## THE IOWA ACADEMY OF SCIENCE

THE Iowa Academy of Science held its thirtieth annual session with Drake University, Des Moines, April 28 and 29, 1916. In the number of papers presented this meeting exceeded any previous session, a fact which speaks well for the scientific activity of the students and investigators of the state. The academy followed the plan instituted last year of having most of the papers presented before sectional meetings, of which there were three—1, Chemistry; 2, Physics; and 3, Botany, Geology and Zoology.

In the evening of the twenty-eighth Dr. Louis Kahlenberg of the University of Wisconsin gave the annual address before the Academy on "Some Results from the Experimental Study of Osmosis."

The Iowa and Ames sections of the American Chemical Society met with the Academy and an Iowa section of the Mathematical Association of America was organized during the meetings.

The following were the officers elected to serve during the coming year.

*President:* G. W. Stewart, State University.

*First Vice-president:* L. S. Ross, Drake University.

*Second Vice-president:* Miss Alison E. Aitchison, State Teachers College.

*Secretary:* James H. Lees, Iowa Geological Survey.

*Treasurer:* A. O. Thomas, State University.

PROGRAM

*Abstracts are by the authors*

*Barium in Tobacco and Other Plants:* NICHOLAS KNIGHT.

A number of samples of tobacco were examined and a small quantity of barium found in each one. The samples were obtained from Sumatra, Cuba and from various sections of the United States. Thirteen samples of leaves of common trees were also examined, and a sample of the soil in which they grew.

*Pure Sodium Chloride:* NICHOLAS KNIGHT.

Samples of common salt were made by four different methods, and small amounts of potassium chloride were found in each sample. Similar results were obtained from three samples of "C.-P." sodium chloride.

*Some Rock Analyses:* NICHOLAS KNIGHT.

*An Improved Method of Determining Solubility:* W. S. HENDRIXSON.

*Acid Potassium and Sodium Phthalates as Standards in Acidimetry and Alkalimetry, II.:* W. S. HENDRIXSON.

*Some Auxoamylases:* E. W. ROCKWOOD.

*Electromotive Forces and Electrode Potentials in Pure and Mixed Solvents, II.:* F. S. MORTIMORE and J. N. PEARCE.

*The Behavior of Solutions at the Critical Temperature, a Preliminary Report:* PERRY A. BOND.

*A Comparison of Barbituric Acid, Thiobarbituric Acid and Malonylguanidine as Quantitative Precipitants for Furfural:* A. W. DOX and G. P. PLAISANCE.

*An Accurate Aeration Method for Determining Alcohol in Fermentation Mixtures:* A. W. DOX and A. R. LAMB.

*Relative Influence of Bacteria and Enzymes on Silage Fermentation, Preliminary Report:* A. R. LAMB.

*Estimation of Calcium in Ash of Forage Plants and Animal Carcasses:* S. B. KUZIRIAN.

*The Pleasant Ridge Group of Effigy Mounds:* ELLISON ORR.

These mounds are included in the proposed Mississippi Valley National Park. This park will include a strip of land along the bluffs from a point about six miles south of McGregor, Iowa, to the mouth of Yellow River, about three miles north of McGregor. This group of mounds lies on a very high point of the bluff about half way between McGregor and the mouth of Yellow River, and is comprised of some eight or nine animal mounds and three bird mounds, all in a good state of preservation.

*An Old Roman Coin in South Dakota:* DAVID H. BOOT.

*Contributions to the Geology of Southwestern Iowa:* GEORGE L. SMITH.

*A Note on Fulgurites from Sparta, Wisconsin:* W. D. SHIPTON.

*A New Stratigraphic Horizon in the Cambrian System of Wisconsin:* W. D. SHIPTON.

*Records of Oscillations in Lake Level, and Records of Lake Temperature and Meteorology Secured at the Macbride Lakeside Laboratory, Lake Okoboji, Iowa, July, 1915:* JOHN L. TILTON.

