

number of attendants became greater than when admission was easier.

This is indeed a serious question. I doubt if the charge for medical services in the country can be much larger than \$1.00 per head, and it is thus seen that the 115,000 physicians of this country must be content to divide among them a paltry income of less than \$90,000,000 at the present time.

Finally, the physician of the future will find his greatest service in prolonging human life. I am not here to claim that human life is so valuable that it needs always to be prolonged. This may not be so from the general economic condition of affairs, but, personally, I think we are all more or less interested in longevity. It can not be denied that there is a distinct economical gain in putting a man out of the world after he has passed his prime and before he becomes a burden upon his friends or the community. The asylum and the poorhouse are not to be regarded as shining lights of advanced political economy, but there is something in life besides mere political economy, and the prolongation of existence is regarded as one of the chief functions both of the medical profession and of public charities.

On the other hand, it must be considered that there is a distinct economical loss in cutting off from existence a man before he has run the full course of his career. To train a man for usefulness requires now fully a quarter of a century, and it seems only fair that he should have at least twice that time for the manifestation of his activities. If, therefore, he be cut off at thirty-five, forty or forty-five, the community is robbed of service to which it is entitled.

If old age could be secured without much of the burden now attending it, there would be the gradual ripening and mellowing of

all the functions of the body and mind. If, in short, the human organism could be so constructed and cared for that it would continue its functional activity like the wonderful 'one hoss shay' until the time of its final dissolution, such a consummation is devoutly to be wished.

The medical profession of the future will find its best exponent in the service of senectitude. An old age without illness or dementation, a ripening without decay, a completion of the functional activity without the breaking down of any organ are steps toward which the medical profession of the future may well direct its energies.

Death should not be regarded as a misfortune, but as an end, as a termination of a journey which has been filled with delight, as a rest for weariness which comes with the natural order of labor, as an euthanasia and not a dreadful disaster.

H. W. WILEY.

U. S. DEPARTMENT OF AGRICULTURE.

*PROCEEDINGS OF THE CENTRAL BRANCH
OF THE AMERICAN SOCIETY
OF ZOOLOGISTS.*

THE third annual meeting of the Central Branch of the American Society of Zoologists, and the sixth annual meeting of the society since its original establishment was held at the University of Chicago, March 31 and April 1, 1905.

The following having received the votes of the executive committees of both branches were elected to membership in the central branch: James Francis Abbott, Bennet M. Allen, Lawrence Edmunds Griffin, Lynds Jones, C. E. McClung, George Wagner, L. M. Walton, Samuel L. Williston, Charles Zeleny.

The bill on vivisection before the Illinois State Legislature was discussed and it was

VOTED, That this society concur in the following resolution and instruct the secre-

tary to communicate this action to the Central Branch of the American Society of Naturalists:

Resolution: "It having come to the attention of the Central Branch of the American Society of Naturalists that a bill has been introduced into the Illinois State Legislature which would restrict the freedom of scientific investigation in Illinois,

"Be it Resolved: That the members of this society protest against such legislation as is contemplated in Senate Bill No. 271, because it is inimical to the interests of science and would seriously obstruct the advance of knowledge concerning the nature and cure of disease in man."

The officers elected for the ensuing year and those holding over are as follows:

President—Frank R. Lillie.

Vice-President—William A. Locy.

Secretary-Treasurer—C. E. McClung.

Additional Members of the Executive Committee—C. H. Eigenmann, for three years; Herbert Osborn, for two years; Thomas G. Lee, for one year.

The following are titles and abstracts of papers presented at the meeting:

The Origin of the Sex-Cords and Rete-Cords of Chrysemys: BENNET M. ALLEN, University of Wisconsin.

In an early stage of development (embryo of 7 mm. total length), each of the more ventral Malpighian corpuscles of the mesonephros is still attached to the peritoneum by a neck of cells which sometimes possesses a lumen and constitutes a peritoneal funnel. There are usually four, sometimes three, such Malpighian corpuscles in each somite. A peritoneal ingrowth arises either directly from the base of each peritoneal funnel or just mediad of it. These ingrowths are termed funnel sex-cords. Other sex-cords arise from the peritoneum between the funnel sex-cords and the mesenteries. These anastomose with the funnel

sex-cords which in turn unite with evaginations from their corresponding Malpighian corpuscles after the latter have broken away from the peritoneum. The bridges thus formed between the funnel sex-cords and Malpighian corpuscles constitute the rete-cords which are thus formed from the distal portions of the funnel sex-cords plus evaginations from the Malpighian corpuscles. The foregoing applies to the sex-gland along its entire length.

