

of the Tryxalinae of New England by an account of the new genus *Pseudopomala*, the single species of which is described in detail. J. W. Folsom describes three new species of the Thysanuran genus *Papirius* found in Massachusetts. Sharp's treatment of the insects in the new volume of the Cambridge Natural History is reviewed, and the proceedings of the Cambridge Entomological Club for January are added. In a supplement, containing contributions from the New Mexico Agricultural Experiment Station, new insects are described by T. D. A. Cockerell and L. O. Howard, including diagnoses of a large number of new Coccidae by the former.

SOCIETIES AND ACADEMIES.

CHEMICAL SOCIETY OF WASHINGTON, 84TH REGULAR MEETING, THURSDAY, DECEMBER 12, 1895.

THE President, Chas. E. Munroe, in the chair, with thirty-six members present. Messrs. H. Carrington Bolton, W. W. Skinner and F. B. Bomberger were elected to membership. Dr. W. F. Hillebrand discussed and exhibited the spectra of Argon and Helium.

Dr. H. W. Wiley read a paper on the 'Use of Acetylene Illumination in Polariscopes with Illustrations.' He said that Acetylene, while not inferior to other forms of illumination in point of accuracy, is so intense as to permit of accurate polarization with solutions so dark in color that they cannot be polarized with lights ordinarily used for this purpose. The Acetylene light and the 'Schmidt-Haensch Triple Field Polariscopes' were exhibited. This polariscopes was said to be of great assistance in rapid and accurate work.

Mr. F. P. Dewey presented a comprehensive paper on 'The Early History of Electric Heating for Metallurgical Purposes.' He traced the history of the application of the current to the production of metals from heated compounds, the necessary heat being developed by the current itself. Beginning with the very early work of van Marum, published in 1795 at Haarlem, the idea was followed through the work of Sir Humphrey Davy, 1808-1808; Children, 1809-'15; Depretz, 1848-'9; Pichon, 1854; Fox, 1875;

Siemens, 1879; Bradley, 1883; Cowles, 1885; Heroult, 1886, and Moissan, 1892-'5.

Dr. Marcus Benjamin contributed a 'Sketch of Professor Josiah P. Cooke,' who, from 1849 until the time of his death in 1894, was Ewing Professor of Chemistry in Harvard University. The sketch was of special interest from the fact that the statements given were taken from a manuscript sent by Prof. Cooke to Dr. Benjamin some years ago. Besides his six years' interest in the great chemical inventions of his time, *i. e.*, friction matches, daguerreotypes and gun cotton, the development of the chemical department under his guidance was fully described. The first practical instruction in chemistry to undergraduates in our American colleges was given by Prof. Cooke. A laboratory was fitted up in a cellar room of University Hall, of Cambridge, and from this grew the present magnificent equipment. Dr. Benjamin discussed Prof. Cooke's chemical work, especially that on the atomic weight of antimony, and referred also to his writings, of which 'The New Chemistry' is probably best known.

A. C. PEALE,
Secretary.

BIOLOGICAL SOCIETY OF WASHINGTON, 254TH MEETING, JANUARY 25.

CHARLES T. SIMPSON presented a paper on *The Extra-limital Mississippi Basin Unios.*

The speaker stated that the Unio fauna of the Mississippi basin was one in which the species were finely developed, often large or solid, richly sculptured or colored. The fauna of the Atlantic region consisted of smaller, less finely developed forms. The boundary between these regions on the north and northeast is not at the Height of Land, but far to the northward. Some 40 or more species of Mississippi naiades are found extra-limital in the northern and Atlantic drainage, while probably but a single Atlantic drainage form inhabits the Mississippi Valley. He believed this distribution was caused by the fact that at the close of the Glacial Epoch the northern lakes overflowed into the Mississippi Valley, and the Mississippi basin species ascended by way of these old streams into the British possessions.

These extra-limital forms were generally smaller and thinner, less highly colored, and

less strongly sculptured than when found in southern waters, and on these geographical variations a large number of species had been founded. Most of these are merely varieties of well-known Mississippi basin forms; a few have, perhaps, developed into good species. He believed these changes had all been wrought since the close of the ice age.

Similar changes on a larger scale had apparently taken place in the closely related unione fauna of the Atlantic drainage system, which, he believed, had been for the most part derived from the fauna of the Mississippi Valley, though at an earlier date.

M. B. Waite described the *Life History of the Pear-blight Microbe, Bacillus amylovorus*. The *Bacilli* first attack the blossoms and other new growth in spring. They multiply in the nectar of the blossoms and are able to enter the tender tissues of the nectar disk without a puncture. The germs are spread with great rapidity in the orchards during blossom time by bees and other insects. New infections take place on the tips of growing twigs or on newly opened leaf buds as well as on the blossoms, and may occur at any time that new growth is pushing out.