Tidal effects were almost zero, barometric effects too small to be detected without magnification, and intake and outflow about equal. Wind effects were noticeable and quickly compensated by movement in the lake. The wind directed the circulation in the lake. The division of the lake water into

epilimnion, thermocline and hypolimnion was pronounced, even after strong winds. Evaporation amounted to about two tenths inch per twenty-four hours. Rainfall caused an immediate rise in the hydrograph.

*The Mollusca of the Loess of Crowley's Ridge, Arkansas:* B. Shimek.

A discussion of the fauna of the loess of this ridge, with a list of species.

*Superimposition of Kansan Drift on Sub-Aftonian Drift in Eastern Iowa:* Morris M. Leighton.

During the reconstruction of the C. M. & St. P. Ry., new cuts were recently opened up in eastern Iowa, in the vicinity of Delmar Junction, showing a body of sub-Aftonian drift beneath Kansan drift. A soil zone, together with a mineralized stump and fragments of wood, separate the two drifts. The Aftonian interval is recorded also by several feet of leaching of the lower till which is in contrast to the calcareous portions of the overlying till.

These exposures are of unusual importance to the Pleistocene geology of Iowa in that they show that the sub-Aftonian ice-sheet as well as the Kansan invaded eastern Iowa, and they throw light upon the data of the superimposition of certain major streams in eastern Iowa.

*Pleistocene Exposures on Capitol Hill:* James H. Lees.

The area made classic in Pleistocene geology by the studies of McGee and Call is now exposing to even better advantage the relations of Wisconsin drift, pre-Wisconsin loess and Coal Measures. No pre-Wisconsin drift is present. Fifteen feet of loess, buff except as weathered to gray, is overlain by Wisconsin till, with a zone of mingled loess and fossil-bearing drift between. A great lens of sand lies within the loess. The possible relations of the strata are discussed.

*Progress Report of Geological Work in the Driftless Area:* A. C. Trowbridge.

*The History of Devil's Lake, Wisconsin:* A. C. Trowbridge.

*An Outlier of the Clinton Formation in Dubuque County:* J. V. Howell.

Describes an occurrence of an oolitic, ferruginous layer at the Maquoketa-Niagaran contact seven miles west of Dubuque, Iowa. The material apparently is identical in lithologic character and stratigraphic position with the "Clinton" ore of eastern Wisconsin, which Savage and Ross have recently shown to be of Ordovician age.

*Geological Conditions Regarding Oil and Gas in Southeastern Iowa:* George F. Kay.

*The Super-Kansan Gumbo of Southern Iowa:* George F. Kay.

*Progress Report on Studies of the Iowan Drift by the Iowa Geological Survey and the United States Geological Survey:* George F. Kay.

*Bibliography of the Loess:* E. J. Cable.

*A Correlation of Peneplains in the Driftless Area:* Urban B. Hughes, presented by A. C. Trowbridge.

*Major Discissive Lines in Prairie States:* Charles Keyes.

Decipherment of the geotectonic features of the Prairie region of the Continental Interior is attended by so many difficulties that little real advance is recorded in a half century. Lately, however, new data on the problems involved became available. Considering alone fault-lines of relatively large displacement the Iowa field affords some unusually instructive information. The great Cap-au-Grès fault is found to extend into Iowa, where its greatest throw is not less than 100 feet. The remarkable Fort Dodge fault with a throw of about 125 feet has economic bearings of high importance. The Red Oak fault has a displacement of more than 350 feet. The famous La Salle fault seems to find expression near Dubuque and elsewhere in the northeastern part of the state. In western Iowa the fault-spacing appears to be quite regular with an approximate value of 25 miles. Recognition of this fact suggests the probable existance of other notable faults of the series and fully explains many hitherto apparently incongruous records regarding the areal distribution of the various terranes of the region.

*Wide Areal Extent of Chouteau Limestone:* Charles Keyes.

Long prevailing misconceptions concerning the stratigraphic extent and relations of the Chouteau limestone, originally described by G. C. Swallow in central Missouri, and a manifest tendency of late years to disregard the terrane as a useful and valid mapping unit have recently led to a reexamination of the section at the type locality and a careful correlation of the formation as there exposed with other sections east and north. In the latter direction it now appears that the Chouteau limestone retains its characteristic features and relationships to the Minnesota boundary, where, with other Paleozoic terranes, it rises against the old Siouan arch—a Triassic mountain axis of large proportions. Towards the east, by complete thin-

ning out, the Burlington limestone, which immediately succeeds the Chouteau limestone at the original locality is, on the Mississippi River, made to rest unconformably upon the older Hannibal shales.

