

The book is illustrated with nine full-page plates, chiefly photographs of specimens. A double-page colored map of the life zones of the two states is also given. Since this is the most detailed zonal map of the region yet published, and since it differs in some respects from previous inclusive maps of smaller scale, it is regrettable that more space was not devoted to discussion of life zones and especially to the boundaries as indicated on this new map. It is also unfortunate that the colors are not those which from repeated use on other maps have become associated with the several zones. As a piece of book-making, the work is not all that might be desired. The paper is rather poor and errors in typography are not infrequent. Minor shortcomings, however, may easily be overlooked in such a good and useful book. It is a thorough exposition of the knowledge, past and present, of the mammals of the two states, and may be safely ranked among our most important works on the mammals of eastern North America.

WILFRED H. OSGOOD.

SCIENTIFIC JOURNALS AND ARTICLES.

THE last number of *The Journal of Infectious Diseases* contains the following articles:

ALICE HAMILTON: 'The Toxic Action of Scarlatinal and Pneumonic Sera on Paramœcia.'

C. P. CLARK and F. H. BATMAN: 'Pneumococcal Bronchiolitis (Capillary Bronchitis).'

E. H. RUEDIGER: 'Improved Technic of Agglutination Test in Typhoid Fever—The Use of Formalinized Cultures.'

ROGER G. PERKINS: 'Bacillus Mucosus Capulatus: A Study of the Group and an Attempt at Classification of the Varieties Described.'

MARY C. LINCOLN: 'Agglutination in the Group of Fluorescent Bacteria.'

EDWARD C. ROSENOW: 'Studies in Pneumonia and Pneumococcus Infections.'

JOSEPH LOUIS BAER: 'Epidemic Gonorrheal Vulvo-Vaginitis in Young Girls.'

EARLE B. PHELPS: 'A Critical Study of the Methods in Current Use for the Determination of Free and Albuminoid Ammonia in Sewage.'

WM. ROYAL STOKES: 'A Simple Test for Routine Detection of Colon Bacillus in Drinking Water.'

GEORGE A. JOHNSON: 'Isolation of Bacillus Coli

Communis from the Alimentary Tract of Fish and the Significance Thereof.'

CHARLES HARRINGTON: 'Sodium Sulphite: A Dangerous Food-Preservative.'

STEPHEN DE M. GAGE and GEORGE O. ADAMS: 'Studies of Media for the Quantitative Estimation of Bacteria in Water and Sewage.'

ANNOUNCEMENT has been made of the initial numbers of a series of *Bulletins* on pathology from the laboratory of the Medical Department of the University of California, Berkeley, under the editorship of Dr. Alonzo E. Taylor, head of the Department of Pathology and director of the Hearst Laboratory in San Francisco.

SOCIETIES AND ACADEMIES.

THE NEW YORK ACADEMY OF SCIENCES.

SECTION OF ANTHROPOLOGY AND PSYCHOLOGY.

THE regular meeting of the section was held on February 29 at the American Museum of Natural History in conjunction with the American Ethnological Society. The program was as follows:

Ethnological Survey of the Pueblos of New Mexico and Arizona, during the Summer of 1903: MR. GEORGE H. PEPPER.

Mr. Pepper first went to Española, and from there visited the pueblos of Santa Clara, San Ildefonso, Pojoaque, Nambe and Tesuque. One of the ceremonial dances at the pueblo of Santa Clara was witnessed. San Juan, Picoris and Tesuque next received attention. After this work was completed the Hopi region was visited, the time selected being the occasion of the Antelope and Snake dances at Walpi. In the pueblos of Hano, Sichomavi and Walpi, special attention was devoted to the work of the Hopi potters, particularly Nampayo of Hano, who is the only one living that has made a careful study of the old pigments and clays.

On the second mesa the pueblos of Mashongnavi and Shungopavi were visited, and the Snake Dance at Mashongnavi observed. Oraibi, the seventh of the Hopi pueblos, situated fifteen miles to the west of the second mesa, came next. During the stay in this pueblo the wonderful Flute ceremony was enacted. From the Hopi region the route taken

led to the pueblo of Laguna in the western part of New Mexico, and from there to Acoma, where the Fiesta de San Esteban was seen. While in the pueblo of Isleta the Fiesta de San Augustine took place.

Visits to the pueblos of Jemez, Zia, Santa Ana, Ranchitas de Santa Ana, Sandia, San Felipe, Santo Domingo, Cochiti and Zuñi completed the season's work, which included all of the twenty-six 'mother pueblos' now inhabited.

