On the other hand, it is quite clear that the binucleated condition in the hyphæ of both groups still further strengthens the evidence for the relationship between the rusts and Basidiomycetes."

Judson F. Clark, of Cornell University, discusses the 'Toxic properties of some copper compounds, with special reference to Bordeaux mixture.' Clark shows that solution of such of the Cu $(OH)_2$ in Bordeaux mixture as is of fungicidal value, is chiefly accomplished by the solvent action of the fungus spores themselves, the total amount of copper necessary being probably not more than one part in 80,000. The amount of injury done to the host, which also has the power of absorbing the copper hydroxid deposited on its leaves, depends on the specific susceptibility of the protoplasm, the solvent properties of the cell sap, the permeability of the epidermis, and the weather conditions following spraying.

G. P. Clinton, of the University of Illinois, announces the discovery of *Cladochytrium Alismatis* Büsg. on *Alisma Plantago,* near Cambridge, Massachusetts. This is the first time this fungus has been found in America. He describes also a peculiar temporary sporangial stage which it had not been previously known to possess. He was also successful in germinating the resting sporangia, which had not been accomplished before.

J. C. Arthur, of Purdue University, discusses briefly 'Clues to Relationships among heterœcious Plant Rusts,' and Leslie N. Goodding describes six new species of plants from the Rocky mountain region.

Fifteen pages of reviews of current literature and four pages of news complete the number.

The December number of the *American Geologist* contains a portrait and a short biographical sketch of the late Ralph D. Lacoe of Pittsburg, Pa., by the Rev. H. F. Hayden. Also the scientific work of the late W. H. Barris of Davenport, Iowa, is described briefly by C. H. Preston and the article accompanied by a portrait. Neither of these men were professional scientists but their contributions to paleontology are valuable and lasting. 'The Loess of Iowa City and Vicinity' is discussed by B. Shimek. He describes the fossils found in the loess and compares them with the forms now living in the vicinity and other loess deposits. E. R. Cummings discusses 'A Section of the Upper Ordivician at Vevay, Indiana,' accompanying the article with two plates of fossils. 'The Cleveland Water Supply Tunnel,' by S. J. Pierce. From the evidence furnished by this tunnel and other work done in the vicinity the author describes a deep V-shaped preglacial valley emptying into Lake Erie, about nine miles long and at its greatest depth 450 feet below the lake level.

The Journal of Physical Chemistry. November. 'Equilibrium between Carbonates and Bicarbonates in Aqueous Solution,' by Frank J. Cameron and Lyman J. Briggs; 'Solubility of Gypsum in Aqueous Solutions by Sodium Chlorid,' by Frank K. Cameron. These papers are communications from the Bureau of Soils of the United States Department of Agriculture. 'Mathematical Expression of the Periodic Law,' by S. H. Harris; 'The Optical Rotatory Power of Cane Sugar when Dissolved in Pyridin,' by Guy Maurice Wilcox.

December. 'Oxidation of Ferrous Solutions by Free Oxygen,' by J. W. McBain. It is found that the oxidation of ferrous solutions by free oxygen is unexpectedly slow and that it increases with the concentration of the ferrous salt. 'Some Applications to Chemistry of J. J. Thomson's Work on the Structure of the Atom,' by Felix Lengfeld; 'Solubility of Gypsum in Aqueous Solutions of Certain Electrolytes,' by Frank K. Cameron and Atherton Seidell. A further study from the Bureau of Soils. In dilute solutions the solubility curves follow the direction indicated by the application of the mass law to the hypothesis of electrolytic dissociation. For high concentrations this is not generally the case, but in such solutions ionic complexes seem to be formed.

SOCIETIES AND ACADEMIES.

THE NORTHEASTERN SECTION OF THE AMERICAN CHEMICAL SOCIETY.