The distal ends of all the funnel sex-cords and of many of the other sex-cords contribute to the formation of the adrenal bodies.

The anterior portion of the sex-gland of the turtle is homodynamous with the rete region of the genital ridge of the mammals (pig and rabbit).

Further Notes on the Chromosome Complex of Orthopteran Spermatocytes: C. E. McCLUNG, University of Kansas.

A careful study of a large number of species indicates that the members of a family possess a common number of chromosomes. In each species there is found a characteristic series of chromosome forms, and these are in many cases peculiarly associated. In some cases the grouping is characteristic of the genus, and within the genus the species are marked by variations in size of chromosomes and other parts of the cell. Heterotypical mitoses occur in spermatogonia, first spermatocytes, and second spermatocytes, and in each case witness a longitudinal division of the chromatin thread. In the spermatocytes all the chromosomes do not divide in the same manner. These irregularities of association and division are largely due to the action of the accessory chromosome, which in some cases unite with the one tetrad, forming a trivalent element, and in others with two tetrads, producing a pentavalent multiple chromosome. From these observa-

tions it is concluded that generic and specific characters are the result of differences in size and associations of chromosomes, and not to variations in numbers. It is also thought that continuous variation may be due to slight differences in size of the chromosomes of the germ cells, while discontinuous variation would be due to alterations in the relations of chromosomes to each other.

Regeneration in Nudibranchs: C. M. CHILD, University of Chicago.

Several species of aëliids abundant in the Pacific Grove region were used for experiment.

It was found that removal of a portion of the body posterior to the middle was followed by rapid regeneration. The larger the portion removed the more rapid the regeneration.

The ganglionic mass is situated posterior to the second pair of tentacles; removal of the whole head anterior to the ganglia was followed by rapid and complete regeneration. When the ganglia were removed no regeneration beyond healing of the wound occurred, though the animals often lived for two weeks.

Regeneration of posterior portions of the body was less rapid in specimens from which the head anterior to the ganglia had been removed than in specimens with uninjured head. The specimens from which the head region had been removed had lost their principal sense organs, but still retained the central nervous system intact. They were much less active than specimens with normal heads and the posterior parts were consequently subjected in much less degree to the conditions accompanying functional activity of this region; hence in all probability the less rapid regeneration. After the new head regenerated, posterior regeneration in these pieces was fully as rapid as in those with uninjured heads.

Removal of other portions of the body such as the lateral regions of the foot, etc., had no effect upon the rapidity of posterior regeneration.

If the animals are not fed a marked reduction in size, often 50 per cent., occurs in the course of two or three weeks.

The Relation of the Degree of Injury to the Rate of Regeneration: CHARLES ZELENY, Indiana University.

Two series of the crayfish, *Cambarus propinquus*, differing only in the degree of injury which they had sustained, were compared with regard to the rate of regeneration of the right chela and the rate of moulting. In one series, AA_2 , the right chela was removed at its breaking joint. In the other series, BB_2 , both chelae were removed at their breaking joints and the last two pairs of walking legs were likewise removed. Series AA_2 comprised 36 individuals and series BB_2 41 individuals.

A comparison of the two series was made 95 days, 130 days and 153 days after the operation. In each case the data show very definitely that the series with the greater injury molts sooner than the one with the lesser injury and also regenerates each of its two chelae more rapidly than the latter regenerates its one removed chela.

Experimental Evidence Concerning the Production and the Preservation of Acquired Characters: W. L. TOWER, University of Chicago.

Dominance; a Potent Factor in the Extinction of Species: W. L. TOWER, University of Chicago. Read by title only.

The Origin and Distribution of Tropical American Fresh-water Fish: C. H. EIGENMANN, Indiana University.

The Sequence of Organisms in a Protozoan Culture and its Irreversibility: AMOS W. PETERS, Zoological Laboratory, University of Illinois.

