several months ago, and Part II., it is announced, 'will be published on April 15, 1902.' The work is edited by 'J. Stanley Gardiner, M.A., fellow of Gonville and Caius College and Balfour student of the University of Cambridge.' The part issued contains, besides the introduction, excellent reports on the physiography of the archipelagoes in question and on the Hymenoptera, Land Crustaceans and Nemerteans. The work will be more fully noticed when completed.

SCIENTIFIC JOURNALS AND ARTICLES.

THE *Journal of Comparative Neurology* for December. 1. Shinkishi Hatai, 'On the Mitosis in the Nerve Cells of the Cerebellar Cortex of Fœtal Cats,' shows: (1) The germinal cells of the nervous system of the fœtal cat present a modified form of the heterotypical mitosis of Flemming, (2) the number of the chromosomes represented by internodes of segmental filaments is 16, (3) all of the 'Halospindel' and a part of the central spindle are derived from the nucleolar substance, the central spindle containing the linin in great abundance. 2. Alice Hamilton, M.D., 'The Division of Differentiated Cells in the Central Nervous system of the White Rat.' The number and position of the dividing cells in later developmental stages (at and near birth) are described and compared with the results of other workers. Regarding the nature of the dividing cells, the author concludes: (1) There are at least two kinds of dividing cells in the central nervous system of the white rat, one small the other large, (2) neuroglia cells are derived from the small cells, nerve cells from the large ones, (3) dividing cells found in the gray matter and fiber tracts of the brain and cord are not indifferent cells, but are partly differentiated and it is possible to tell which are to become neuroglia cells and which nerve cells, (4) mitotic figures are occasionally found in multipolar nerve cells and in spongioblasts. 3. C. H. Turner, 'The Mushroom Bodies of the Crayfish and their Histological Environment.' A description of the supra-œsophageal ganglion of the crayfish, in the course of which it is shown that the mushroom bodies and the central bodies of the brains of crayfish and insects are homologous structures and that both of these organs are also present in worms. The first article is illustrated by one plate, the second by two, and the third by four.

PLANS have been made for a new engineering quarterly, which is to be known as the *Harvard Engineering Journal*. The first number, which will appear on March 1, will consist largely of a description of Pierce Hall, the new enginering building, and of the engineering department.

THE two journals devoted to geographical education that have hitherto existed in this country have been merged, and will appear, beginning with January, as the *Journal of Geography*, devoted to the advancement of geographical education. The new journal will be edited by Richard E. Dodge, professor of geography, Teachers College, Columbia University, and hitherto editor of the *Journal of School Geography;* Edward M. Lehnerts, professor of geography, State Normal School, Winona, Minn., and formerly editor of the *Bulletin* of the American Bureau of Geography, and Dr. J. Paul Goode, instructor in geography, University of Pennsylvania, Philadelphia, Pa. The *Journal of Geography* will appear ten times a year, with 480 pages to the volume. It will be 7 x 10 inches in size, and extensively illustrated. The editors will be aided by a large number of associate editors, representing different phases of geography. The journal will be published by the J. L. Hammett Co., Boston and New York, and will be printed at Lancaster, Pa.

SOCIETIES AND ACADEMIES.

AMERICAN MATHEMATICAL SOCIETY.

THE eighth annual meeting of the American Mathematical Society was held at Columbia University on Friday and Saturday, December 27–28, 1901. A single day's sessions no longer suffice for the extensive programs of the Society's more prominent meetings. In providing for a two-day meeting it was hoped to gain ample time for the presentation of papers, but the long program completely filled the four sessions. Fifty-nine members were in attendance, a number exceeding all

previous records. An enjoyable social feature of the meeting was the dinner at the Hotel Marlborough on Friday evening attended by fifty persons, including representatives of the American Physical Society, which was in session on Friday.

At the annual election, on Saturday morning, the following officers and members of the Council were chosen: Vice-Presidents, Maxime Bôcher, Frank Morley; Secretary, F. N. Cole; Treasurer, W. S. Dennett; Librarian, D. E. Smith; Committee of Publication, F. N. Cole, Alexander Ziwet, Frank Morley; Members of the Council to serve until December, 1904, Pomeroy Ladue, G. A. Miller, P. F. Smith, E. B. Van Vleck. The President of the Society, Professor E. H. Moore, holds office for a term of two years expiring at the annual meeting of 1902. Resolutions were adopted by the Council expressing appreciation of the services of the retiring Librarian, Professor Pomeroy Ladue, who has held that office since 1895.