The subject of primitive pottery-making as represented in the various groups was carefully considered and the technique of each culture was investigated. Samples of the materials used in the manufacture of pottery were obtained, as well as representative forms of finished vessels from each pottery-making pueblo. Nearly one thousand negatives were made to supplement the field notes, and to enhance the value of the exhaustive card catalogue pertaining to southwestern ceramics, which is now in the course of preparation.

Archeological Survey of the Interior of the State of Washington, during the Summer of 1903: MR. HARLAN I. SMITH.

Archeological explorations of the Jesup North Pacific Expedition were carried on in 1897 by Mr. Smith in the Thompson and Fraser River valleys of Southern British Columbia, and in 1898-99 in the shell-heaps along the coasts of British Columbia and Washington. In continuance of the general archeological reconnoissance thus begun in the northwest, the Columbia Valley was chosen as the field for research during the field season of 1903.

It was thought that by working in the Yakima Valley the boundary between the culture of The Dalles and that of the Thompson River region might be determined. The material, however, discovered by the expedition seems to prove that the Yakima Valley was inhabited by people having a culture which previously had been unknown to science.

In the region were found numerous evidences of the close communication of the people of this culture with tribes of the Thompson River region. Underground house sites, tubular pipes, engraved detaliu shells,

a decoration consisting of a circle with a dot in it, and rock-slide sepulchres, each of a particular kind, were found to be peculiar to both regions.

A considerable amount of material of the same art as that found in the Dalles region was seen. It is clear that the people living in the Yakima valley had extensive dealings with the tribes both northward, as far as the Thompson valley, and southward, as far as The Dalles of the Columbia. In this connection it is interesting to note that the present Indians of the region travel even more extensively than would be necessary to distribute their artifacts this far. Much less evidence of contact between the prehistoric people of the coast of Washington and that of the Yakima valley was discovered. A pipe, however, was seen which is clearly of the art of the northwest coast. It was found far up the Toppenish River (one of the western tributaries of the Yakima).

From the Yakima Valley the expedition was transferred to the lower Cowlitz River for work down that stream and along the Columbia from Portland to its mouth, partly to determine whether or not a portion of the evidences of coast culture which were found in the Yakima valley had not come up the Cowlitz and down the Toppenish River, since the head waters of the Cowlitz and the Toppenish are near each other. In this region many specimens were secured. The main work, however, was done in the Yakima valley, where many photographs were taken, not only of archeological sites, but also of the country in general. Human remains, which are useful in determining the type of these old people, were also collected.

The most remarkable specimen secured was a piece of antler carved in human form. This was very thin, and when found it was nearly as soft as so much sawdust or moulder's sand pressed together tightly. Proper treatment has rendered the object quite hard and able to bear handling. It was found under the vertebrae of a child in a grave. The grave was of peculiar interest because, contrary to usual practice, the body had been enclosed in a rude box made by placing about it thin slabs of

stone, and the cist thus formed had been covered with jagged fragments of rock, over which earth was spread. This doll-like carving of antler is considered to be one of the finest pieces of prehistoric art ever found in northwestern America.

JAMES E. LOUGH,
Secretary.

SECTION OF GEOLOGY AND MINERALOGY.

THE Section of Geology and Mineralogy held its regular meeting January 18, 1904, with the chairman, Professor James F. Kemp, presiding. In the absence of the secretary, Dr. A. A. Julien was appointed secretary *pro tem*, and papers by Dr. Irving and Mr. Wilson, abstracts of which follow, were presented.

Microscopic Structure and Origin of Certain Stylolitic Structures in Limestone: J. D. IRVING.

From an extended examination of stylolitic limestones collected in Indiana and Wyoming, mainly by Mr. M. L. Fuller and himself, the author has drawn the following conclusions regarding the origin of the peculiar structures:

1. They were initiated along a thin clay layer in limestone and have been produced by the interpenetration of the limestone material on either side of this clay seam.

2. They are entirely independent of the presence of fossils existing in the rock, for they occur equally in those portions of the rock where fossils are absent and where they are present.

3. They were not formed by metamorphic agencies, or by the weight of overlying strata, or by other causes which would tend to distort and crush the rock material.

4. They were produced by a cause which operated on the material of the rock while it was yet unconsolidated, and in a condition approximating that which obtained at the time of deposition.