The regular monthly meeting of the Section

was held in the rooms of the German Turnverein on Tuesday evening, January 28. Dr. James Locke, of Yale University, addressed the Society on 'Some Recent Problems in the Systematization of Inorganic Compounds.' The paper was a résumé of some work on the solubility of various alums, and of certain double sulphates, which has been in progress for several years in the laboratories of the Sheffield Scientific School. It was shown that when the solubility of the alums of aluminium, vanadium, chromium, and iron with ammonium, sodium, potassium, cæsium, rubidium, and thallium is expressed in gram-molecules per liter of water as a function of the atomic weight of the trivalent metal, a figure is obtained in which the straight lines connecting the solubility of any two trivalent metals with successive univalent metals meet in a point, if prolonged. It was assumed that the points of solubility stand in fixed mathematical ratio to one another, and it was shown that if the difference of the solubility of the alums of a trivalent metal with two alkali metals is called the increment of solubility of the latter, then the ratio between the increments of solubility of the corresponding alums of two trivalent metals for any two alkali metals is a constant. This general law was amply confirmed by the experimental results, and it was shown that the solubility of new alums could be predicted with considerable accuracy.

Dr. B. S. Merigold, of the Worcester Polytechnic Institute, read a paper on 'Some Recent Work on Uranium,' in which he described the method and apparatus for obtaining pure anhydrous uranous bromide and the use of this substance for the determination of the atomic weight of uranium. The mean value of two sets of experiments was 238.52, about one unit lower than the recent values of Zimmerman.

HENRY FAY,
Secretary.

SECTION OF ANTHROPOLOGY AND PSYCHOLOGY OF THE NEW YORK ACADEMY OF SCIENCES.

A MEETING was held on January 27. The chairman, Professor Farrand, after opening the meeting, called on General James Grant Wilson to preside.

Mr. F. S. Dellenbaugh explained his understanding of the location of the historic towns and 'nations' of the Rio Grande valley in New Mexico prior to 1630. This differs radically and entirely from the present accepted arrangement. He maintains that the location of Tiguex, rather than Cibola, is the key to the correct solution of this problem, and from strong evidence derived from Benavides, Espejo, Castañeda and others, he locates Tiguex near San Antonio station. The site at Bernalillo, for this central town, so long advocated by Bandelier and his followers, he declares is impossible. With Tiguex at San Antonio station, the famous 'Seven Cities of Cibola,' which Bandelier placed on the site of modern Zuñi, are thrown instead into southwestern New Mexico, either on the Gila near Old Camp Vincent, or Old Fort West, or between these and the Florida Mountains, with the balance in favor of a site on the Gila. Cicuyé, instead of being at Pecos, was apparently a Tompiras town, either what has been erroneously called *Gran Quivira* or some village of that locality. The Braba of Coronado would fall in the vicinity of the present Cochiti, instead of at Taos, and Tusayan instead of being at the Moki Towns, would fall in its position 20 leagues (50 or 60 miles) northwest of the position of Cibola.

Mr. Harlan I. Smith presented a paper on the 'Hauptman Earthwork,' in Ogemaw County, Michigan. The discovery of this earthwork was first announced by him in SCIENCE, June 21, 1901 (p. 991). Personal observation in July enabled him to correct its location somewhat. It is on Section 33 or 34, or both, T. 22, N. (instead of 21), R. 1, E. It was found to lie in a lumbered pine area, and, unlike most such earthworks, far from any watercourse. It is covered by dense undergrowth and fallen timber. It is composed of a rounded embankment of earth, about 2 feet high and 12 feet wide, encircling an area about 197 by 177 feet; outside this is a ditch, 2 feet deep, 6 feet wide at the top, but narrowing towards the bottom. Signs of another embankment were seen outside the ditch, and within the enclosed area were several humhocks which may prove to be mounds or sim-

ilar works. There are three openings in the embankment. The antiquity of the work is indicated by the presence of large pine stumps on the embankment and in the ditch; the largest stump measured 13 feet 4 inches in circumference.

An effort is being made to have this ancient work enclosed in a state, county or township park. The land, now worth perhaps less than $10 an acre, can easily be secured. If neglected, the road to be built on the line between sections 33 and 34 will probably destroy the work.

Dr. John R. Swanton reported some results of his investigations into the mythology and origin of the Haida Indians of northern British Columbia. The whole Haida people is divided into two clans, Raven and Eagle, each of which is strictly exogamic with descent in the female line, and has its own crests, its own names, its independent traditional centers of origin. Each is subdivided into a number of families. The Raven clan traces its origin from a single legendary ancestress, who is reputed to have emerged from the waters with the Haida island. Some families of that clan, however, trace their descent from other sources. The Eagle clan has much less traditional unity of origin, and there are certain indications in the tradition that this clan is of foreign origin or at least has received considerable admixture of foreign blood. One important fact that seems to point to the Raven clan as the indigenous element is the great preponderance of Ravens among the supernatural beings of the island.