*Cirque Phenomena in British Columbia:* CHARLES KEYES.

From the banks of the Skeena River, which flows into the Pacific ocean a few miles below the southernmost point of Alaska, the coast ranges rise abruptly to elevations of 3,000 to 4,000 feet. The snow-line is here sufficiently low to render it easily accessible. Cirque phenomena are developed to a wonderful extent. Perhaps nowhere else in all the world are the various phases so well displayed. The glaciers are in all stages of disappearance, so that on every hand their work is left open to the most detailed scrutiny. Even from the railway train many of the different aspects are easily viewed. For a distance of more than 100 miles the rail journey is interruptedly in the midst of clearly observable cirque phenomena. In few places on the globe are all the details corroborating the Johnson hypothesis of cirque formation so well laid bare.

*The Lithogenesis of the Sediments:* F. M. VAN TUYL.

There are few lines of investigation in geology which promise more fruitful returns than the lithogenesis of the sediments. The importance of careful study of recent sedimentary deposits both of the continental and marine type as a basis for interpreting the history of the ancient sediments can not be too strongly emphasized, as was pointed out recently by Andrée. Indeed, some of the greatest contributions to stratigraphy have already come through such studies.

It is believed that more careful and systematic examination of the sediments with the aid of the microscope would aid greatly in interpreting the conditions of their deposition as well as the nature of their source. Here lies a great field almost untouched, although its possibilities have been shown by the studies of Sorby, Cayeux, Mackie, Rogers, Goldman and others.

*The Western Interior Geosyncline and its Bearing on the Origin and Distribution of the Coal Measures:* F. M. VAN TUYL.

*Some New Niagaran Corals from Monticello, Iowa:* A. O. THOMAS.

The coral reef near Monticello is rich in the more common species of Niagaran corals. Careful collecting extending over a number of years has resulted in the discovery of a few new and instructive species. Among them are several commensals exhibiting some interesting relations. Descriptions and illustrations.

*A Highly Alate Specimen of Atrypa Reticularis (Linné):* A. O. THOMAS.

Specimens of *Atrypa reticularis* preserving the fragile excrescences about the margins of the shell are uncommon. A fine specimen from the Devonian at Independence, Iowa, illustrates this feature better than any figured in the literature at present, as far as known.

*The Effect of Temperature upon the Elasticity of Tungsten:* H. L. DODGE.

*On the Variation of the Reflecting Power of Isolated Crystals of Selenium with the Azimuth of the Incident Polarized Light:* L. P. SIEG.

*A Physical Representation of the Summation of Certain Types of Series:* L. P. SIEG.

*A Study of Some of the Torsional Elastic Properties of Phosphor-Bronze Wires:* A. J. OEHLER, introduced by L. P. SIEG.

*An Electrical Apparatus for securing and maintaining Constant High Temperatures:* W. E. TISDALE.

*The Tungsten X-Ray Spectrum:* ELMER DERSHEM.

*Why Hot-Water Pipes in Household Plumbing burst more frequently than Cold Water Pipes:* F. C. BROWN and WALDEMAR NOLL.

*A Bibliography of the Literature bearing on the Light Sensitiveness of Selenium and a Statement of Outstanding Problems:* F. C. BROWN.

*A Curve of Moisture Condensation on Glass Wool:* L. E. DODD.

*The Stroboscopic Effect by Direct Reflection of Light from Vibrating Membranes:* L. E. DODD.

*A New Tonoscope:* L. E. DODD.

*Certain Conclusions in Regard to Audition:* G. W. STEWART.

*A New Method of Identification of Polarized Light Reflected from Small Opaque Crystals:* LEROY D. WELD.

*A Sheep's Brain without a Corpus Callosum, a Demonstration:* H. A. SCULLEN.