The following persons were elected to membership in the Society: R. E. Allardice, Stanford University; Miss Grace Andrews, Columbia University; S. E. Brasefield, Michigan Agricultural College; W. E. Brooke, University of Minnesota; T. C. Esty, University of Rochester; L. L. Jackson, State Normal School, Brockport, N. Y. Seven applications for membership were received and laid over, under the by-laws, for action at the February meeting.

Reports were received from the secretary, treasurer and librarian. These reports will appear in the Society's Annual Register now in preparation. The Society has now 378 members, a net gain of 21 over last year. There are 17 life members. The total attendance of members at the meetings of 1901 was 230, the number of papers read 140, in both cases a large increase over previous years. The Treasurer's report shows a balance of over two thousand dollars. The *Transactions* has just initiated its third annual volume; the *Bulletin* has been issued since 1891. An especially important event of the past year was the deposit of the library of the Society in the charge of Columbia University, through whose generous action the books will now become available for the use of the members. A catalogue will soon be issued and steps will be taken to extend and complete the collection.

Following is a list of the papers read at the annual meeting. It may be added that the Chicago Section of the Society issued a preliminary program of nineteen papers for its meeting at Evanston, Ill., on January 2–3, 1902.

(1) 'Further types of unicursal sextic scrolls,' by Virgil Snyder.

(2) 'On the nature and use of the functions employed in the recognition of quadratic residues,' by Emory McClintock.

(3) 'A theorem concerning the method of least squares,' by Harold Jacoby.

(4) 'The theory of maxima and minima in n variables,' by Harold Jacoby.

(5) 'Recent researches in the theory of screws,' by Sir R. S. Ball.

(6) 'On surfaces whose geodetic lines are represented by curves of the second degree when represented conformably upon the plane,' by H. F. Stecker.

(7) 'A recent method for treating the intersection of plane curves,' by C. A. Scott.

(8) 'Two principles in the theory of multiple forms,' by Edward Kasner.

(9) 'On the invariants of a homogeneous quadratic differential equation of the second order,' by D. R. Curtiss.

(10) 'Some applications of the theory of assemblages,' by Arnold Emch.

(11) 'On a method for constructing all the groups of order p^m,' by G. A. Miller.

(12) 'Note on the transformation of a group into its canonical form,' by S. E. Slocum.

(13) 'On the characteristics of differential equations,' by E. R. Hedrick.

(14) 'On the circuits of plane curves,' by C. A. Scott.

(15) 'On the plane quartic curve,' by F. Morley and A. B. Coble.

(16) 'On the real solutions of systems of two homogeneous linear differential equations of the first order,' by Maxime Bôcher.

(17) 'The projective axioms of geometry,' by E. H. Moore.

(18) 'Remarks on the sufficient conditions in the calculus of variations,' by E. R. Hedrick.

(19) 'Note on isotropic congruences,' by L. P. Eisenhart.

(20) 'Lines of length zero on surfaces,' by L. P. Eisenhart.

(21) 'Concerning the class of a group of order p^m that contains an operator of order p^{m-2} or p^{m-3}, p being a prime,' by W. B. Fite.

(22) 'A characteristic property of the parabolic curve of nth order,' by Edward Kasner.

(23) 'On the content or measure of assemblages of points,' by Carl Gunderson.

(24) 'On the holomorphisms of a group,' by J. W. Young.

(25) 'On the resolution of orthogonal transformations,' by P. F. Smith.

(26) 'Proof that the group of an irreducible linear differential equation is transitive,' by Saul Epsteen.

(27) 'On the uniform convergence of Fourier's series,' by W. B. Ford.

The next meeting of the Society will be held in New York City on February 22. The Chicago Section will meet at the University of Chicago in April.

F. N. COLE,
Secretary.

COLUMBIA UNIVERSITY.

THE ACADEMY OF SCIENCE OF ST. LOUIS.

AT the meeting of the Academy of Science of St. Louis on the evening of December 16, the Nominating Committee reported a list of candidates for the offices of the Academy for the year 1902.

A paper by K. K. MacKenzie and B. F. Bush, entitled, 'The Lespedezas of Missouri,' was presented by title.