5. They originated under great pressure, the rock material being sufficiently soft to allow the bending of individual stylolites, and yet potentially rigid, so that organisms were sharply sheared off while held in the soft matrix.

While the cause of the pressure and the manner in which it had operated to produce these structures has not been determined, the author suggests that their production may be the result of the hydrostatic pressure of the sea water lying above the deposits. In the instances examined stylolites are characteristic of marine deposits formed in water varying from 400 to 2,500 fathoms in depth. If sea water be taken to have an average specific gravity of 1.028, then a one-foot column of water exerts a hydraulic pressure of .434 lb. per sq. in. of area. This would give, for the depth stated, a hydrostatic pressure of from 1,041 to 6,408 lbs. per sq. in. Such a pressure as this, coupled with the soft unconsolidated nature of the rock at the time it might have been exerted, seems to fulfil better than any other the conditions demanded by the observed facts.

Recent Journeys among Localities Noted for the Discovery of Remains of Prehistoric Man: J. HOWARD WILSON.

The author discussed man in the earliest times before the Neolithic age and afterwards illustrated his paper by nearly forty views of some of the most famous rock shelters, caves and deposits of Europe which have furnished remains of paleolithic man, including also slides of the type implements and weapons from which have been derived the principal evidence of man's existence in Quaternary times.

The paper recited briefly the history of the subject, the first finds, especially the work of Boucher de Perthes, and the gradual development of the science of prehistoric archeology. Reference was made to some of the disputed evidence of man's existence in the Tertiary period, and then the subject of man's existence as early as the Second Glacial period was treated more at length, with a consideration of the climate and physical conditions which prevailed in paleolithic times.

The paper closed with an attempt at a realization of the great antiquity of paleolithic man as shown by the immense physical and geological changes which have taken place since he first made his undoubted appearance.

At the regular meeting, February 15, Vice-President James F. Kemp presiding, the secretary read a letter from Dr. J. G. Aguilera correcting a statement in one of the papers presented at the December meeting of the academy, as reported in *SCIENCE*, regarding the great Bacubirito meteorite of Mexico. Dr. Aguilera called attention to the fact that this meteorite was discovered in July, 1871, as was stated by A. del Castillo in 'Catalogue descriptif des Meteorites,' Paris, 1889. It was described by F. Sosa y Avila in *Minero Mexicano* in 1890, and afterward was visited by Signor Buelna as a commissioner of the Geological Institute of Mexico for the purpose of calculating the cost of transporting it to the City of Mexico. In connection with this expedition Buelna made several drawings and photographs of the great mass of iron. Through the Geological Institute Professor H. A. Ward received exact information as to the locality of the meteorite and then visited it, removing the earth from about it and making new photographs. Professor Ward's recent articles (1903) have drawn renewed attention to this enormous meteoric mass, but the credit of original discovery and description belongs to the Mexicans.

The program of the evening comprised two papers, abstracts of which follow:

The Occlusion of Igneous Rock within Metamorphic Schists: DR. ALEXIS A. JULIEN.

The term 'inclusive' is commonly applied, by the petrographer, to ordinary dikes of igneous rock, surrounded by beds of sedimentary rocks or of crystalline schists, intersecting them or intervening between their foliation planes. But for similar masses cut loose from all connection with the underlying magmatic source, swallowed up within strata of crystalline schists, and experiencing all stages in the process of reaction and final absorption, during metamorphic change, another term seems to be called for, 'occlusion,' signifying shut or sealed up beyond escape. Although the word is borrowed from the physicist, this can produce no confusion when applied to petrographic phenomena. Occluded igneous rocks may belong to either the acid or the basic class, as illustrated respectively,

on Manhattan Island, by the earlier intrusions of pegmatite, never found as intersecting dikes, and by the intercalated sheets of diorite-schist. Occlusion is usually attended by mechanical and chemical processes. The former consist of thinning or thickening of igneous masses caught between the folia of schists during orogenic movements into lenticular masses; the crumpling and corrugation of sheets, and even rolling into cylinders; and the forcing of the pasty masses along foliation planes, in the form of intercalated or 'secondary' dikes. The chemical processes usually consist of micaceous alteration and ultimate absorption by disintegration and dissemination through the surrounding country rock.

In discussing this paper, Professor Kemp spoke of the value of the interpretation to those who have studied the region.

Outlines of the Continents in Tertiary Times:

DR. W. D. MATTHEW.