*Recent Theories of Heredity in relation to the Theory of Natural Selection:* C. C. NUTTING.

The paper discusses briefly the theories of Weismann, Mendel, de Vries and Bateson with the definite contribution of each to our knowledge of heredity, together with its net result as affecting our attitude towards natural selection.

*Trophospongium of Crayfish Nerve Cell* (illustrated): L. S. ROSS.

*"Axone Hillock" of Crayfish Nerve Cell* (illustrated): L. S. Ross.

*A Malignant Tumor of a Chicken Liver, a Demonstration:* L. S. Ross.

*Notes on Two Strawberry Slugs:* R. L. Webster.

An account of two strawberry insects that have been frequently confused in the literature of economic entomology.

*A Method of Preparing Studies of Trichinella spiralis Owen:* Dayton Stoner and Thesle T. Job.

*Life History and Habits of the Gold-banded Paper Maker, Polistes metricus Say:* Frank C. Pellett.

*Distributional Notes on Some Iowa Pentatomoidea:* Dayton Stoner.

*An Hermaphrodite Crayfish:* Ivan L. Ressler.

*The White Admiral or Banded Purple Butterfly in Iowa:* B. O. Wolden.

*Notes on the Little Spotted Skunk:* B. H. Bailey.

*Successful Mink Farming in Iowa:* B. H. Bailey.

*A Handy Device for Staining Slides:* E. Lawrence Palmer.

The simple staining apparatus demonstrated was devised to take the place of the more expensive staining jars sold by most of the scientific supply houses. Besides the cheapness of the outfit, which fits into any tumbler, there is the added advantage that all of the slides being stained may be removed from the jar at once and may be rinsed while still in the frame. Fourteen slides may be inserted into the frame at one time, which is four more than the average staining jar holds.

The device is made by bending eight strips of zinc $15 \times 200$ mm. into the channels ($a$). These are soldered to the $20 \times 140$ mm. zinc strip ($b$) which is then bent into a rectangular form with the channels on the inside. The strip ($c$) $1 \times 26$ cm. is then soldered to the ends of the strip ($b$), forming a handle with which to lift the frame, and a guard to prevent the slides from falling out at the bottom.

This piece of apparatus has proved particularly handy in staining work where most of the slides require the same treatment.

*A Seed Key to Some Common Weeds and Plants:* E. L. Palmer.

This preliminary key to the seeds and fruits of one hundred and eighteen of the common weeds and plants of northeastern United States uses external characters as a basis for classification and arranges the seeds according to size. Most keys are made on a strict dichotomous plan. In this case, however, those seeds whose length is between 1 and 2 mm., between 2 and 3 mm., etc., are considered separately. After this step, one finds the key on a strict dichotomous plan. The possibility of entering the key at a number of places lessens the number of decisions to be made in determining the individual and consequently increases the probability of correct determination. Besides detailed descriptions of all the seeds mentioned in the key, there are pen and ink sketches of forty-one of the more typical forms considered.

*The Growth of Legumes and Legume Bacteria in Acid and Alkaline Media:* R. C. Salter.

*A Forest Census in Lyon County, Iowa:* David H. Boot.

*The Preservation of Fleshy Fungi for Laboratory Use:* Guy West Wilson.

*Notes on some Peliate Hydnaceæ from Iowa:* Guy West Wilson.

*Scleroderma vulgare and its Allies:* Guy West Wilson.

*Some Observations on California Plants:* L. H. Pammel.

*Some Observations on the Weeds of California:* L. H. Pammel.

*A Record of Fungus Diseases:* L. H. Pammel and Charlotte M. King.

*How a Tree Grows:* Fred Berninghausen.

*Notes on the Pollination of Some Plants:* Robert L. Post, presented by L. H. Pammel.

*Notes on Anatomy of the Leaves of Some of the Conifers of North America:* L. W. Durell, presented by L. H. Pammel.

*Notes on the Flora of Sitka, Alaska:* J. P. Anderson.

*Notes on a Cultivated Elodea:* R. B. Wylie.

*Insect Pollination of Frasera stenosepala:* L. A. Kenoyer.