Professor F. L. Solden delivered an address on the advance made in education during the nineteenth century, stating that the most characteristic feature of the century's progress lay in the epoch of expansion and organization which it marked. The influence of Pestalozzi, Froebel, Horace Mann, William T. Harris and other distinguished educators was traced, the marked change in opinion concerning the commercial value of education brought out by the Centennial exposition of 1876 was indicated, and the establishment of a true university grade in this country with the opening of the Johns Hopkins University, the year following, was commented on.

Professor F. E. Nipher stated that he had continued his experiments on the production of ether disturbances by explosions, and by the motion of masses of matter. He had apparently succeeded in eliminating the effects of the shock of the air-wave upon the magnet needle. The needle is adjusted to a condition approaching maximum sensitiveness. There is no iron about the apparatus, except what is contained in the needle and in the compensating magnets. The latter are clamped in place so that the structure on which they are mounted may be pounded by a mallet without disturbing the needle. Rowland effects due to convection of electrified particles have also been eliminated. There remains a marked deflection of the needle, seeming to indicate that an ether distortion or wave originates in a sharp or violent explosion. This result is so amazing that it is announced with the statement that the whole subject is yet under the most searching examination. The coherer and the receiver of the telephone are to be used in two wholly different plans of experiment, in one of which the effects along the entire track of a leaden bullet are to be summed up in an alternating current. The results which seem to have been reached are in entire harmony with the well-known experiment of Michelson and Morley, who found that the ether within the building in which they worked was being carried along with the building and with the earth in its orbital motion.

WILLIAM TRELEASE,
Recording Secretary.

NORTH CAROLINA SECTION OF THE AMERICAN CHEMICAL SOCIETY.

THE fall meeting of the North Carolina Section was held on Saturday, November 23, 1901, at 11 a. m., in the office of the State Chemist, Agricultural Building, Raleigh, with presiding officer, W. A. Withers, in the chair. Eighteen (18) members and visitors participated in the meeting.

After the reading and adoption of the minutes of the previous meeting and the transaction of some minor miscellaneous business, the following program was presented and discussed:

'Notes on Instruction in Dyeing': G. S. Fraps.

The author gave a brief account of methods used and results obtained, in teaching dyeing at the North Carolina College of Agriculture and Mechanic Arts. Scrap books, which had been prepared by students, containing dyed samples and tests made on them were exhibited, to show the methods pursued.

'Systematic Acid Analysis': A. S. Wheeler.

The plan suggested by Abegg and Herz (*Zeit. für Anorg. Chem.*, 23, 236) is being tried with certain modifications with his classes in qualitative analysis in the University of North Carolina with considerable success. He finds it to be the nearest approach to a separation similar to that used with bases that he has cognizance of.

'Recent Work on the Phthaleins': Charles E. Brewer.

This was a review of the several articles that have recently appeared. The first of these was by Orndorff and Brewer on the constitution of gallein. The other three articles, in the current volume of the *Berichte* contributed by Liebermann, Thiele and Jaeger and Feuerstein and Dutoit, were on dioxyfluorescein or oxyhydroquinone phthalein. In every case the view that the phthaleins react as tautomeric compounds was sustained. All the contributors agree that those derivatives which have color should have given the quinoid structure, while those which are colorless are properly represented by the lactoid structure. A number of new compounds belonging to each of these two classes were reported.

'A Constant High-Temperature Bath': Charles Baskerville.

An ordinary enameled iron water-bath is made use of, surrounded by asbestos with a copper cover and a second asbestos top projecting in the bath and a wrought-iron float constructed to hold crucibles of various sizes. The liquid of the bath is composed of a mixture of the more fusible alloys. A specially constructed thermostat, made of very infusible glass, controls the flame of a large lamp. A glass tube, open at the bottom, penetrates the dual cover and is placed within one of the crucible receptacles. A mercury thermometer under 20 degrees atmospheric pressure is used.

'New Apparatus: (1) Soil Digestion Bath and (2) A Modified Condensing Bulb Tube for Nitrogen Determinations': C. B. Williams.

Drawings of these two pieces of apparatus, designed for use in the Chemical Laboratory of the North Carolina Department of Agriculture, were submitted; also, a description was read. Mr. Williams stated that these two pieces of apparatus had proved very helpful, both in point of economy of time and reliability.

'Nitrification of Ammonium Sulphate and Cotton-Seed Meal': W. A. Withers and G. S. Fraps.

