sion of cotton culture is now going on in the Salt River Valley and other irrigated districts of Arizona and may bring the crop within the range of the native weevils.

O. F. COOK

BUREAU OF PLANT INDUSTRY,
U. S. DEPARTMENT OF AGRICULTURE,
December 18, 1912

THE AMERICAN SOCIETY OF ZOOLOGISTS

THE Eastern and Central Branches of the American Society of Zoologists met in joint session at Western Reserve University, Cleveland, Ohio, December 30 and 31, 1912, and January 1, 1913, in conjunction with the American Association for the Advancement of Science and the American Society of Naturalists.

The following officers of the Eastern Branch were elected for the year 1913:

President—Raymond Pearl, Maine Agricultural Experiment Station, Orono, Me.

Vice-president—Alexander Petrunkevitch, Yale University, New Haven, Conn.

Secretary-treasurer—Caswell Grave, Johns Hopkins University, Baltimore, Md.

Additional Member of the Executive Committee—C. E. McClung University of Pennsylvania, Philadelphia, Pa.

These officers, in addition to R. G. Harrison (elected at the Ithaca meeting in 1910) and H. E. Jordan (elected at the Princeton meeting in 1911), will constitute the executive committee of the Eastern Branch for the ensuing year.

The present officers of the Central Branch continue until the next meeting of this branch.

The president of the society as a whole until the next joint meeting is Henry B. Ward, University of Illinois, Urbana, Ill.

The following persons were elected to membership in the American Society of Zoologists:

Eastern Branch—Ethel N. Browne, Princeton University; Esther F. Byrnes, Brooklyn High School for Girls; Wayland M. Chester; C. G. Crampton, Massachusetts Agricultural College; Edward C. Day; Alfred O. Gross, Bowdoin College; E. Newton Harvey, Princeton University; Davenport Hooker, Yale University; Otto F. Kampmeier, University of Pittsburgh; Henry Laurens, Yale University; Samuel C. Palmer; Edward E. Wildman, West Philadelphia High School.

Central Branch—Alexander MacGillivray, Cornell University; Gideon S. Dodds, University of Missouri; George A. Baitsell, Central College; W. C. Allee, University of Illinois; Aute Richards, University of Texas; Bertram G. Smith, State Normal School, Ypsilanti, Mich.; William Scott, University of Indiana; W. A. Willard, University of Nebraska; Addison Gulick, University of Missouri; Robert K. Nabours, Kansas Agricultural College; Mary T. Harmon, Kansas Agricultural College.

Elected to honorary membership, in recognition of his services to American zoology, Honorable James Bryce, British Ambassador to the United States.

Professor Nutting reported that the committee on zoological nomenclature, appointed by the Central Branch at its last meeting, had published its report in SCIENCE, December 13, 1912. The report was approved.

Professor S. A. Williston was elected a delegate at large to the Eighth International Zoological Congress at Monaco and requested to present the above report to the congress. The executive committee of the society was authorized to appoint an alternate.

The report of the treasurer of the Eastern Branch was presented as follows:

Receipts

Investments:	
From Raymond Pearl, Certificate of Stock No. 11,865 Industrial Savings and Loan Co	$150.00
Current funds:	
Received from R. Pearl	195.41
Interest on current funds	2.18
Dividend from stock	3.75
Dues from members	187.00
From treasurer Central Branch, for share of printing members' list	18.95
Total receipts in current funds	$407.29

Disbursements

Smoker, Princeton meeting	$7.00
Express on records from Orono, Me.	1.15
Postage and envelopes	15.90
Membership cards and receipt book	2.75
300 copies list of members ($45.00) with envelopes	46.35
Clerical assistance	5.98
Fees of notary and clerk of court	.77
Secretary's ticket, Hanover to Cleveland	36.10
Total disbursements	$116.00

Total receipts, as above	$407.29
Deduct total disbursements	116.00
Balance in current funds	$291.29

The report was approved by an auditing committee and accepted by the society.

The treasurer reported the failure of the Industrial Savings and Loan Co. in which the permanent funds of the Eastern Branch had been invested by a former secretary-treasurer. The treasurer, Professor J. H. Gerould, was appointed custodian of the claim on the fund so invested in order that legal processes incident to the change of treasurers might be avoided.[1]

Mr. Mayer offered resolutions upon the deaths of Professors T. H. Montgomery and Nettie Stevens. These were adopted by the society and the secretary instructed to publish them in SCIENCE and transmit copies to the families of the deceased members.