The author presented a series of world-maps showing the hypothetical outlines of the continents during the Pleistocene, Pliocene, Miocene, Oligocene, later Eocene and at the opening of the Tertiary period, as contrasted with the modern conditions. The series was got up for use in the Hall of Fossil Mammals in the American Museum of Natural History, to illustrate the geographical distribution of different groups of mammals during the successive epochs of the Tertiary and Quaternary. It is intended to represent a somewhat conservative view of past changes in world geography, and is regarded as a working hypothesis, based on our present knowledge of geology, paleontology and zoology, especial consideration being given to the mammalian paleontology.

The former extension of the Antarctic continent, so as to join Australia with South America, is regarded as occurring at the end of the Cretaceous period and is represented in the first map of the series. The connection with South Africa is regarded as too problematic to place on the map. The Eocene map shows the extreme of Tertiary submergence of the continents which are represented as forming six isolated land masses. The

three northern continents are connected throughout the Oligocene, Miocene, Pliocene and Pleistocene, Africa being joined to them by the Miocene, South America by the Pliocene epoch. The Pleistocene map shows especially the simultaneous glaciation of both northern and southern regions, modified in the north by sinking of the old Arctic continent beneath the sea level.

The supposed ancient continents of Lemuria, Atlantis, the Brazil-African land bridge, etc., are regarded either as proposed on insufficient data or as being outside the limits of this series.

In general it has been found possible to consider the true ocean basins (limited by the 1,000-foot contour) as permanent throughout Tertiary time. The union of Antarctica with Australia and South America is an exception to this rule, but is based on a large amount of evidence. It appears probable also that the disturbed belt which stretches through central Europe to south-central Asia, and ends perhaps in the East Indian islands, has been, in part, raised from abyssal depths to an equally stupendous height above the sea, since the beginning of the Tertiary.

Discussion.—Professor Osborn emphasized the value of these maps as expressing working hypotheses for the use of students of vertebrate paleontology.

Dr. Julien called attention to the evidences of glaciation in South Africa as having a bearing upon the question of a previous existence of land masses farther south.

EDMUND OTIS HOVEY,
Secretary.

ASTRONOMY, PHYSICS AND CHEMISTRY.

THE regular meeting of the section was held on February 1 at the American Museum of Natural History.

The first paper of the evening was a biographical sketch of the late Dr. H. Carrington Bolton by Dr. D. S. Martin, which was read by Professor Crampton, the recording secretary of the academy, in the absence of Dr. Martin. The section then passed a resolution to the effect that Dr. Martin's address should be published in the *Annals* of the academy,

together with a bibliography of Dr. Bolton's papers.

The second paper was entitled 'Researches as to the Identity of Lexell's Lost Comet of 1770 with the Periodic Comet of 1889, 1896 and 1903,' and was read by Professor Charles Lane Poor. This paper gave the result of a new investigation of the motion of the periodic comet of 1889, 1896 and 1903 (Brooks), dealing especially with the great changes in its orbit caused by the close approach to Jupiter in 1886. The comet has now been seen at three returns to perihelion and the many observations made allow of a most accurate determination of the present orbit on which to base the investigation. Attention was called to the supposed identity of this body with the lost comet of Lexell, 1770, which disappeared after passing close to Jupiter in 1779, and this question was discussed at length.

The next paper, entitled 'The Year's Work with Radium,' was read by Dr. George B. Pegram, and was the second of the series on 'Recent Progress in Physical Science.' Dr. Pegram gave a review of the most important experimental and theoretical advances made during the past year in the knowledge of radio-activity; especially the work of Rutherford and Soddy in formulating the atomic disintegration theory of radio-active change, the discovery of Curie in regard to the heating effect of radium, and the experiments of Ramsay and Soddy bearing on the question of the continuous production of helium in radium compounds. An apparatus was exhibited like that of Mr. Strutt, to show by the alternate charging and discharging of an electroscope the production of electric charges by radium. The charging of the gold leaf in the apparatus shown by Dr. Pegram took place in about one minute.

The next meeting of the Section of Astronomy, Physics and Chemistry was held on March 7 and was devoted to an address by Dr. S. A. Mitchell under the title 'Recent Progress in Astronomy,' the subject being 'The Results of the Observations of the Last Solar Eclipse.' Dr. Mitchell gave an interesting *résumé* of the results obtained by the

different expeditions which made observations in the island of Sumatra on May 18, 1901.

CHARLES C. TROWBRIDGE,
Secretary.