R. S. Woodworth,
Secretary.

SECTION OF ASTRONOMY, PHYSICS AND CHEMISTRY.

The Section of Astronomy, Physics and Chemistry met at the Chemists' Club on February 3. Mr. G. B. Pegram addressed the Section on the subject of 'Experimental Methods of Studying Radio-Activity.' Mr. Pegram described the principal methods which have been used in the study of radio-active substances and also gave a brief summary of the more important results so far obtained. The address was followed by a very interesting discussion of the subject.

F. L. Tufts,
Secretary.

ZOOLOGICAL CLUB, UNIVERSITY OF CHICAGO.

At the meeting of October 23, 1901, the following paper was presented:

'The Origin and Development of the Wings of Coleoptera': W. L. Tower.

The embryonic origin of the wings was studied in *Lepitinotarsa decemlineata,* where the hind wings were found to be derived from the rudiment of the metathoracic spiracle. The elytra are also probably derived from the remains of the mesothoracic spiracular disk, which are left in the segment after the anterior migration of the spiracle of the mesothorax.

In the larvæ of several species of beetles the wings were found to develop in one of three ways: (1) Directly beneath the cuticula—Carabidæ, Cerambycidæ, Buprestidæ and others; (2) in a shallow peripodal sac, which is broadly open against the cuticula—Scarabæidæ; (3) in a closed peripodal sac which is removed to a greater or less distance from the surface—Coccinellidæ, Chrysomelidæ.

In the wings there is a larval temporary tracheal system which develops from the cells of the hypotrichal membrane of the tracheal trunks. This system is functional in the late larva, prepupa and early pupa, but is destroyed during the pupal stage, probably by ferments in the hæmolymph and not by phagocytes.

The elytra and hind wings were found to have an essentially similar structure, both gross and microscopic, and are therefore homodynamous organs. The development of scales and glands, the development and finer structure of the cuticula, and the behavior of the hypoderm were followed in detail, and have given interesting results.

The conclusion reached is that the wings of beetles are homologous to those of other insects, but are specialized by reduction. They are not divergent organs specialized for a new function, as was stated by Krüger.

MEETING OF NOVEMBER 6, 1901.

'Spermatid Transformations in *Gryllus*

assimilis with Special Reference to the Nebenkern: W. J. BAUMGARTNER.

After the anaphase of the second spermatocyte division, the chromosomes separate and break up as has been described in other forms. But as the nucleus elongates to form the head of the spermatozoon, it forms a tube instead of a solid mass as described for other forms. The head has a darkly-staining outer wall of chromatin, and a hollow clear space probably filled with nuclear sap.

The remaining fibers, after they are cut by the division-plane, become fewer and thicker; their ends bend together and they form a 'striated' nebenkern, a condition not previously described. This striated nebenkern looks like an egg with dark drawn-out ends, and several (frequently five) dark cross striæ parallel with the long axis of the cell.

In a relatively short time the fibers break up, and soon the dark-staining substance appears as a round ball, which, with the immediately surrounding clear space, is enclosed by a surrounding membrane. In cross-section this appears as a dark circle, a ring of clear space and another dark ring.

As the axial filament grows out it passes over the surface of the bounding membrane, and not through the nebenkern. Soon after this the nebenkern elongates, loses the ring, and the dark ball passes back (away from the nucleus) along the tail, sometimes breaking up into several small drops. The substance is thus distributed over the tail and forms a covering for it.

A second body in the cytoplasm is smaller and always lies in the angle between the nucleus and the nebenkern. As the nebenkern passes backward and disappears, it moves up against the nuclear membrane, passes to the front end of the elongating head and forms the point. Its origin could not be determined, but from its destiny it corresponds to an acrosome.

C. M. CHILD,
Secretary.

THE TEXAS ACADEMY OF SCIENCE.

THE formal midwinter meeting of the Texas Academy of Science was held in the rooms of the Business Men's Club, at Waco, on Thursday evening, December 26, and Friday morning, December 27, 1901.