The society passed the following resolution by unanimous vote:

WHEREAS: It is essential to the advancement of the interests of American fisheries both at home and abroad that the commissioner of fisheries should be a man of the highest scientific attainments, as well as one of wide practical experience in the varied activities of the Bureau; therefore,

Be it Resolved, That the American Society of Zoologists, in session at Cleveland, Ohio, without expressing preference for any particular candidate, earnestly urge upon the President-elect, in the event that a change be made in the administration of the United States Bureau of Fisheries, the selection of a person for this office who is recognized as a trained zoologist, who has shown marked ability in the practical application of zoological methods and results, who is thoroughly familiar with the problems of American fisheries, and who possesses the ability so to organize and administer the affairs of the bureau as to bring the efficiency of its work to the highest development.

[1] At a meeting of the executive committee it was resolved that the funds of the society should for the present be invested only in savings banks or other institutions recognized as suitable depositories for trust funds and that the treasurers of the two branches should confer during the coming year and present recommendations for the investment of the society's funds not held for current expenses.

A committee consisting of E. G. Conklin (chairman), H. V. Wilson and A. G. Mayer was appointed to present this resolution to the President-elect.

After consideration and discussion of a motion by Professor C. C. Adams, the society voted to give the officers power to act for them in the support of both state and national legislation looking toward the protection and conservation of wild animals.

The following papers were presented at the meeting, either in full or by title:

ECOLOGY AND BEHAVIOR

A. S. PEARSE (University of Wisconsin): *The Beaches at Nahant, Mass.*

S. R. WILLIAMS (Miami University): *Notes on the Distribution of Thermobia domestica and Lepisma saccharina.*

These two *Thysanurans* are common in the house in Oxford in which I live, *Thermobia* in the attic and *Lepisma* in the cellar. The conditions of moisture and temperature are of course very different at the two levels. Daily records from July 11 to September 11, our hottest weather, gave the following results:

Cellar.—Highest record of maximum thermometer, 27° C., July 15. Lowest record of the minimum thermometer, 17° C., August 6. Average for two months, maximum, 22.7°; minimum, 19.5°.

Attic.—Highest record of maximum thermometer, 41° C., July 14. Lowest record of minimum thermometer, 11.5° C., August 4 and 5. Average for two months, maximum, 33.9°; minimum, 20.7°.

Animals of both species were kept in jars in the attic. It was found that when the temperature reached 40° C. or more, as it did July 14, 15, 24 and September 3, the *Lepisma* died, the last to succumb being young which hatched from eggs laid in the jars. To test this experimentally some *Lepisma* and *Thermobia* were heated over a water-bath in a flask with a thermometer passing through the cork. It is difficult to keep the animals from burning to death on the hot glass of the flask but an insulating material was put in the flask. All *Lepismas* died while the air-temperature of the flask was not beyond 40° to 43° C., while *Thermobia*—known in England as the "firebrat"—died at 47° to 48°. This indicates experimentally that *Lepisma* is unable to withstand the heat of an average summer in an attic at our latitude and hence does not go there, while *Ther-*

mobid endures such heat easily. The arrangement of the scales on the two forms is likely a part of the explanation of the distribution, since they lie flatter and less loosely on *Lepisma* than they do on *Thermobia*. Further observations are being carried on with reference to the moisture relations of the two forms in these habitats.

V. E. SHELFORD (University of Chicago): *An Experimental Study of the Reactions of certain Animals to Gradients of Evaporating Power of Air.* (Lantern.)

Millipedes, ground beetles and amphibians inhabiting moist forests react negatively, usually by turning back, when they encounter air of high evaporating power. The negative reaction usually begins after several trials of the air of high evaporating power. The reactions are similar when the evaporating power is due to current and when due to dryness, but in some cases they are more pronounced when it is due to higher temperature. Comparable animals from habitats where evaporation is great do not react sharply to the gradients used with the forest animals. Sharpness of reaction is not correlated with the length of time required to kill the animals with dry air.