THE CHEMICAL SOCIETY OF WASHINGTON.

THE 149th regular meeting of the Washington Chemical Society was held on Thursday, March 10, at 8 P.M., in the Assembly Hall of the Cosmos Club.

The regular program for the evening was preceded by appropriate remarks and the presentation of resolutions (published on page 595 of this journal) upon the deaths of Mr. E. E. Ewell and Dr. E. A. de Schweinitz, both of whom were former officers of the Washington Chemical Society.

The first paper on the program, entitled 'Testing and Quality of Chemical Reagents,' was presented by Mr. Lyman F. Kebler.

The speaker first considered the subject from the point of view of the manufacturer who, on account of competition and the demands for lower priced material, often finds it necessary to send out inferior reagents designated as 'C. P.' with the tacit understanding that this abbreviation stands for something other than its generally accepted meaning. The speaker believed that the above condition of affairs could eventually be overcome by the establishment of standards of purity for all chemical reagents, and the agreement of chemists and consumers generally to insist upon receiving goods which are of the purity designated. Such a plan would tend to put all manufacturers on an equal footing and make it impossible for one firm to sell a lower grade of goods for the same price that another receives for better reagents.

A great deal of the trouble up to the present time was considered to be due to the fact that government chemists generally have not insisted on getting pure materials, and it has, therefore, been difficult for chemists connected with manufacturing establishments to maintain a high degree of purity, because it is frequently contended by dealers, that what is accepted by the government ought to be good enough for the individual. The speaker urged

the necessity for all chemists standing together in the matter. A large number of specimens of reagents containing a greater or less amount of impurity were exhibited, and discussion on the subject was entered into by Messrs. Hillebrand, Voorhees, Tolman and Noyes.

The second paper on the program was presented by Mr. B. J. Howard, and was entitled 'Comparison of Tests for Turmeric in Mustard.'

Turmeric may be added to mustard either in the powdered or else as a form of extract. Though added as a powder, if it is subsequently made up into prepared mustard by heating with water or vinegar, or both, the condition for the purpose of analysis is the same as the case of an extract.

Five methods of testing were made, viz., (1) the alkali test, (2) the sulphuric acid test, (3) the diphenylamine test, (4) the boric-hydrochloric acid and (5) the boric-oxalic acid test. The last two are merely adaptations of the tests made use of for detecting borax or boric acid used in foods as preservatives. The boric-hydrochloric acid reagent is made up of about equal parts of a saturated aqueous solution of boric acid and an equal solution of strong hydrochloric acid.

For the detection of turmeric in the powdered form a thin film of the sample to be tested is spread upon a microscope slide with a few drops of the reagent and examined with a low power lens or reading glass. When the boric-hydrochloric acid is used the film is allowed to evaporate—the best results being obtained with spontaneous evaporation. With sulphuric acid, boric-hydrochloric acid, or diphenylamine one part of powdered turmeric to 20,000 of mustard is easily detected, and much more positively than with either of the other reagents. In using diphenylamine, however, care must be taken not to confuse the after color produced by the action of the reagent upon the mustard itself for that produced by the turmeric.

For the detection of turmeric in the extract form the method must be modified. The sample is mixed with three or four times its volume of 90 per cent. alcohol, and allowed

to stand for one or more hours, shaking from time to time. The solid particles are then allowed to settle and a portion of the supernatant liquid poured into a salt cellar. A wedge-shaped strip of filter paper is suspended so that the tip dips a short distance beneath the surface of the liquid. The liquid is drawn up into the paper, and as evaporation takes place the turmeric is concentrated in the filter paper for subsequent testing. After standing for a few hours the paper is tested by the boric-hydrochloric acid reagent upon a porcelain or glass plate. A pink or bright red color which turns blue when treated with ammonia indicates the presence of turmeric. Some anilin dyes used for coloring mustard give a similar red tint but are not turned blue with ammonia. If a few drops of the boric-hydrochloric acid are added to the test liquor in the salt cellar before absorbing into the filter paper, the pink color shows up as the drying proceeds and thus sometimes lessens the time required in making the test.

The third paper on the program was presented by Mr. E. McKay Chace, and was entitled 'The Use of Basic Aluminium Acetate as a Preservative in Sausage.' Two samples of imported sausage were found to be preserved with aluminium salt to the extent of 200 milligrams to the pound can. The manufacturer of one of the samples admitted having used basic aluminium acetate in the proportion of one half of one per cent.