The speaker at the evening session was Dr. Frederic W. Simonds, Professor of Geology in the State University. He was introduced by the president, Professor J. C. Nagle, of the Agricultural and Mechanical College of Texas.

The subject as announced was 'Petroleum.' The speaker opened with a brief statement concerning the oil development in the State of Texas—a comparison having been made with the fields in the North and in California. He then entered upon a discussion of the nature of petroleum, showing its position in the hydro-carbon compounds and commented at some length upon its physical properties. The theories of the origin of petroleum received special attention, references having been made to the early work of the late Dr. T. Sterry Hunt and the more recent work of the late Professor Orton as well as to the investigations of many other distinguished students. The evolution of the oil well from that which was hand drilled to the modern steam drilled well was discussed and the latest statistics of the oil industry both in the United States and in Texas announced. With the generous assistance of Dr. A. F. Sontagg thirty excellent illustrations of the present condition of the oil development in Texas, including several Beaumont gushers, were thrown upon the screen.

At the morning session the following papers were presented: 'The Petroleum of Jefferson County, Texas,' by Professor H. H. Harrington, of the Agricultural and Mechanical College of Texas. Of this oil he says: "It makes an excellent fuel oil; but this is not to my mind its most promising feature. The sulphur which it contains (about 2 per cent.) is larger than that found in any other known petroleum; and is a menace to it as a source of illuminating oil or kerosene. Unlike most other oils in the United States, it has asphalt for a base * * *. This, it seems to me, is the key to its usefulness. Distilled it furnishes a good quantity of kerosene fraction, but with a high boiling-point and leaves a residue of fine asphalt, not excelled perhaps by that of

Trinidad. A protective tariff on asphalt is all that is needed to increase the value of the Beamont residue.

* * * * *

The following is a detailed analysis of the oil: Sp. Gr.=.912—very heavy. Begins to distill at 70°C. and boil at 150°C.:

70°—150°C.—	3.337%	comes	over.
150°—260°C.—	41.00 "	"	"
260°—300°C.—	19.00 "	"	"
300°—350°C.—	20.00 "	"	"
Above 350°C.—	16.67 "	"	"

"The first distillate below 150°C. is what is ordinarily known as the 'Benzine Fraction,' and as noted is 3.33% of the crude oil; it boils at 70°C. 150° to 260°C. is the illuminating oil fraction; 260° to 300°C. are the light lubricating oils; and 300° to 350°C., heavy lubricating oils, mixed with asphalt. The remaining 16½% is asphalt. As before mentioned, the amount of sulphur in the oil is the greatest obstacle in the way of refining it. When the illuminating fraction is refined, it requires the use of a much larger percentage of sulphuric acid, and the loss on refining from treatment with this acid is much greater * * than takes place with oils having a paraffine base and very little sulphur."

Professor Frederick W. Malley, of the Agricultural and Mechanical College, presented a paper on 'Factors of Progress in Insect Warfare,' in which he indicated the lines of effort and research among economic entomologists at the present time and made a comparison with similar work attempted twenty years ago. He grouped the warfare roughly into four great divisions: Insecticides, Cultural Methods, Parasites and Natural Enemies, and Climatic Conditions. The whole discussion was from the standpoint of *applied* entomology and a plea was made for elementary instruction along these lines in the public schools of the State.

Professor D. W. Spence, of the Agricultural and Mechanical College, discussed the 'Effects of Prolonged Exposure to X-rays on the Human Body,' showing their extraordinary effects, in some instances, in producing a disintegration and diseased condition of the skin. He himself had his hand in bandages covering a 'burn' of some months duration and not yet healed.

'A Preliminary Report on the Austin Chalk Underlying Waco and the Adjacent Territory' is the title of a paper presented by Mr. J. K. Prather. The rocks of this formation within the area mentioned were described minutely and their position in the great Upper Cretaceous Series, pointed out. Reference was made to the early work of Dr. Ferdinand v. Roemer and a list of fifteen characteristic fossils given. Examples were also given of the vertebrate remains found in this formation and attention called to the fruitfulness of this field for investigation in that direction.