J. W. SCOTT (Kansas Agricultural College): *The Viability of certain Cystocerci in Pigs and in Young Dogs.*

A series of experiments was tried to determine whether hogs are injured by feeding upon rabbits that are infected with the cysticerci of *T. serrata* and *T. serialis*. When corn is scarce it is a common practise for farmers in the western part of Kansas to feed jackrabbits to their hogs instead of corn. The intermediate host of *T. serrata* is the cottontail or common wild rabbit, but this parasite is occasionally found in the jackrabbit. In the vicinity of Manhattan out of a total of sixty-one rabbits examined during the winter of 1911–12, fifty-one (nearly 84 per cent.) were infected with cysticerci of *T. serrata*. The multiple cyst of *T. serialis* is found occasionally in the cottontail but is very common in the jackrabbit. This cyst may grow as large as a goose egg, and a single jackrabbit may have as many as half a dozen or more of these so-called "waterblisters" in various stages of development. Cysticerci from both species of tapeworms were fed to pigs weighing from seventy-five to ninety pounds, care being taken to prevent injury to the cysts before they were swallowed. Though a large number of cysticerci were fed, not a single tapeworm was found when the pigs were killed ten days later. When the same kinds of cysticerci were fed to young dogs from 90 per cent. to 100 per cent. were recovered in the form of young tapeworms. These experiments indicate a very high degree of specialization of the parasite with reference to its optimum environment.

A full account of these experiments, together with the time required for transformation, rate of development and effect upon the definitive host, will be published later.

C. C. ADAMS (University of Illinois): *Ecological Surveys.*

R. H. WOLCOTT (University of Nebraska): (1) *Some Aspects of Faunal Conditions in Western Nebraska.* (Lantern.) (2) *Biological Work in the Alkali Lakes of Cherry County, Neb.*

F. B. ISELY (Central College) (introduced by W. C. CURTIS): *Experimental Study of the Growth and Migration of Fresh-water Mussels.*

About 900 specimens, representing eleven species, of fresh-water mussels were tagged, weighed, measured, initial records taken and planted (returned to the stream or pond) by the writer in June, 1910. Many of these specimens were reclaimed, a number of times, and further records taken in 1910, 1911, 1912. Tabular results concerning the growth and migration of 122 of the specimens under observation are given.

A few points from the summary may be stated as follows:

1. Rate of growth is exceedingly variable.

2. The summer months are the growth months.

3. Lines of arrested growth may be called *rest rings*, the conspicuous ones being usually winter rest rings; occasionally, the rest rings may be two or more years apart, more often, however, several equally prominent rings may be formed in one year. Prominent rest rings are generally due to double prismatic and epidermal layers.

4. Under favorable environmental conditions there is little migration, especially among the Quadrulæ.

J. E. WODSEDALEK (introduced by A. S. PEARSE): *Some Results of Studies on Behavior and Starvation of Dermestidæ.*

NATHAN FASTEN and GEORGE WAGNER (University of Wisconsin): *The Behavior of a Parasitic Copepod, Lernæopoda edwardsii.*

This copepod is exclusively parasitic on the brook trout (*Salvelinus fontinalis*). During its free-swimming existence, not more than two days

at the most, it is strongly positive to intense illumination, whereas in light of low intensity it remains indifferent. On that account the copepod swims about close to the surface of the water throughout most of the day, with a spiral, dart-like motion, which in many respects is similar to the locomotion of the hunter ciliates. At night it sinks to deeper regions, due to its high specific gravity. These migrations are parallel with those of the brook trout and are, therefore, of great advantage to the life of the parasite. Increasing the temperature of the water, even to a degree that proves fatal, does not alter the reaction of the copepod to light. Chemicals also, such as sodium chloride, potassium chlorate, copper sulphate, calcium chloride, hydrochloric, sulphuric, tartaric and oxalic acids cause no reversal in the behavior of the copepod to light. In hydrogen-peroxide, magnesium sulphate, nitric and acetic acids indications of reversal were noticeable. The copepod reacts quickly to pieces of gill of the brook trout, but not at all to those of rainbow trout.

COMPARATIVE ANATOMY

Alexander Petrunkevitch (Yale University): *The Origin of Arachnida in the Light of Paleontological Evidence.*

Edwin Linton (Washington and Jefferson College): *Note on a Viviparous Distome.*

A distome (species not yet determined) found in the cloaca of a herring gull at Woods Hole, Mass., July 22, 1912, is unique in that the folds of the uterus contain ova in which active, ciliated larvæ (miracidia) have developed. The larvæ are conspicuous on account of the black pigment eye-spots. When the larvæ are set free from the parent worm each is seen to contain a single well-developed redia.