The conclusions drawn by the authors from their pot experiments on nitrification are:

(*a*) Ammonium sulphate in some cases hinders nitrification.

(*b*) In nitrification of ammonium sulphate, sulphuric acid is produced and hinders the process unless neutralized.

(*c*) Soils differ in their action, depending upon the kinds of bacteria present.

(*d*) The relative number of organisms in the soil capable of nitrifying ammonium sulphate may be increased by continued addition of the substance and lime if such germs were originally present.

(*e*) Calcium carbonate is very helpful in nitrification.

Charles Burgess Williams,
Secretary.

The Section of Geology and Mineralogy of the New York Academy of Sciences.

The Section met December 16, at 8:15 P. M.

Mr. D. W. Johnson gave a paper on 'Notes on the Geology of the Saline Basins of Central New Mexico.' He said that in the Antonio Sandoval Grant, near the center of the Territory of New Mexico, are noted saline deposits which have served as important sources of a very pure salt in past years. The character of these basins was discussed in some detail, and points concerning their historical interest briefly touched upon. The general geology of the central portion of the Territory was then briefly reviewed, while the local geology of the Antonio Sandoval Grant was presented more in detail. It was shown that the saline lakes occur in the Red Beds of Jura-triassic or Per-

mian age. These beds are separable, on lithological grounds, into three divisions, designated as the Red Series, the Chocolate Series, and the Vermillion Series. Lenticular deposits of salt and gypsum are frequently found at the top of the lower or Red Series, and evidence was produced to show that the Saline Basins under consideration occur at this horizon. The facts were noted that Triassic types have been described from some part of the Red Beds (presumably the upper), while a characteristic Permian fauna has been recently found near the base of the Red Series. In view of these facts, and since no horizon of marked transition other than the salt and gypsum deposits occurs, it was suggested that these deposits might possibly mark the boundary line between the Jura-triassic and Permian in central New Mexico.

Dr. D. S. Martin presented a paper entitled 'Some Geological Notes on the Neighborhood of Buffalo, N. Y., made in the Summer of 1901.' Dr. Martin did not claim any special novelty for the data presented, but judged that they might be of interest to any members not acquainted with that region. Dr. Martin first outlined roughly the distribution of the series from the Medina to the Corniferous Limestone, and then mentioned in detail certain special features. He particularly noted certain joint seams in the Niagara Limestone near Lockport, N. Y., which have been much eroded and decomposed, and which are now filled with a dark brown claylike material, containing numbers of half decayed modern land shells, such as *Helix albolabris*. He then described the series of rocks exposed in the quarries found on North Main street, Buffalo, which are the source of the famous *Eurypterus* specimens. This series extends from the Corniferous Limestone to the Saline series and is divisible into five members, known as the Corniferous Limestone, the Blue Limestone, the Bulkhead Rock, the Water Limestone, and the Salina. Dr. Martin particularly emphasized the contact between the Bullhead Rock and the overlying Blue Limestone, and noted the occurrence of a sandstone dike extending to the top of the Bullhead series.

Mr. A. J. Queneau, in a paper entitled 'The Grain of Igneous Rocks,' said that a general observation might be made in regard to intrusive dikes. Near the margin the rock is dense, often glassy without any appreciable grain, whereas the grain begins to grow coarse according to some definite law, progressively as the distance from the wall increases. The present paper is based on the study of the laws governing such increase. It appears that the loss of heat is of paramount importance.* The problem taken up is very analogous to the one presented by the cooling of a slab of finite thickness and of great length and depth with respect to the first dimension, viz., the thickness. The method followed rests on the *Théorie de la Chaleur* of Fourier, and on the general theory of cooling by Professor R. S. Woodward.† The following laws have been deducted: (1) The zone of varying grain will vary indirectly as the initial temperature. From this follows that (*a*) Platonic rocks very deeply seated will not present a zone of varying grain to any extent. (*b*) Rocks which come to rest at a temperature nearing their consolidation point will present a wide zone of varying grain. (2) The time of cooling, other conditions being the same, varies as the square of the thickness of the dike.‡ From this last law it is assumed that the size of the crystals vary as the square of their distances from the nearest margin; then the square root of their area, which can be measured, varies directly as the distances from the margin. Thus we have a simple law of easy application.

RICHARD E. DODGE,
Secretary pro tem.

