secretion.

G. H. A. Clowes: A critical study of the conditions under which zymase and its associated co-enzyme bring about alcoholic fermentation.

Alexis Carrel: Presentation of a dog ten months after double nephrectomy and replantation of one kidney.

Don R. Joseph and S. J. Meltzer: A demonstration of the life-saving action of eserin in poisoning by magnesium.

A. O. Shaklee and S. J. Meltzer: The mechanical destruction of pepsin.

John Auer: A demonstration of the effects of CO_2 upon the frog's pupil.

[1] Authors' abstracts of the papers read before the Society for Experimental Biology and Medicine are published in the *Proceedings of the Society for Experimental Biology and Medicine.* A number is issued shortly after each meeting, and costs twenty cents a copy. Copies may be obtained from the managing editor, William J. Gies, 437 West 59th Street, New York.

Richard Weil: On the specific acquired resistance of red blood cells.

Hideyo Noguchi: The butyric acid reaction for syphilis in man and in the monkey.

D. D. Van Slyke and P. A. Levene: The quantitative separation of leucin from valin.

W. A. Jacobs and P. A. Levene: Further studies on the constitution of inosinic acid.

Ralph S. Lillie: The significance of changes in the permeability of the plasma membrane of the living cell in the processes of stimulation and contraction.

F. C. Becht and J. R. Greer (by invitation): On the relative concentration of lysins, precipitins, agglutinins, opsonins and related substances in the different body fluids of normal and immune animals.

Nellis B. Foster: Studies of the influence of various dietary conditions on physiological resistance. I. The influence of different proportions of protein in the food on resistance to the toxicity of ricin and on recuperation from hemorrhage.

WILLIAM J. GIES,
Secretary

THE AMERICAN CHEMICAL SOCIETY
NEW YORK SECTION

THE fourth regular meeting of the session of 1908–9 was held at the Chemists' Club on January 8.

Mr. Frank Gottsch presented "A Simple Specific Gravity Apparatus for Portland Cement." His method, which he illustrated by a determination on the lecture table, depends upon the weight of cement required to replace a measured volume of kerosene removed from a graduated flask. It is rapid and gives results sufficiently accurate for commercial work.

The rest of the evening was devoted to the general subject: "The United States Patent Law: Its Use and Abuse." The speakers and their titles were:

F. I. Allen: "Introduction: Historical and Descriptive."

W. Hastings Swenarton: "Patents, Trade Secrets and Trade Names as Factors in Industrial Development—Their Relative Functions."

L. C. Raegener: "Some Defects in the Practise of Our Patent System and Suggested Remedies."

B. C. Hesse: "Some Suggestions as to Desirable Improvements."

L. H. Baekeland: "The Inventor's Standpoint."

C. M. JOYCE,
Secretary