A definite procedure is followed in the setting and care of protozoan cultures with a medium of hay infusion. The seed here used came from previous laboratory cultures or from field collections. The physiological conditions are determined at almost daily intervals by physical and chemical methods. Evidence so obtained points to fermentative action as the beginning of metabolism in the culture. The curve for acidity is of much physiological significance. An approximate method of estimation is used to compare the relative abundance of the different organisms and the results are represented by curves. Relative curves have been approximately determined for bacteria, *Colpidium*, *Paramæcium*, *Amæba*, some *Hypotricha*, *Arcella*, some Rotifera and *Stentor*. All efforts to change well-defined curves to decidedly different relative positions in the history of the culture have failed. The maxima of the curves can not be interchanged by reseeded. Since reseeded was not practised (except for experiment) the cysts or spores of all the organisms found must have been continually present. Mutual antagonism of the different forms is not a probable explanation. The serial succession of the organisms and the parallel physicochemical changes in the environment point to *specific adjustment* as a probable hypothesis. The determination of some of the specific adjustments of *Paramæcium* and *Stentor* supports this hypothesis.

An Analysis of Physiological Conditions in a Protozoan Culture: AMOS W. PETERS, Zoological Laboratory, University of Illinois.

The influence of the physiological states of protozoa in producing variations from a supposed standard is seen in the results of experiments upon both the directional and the metabolic reactions of this group. To obviate this important difficulty the

writer proposes to standardize the given conditions of any culture. Standardization of the conditions, if successful, uses the peculiarities of the physiological states for a more accurate interpretation of the results of experiment, instead of leaving these states as objectionable factors in an experimental procedure.

The methods to be used must conform to at least two conditions. First, they must not require more than a small amount of culture liquid (5 to 10 c.c.) for a test, in order that serial observations can be made upon the same culture. Second, they must be sufficiently accurate and sensitive to yield results that show the successive small differences which occur in the history of a single culture. The special methods here applied are mostly volumetric and comprise the determination of: (1) Qualitative chemical content, (2) free acidity or alkalinity, (3) dissolved oxygen, (4) bicarbonates, (5) alkali earths, (6) electrical conductivity, (7) oxygen consumed, (8) sulphated nitrogen, (9) ammoniacal nitrogen, (10) individual salts—nitrites, nitrates, chlorides, potassium, calcium, etc. For both convenience and accuracy, a system of standardizing all the necessary volumetric solutions in terms of one original standard acid has been devised. By these methods one series of data has been taken from various media promiscuously selected for comparison, and another series comes from the history of single cultures. In both series the biological aspect of the media was known. Comparison of the physicochemical and the biological data indicates that variations in the former are an approximate expression for corresponding changes in the physiological states of the organisms. The methods here selected are therefore serviceable for the physiological estimation of the protozoan environment.

The Evolution of Color Characters: R. M. STRONG, University of Chicago.

Color characters are purely relative means of distinguishing various individuals or groups of animals, and their significance varies according to the experience and knowledge of the observer. In birds, color characters are all connected by series of transitional stages which appear perfectly continuous even after careful analysis, and the most highly developed characters may be found in incipient stages not ordinarily observable. A study of the colors of birds has led the writer to believe strongly in an orthogenetic theory of evolution of color characters by continuous variation in birds.

Some Observations on the Litoral Fauna of Pacific Grove, Cal.: C. M. CHILD, University of Chicago.

The Entomological Ecology of the Indian-corn Plant: S. A. FORBES, University of Illinois.

This paper consists of material in pure ecology selected from the mass of matter accumulated in the course of several years' study of the corn insects from the economic point of view. It deals with adaptive relations of the corn insects to their food plant and to one another; classifies adaptations of insects to their food as structural, physiological, psychological, local, biographical and numerical, giving illustrations of each class; discusses the adjustment by natural selection of the life histories of insects dependent upon the same plant; analyzes examples of competition among such insects; refers to the agency of natural selection in transforming competitions from the simultaneous to the serial order; and theorizes the whole subject by reference to the general principle of a community of interest between a phytophagous insect and its food plants.

The Fauna of Mayfield's Cave: ARTHUR M. BANTA, Indiana University.

