

ishes and its solubility in triphenylmethane increases as the temperature rises. This state is named S_λ . The form which constitutes the greater part of the liquid from 160.1° onward is deep-brown in color and very viscous. Its coefficient of expansion increases and its solubility in triphenylmethane diminishes as the temperature rises. This state is named S_μ . Amorphous sulphur is supercooled S_μ .

On the Constitution of Portland Cement and the Cause of its Hydraulic Properties: CLIFFORD RICHARDSON.

The paper was read before the Association of Portland Cement Manufacturers, June, 1904, and has been published in pamphlet form.

Bivalent Carbon: JAMES F. NORRIS.

An attempt to prepare compounds of the type $C \begin{smallmatrix} R \\ \diagdown \\ R \end{smallmatrix}$, analogous to CO, in which the radicals, R, will have the same energy as oxygen in carbon monoxide. In this way it is hoped to avoid polymerization into $R_2C = CR_2$.

The Need of Action Regarding the Adulteration of Foods and Drugs: LEON L. WATERS.

A brief review of the subject, in which the need of legislation was illustrated by examples that had come under the notice of the author.

The members of Section C and of the society were invited to visit numerous manufacturing establishments. A list of these was published in SCIENCE, for January 6, page 5.

The visiting chemists unanimously tendered a vote of thanks to the University of Pennsylvania, and especially to Professor Edgar F. Smith, his associates, and to the proprietors of the establishments mentioned.

Dr. C. F. Mabery was nominated by the sectional committee to be vice-president of

Section C for the New Orleans meeting and was elected by the general committee.

C. E. WATERS,
Press Secretary.

Transmitted by

CHARLES L. PARSONS,
Secretary of Section C.

SECTION F, ZOOLOGY, OF THE AMERICAN ASSOCIATION FOR THE ADVANCEMENT OF SCIENCE.

SECTION F met for organization on December 28, but no papers were read until after the adjournment of the sessions of the American Society of Zoologists. The officers for the St. Louis meeting were as follows:

Vice-President—C. Hart Merriam, U. S. Department of Agriculture.

Secretary—C. Judson Herrick, Denison University.

Councilor—C. B. Davenport, Carnegie Institution.

Member of General Committee—C. H. Eigenmann, Indiana University.

Sectional Committee—C. Hart Merriam, E. L. Mark, C. Judson Herrick, H. F. Osborn, S. H. Gage, C. H. Eigenmann, H. B. Ward, Frank Smith.

For the New Orleans meeting H. B. Ward was elected vice-president and W. E. Ritter member of the sectional committee.

The sectional address by E. L. Mark, entitled, 'The Bermuda Islands and the Bermuda Biological Station for Research,' was not read on account of the absence of the author. Nineteen communications were presented.

Natural and Artificial Parthenogenesis:

ALEX. PETRUNKÉVITCH, Harvard University.

Heredity of Coat Characters in Guinea-Pigs and Rabbits: W. E. CASTLE, Harvard University.

1. Albino coat and angora coat are recessive Mendelian characters in heredity in guinea-pigs and rabbits.

2. Rough, or 'Abyssinian,' coat is in guinea-pigs dominant over normal or smooth coat.

3. The three coat characters mentioned are independent of each other. Each may exist either apart from or associated with one or both of the others.

4. Accordingly, cross-breeding involving the three pairs of alternate characters results in the production ultimately of eight visibly different classes of individuals, but of twenty-seven really different classes.

5. The principle of gametic purity is realized in a general way but not absolutely, for cross-breeding induces variability in the intensities of characters.

6. The gametes formed by certain recessive individuals are prepotent. This prepotency is hereditary.

Tropical American Fresh-Water Fishes:

C. H. EIGENMANN, Indiana University.
*The Early Development of Chordates in the Light of the Embryology of Ascidi-
ans:* E. G. CONKLIN, University of Penn-
sylvania.