The majority of cases of blight come to a standstill after running their course, the twigs dry up and the germs all die in a week or two of exposure to summer weather, for this *Bacillus* forms no spores and cannot withstand drying. Some of the cases of blight do not, however, come to a standstill but continue slowly through the summer. Again, late growth in autumn often results in new infections, so that the trees go into their winter condition with active germs in them. These cases keep the *Bacilli* alive, and the speaker had been unable to find the germs living over winter in any other way. These cases of 'hold-over' blight are the key to the pear-blight question, for by cutting them out and destroying them when the tree is in a dormant or semi-dormant condition we can exterminate the microbes and prevent or control the disease.

Pierre A. Fish spoke of the *Action of Electricity upon Nerve Cells*, stating that Hodge's experiments have shown that certain well-defined changes occur in the structure of the nerve cell as a result of the stimulation of the nerves by

weak electric currents. A strong current, on the contrary, such as is used in electrocutions, seems to cause no visible change, apparently killing and fixing the protoplasm in a manner analogous to that produced by histological reagents.

He gave the results of the examination of nervous tissue from three electrocuted subjects: In No. 1 a portion of the myel was examined, particularly the motor cells, and the cytoplasm in most cases showed numerous vacuoles. In No. 2 normal cells were the rule, and vacuoles the exception in the cervical myel. A small portion of the cortex from the precentral gyre (the region nearest the electrode) showed vacuolation of the large and small pyramidal cells, either in the cell body, or in the peripheral process. In No. 3 a small portion of the cerebellum only was obtained, and after careful search vacuoles were found in two Purkinje cells.

As vacuolation of the nerve cell is often the result of disease, an examination of plenty of material and a knowledge of the previous history of the individual is essential for a solution of the question of the action of electricity.

C. Hart Merriam read by title a *Revision of the Lemming-Voles (genus Synaptomys)*.

Mr. Vernon Bailey read a paper entitled *Tamarack Swamps as Boreal Islands*. He stated that the common Eastern tamarack (*Larix americana*) is generally considered a boreal tree. East of the Rocky Mountains it overreaches the Boreal Zone, and occurs in scattered swamps throughout the transition and even in the northern part of the Upper Austral Zone. Such swamps are common in central Pennsylvania, northern Ohio, southern Michigan and northern Indiana, though the line marking the southern limit of the Boreal Zone is drawn much farther north. Within a radius of ten miles from Ann Arbor, Mich., which is in the Upper Austral Zone, are at least a dozen such swamps, ranging in size from a few acres to a mile square.

The vegetation of these swamps is composed largely of boreal species of plants, including the white birch, cassandra, andromeda, cranberries, pitcher plants, many species of northern grass, carex, herbaceous plants, mosses and a carpet

of sphagnum, 5 to 8 inches thick, as porous and absorbent as a sponge. The stem and leaves of sphagnum have a peculiar porous structure, through which a constant flow of water is carried up and poured out to evaporate on the surface. Thus by constant evaporation the plant and its surrounding atmosphere are kept cold. Ice was found under the sphagnum in one of these swamps as late as May 10, although the preceding winter had been mild and the snow had all disappeared by the middle of March. A number of small shrews (*Sorex personatus*), a boreal species of a boreal genus, were taken in one of these swamps, some being caught in traps resting on ice. The star-nosed mole, another boreal mammal, also occurs in some of these swamps, and the varying hare (*Lepus americanus*) was formerly common.

Evidently these boreal species of plants and animals are retained in the Southern swamps by the low temperature produced by evaporation from the sphagnum. F. A. LUCAS,

Secretary.

GEOLOGICAL CONFERENCE OF HARVARD UNIVERSITY, JANUARY 21, 1896.

On the Origin of the Copper Deposits of Keweenaw Point: By PROF. H. L. SMYTH.

After a brief review of the character and structure of the rocks of the Keweenaw Series, and the geological and geographical distribution of copper in them, the author pointed out the close genetic connection between the three forms of occurrence of copper in this district. The amygdaloid and conglomerate 'floors' in the vein mines are essentially the same except in scale, as the greater impregnated and replaced amygdaloids and conglomerates. From this consideration all would date from the time of formation of the fissures of the vein mines; this was probably the time of general tilting, and long subsequent to the formation of the lower flows and conglomerates.

Pumpelly worked out many years ago a paragenetic series among the mineral associates of the copper; this series cleaves along a chemical line. The earlier minerals, which preceded the copper, are chlorite mainly, with certain other non-alkaline hydrous silicates; the latter are alkaline, and are close contemporaries of the

copper. Among them are apophyllite (a fluorine mineral), and datolite (a boron mineral). Calcite is abundant through the whole series.

The author pointed out that from the consideration of the conditions of formation of the separate flows, with their subordinate intercalated conglomerates, each after consolidation was immediately subjected to the action of meteoric waters. Afterwards, by slow subsidence, each bed would eventually sink beneath their reach. The minerals of the first division of Pumpelly's series, essentially weathering products, belong to the successive periods of exposure of individual beds. The observed progress of alteration, from top to bottom in each individual bed, accords with this view, as do also the non-alkaline alteration products.