Mayfield's Cave is a small cave near Bloomington, Ind., which presents typical cave conditions having a nearly constant temperature and conditions of light shading from twilight to absolute darkness. Eighty-seven species of animals were taken in this cave as against 68 heretofore known from all of the Indiana caves. Of the 87 species but 21 are permanent residents and only 8 are found in caves exclusively. Species including diptera, lepidoptera (2 species), arachnida and the bats hibernate in the cave in considerable numbers. Each cave inhabitant sustains a certain definite relation to the light, some living only in absolute darkness, others in dim twilight, etc. Aside from conditions of light and temperature, the distribution of cave animals is influenced by moisture, the presence of organic matter which serves as food and the presence of means of concealment. Some of the highly modified and truly cavernicolous forms are occasionally found outside of caves in springs, about wells, in drains and in similar situations. Change of seasons has little influence upon cave life. Species which are only temporary residents and some of the less highly specialized of the permanent residents are young and local cave forms, while the highly specialized cave inhabitants such as the blind fish, blind cray-fish and the blind earabids are old and widely distributed cave forms. The nearest relatives of cave forms are nocturnal or are dark or shade-loving species, while the food and habits of cave species are exactly similar to the food and habits of their near relatives living in other situations. The habit of hiding under loose stones and other debris persists in many cave forms where the habit is apparently altogether useless. *Cambarus bartoni* living in the cave possesses less

pigment, and their antennæ are eleven per cent. longer compared with individuals of the same species living outside.

Guinea-chicken Hybrids: MICHAEL F. GUYER, University of Cincinnati.

These hybrids, five in number, were produced by crossing a black Langshang cock with a common guinea hen. When young the hybrids resembled more young guineas, although the shanks were feathered, as were those of the father. Traces of these feathers still (nearly three years later) persist. The hybrids are much larger than guineas and have louder and even more discordant voices. They are extremely wild. The head shows no trace of either the comb of the chicken or the helmet of the guinea, but is covered with feathers clear to the beak. Neither are wattles nor earlobes present. The beak, in color and shape, resembles more that of the guinea. A trace of the guinea's white face is discernible in the hybrid in the immediate region of the eyes. The neck is very long and snake-like. The feathers are more or less intermediate in structure between those of the parent forms. The tail is erect and never droops like that of the guinea. The large quill feathers of tail and wing not infrequently possess vanes which are black on one side of the rachis and more like the hybrid general plumage on the other. The first one to three primaries are white in all of the hybrids. Guineaes frequently show similar white primaries. The color of the head and neck is mainly black, although in two of the forms, there is a decided sprinkling of white feathers in this region. The general ground color of body, wing and tail plumage is dark gray in three of the hybrids, but in the remaining two it verges more toward a chestnut color. In all, the feathers are crossed by narrow lighter colored V-shaped bars which gives the plumage, on

the whole, a decidedly barred appearance. The conspicuous white dot of the guinea's plumage seems to be entirely lost. There is, however, a secondary inconspicuous barring in many of the features of the guinea which possibly may be the source of the bars of the hybrid. The forms have not proved fertile and the chief interest in them will center in the chromosomal structures of the germ cells. At present there is no means of telling their sex.

Notes on Cross-bred Chickens: MICHAEL F. GUYER, University of Cincinnati.

Barred or white Plymouth Rocks and brown Leghorns were used in crossing. There is much question regarding the exact ancestry of Plymouth Rocks, but undoubtedly the American Dominique and the black Java are the main sources, with probably also a considerable admixture of Brahma blood. The brown Leghorn of today appears to be the descendant of an old breed of fowls introduced from Italy in 1834.

The offspring, 400 in number, of brown Leghorn ♂ × Plymouth Rock ♀ were every one black, except for an occasional feather of reddish hue in some of the cocks. While in plumage they thus seem to revert to the ancestral black Java, this is not so true of shape and weight, which varies in all degrees between that of the two parent types. The white ear lobes of the Leghorn always persist. Some of the progeny, indeed, resemble black Minorcas very closely. Most of them have the dark slate-colored shanks that commonly accompany black fowls, although about 30 per cent. are yellow shanked. The comb is the most variable structure, exhibiting 3 or 4 to 7 serrations. Not infrequently double combs (two single ones side by side) appear in the cocks. Various crosses among the members of this generation and between them and the parent stocks were made, but

the limits of an abstract will not permit record of these results. On the whole, no characters observed, appeared to follow the laws of Mendel with any accuracy. For example, black \times black have invariably produced black offspring, so far with the white ear lobes persisting. A black $\sigma \times$ barred plymouth f , among others, produced one male offspring which rather closely resembles a dark Brahma cock.