Owing to the high degree of differentiation of the egg and early cleavage stages of ascidians, the small number of cells present during gastrulation and organogeny and the known cell-lineage of the principal organs of the larva, the ascidian egg is the most favorable in the whole phylum of the Chordata for an exact study of the early development. Under these circumstances it is worth while to compare the development of ascidians with that of other chordates, whatever may be thought of their phylogenetic position in the phylum.

In ascidians the animal (maturation) pole of the egg finally comes to occupy a position between the anterior and ventral poles of the larva and the chief axis of the egg is antero-ventral and postero-dorsal in direction. In other chordates the axial relations of the egg and larva are not certainly known, but there is considerable evi-

dence that *Amphioxus* and the frog are like the ascidians in this respect.

In ascidians, the frog and possibly in *Amphioxus* also the spermatozoon either enters the egg at the posterior pole or moves to this pole after its entrance; in the two former classes the copulation path of the sperm within the egg lies in the future median plane, though in the case of the ascidians this plane is not determined by the path of the sperm, but is already established before fertilization.

In ascidians the cleavage of the egg is bilaterally symmetrical; the same is the case with several other classes of chordates; the resemblances between ascidians and *Amphioxus* being especially close. Probably in all chordates with holoblastic cleavage the third cleavage plane cuts off four ectodermal cells at the animal pole; in ascidians the four cells at the vegetal pole are endodermal, mesodermal and neural plate cells.

In ascidians and amphibians the blastula and gastrula are bilaterally symmetrical and the closure of the blastopore takes place chiefly by the overgrowth of the dorsal lip; probably the same is also true of *Amphioxus*.

Among ascidians the chorda and neural plate arise from a crescent of chorda-neuroplassm which surrounds the anterior side of the egg and gives rise to the dorsal lip of the blastopore. In many respects this crescent resembles the 'gray crescent' of the frog's egg and it seems not unlikely that here and in *Amphioxus* also the chorda and neural plate arise as in ascidians. In all of these classes the neural plate comes from the outer layer of cells of the dorsal lip, while the chorda comes from its inner layer. In ascidians and the frog the anterior limit of the neural plate reaches about one third of the way from the equator to the animal pole; the same is probably true of *Amphioxus* also.

The mesoderm of ascidians comes from a crescent of mesoplasm which surrounds the posterior side of the egg just dorsal to the equator. The substance of the crescent is later infolded in the posterior and lateral lips of the blastopore and its anterior portion lies alongside of the notochord. There are no mesoblastic teloblasts here, but with this exception this condition closely resembles Hatschek's account of the origin of the mesoderm in *Amphioxus*. The method of origin of the mesoderm in the ascidians supports Rabl's theory that the peristomal mesoderm is primary, the gastral secondary, and that the latter is derived from the former.

The Skin, Lateral-Line Organs and Ear as Organs of Equilibration: G. H. PARKER, Harvard University.

Equilibration, as exemplified by the upright position of man, is in part carried out through the eye, the ear, the sense of touch and probably other senses such as the muscle sense. It is a reflex involving sense organs and muscular response; hence the term 'sense of equilibrium' is inappropriate. The lateral-line organs of fishes have been supposed to be organs of equilibration. Lee has shown that when the central end of the cut lateral-line nerve in the dogfish is stimulated, compensating movements occur in the fins; but these movements can also be called forth by stimulating the skin in regions where no lateral-line organs occur. Hence the skin is as much an organ of equilibration as the lateral-line organs. Both skin and lateral-line organs are, however, inferior to the eye and the ear as organs of equilibration. The lateral-line organs are stimulated by water vibrations of low rate, *i. e.*, six per second.

The ear of the squeteague consists of a utricle with three semicircular canals and a sacculus containing a large otolith. The cavities of the utricle and of the

sacculus do not communicate with each other. When the utricle and its semicircular canals are destroyed, the fish shows equilibration disturbances, but no loss of hearing. When the otoliths of the sacculi are made motionless by pinning them against the lateral (non-nervous) walls of the cavities in which they are, equilibrium remains normal but hearing is for the most part lost. In the fish ear the utricle is the organ of equilibration, the sacculus that of hearing.