Afterwards came the northerly and north-westerly tilting, and the formation and filling of the fissures, and the impregnation and partial replacement of the amygdaloids and conglomerates. The new minerals of this period are sharply separated from the alteration products of the first (which they often replace) by their richness in alkalis, and the presence of fluorine and boron. The two periods, therefore, are far separated in time as well as by the character of the chemical agents at work, and do not, as Pumpelly supposed, represent a continuous march of alteration.

The author then discussed the more immediate questions of origin, and concluded that neither Pumpelly's view, that the copper had been brought down from the sandstones of the upper division of the series, nor Wadsworth's, that it had come from the lava-flows themselves, was probable. On the other hand, the mineral associates of the copper, the time of formation, and, in the case of the veins, the evident arrest of the copper-bearing solutions below the relatively impervious greenstone, all pointed to a deep-seated source and to ascending solutions as the transporting agent.

As to the precipitating agent, the author could not accept the view that it was electrolytic in its nature, because the deposition was manifestly accompanied in so many cases by the chemical destruction of the cathode. It was concluded that in spite of lack of confirmation by laboratory experiment, no theory so well ex-

plained the invariable deposition of metallic copper to great depths as Pumpelly's, viz: that it was effected by the reduction of copper salts by the FeO in the universally present chlorite.

T. A. JAGGAR, JR.,
Recording Secretary.

ST. LOUIS ACADEMY OF SCIENCE.

At the meeting of February 3, of the Academy of Science of St. Louis, President Gray in the chair and twenty-two other persons present, Mr. Trelease exhibited several specimens, about three feet square, of a curious silk tapestry, taken from the ceiling of a corn storing loft in San Luis Potosi, Mexico, by Dr. Francis Esch-
auzier, stating that he was informed that the larger specimen had been cut from a continuous sheet over twenty yards wide and about four times as long. The specimens, of a nearly white color, and of much the appearance and feeling of a soft tanned piece of sheepskin, were shown to be composed of myriads of fine silken threads, crossing and recrossing at every conceivable angle, and so producing a seemingly homogeneous texture. Although specimens of the creatures by which they are produced had not been secured, it was stated that there was no doubt that these tapestries are the work of lepidopterous larvæ which feed upon grain, the presumption being that they are made by the larvæ of what has been called the Mediterranean Grain or Flour Moth (*Ephestia Kühniella*). The speaker briefly reviewed the history of this insect and its injuriousness in various parts of the world, and quoted from a report of Dr. Bryce, showing that in Canada, where it became established in 1889, 'a large warehouse, some 25 feet wide, 75 feet long, and four stories high, became literally alive with moths in the short course of six months.'

One name was proposed for active membership.

WILLIAM TRELEASE,
Recording Secretary.

NEBRASKA ACADEMY OF SCIENCES.

THE fifth annual meeting was held in Lincoln January 2 and 3, at which a considerable number of papers were presented.

Dr. C. E. Bessy discussed the peculiar conditions by which the Buffalo grass had devel-

oped here on the plains from the nearly related Gramma grasses; and also the origin of the present flora of Nebraska in general.

Prof. C. D. Swezey showed by a comparison of early rainfall records in Nebraska with those of recent years that there is no evidence of any progressive change of our climate either towards greater rainfall or towards droughty conditions.

Mr. H. S. Clason presented facts dealing with the primitive civilization in America as indicated by the character of the ruins left.

Prof. F. W. Card showed how much less important were the economic fungi of the West than in the East, owing to our drier climate.

Dr. H. B. Ward described some new and little known animal parasites from Nebraska.

Mr. C. J. Elmore described some fossil diatoms from the State, and Dr. E. H. Barbour gave some facts as to the occurrence of considerable deposits of these organisms, such as give promise of commercial value.

Mr. G. A. Loveland presented an analysis of wind velocity records in the State to show how many hours a day the wind may be depended on for windmill power.

Dr. E. H. Barbour made a report of progress on the peculiar fossil *Dæmonelix*, of which he has now obtained a series of forms from successive horizons, indicating its probable genesis and development.

LINCOLN, NEB., February 4, 1896.

G. D. SWEZEY,
Secretary.

NEW BOOKS.

A New View of the Origin of Dalton's Atomic Theory. HENRY E. ROSCOE and ARTHUR HARDEY. London and New York, Macmillan & Co. 1896. Pp. ix + 190. \$1.90.

The Number Concept, Its Origin and Development. LEVI LEONARD CONANT. New York and London, Macmillan & Co. 1896. Pp. vi + 218. \$2.00.

The Spraying of Plants. E. G. LODEMAN. New York and London, Macmillan & Co. 1896. Pp. xvii + 399. \$1.00.

La Théorie Platonicienne des Sciences. ÉLIE HALÉVY. Paris, Alcan. 1896. Pp. xl + 378.