Pure white Plymouth Rocks which always produced white offspring when bred together, never produced white offspring when crossed either way with brown Leghorns, nor did any of the mongrel offspring, when interbred. The majority of the offspring were barred, the remainder being nondescripts or occasionally black. Interbreeding this generation resulted in the production of several fowls which were of a pure barred Plymouth Rock type except for the persistent white ear lobes of Leghorn origin.

Observations on some Peculiar Habits of the Mole-crickets: W. J. BAUMGARTNER, Kansas University.

The female of our northern mole-cricket, *Gryllotalpa borealis*, has quite a loud and distinct chirp. This seems to be used as a means of recognition in their dark burrows. This observation is contradictory to the conclusion of all writers who say only male orthoptera chirp, or stridulate. The female of the Porto Rican species *Scotteriscus didactylus* has the same kind of a stridulating organ (much smaller and weaker than that of the male) on its elytra, and so I conclude it also chirps.

Du Four's gland of 'excretory secretion,' which later investigators have connected with the copulatory organs, is by my observations and experiments shown to be an effective protective device. A strongly *fætid* and very *sticky* secretion is ejected with considerable force from the siphon-

like genito-anal opening. This must repel or retard the most ardent pursuer and so protect the soft abdomen from the rear.

In the act of copulation these insects assume the relative positions suited to their tunnel-like homes. They turn posterior end to posterior end and ventral side to ventral side, the male lying on his back. The sperm is transferred in a *spermatophore*. *Scotteriscus* has a similar protective gland, but its copulation was not observed.

The chirping of the female, the protective anal secretion and the unusual position of male and female in copulation which distinguish the mole-crickets from the rest of the orthoptera are very evidently adaptations to life in underground tunnels. The presence of the spermatophore accounts for the annexed glands in the male *Gryllotalpa*.

The Reflex Theory of Orientation as Applied to the Phototaxis of Ranalia: S. J. HOLMES, University of Michigan.

A Note on the Position of the Temporary Pharynx in the Planarian Embryo: W. C. CURTIS, University of Missouri.

Mattiesen in his extensive account of the embryology of the European *Planaria torva*, which has been recently published in the *Zeitschrift für Wissenschaftliche Zoologie* ('04), suggests that my description of the orientation of the adult and embryonic pharyngeal structures in *P. maculata* must have been due to the examination of a single abnormal specimen or to distortion caused by poor fixation. My observation has been confirmed by Bardeen ('02); and in another American form, *P. simplicissima*, Stevens ('04) believes the same orientation to exist, although in this case the early disappearance of the primitive or embryonic pharynx makes the matter difficult to establish. Mattiesen finds that in *P. torva* the adult pharynx appears

just behind the degenerating embryonic pharynx, which is, therefore, located on the future ventral part of the body as the spherical embryo becomes flattened. This confirms Ijima's ('84) description of the orientation in *Dendrocælum lacteum*. In *B. maculata* the point at which the degenerating embryonic pharynx is last seen is on the dorso-posterior surface.

The Arrangement of the Mesenteries in the Cerianthidæ. J. PLAYFAIR McMURRICH, University of Michigan.

In 1892 Faurot observed that the mesenteries of *Cerianthus membranaceus* were arranged in groups of four, each quartet consisting of a longer and a shorter fertile mesentery alternating with a longer and a shorter sterile one, and his observation was subsequently confirmed by van Beneden for *C. Lloydii*. Both authors regarded the quartets as beginning with the fourth mesentery on each side of the mid-siphonoglyphic line. The study of the development of the cerianthid mesenteries has shown, however, that the first four mesenteries on either side of the mid-siphonoglyphic line constitute a group distinct from the others and are comparable to the eight protocnemes of the other groups of Anthozoa.

Among the 'Siboga' actinians is a species from Amboina, probably *C. elongatus* Kwietn. In this form there is on either side of the mid-siphonoglyphic line the usual short sterile directive mesentery, then follow two additional sterile mesenteries, and then a long fertile mesentery which extends almost to the aboral pole of the body. This last is apparently the so-called *continuous mesentery*, and the interest of it lies in the fact that it is the fourth mesentery and not the second, as in all other species that have been examined. This departure, which occurs in all the individuals of the species examined, corroborates

the view based on the developmental history that the four mesenteries on either side of the mid-siphonoglyphic line constitute a group apart from the rest, and that the quartets should be regarded as beginning with the fifth mesenteries.