As aluminium does not occur in the animal organism a qualitative test is sufficient to detect its addition. The following test was used: Ash the sample, boil with strong HCl, add NaOH in excess, filter, make the filtrate acid and precipitate the aluminium with ammonia. The aluminium hydroxide and phosphate may be filtered off and tested on charcoal with cobalt nitrate.

For a quantitative determination the method of Wachenroder and Fresenius was used. (Fresenius, 'Quantitative Analysis,' 1904, Vol. 1, p. 459.)

It was found that aluminium formed a stable compound with the constituents of the sausage, which was insoluble in water, or HCl N/10 strength, but which was broken up on

digestion with pepsin in .33 per cent. HCl, showing that the aluminium would be set free to retard the digestion in the stomach and intestines.

A. SEIDELL,
Secretary.

THE ONONDAGA ACADEMY OF SCIENCE.

At the January meeting of the Onondaga Academy of Science held in Syracuse, N. Y., the following officers were elected:

President—E. H. Kraus.

Vice-President—P. F. Schneider.

Recording Secretary—Albert M. Reese.

Corresponding Secretary—J. E. Kirkwood.

Treasurer—Miss L. W. Roberts.

Librarian—Mrs. L. L. Goodrich.

Councilors to serve until 1907—Mr. J. D. Wilson and Mrs. M. B. Ackerman.

The annual reports of the different sections follow:

Zoology.—Professor C. W. Hargitt. The section of zoology suffered an irreparable loss in the death of its chairman, Mr. H. W. Britcher, which occurred early in the year.

As a field naturalist he had few equals either among his associates in the academy or throughout the state. This will be measurably attested in the admirable check-list of the spiders of the county, which appears in the recent volume of the *Proceedings* and constitutes his final contribution to science, passing into type almost coincidentally with the passing of his life. Other observations of like character are recorded in earlier contributions; notes on amphibia, reptilia and mammalia of the county appearing in the same volume. Would that his mantle might fall upon some worthy successor!

Botany.—L. Leonora Goodrich. The botanical class organized by certain members of the section has pursued a study of trees in winter which has proved very interesting. Of special interest, however, is the discovery of three plants new to this (Onondaga) county, one of which is new to the state. *Gaura biennis* was found among the limestone rocks near Belle Isle, and *Lythrum Salicaria* between Syracuse and Baldwinsville, about six miles from the city. In October *Phacelia dubia* was found growing on top of limestone rocks about eight miles south of Syracuse.

In this locality the plant was abundant and in bloom, notwithstanding the fact that its usual time of flowering is from April to June. This appears to be the farthest northern limit of this plant's occurrence and the only station thus far reported for it in this state.

Geology.—P. F. Schneider. The discovery is noted of two overthrust faults of small throw in the limestones of the Waterlime group, exposed by a cutting on the Jamesville suburban road. They are especially interesting because of the rarity of such occurrences in our horizontally stratified Paleozoic rock.

Several marked disturbances were also discovered in the limestones of the Helderberg series along the route of the Marcellus line and studied. A cave of considerable size was also opened up by the line of the Auburn inter-urban road.

Peculiar crystals of bright sparkling hematite have been found in the Red Shale of the Saline formation, especially in the lines of the cavities formed by the pseudomorphs after salt. These have been collected, described and studied. Crystals of celestite have also been discovered disseminated through one or more of the layers of the waterlime group in a recent railroad cutting near Jamesville. Some of the cavities are over half an inch in length and show the fauna of the celestite crystals perfectly preserved. More of the peculiarly clear and limpid quartz crystals have been found in the veins of the crystalline Onondaga limestone and described. Much additional information has also been added to our knowledge of local Pleistocene geology.

J. E. KIRKWOOD,
Corresponding Secretary.

THE ACADEMY OF SCIENCE AND ART OF PITTSBURG.
SECTION OF BIOLOGY.

THE monthly meeting of this section of the academy was held in the lecture hall of the Carnegie Institute, on January 5. Professor John C. Fettermann, biologist of the Western University of Pennsylvania, lectured on the 'Relation of Bacteria to the Dairying Industry.'