BIOLOGICAL SOCIETY OF WASHINGTON.

THE 345th meeting was held on Saturday evening, December 14.

Mr. W. H. Holmes spoke on 'Finds of Fossil Remains and Indian Implements in a Spring at Afton, Indian Territory.' The spring was situated in a level country and the superficial strata consisted of four feet of sand overlying

* Alfred C. Lane, Geol. Surv. of Michigan, Vol. VI.

† *Annals of Mathematics*, Vol. III.

‡ Riemann, 'Partielle Differential Gleichungen.'

a gravel bed about sixteen feet in thickness. In the gravel at the bottom of the spring were found several hundred finely made flint arrow-heads and spear-points, such as were used by the buffalo-hunting tribes, flakers of deer antlers, bones of recent wolf, horse, bison and elk, and teeth and fragments of bone of fossil bison, horse, mammoth and mastodon, teeth of these latter being present in considerable numbers and in an excellent state of preservation. In the gravel all about were similar fossil remains, but somewhat widely scattered. It had been learned from an old Indian chief that the arrow heads and other implements were cast into the spring as offerings, but it was difficult to account for such large numbers of fossil teeth and broken bones and their mixture with those of recent animals. It was suggested by Mr. Gilbert in the discussion which followed Mr. Holmes' paper, that possibly these teeth were offerings also, having been gathered from time to time, as they might have been washed out, and cast into the spring.

W. A. Orton described 'The Wilt Disease of the Cow Pea and its Control,' stating that the disease was caused by the clogging of the water tubes by bacteria, and that it was very prevalent among all save one of the varieties of the cow pea. This variety, known as the Iron, was resistant to the wilt bacillus as well as to the nematode, causing root-knot; that it was thus doubly resistant was an additional reason for hoping that similar cases might be found among other plants.

Theo. Gill presented a paper, in conjunction with C. H. Townsend, on 'The Largest Deep-Sea Fish,' this being the species described in Science for December 13, under the name of *Macrias amissus*.

William Palmer gave 'A Study of Two Ghosts,' explaining the manner in which spectral appearances had been caused on two occasions. In one instance the shadow of a person had been thrown on a cloud of mist by a light shining through a window of an adjacent house, and in the other a similar shadow had been cast on a passing dust cloud by an electric light. The disappearance of the mist and of the dust gave the impression of a vanishing figure.

F. A. Lucas.

SHORTER ARTICLES.

ARE HUMMING-BIRDS CYPSELOID OR CAPRIMULGOID?

In the *Proceedings* of the Zoological Society of London, for April 2, 1901, there is a most interesting paper by Professor D'Arcy Thompson 'On the Pterylosis of the Giant Humming-bird (*Patagona gigas*).' It is illustrated by some excellent figures and the description is detailed and accurate. In his concluding paragraph the writer says: "On the balance of evidence, I am inclined to think that the facts of pterylosis, so far as they go, tend to justify the association of the humming-birds with the goat-suckers and swifts, and, if anything, to bring them somewhat nearer the former than the latter of the last two." But he adds that 'the evidence is confused and the judgment far from clear.'

In the *Journal of the Linnean Society*, 1888, Dr. R. W. Shufeldt published his well-known 'Studies of the Macrochires.' He, too, had investigated the pterylography of humming-birds, goat-suckers and swifts, and he reached these conclusions: The *Caprimulgi* "have their nearest kin in the owls, and they have no special affinity with the *Cypseli*, much less with the *Trochili*. * * * The true swifts must have a group or an order created for them, as the order *Cypseli*, * * * just outside the enormous Passerine circle, but tangent to a point in its periphery opposite the swallows. * * * For the *Trochili*, I have already proposed a separate order * * * and am to-day more convinced than ever of the correctness of that proposal." On page 369 Dr. Shufeldt says further regarding humming-birds and swifts: "They differ essentially in their pteryloses and in the number of their secondaries."

I have just completed a careful examination of 23 humming-birds, representing 11 species, ranging in size from *Mellisuga humilis* to *Coeligena clemenciæ*, and 15 swifts, representing 10 different species, including *Collocalia*, *Hemiprogne*, and *Macropteryx*. I have also studied carefully the pterylography of 17 goat-suckers, representing 8 species. I have, therefore, had a considerably larger number of species at my disposal than even Dr. Shufeldt