The skin, lateral-line organs and ears represent, figuratively speaking, three generations of sense organs. The oldest is the skin stimulated by varying pressures, such as are produced by irregular currents, and capable of initiating equilibration responses. From the skin have been derived the lateral-line organs stimulated by water vibrations of low rate, and also significant for equilibration. Finally, from the lateral-line organs have come the ears stimulated by water vibrations of a high rate and important for equilibration. The ear, unlike the skin and lateral-line organs, is differentiated for its two functions, the sacculus for hearing, the utricle for equilibration.

Comparison of the Habits and Mode of Life of Amphioxus and Ammocetes: S. H. GAGE, Cornell University.

1. Both *Amphioxus* and *Ammocetes* live in the sand completely covered. If the head is projected or the entire animal remains out in the water on top of the sand, it is a sign of insufficient oxygen, too great heat, or illness on the part of the animal.

2. By repeated and continuous observation day and night I am led to believe that when in good condition the two forms remain constantly under the sand day and night; they change their position in the sand from time to time, however.

3. In entering the sand from the water there is a swimming motion until a consid-

erable part of the body is covered, then there is a snake-like movement in the sand and the animal quickly draws itself completely under. With the *Ammocætes* the process of entering the sand is performed slowly enough to enable one to see all the steps. With *Amphioxus* and *Asymmetron* the movement is so rapid in vigorous individuals that one can not see the details. They seem to enter the sand like an arrow. When the animal becomes weakened from any cause or weary by much swimming and entering the sand, the movements become sufficiently slow to enable one to follow the steps.

4. *Ammocætes* always enters the sand head first. *Amphioxus* usually goes head first, but may enter the sand tail first.

5. Both forms feed continuously, the food being derived from the respiratory stream entering the common branchioesophageal chamber. In *Amphioxus* the respiratory stream is produced by ciliary action. In *Ammocætes* the stream is produced mostly by muscular action on the two folds of the velum.

6. From the manner of feeding in nature it is easy to carry on feeding experiments. Any food, if finely enough divided to pass the sieve guarding the hood or oral entrance, will find its way into the digestive tube.

7. While both these forms live normally under the sand, each has a free life—the *Amphioxus* in its beginning or larval stage, and *Ammocætes* in its adult or terminal stage.

8. *Method of Capture*.—With *Amphioxus* in Bermuda the animals live most abundantly in places where there is a current. The depth of the water is not, apparently, of great importance, as they were obtained in depths of a few inches up to a depth of thirty to sixty feet. It is only necessary to scrape up some of the sand with a dredge or dipper and look over the sand. When

exposed to the air the animals wriggle vigorously and then are easily seen. If they remain quiet, they are seen with difficulty, they look so much like the sand. *Ammocætes* is taken in the same way. It usually lives on the edge of a stream and it is easy to shovel up the sand and mud and look it over. The wriggling movement helps here also, as the coloration of the animal and that of the sand are almost identical.

9. *Hardiness of the Two Forms*.—Both are very hardy, and hence it is easy to keep them in the laboratory. Food will be supplied by the water, or one may feed them any desired food, as cooked flour, finely divided yolk of hard boiled egg, etc.

10. It was found possible to keep *Ammocætes* in the laboratory from four to six months without doing more than change the water occasionally. *Amphioxus* and *Asymmetron* were captured the middle of August in Bermuda, taken to Ithaca in fruit jars of sand and sea water, and in this way some of them lived until the first of December. This experiment shows, I think, that it is entirely practicable to have living *Amphioxus* for study and experiment in our northern and inland laboratories.

Vitality of Mosquito Eggs: JOHN B. SMITH, Rutgers College.