Professor T. U. Taylor, of the Engineering Department of the University of Texas, gave an account of the 'Big Springs of the Edwards Plateau'—the region bounded by the Colorado River, the International and Great Northern and the Southern Pacific railroads—showing their fluctuation in discharge and offering an explanation therefor.

Mr. John K. Strecker, Jr., made a 'Preliminary Report on Reptiles and Batrachians of McLennan County.' In this paper are recorded many interesting and valuable observations extending over a period of years concerning the life and habits of these little-known species of animals.

The closing paper, on 'Dr. Ferdinand von Roemer, Father of the Geology of Texas: His Life and Work,' was presented by Dr. F. W. Simonds of the State University. Dr. Roemer was born at Hildesheim, Hanover, in 1818, and died in Breslau in 1891. In 1845 he visited Texas and wrote the first account of the physical geography and geology of the State. His monograph upon the Cretaceous of Texas—'Die Kreidebildungen von Texas'—appeared just fifty years ago.

FREDERIC W. SIMONDS,
Secretary.
UNIVERSITY OF TEXAS.

THE ELISHA MITCHELL SCIENTIFIC SOCIETY.

THE 139th meeting of the Society was held on February 11, at the University of North Carolina. The following papers were read:

'The Pressure of Light': J. E. LATTA.

'A Nineteenth Century Geometry': ARCHIBALD HENDERSON.

'The Absolute Properties of Molecules': J. E. MILLS.

CHAS. BASKERVILLE,
Secretary.

DISCUSSION AND CORRESPONDENCE.

A GEOGRAPHICAL SOCIETY OF NORTH AMERICA.

IF a general American Geographical Society, equivalent in rank to the Geological Society of America, could be developed by following Professor Russell's plan (SCIENCE, Jan. 31), there is no question that great good would come from it; but I do not believe that his plan would lead to the desired end. After stating some of its difficulties, I will present an alternative.

Centralization that weakens local activity is of doubtful value. It is perfectly true that the publications of the existing geographical societies are not always of a high order, but they are the best that the local societies can produce; they serve a very useful purpose in providing opportunity for beginners to publish their early efforts; they are the necessary steps toward something better. Furthermore, several of the local journals, being largely concerned with personal narratives of outings and excursions, are of greater interest to their local readers than any general and scientific geographical journal could be. It would more likely kill than kindle geographical interest to replace such local journals by a high-grade scientific central journal. The sufficient reason for this is that the great majority of the local readers are not geographers. This leads to the next difficulty.

No equivalent of the Geological Society of America could be made by uniting the existing geographical societies of the country. Candidates for membership in the Geological Society are carefully scrutinized. They must have had good scientific training and they must have actually accomplished something in the way of geological work, either in the field or in the lecture room, before they are recommended by the Council of the Society for election. The standard of training and accomplishment is not by any means discouragingly high, but it is set at such a level that membership in the Society really means something regarding a member's geological attainments. There is not a single geographical society in the country in which there is any corresponding requirement for membership. Any reputable person who is willing to pay the necessary fee may be elected. The societies are all glad to add his name to the count of members, and his fee to the treasury. In some of the societies it may perhaps be assumed that a considerable number of members feel a certain interest in the general subject of geography, an interest that is passive rather than active; but in nearly all the societies there is a large number of members whose interest is excited chiefly by the meetings, outings and excursions that the societies promote. Even in this respect, only one society, the Mazamas, exacts any performance as a measure of interest, and the performance that it demands—the ascent of a mountain some thousands of feet in height—is no more a test of geographical training and accomplishment than is the test that might be exacted by a yachting or a hunting club. By all means let the meetings, outings, excursions and mountain ascents continue; let the societies that conduct them flourish; let the publication committees secure the best narratives that the members can produce; but do not let us imagine that the members of these societies are all geographers.

Turning now to constructive suggestions: Let the proposed society be satisfied with the northern part of the New World for its field; let its name be the Geographical Society of North America, in order not to imply that America is all north of the Isthmus, and not to infringe upon the name already occupied by the society long established in New York city. Let the various geographical societies of North America be invited to send delegates, one for every five hundred members, to Pittsburgh next summer at the time of the meeting of the American Association; and let these delegates invite fifty or a hundred persons of real geographical attainments to become 'original members' of the new society. Let those who accept this invitation meet at Washington in Convocation Week, 1903, and