The lecturer brought out a number of facts

concerning this very important industry. He discussed the nature of milk as it is secreted from the milk glands; the various bacteria commonly found in milk, and sources of contamination; the keeping qualities of milk, and the influence temperature has on the development of the bacteria; the different preservatives used to keep milk from souring, and their action on milk, and the injurious effect upon the consumer. Condition of milk as sold in large cities; the significance of the great numbers of bacteria present in normal milk; results of the bacteriological examination of normal milk, and the facts regarding sterilization and pasteurization; the use of pure cultures in butter making; the prevalence of particular bacteria in certain localities, by which means a peculiarly desirable flavor is imparted to the butter; the introduction of these bacteria into other localities, in order to produce butter of an equally good quality; the occurrence of bacteria in cheese, and their importance to the manufacturer.

A number of cultures in culture tubes were exhibited, showing the various stages of the development of the bacteria, and their effect on the milk. The method of making the cultures was also explained. The discussion following the lecture chiefly concerned tuberculosis and the danger of inoculation of human subjects by the use of milk coming from infected cattle.

Professor Fettermann stated that, unless the tuberculous stage involves the udder of the cow, there need be no cause for apprehension of inoculation of human subjects, and as this only occurs in about one per cent. of all cows infected with tuberculosis, the danger resulting from the use of such milk is insignificant.

Professor J. B. Hatcher exhibited before the section a molar tooth of *Mastodon* (*Tetralophodon*) brought from Burmah by Mr. J. F. Weller, of Emlenton, Pa. The specimen, which belongs to *M. latidens* or a closely related species, exhibits an interesting stage in the passage of the molar teeth of the Proboscidea from the conular type of the mastodons to that of the elephants, where the

enamel is arranged in numerous transverse laminae.

FREDERIC S. WEBSTER,
Secretary-Treasurer.

THE MASSACHUSETTS INSTITUTE OF TECHNOLOGY
GEOLOGICAL JOURNAL CLUB.

THE club has reviewed the following papers during the month of February:

W. G. Ball, 'The Outlook for Mining in the New Territory Opened up by the San Pedro, Los Angeles and Salt Lake Railroad' (*Eng. and Min. Jour.*, February 4, 1904); G. G. Wald, 'Comparison of Fatal Mining Accidents in the United States and Great Britain' (*Eng. and Min. Jour.*, January 14, 1904); L. T. Buell, J. T. Glidden, W. L. Spalding and E. Burton, 'Theories of Ore Deposition, Historically Considered' (*Eng. and Min. Jour.*, December 14, 1903); G. F. Loughlin, 'The Differentiation of Rock Magmas' (*Eng. and Min. Jour.*, October 17, November 28 and December 14, 1903). These papers were discussions by J. F. Kemp and Blamey Stevens, and the arguments were presented by Mr. Loughlin, with illustrations of occurrences of igneous rock in Massachusetts. R. H. Allen, 'The Production of the Minor Minerals in 1903' (*Eng. and Min. Jour.*, January 14 and 21, 1904); J. Daniels, 'The Geology of the Kolas Gold Fields' (*Eng. and Min. Jour.*, February 11, 1904); B. L. Johnson, 'Native Gold Original in some Metamorphic Gneisses' (*Eng. and Min. Jour.*, February 4, 1904); S. Shapira, 'Mining in Korea' (*Eng. and Min. Jour.*, March 3, 1904); U. S. Whittemore, 'The Origin, Properties and Uses of Shale' (*The Michigan Miner*, November, 1899, to February, 1900).

The following original papers were presented:

H. W. Shimer, 'The Discussions of Questions Arising from the Interpretation of Faunas with Reference to Trilobite Mountain, Orange Co., N. Y.' 'The paper was taken from the results of detailed study in the region, and dealt mainly with the determining of strata in the absence of definite fossil evidence. The complete results are now in process of publication. G. Richards, 'Experi-

ences in Mining in Mexico.' Dr. C. H. Warren, 'Asbestos as a Fire-Proofing Material.' Experiments by Dr. Warren on chrysolite, the principal asbestos of commerce, showed that it lost its cohesive strength after being subjected to red heat from three to four minutes, and gave ground for the conclusion that, in cases of great fires, asbestos could, at the most, serve only to delay the progress of the flames for a few minutes.

G. F. LOUGHLIN,
Secretary.

THE CLEMSON COLLEGE SCIENCE CLUB.

THE club held its regular monthly meeting on Friday night, January 15, 1904.

Professor W. M. Riggs gave some facts and figures in regard to street railways, as compiled from reports of the last census. The figures were especially interesting as showing the small number of fatalities resulting from travel on street cars.