The salt marsh mosquito, *Culex sollicitans*, lays its eggs in the soft mud on salt meadows and these eggs may remain for months, losing nothing of their vitality. After lying dry for a long time a large percentage hatches within a few hours after becoming covered with water. The remainder lie dormant for a period long enough to enable the first lot to reach full growth and then, if they are yet water covered, most of them hatch. A few eggs of each brood lie over until the year following, and all the eggs of the last brood hibernate. The first spring brood of these

mosquitoes is the largest of the season because it contains the accumulation of all the eggs remaining unhatched for any reason from the summer previous. Migrating adults of this first brood live until September and the additions from later broods give the impression of large summer broods, whereas, in fact, the late broods are less numerous than the earlier.

Light Organs of the Firefly, Photinus marginellus: ANNE B. TOWNSEND, Friends Select School, Philadelphia.

Investigations of physicists have shown the light of the firefly to be the most perfect known; not more than one one-thousandth of the energy expended is converted into heat. The nature of the process of photogeny has not been conclusively determined, although the theory which has most credence is that the light is caused by the oxidation, in alkaline media, of some substance produced by the photogenic cells. Radziszewski has found carbon compounds, similar to those found in living organisms, which are luminous under such conditions.

The purpose of the author's study has been to find what light the structure of the organs throws upon these theories. The light organs of the male *Photinus marginellus* are two plates lying directly upon the hypodermis of the fifth and sixth abdominal segments. These organs are made up of two clearly defined layers: the dorsal, in which the cells are filled with a dense content of opaque granules, and a transparent ventral, the truly photogenic layer. Within the ventral layer the tracheæ branch profusely in an arborescent manner. The vertical tracheal trunks with their branches are surrounded by cylinders of transparent tissue. Between the cylinders are parenchyma cells, irregular in size and outline, and containing fine granules. At the periphery of the cylinders the tracheæ send out fine tracheoles, without chitinous in-

tima, which anastomose, thus forming a close network of thin-walled air capillaries. When fresh tissue is studied under a microscope in the dark room the light is found to be uniformly distributed through the area of this tracheolar network, the cylinders appearing as non-luminous spots. Crushed light organs placed in oxygen respond instantly with increase of brilliancy. The light extinguished by CO₂ reappears instantly when the tissue is placed in oxygen. Experiments with a ctenophore, *Mnemiopsis leidyi*, show similar results with oxygen. Tissue in alkaline solutions becomes brilliantly photogenic under the influence of oxygen. The light is wholly extinguished when tissue is placed in acid solutions and does not reappear when oxygen is introduced. When the acid solution is made alkaline, the tissue again becomes photogenic.

Color Nomenclature: R. M. STRONG, The University of Chicago.

The color terms used in biology are neither logical nor precise. An attempt to reduce color terminology to something like a precise system was made by Ridgway in 'A Nomenclature of Colors for Naturalists * * *' (1886). This publication was useful, particularly among ornithologists, in securing more uniformity in the naming of colors, but it employed the color terms in common usage among artists, dye-makers, etc. There is no general agreement concerning the spectral positions of these colors, and samples taken from various sources show very great variations.

The color system advocated by Milton Bradley in his 'Elementary Color' (1895) is both logical and precise. It is founded upon six standards with definite spectral positions. These are red, orange, yellow, green, blue and violet. All other 'pure' colors are obtained by combining these; thus we get 'blue-green,' 'violet-red,' etc. Dull or 'broken' colors and shades and

tints of the so-called 'pure' colors are produced by adding varying amounts of black and white. Mr. Ridgway has himself adopted this system and is elaborating it for practical work in biology.

Popular Knowledge of Common Birds:

EDWARD L. RICE, Ohio Wesleyan University.

Statistics showing the number of common birds known by students electing work in bird study in Ohio Wesleyan University during the years 1902-1904. Data have been collected for 71 women and 55 men, both before and after the course. For ease in comparison a limited list of 75 species of birds has been used, the list containing all the very common birds except the English sparrow. The number of birds known at the beginning of the course was startlingly small, the average for the whole class being 21. The average record of the men (27) was decidedly above that of the women (17). About 12 per cent. of the students (14 women and 1 man) knew 10 birds or less. The lowest number reported was 4. No bird was known by all students, the robin (known by all but one) heading the list. Bob-white, crow, hummingbird, blue jay, red-headed woodpecker, bluebird, mourning dove and cardinal followed in order named. The record at the close of the course showed the following averages: for women, 45; for men, 56; for all students, 50.