An Improved Form of Reconstruction Apparatus: THOMAS G. LEE, Laboratory of Histology and Embryology, University of Minnesota.

Doctor Lee presented a very satisfactory form of reconstruction apparatus, which he had designed and which is an improvement over the models now in use. It consists of a cast-iron bed plate $8\frac{1}{2}$ cm. ($3\frac{1}{4}$ inches) thick at sides, and $4\frac{1}{2}$ cm. (2 inches) thick in the middle. The top measures 23 x 30 cm. (9 x 12 inches), and has been accurately planed and polished, giving an area of 690 sq. cm. (108 sq. in.). The side pieces, by which the thickness of the wax plate is determined, are moved up an inclined plane which is rigidly fastened to the bed plate in a manner similar to the movement of the object holder in a Thoma microtome. All parts of the top of each side piece are thus always in the same plane. The side piece is moved up and down by a large and accurately made screw at the rear of the apparatus. After adjustment the side pieces can be firmly fixed in place by two set screws by means of a small wrench. A metal scale is placed on each side piece, so that any thickness of wax plate can be made from $\frac{1}{2}$ mm. up to 1 cm. at $\frac{1}{2}$ mm. intervals. Thus plates of $\frac{1}{2}$, 1, $1\frac{1}{2}$, 2, $2\frac{1}{2}$ mm., etc., can be made. Projecting from the bed block are two metal strips with a depression to hold the roller when not in use. This whole apparatus weighs about 67 pounds, and is quite rigid.

The roller is of polished steel 30 cm. (12 inches) long by 6 cm. ($2\frac{1}{2}$ inches) diameter, with a steel rod projecting at each end and covered by a movable wooden handle. This

roller weighs 17 pounds, but works very easily, indeed.

The heating apparatus consists of a metal frame supporting a copper jacket which has a concavity on its upper surface just a little larger in diameter than that of the roller. This protects the surface of the roller from contact with either the metal or flame. This concavity could easily be changed into a hot water bath for the roller, if so desired. The lamp is a horizontal Bunsen burner tube with numerous small openings. The roller does not require to be heated between each pair of plates, and thus when not in use it is readily rolled up into the support in front of the bed plate.

This whole apparatus is very solid, compact, accurate and easy to adjust.

Some Abnormalities of Growth Produced by Parasites on Alcyonaria: C. C. NUTTING, State University of Iowa.

In their 'Report on the Alcyonaria of the *Challenger* Expedition,' Wright and Studer described a new genus, *Calypterymus*, giving as a generic character a certain tunnel-like structure formed by excessively enlarged spicules, the tunnel being along one side of the stem or branch. Later Studer, in reporting on the Alcyonaria secured by the Prince of Monaco's yacht, declares that this peculiar structure is due to the presence of an annelid, and is pathological in fact. A similar structure was found by the writer in a species of *Tenella* secured by the *Albatross* from Hawaiian waters. The tunnel-like structures, with the annelids inside, were shown by means of lantern slides.

In a new species of *Dasygorgia* from the same collection the writer found certain very greatly enlarged polyps which at first looked like a form of dimorphism hitherto unknown. Upon dissection, however, these monstrous polyps were found to contain, without exception, minute crustaceans,

either embryos or some form of degraded parasite. These were also shown by means of lantern slides from photographs made by the author. It appears that we have here a condition of affairs in an animal organism which bears a close analogy to the production of 'galls' in vegetable tissues.

The Origin of the Subclavian Artery in the Chick: WM. A. LOCY, Northwestern University. (Based on the work of Mr. Sabin.)

The subclavian artery in birds lies ventral to the vagus nerve and vena cava; in mammals it occupies a dorsal position with reference to those structures. On this account the subclavian arteries do not appear to be homologous as to origin in these two classes of vertebrates. Hochstetter was the first in 1890 to clear the question by showing that the definitive subclavian in birds is of secondary origin. Prior to its appearance there is a vessel arising from the dorsal aorta, opposite the 15th mesodermic somite, which supplies blood to the wing-bud from the third to the sixth day of development. On the sixth day the secondary subclavian arises from the ventral end of the third aortic arch. This new vessel passes backward and joins with the primary subclavian artery, coming from the dorsal aorta, and, from the sixth to the close of the seventh day of development, the wing bud receives blood from the two sources. The primary subclavian then disappears and the secondary subclavian remains as the permanent one.