*Insect Pollination of Timber Line Plants in Colorado:* L. A. Kenoyer.

*Pioneer Plants on a New Levee, II.:* Frank Thone.

The paper is a condensed summary of late developments on the area discussed in a paper presented at the 1915 meeting of the academy.

*The Control of the Oats Smut by Formalin Treatment:* J. A. Krall.

*Late Blight Epidemics in Iowa as Correlated with Climatic Conditions:* A. T. Erwin.

*The Sand Flora of Eastern Iowa:* B. SHIMEK.

The sandy areas in Muscatine and Louisa counties are chiefly discussed. The number of species peculiar to the sands of this region is small, the greater part of the flora being that of the prairies. Notes on seasonal succession on these areas are included.

*The White Waterlily of Iowa:* HENRY S. CONRAD.

The paper describes the variations of *Nymphæa odorata,* and gives in parallel columns the distinctions between this species and *Nymphæa tuberosa.* It questions the identification of all the waterlilies from the Great Lake region and the Central States, and asks for fuller study to determine the taxonomic value and the range of these forms.

*A Section of Upper Sonoran Flora in Northern Oregon:* MORTON E. PECK.

The paper gives first a brief account of the climatic conditions, topography, etc., in the neighborhood of Umatilla, Oregon. The several plant associations, with the areas they cover, are next described. The discussion closes with a complete annotated list of the species of seed plants known to inhabit the area under consideration.

JAMES H. LEES,
*Secretary*

DES MOINES, IA.

## THE KENTUCKY ACADEMY OF SCIENCE

THE Kentucky Academy of Science held its third annual meeting at Lexington, in the lecture room of the physics department, University of Kentucky, May 6, 1916, President N. F. Smith in the chair.

After a business session at which a number of new members were elected, and among other things a resolution was passed favoring the adoption of the bill now before Congress requiring the use of the Centigrade thermometer scale in government publications (H. R. 528), the following program was carried out:

*President's Address—Problems and Progress of Twentieth-century Physics:* N. F. SMITH.

Twentieth-century physics had its birth in the year 1895, when Roentgen discovered the new form of radiation known as X-rays. There followed rapidly after this a succession of important discoveries chiefly connected with radio-activity. From the many new facts discovered there has gradually developed the electronic theory of matter and electricity. It has been definitely established that every electric charge is made up of an exact number of elementary electric charges or atoms of electricity. The magnitude of this elementary electric charge has been determined with great accuracy. From the value of this elementary charge other important physical constants can be accurately determined, among them the mass of an electron, and the masses of different atoms. It has been shown that every electric current is a convection current; the inertia of matter is probably entirely due to its electrical nature and is analogous to self-induction. It has been shown that X-rays are of the same character as light, but with a wave-length about one-ten-thousandth part as great. This has been established by the use of crystals as a diffraction grating. A reasonable theory of the structure of the atoms of the different elements has been established which is in close agreement with observed facts. The electromagnetic theory, as worked out by Maxwell, is incomplete and requires important modification to account for the facts of radiation. On the whole, remarkable progress has been made in the development of physical theory.

*Astronomy Applied in Archeological and Historical Research:* HENRY MEIER.

The author had collected a large number of events and circumstances mentioned in works on ancient history and given in ancient Greek or Roman classics, which events referred to a probable total eclipse of the sun or moon taking place about the time given and visible in the regions referred to. He then calculated the times of all possible eclipses for the time and place of each event and having thus established accurately the year, month and day of the event given by history he was enabled to determine with certainty other historic dates related to the event.

Likewise from the accurately measured orientations of certain ancient temples in Upper Egypt dedicated either to the sun or to a well-known star, he determined, based upon the facts that the obliquity of the sun's ecliptic is a variable quantity and that the declinations of fixed stars change from year to year, the probable time of construction of each temple, and thus he was able to fix chronologically the events related through inscriptions in each temple.

*Some Historic Fish Remains:* ARTHUR M. MILLER.

When the writer took charge of the department of geology, State College, in 1892, he found stored in the basement of the old Chemistry Building, some interesting fossil fish remains. He later found that