Notes and Queries as to: (a) The Cerebral Commissures of the Elephant Shrew, Macroscelides; (b) The Brain and Heart of a Manatee, and what is believed to be the Smallest Known Sirenian Fetus; (c) The Brains of various 'Fishes,' including the Rare Japanese Shark, Mitsukurina; (d) The Swallowing of a Young Alligator by a Frog: BURT G. WILDER, Cornell University.

In the African *Macroscelides* G. Elliot Smith has described and figured the cal-

losum as long, but the splenium as terminating in a point without the usual continuity with the mesal or commissural part of the fornix; his specimen was not perfectly preserved and the only example examined by the speaker has not enabled him to determine the facts; the apparent condition is unprecedented and difficult to explain; well hardened brains should be carefully sectioned. Just the reverse condition is presented by the brain of a manatee that was hardened within the cranium in 1885 by the continuous injection of alcohol; not only do the callosum and the fornicommissure constitute a single continuous area, but there is no sign whatever of the pseudocoele ('fifth ventricle' or ventriculus septi pellucidi); other unusual features are the great size, especially the height, of the paraceles ('lateral ventricles'), the caudal extension that may, perhaps, represent the postcornu, and the decided ental elevation that converts the deep lateral (Sylvian?) fissure into a 'total' fissure. The heart may not differ materially from those previously examined, but its preparation by continuous alinjection displays to advantage the independence of the ventricular apexes which is characteristic of the sirenians. The fetus has the tail at less than a right angle with the trunk and the head is strongly flexed; between the two curvatures it measures about 55 mm., a little over 2 inches; it was figured and described in the *American Journal of Science*, in August, 1875, but has been commented upon only by Murie; the minute papilla on the ventral side of the tail has not yet been interpreted. The brain of *Mitsukurina* is probably now seen for the first time; most of the features are like those of other low sharks, but the olfactory crura are very long; the spiracles are far ventrad of the eyes, and not as figured in Jordan's example. The speaker has already published papers respecting the 'fish' brains exhibited, the *Polyodon* in

1875, the *Chimaera* in 1877, and the *Ceratodus* in 1887. Contrary to supposed conditions at the first date, the speaker now believes that in teleosts the olfactory bulbs are always solid, and that their hollowness in ganoids is a diagnostic character. Some progress has been made upon the peculiar conditions presented in the chimæroids, but much remains to be done with specimens specially prepared. Attention was again called to the ventral extension of the cerebral hemispheres in the dipnoans, and to their remote affinities with the ganoids. If the account by T. J. Parker of *Scymnus* (or *Scymnorhinus*) in 1882 is correct, that shark presents a nearer approximation to the ideal type of the vertebrate brain than any other form, but more specimens should be studied. There was submitted a dichotomous arrangement of the vertebrates above the lampreys, differing in some respects from that published in the *Proceedings* for 1887, and in the *American Naturalist*, Vol. 21, 913 and 1033. It is based mainly upon encephalic and cardiac characters. For the first time stress was laid upon the absence from all the holocephala of the rectal pouch which is a constant and peculiar feature of all sharks and rays.

The Feeding and Other Reactions of Actinian and Coral Polyps: J. E. DUERDEN, University of Michigan.