Mr. C. G. Sabin, a graduate student in Northwestern University, has traced with great care the embryonic history of the subclavians in the bird and has illustrated the same. His results agree closely with those of Hochstetter, except that he finds the primary subclavian in earlier stages than Hochstetter, and observes that in the early condition the subclavian arises inde-

pendently of the segmental arteries, with which, however, they join later. The illustrations which Mr. Sabin gives of the actual condition of the developing subelavian arteries were very much to be desired, since Hochstetter's paper was illustrated only by a few simple diagrams. The results are now published in the *Anatomischer Anzeiger*, Vol. 26, Nos. 11 and 12, with 29 illustrations.

The following demonstrations were made before the society:

1. William A. Loey, Northwestern University, 'Dissections Showing the Nervus Terminalis in *Scyllium*, *Trygon* and other Selachians.'

2. William S. Miller, University of Wisconsin, 'Demonstration of the Lymphatics of the Lung and Stomach in *Necturus*.'

3. Bennet M. Allen, University of Wisconsin, 'Models showing the Origin of the Sex-cords and Rete-cords in *Chrysemys*.'

FRANK R. LILLIE,
Secretary.

SCIENTIFIC JOURNALS AND ARTICLES.

THE April-May number of *The Journal of Geology* contains an article on 'The Zuni Salt Lake' of western New Mexico, by Mr. N. H. Darton. It is illustrated by two maps and three half-tones. Mr. Douglass W. Johnson reviews 'The Tertiary History of the Tennessee River' and concludes that it has followed its present course through Walden Ridge for a long time, 'probably since the close of the Cretaceous period at least.' This article is illustrated by nine figures. Professor B. Shimek contributes an 'Additional Note on *Helicina occulata*,' a recent species, which also occurs as a fossil in the loess, and concludes that it supports the view that 'during the deposition of the fossiliferous loess the climate was not glacial.' Mr. Rollin T. Chamberlin describes 'The Glacial Features of the St. Croix Dalles Region,' which is illustrated by three sketch maps. Professor Stuart Weller describes 'A Fossil Starfish

from the Cretaceous of Wyoming,' which he names *Pentagonaster browni*. Mr. O. W. Willcox contributes an article on 'The So-called Alkali Spots of the Younger Drift-sheets,' which are patches of white efflorescence which 'consist of small amounts of sodium chloride and much larger amounts of the carbonates and sulphates of magnesium and calcium.' Mr. George C. Matson has a paper on the 'Peridotite Dikes near Ithaca, N. Y.,' in which he describes several new dikes in addition to those noted over sixty years ago by Vanuxem and much more recently by Professor Kemp, and Mr. Wallace W. Atwood describes the 'Glaciation of San Francisco Mountain, Arizona.' This article is illustrated by a sketch map of the top of the mountain and it is stated that these records 'may possibly be those of the southernmost ice which existed in this country during the Pleistocene period.'

To the *American Geologist* for April Professor Eugene A. Smith contributes a 'Biographical Sketch of Henry McCalley' with portrait. Professor Warren Upham has an article on 'The Nebular and Planetary Theories of the Earth's Origin,' in which he quotes at length from Dr. T. C. Chamberlin's recent paper on the planetary hypothesis. Professor Upham also quotes from Dr. G. K. Gilbert's paper on 'The Moon's Face' and concludes that his explanation of the origin of the very abundant small and large crateriform features of the moon seems largely identical with Chamberlin's hypothesis 'so far as that hypothesis deals with the segregation of the originally nebulous matter to form planets and satellites.' Professor J. W. Spencer reviews 'Dr. Nansen's Bathymetrical Features of the North Polar Sea, with a Discussion of the Continental Shelves and the Previous Oscillations of the Shore Line.' Mr. Spencer says that while this memoir 'treats of the physiographic features of the Polar basin, yet the greater part is devoted to the investigation of continental shelves, not merely of the Arctic basin, but also those of the Atlantic, in which respect it is the most important work that has appeared anywhere.' Professor