Professor H. Benton gave a communication entitled 'The Shipment of Fruits and Vegetables on a Commercial Scale.' The speaker explained in detail the different kinds of shipping cases used in practice and pointed out the defects and advantages of the different types. The methods used in packing and handling the various fruits and vegetables on some large gardens and orchards in Georgia were pointed out. The methods of packing the various fruits and vegetables were explained, special attention being paid to the cantaloupe. The construction and method of filling refrigerator cars were explained and the defects in the method of refrigeration, as used at present, were pointed out. Some of the improvements which have been proposed, namely, refrigeration by means of liquid air, etc., were mentioned. The effect of cold storage on fruit was shown by means of lantern slides. The whole paper was illustrated by a number of lantern slides.

Under the title of 'Some Leaf Mining Insects,' Professor Chas. E. Chambliss gave notes on *Bucculatrix pomifoliella*, *Aspidisca splendoriferella* and *Tischeria malifoliella*. The work and the stages in the development

of *Tischeria malifoliella* were illustrated by photographs and photomicrographs.

F. S. SHIVER,
Secretary.

CLEMSON COLLEGE, S. C.,
March, 1904.

THE ACADEMY OF SCIENCE OF ST. LOUIS.

THE academy held a regular meeting on March 7, Mr. Edwin Harrison presiding.

Dr. C. A. Snodgrass, city bacteriologist and pathologist, read a paper on the subject 'Bacteria and Their Work,' illustrated with drawings and cultures. He gave a clear conception of the place occupied by the bacteria in the living world, and the important work they were doing. He emphasized the fact that bacteria must not be confounded with disease. The following were some of the topics discussed: The distribution of bacteria on the globe; nitrogen fixation; changes in bacterial flora in milk supplies; the bacteria of the Illinois, Missouri and Mississippi Rivers; symbiosis; immunity; biological factors that affect bacteria; the relation of human and bovine tuberculosis, and various methods by which infection occurs.

THE ELISHA MITCHELL SCIENTIFIC SOCIETY OF THE UNIVERSITY OF NORTH CAROLINA.

THE 153d meeting was held in the Physics Lecture Room, Tuesday evening, March 8. The following papers were presented:

PROFESSOR A. S. WHEELER: 'Mercerization.'

PROFESSOR I. H. MANNING: 'The Work of the Digestive Glands.'

PROFESSOR CHARLES BASKERVILLE: 'Kunzite, the New Gem; Its Unique Properties' (with demonstrations).

A. S. WHEELER,
Recording Secretary.

DISCUSSION AND CORRESPONDENCE.

DR. CASTLE AND THE DZIERZON THEORY.

IN a recent number of SCIENCE (March 4, 1904), Dr. W. E. Castle offers some criticism of my paper entitled 'The Origin of Female and Worker Ants from the Eggs of Parthenogenetic Workers,' published in the same journal December 25, 1903. My paper was writ-

ten for the purpose of calling attention to certain observations which go to show that worker ants can produce worker offspring, probably from unfertilized eggs. I indicated the possible bearings of such observations on current theories of sex, instinct and natural selection. Incidentally, I protested against the wording of the Dzierzon theory in such terms as to preclude further investigation of certain phenomena covered by it, against a premature extension of the theory to groups of social insects less perfectly known than the bees, and against its use in bolstering up other hypotheses.

Castle pleads guilty to having used terms like 'invariably' in formulating the Dzierzon theory, but tries to evade the point by remarking that 'it scarcely requires explicit statement here that *all* conclusions of inductive science must be so qualified,' that is, by using such expressions as 'so far as observed' instead of 'invariably,' 'always,' etc. It is difficult to see what Castle gains by this statement unless he wishes to imply that all the conclusions of inductive science are on the same dead level of probability—Dzierzon's theory, the circulation of the blood, the etiology of cancer, the rotation of the earth and what not.

After virtually admitting that I was justified in objecting to his formulation of the Dzierzon theory, Castle feels called upon to present the arguments in favor of that theory, all of which are well known to every tyro in zoology. The remarks prefacing Castle's disquisition show that he regards the Dzierzon theory as sufficiently and satisfactorily established, and any expression of doubt concerning some of its implications as certainly useless and possibly heretical or even malicious. He desires to 'join issue' with me 'sharply.' Although I am by no means opposed to the Dzierzon theory, I accept the challenge, both because I do not wish to disappoint Castle and because his presentation of my views amounts almost to misrepresentation.

Since its promulgation more than half a century ago, there has never been a time when the Dzierzon theory lacked opponents, both among the bee-keepers and among zoologists