The paper describes the reactions of actinian and coral polyps to mechanical and chemical stimuli, founded upon experiments conducted in the Hawaiian Islands during a recent visit of the writer under the auspices of the Carnegie Institution. Studies similar to those of Loeb, Parker, Torrey and Nagel were carried out upon two species of actinians (*Cribrina*), preliminary to those upon the corals *Fungia* and *Favia*. The principal results are a demonstration of the important part played by mucus in the feeding and other processes of the two groups of polyps, the conditions

governing the inhalent and exhalent currents of the stomodæum, and the movements of small and large particles over the disc. They may be summarized as follows:

1. Small, non-nutritive particles falling on the disc and tentacles become embedded in a superficial layer of mucus always present. They may remain there for some time, dependent upon the state of activity of the polyp. In the end the mucus is broken up into shreds or patches and, with the embedded particles, is wafted away by exhalent currents from the stomodæum.

2. Nutritive substances lead to an opening of the mouth, the establishment of an inhalent stomodæal current, and a more rapid secretion of mucus, surrounded by which the substances are indrawn into the digestive cavity. An inhalent current being established, objects are indrawn independently of their nutritive value.

3. In actinians the transference of food to the mouth is largely assisted by the movements of the tentacles, disc, and upper part of the column; but in corals the stomodæal currents, assisted by the secretion of mucus, are the principal agents. A complex system of mucous streams is beautifully shown in compound corals.

4. The movement of heavier particles over the disc is largely due to thigmotactic or recovery reactions on the part of the polyp. Attention is drawn to the importance of this in the conditions under which many actinians and corals live.

5. The correlation of the various reactions with the anatomical structure of polyps is considered, and comparison is instituted between the reactions of polyps as fixed radiate organisms with those of free bilaterally symmetrical animals.

Celosporidium blattellæ, sp. n., a Sporozoan Parasite of *Blattella germanica*: HOWARD CRAWLEY, Wyncote, Pa.

The parasite lives in the Malpighian tubules of the host. It originates as a

minute cell with a few nuclei. There is no definite body form. Development follows the neosporidian type; *i. e.*, nuclear multiplication and spore formation proceed *pari passu* with vegetative growth. There are two developmental cycles, resulting in the production of 'round bodies' and of spores. The 'round bodies' are 1.5 to 2 microns in diameter and contain a very irregularly shaped nucleus. The spores are ellipsoidal, 5 microns long and contain a round, oval or dumb-bell shaped nucleus. The parasite occurs in enormous numbers, but does not appear to exert a deleterious influence on the host.

Descriptions of a New Genus of Tanaidæ and a New Species of Tanais, both from Monterey Bay, California: HARRIET RICHARDSON, Smithsonian Institution.

Isopods from the Alaska Salmon Investigation: HARRIET RICHARDSON, Smithsonian Institution.

An Unnoticed Organ of the Sand-dollar, Echinarachnius parma: EMILY RAY GREGORY, Wells College.

A study of the morphology of the sand-dollar has shown the presence of a blind-ending diverticulum of the intestine which passes around the body-cavity, giving off branches on the outer side. In the young animal it is frequently distended with sand, but generally only a few grains of sand are found in it in the adult. The organ appears to be of most importance to the young animal, but whether its chief value is in removing sand from the intestine at this time or in carrying it to the different parts of the body cavity, has not been determined.

Physiological and Morphological Changes during 860 Generations of Oxytricha fallax: LORANDE LOSS WOODRUFF, Columbia University.

A culture of *Oxytricha fallax* was carried on from October, 1901, to its death in

July, 1903, at the 860th generation. A record of the daily rate of division of the four lines of the culture was kept, and showed that the organism, when subjected to a uniform diet of hay-infusion, passes through marked periods of greater and less dividing activity. The first period of great loss of vitality occurred at about the 230th generation and the culture was on the verge of extinction, when it was 'rejuvenated' by the use of extract of beef. The second depression-period resulted in the death of the culture. A study of some two hundred permanent preparations of individuals showed that morphological changes occur during the life-cycle. A vacuolization of the cytoplasm appears first, and then distortion and fragmentation of the macronucleus, and reduplication of the micronuclei beyond the normal number when the vitality is at the lowest ebb. A similar study was made on four other cultures of hypotrichous ciliata and the results compared.

The Groups and Distribution of the North American Species of Diaptomus: C. DWIGHT MARSH, Ripon College.

Diaptomus is a genus of considerable interest, as it forms the greater part of the plankton that is available for food for fish. It is assumed that the genus is derived from marine ancestors, but it has no very close relatives. Thus far no attempt has been made even to arrange the American members of the genus in groups. A study of the distribution of the species with our present knowledge throws some light on the probable phylogeny of the group. There are now known thirty species. The distribution is in general one of latitude, with the greatest number of species in the mountain region of the west. A study of the distribution, with a comparison of structural characters, leads to a grouping of the species under four heads, the *tenuicaudatus* group, probably, being the

most primitive. The most important factors in the development of the various forms are temperature and isolation.

A Preliminary Note on the Snake's Tongue: EDITH M. BRACE, Western Maryland College.

The chief function of the snake's tongue seems to be connected with a sense of feeling that does not require the stimulus of contact, and may be a finer development of the sense that enables some people to avoid obstacles in the dark without touching them. The bifid tip and the numerous folds that lie behind the forking of the tongue serve to greatly increase the surface exposure. Beneath the epidermis and extending out into the folds there is a deep nerve plexus composed of multipolar cells whose ends are frayed out into extremely fine fibrils that interlace in every direction. From this plexus nerve fibers extend out between the cells of the epidermis.

C. JUDSON HERRICK,
Secretary.

DENISON UNIVERSITY.

SCIENTIFIC JOURNALS AND ARTICLES.

Palæontologia Universalis.—The third fasciculus of this important republication of old or obscure species of fossil organisms has arrived. These three parts of 75 species, figured and described on 161 sheets. This completes the first annual subscription, which is eight dollars. The first fasciculus of the second series will soon appear, and subscriptions should be sent to G. E. Stechert and Co., 129-133 West 20th Street, New York City. The editorial work is in the hands of D.-P. Cehlert, of Laval, France, secretary to the International Commission appointed by the International Geological Congress, at its eight meeting.

CHARLES SCHUCHERT.

The contents of *The Journal of Comparative Neurology and Psychology*, for January, is as follows:

'On the Areas of the Axis Cylinder and Medullary Sheath as seen in Cross Sections of the Spinal

Nerves of Vertebrates.' By Henry H. Donaldson and G. W. Hoke.

'On the Number and Relations of the Ganglion Cells and Medullated Nerve Fibers in the Spinal Nerves of Frogs of Different Ages.' By Irving Hardesty.

Editorial: 'Psychology and Neurology,' 'The International Commission on Brain Research.' Literary Notices.

SOCIETIES AND ACADEMIES.

THE NEW YORK SECTION OF THE AMERICAN CHEMICAL SOCIETY.

The New York Section of the American Chemical Society held its fourth regular meeting of the season at the Chemists' Club, Friday evening, January 6. The following papers were presented before the section:

The Application of Bismuth Ammonium Molybdate to Gravimetric Analysis: F. V. D. CRUSER and E. H. MILLER.

Portions of a standardized bismuth nitrate solution were precipitated by acid ammonium molybdate, under varying conditions. In order to get the solution barely acid, the use of congo red was found to be preferable to methyl orange. In washing the precipitate of bismuth ammonium molybdate, ammonium nitrate gave better results than ammonium sulphate. It was found that bismuth may be determined correctly by the ignition of bismuth ammonium molybdate to Bi_2O_3 : 4MoO_3 , when the temperature of ignition is kept below a dull red heat, and that this method gives as good results as those obtained by the reduction and re-oxidation of the molybdenum by potassium permanganate.

In determining bismuth by the evaporation of a nitric acid solution of bismuth nitrate, the operation must be conducted in porcelain, otherwise some bismuth trioxide is reduced by unburned gases passing through the platinum.

Recent Progress in the Chemical Department of the Geological Survey: F. W. CLARKE.

The Work of the Bureau of Standards: W. A. NOYES.

The work of the National Bureau of Standards is organized under three divisions and the first two of these divisions are subdivided into six sections each. The bureau is, first of