So far as the early stages of distomes have been observed in the marine invertebrates of the Woods Hole region they show a much less complicated life-history than that of the liver fluke. Sporocysts have been found (in certain mollusks and one annelid) some containing tailed, others tailless cercariæ. None were seen with rediæ. In those cases the redia stage is missing. In this distome from the herring gull the sporocyst stage is evidently omitted.

J. F. Abbott (Washington University): *Adaptations for Air-breathing in the Ocypod Crabs.*

F. D. Barker (University of Nebraska): *A Contribution to the Parasitic Turbellaria.* (Lantern slides and demonstrations.)

While working on the parasites of the fishes at the Bermuda Biological Station last summer two new species of parasitic turbellaria were found in the posterior sacculated portion of the intestine of the Bermudian holothurian *Stichopus*, both the black and the spotted varieties harboring the parasites.

In Bronn's "Klassen und Ordnungen des Thier-Reichs," 1908: 2574, forty-seven parasitic turbellaria are enumerated. These are classed as ecto- and ento-"Raumparasiten" and ecto- and ento-parasites; the latter are further divided into cœlomic, liver, kidney and intestinal parasites.

Parasitic turbellaria have been found in the following hosts: annelids, gephyreans, crustaceans, echinoids, holothurians, lamellibranchs and gastropods. Six species representing two genera have been reported for holothurians in general and one species, *Anoplodium schneideri*, has been described by Semper as occurring in the intestine of the holothurian *Stichopus variegatus*. With the exception of two species, the parasitic turbellaria of the holothurians occur in the body cavity. Not all of the holothurians examined were infected and in no case was the infection severe, twelve parasites being the largest number found in any one host. Both species of turbellaria were found in only one third of the animals examined, the larger elongated parasite being the more abundant.

The preliminary study of these turbellaria and a comparison with the known parasitic turbellaria shows them to be new and undescribed species and thus adds two more parasitic turbellaria to the list.

The detailed description of these forms will be published soon and will be followed by a further study of the histology and life history of these turbellaria with the hope of settling or giving new light and additional knowledge on a number of points concerning trematode and turbellarian morphology and histology which are now in dispute.

H. S. Pratt (Haverford College): *The Trematode Parasites of the Loggerhead Turtle.*

The parasites of the loggerhead turtle (*Caretta caretta*) have been studied from the Mediterranean Sea and the Gulf of Mexico. The two principal localities in the Mediterranean region where they have been collected are Trieste and Alexandria, where a large number of the turtles have been investigated for parasites by well-known zoologists from the time of Rudolphi to the present. In the most recent times Braun and

Looss have been the most active in this field. In the Gulf of Mexico three turtles have been investigated by Professor E. Linton and two by myself at the laboratory of the Carnegie Institution of Washington situated on Dry Tortugas. In all, nineteen species of trematodes have been found. Of these, nine species occurred in the turtles of the Gulf of Mexico, of which eight species live also in those of the Mediterranean Sea, only one species being peculiar to the former locality. Ten species which occur in the Mediterranean have not yet been obtained in the Gulf of Mexico, although the probability that some of them at least will be discovered there when a larger number of loggerheads are investigated is a strong one.

The most numerous trematode occurring in the Gulf of Mexico loggerheads is *Cymatocarpus undulatus*, several thousands of this species having been found in the duodenum of each of the five turtles investigated. This worm is apparently not common in the Mediterranean, not having been found at all off the Italian coast, although it has been taken a number of times at Alexandria. Among the individuals of this species in the duodenum of two of the turtles were many specimens of *Rhytidodes gelatinosus*, and in the intestine of two turtles was *Pachypsolus ovalis* many worms being present in one case and but two in the other. This last-named worm is the only species which is peculiar to the Gulf of Mexico, but its similarity to *P. irroratus* of the Mediterranean is so great that it is a question if it is not identical with it. The urinary bladder and rectum of two turtles contained many specimens of *Plesiochorus cymbiformis* and in the intestine of one turtle were two specimens of *Monostomum pandum*, while in another was found a single *Cricocephalus delitescens*. *Orchidasmus amphiorchis*, which is a very common worm in the Mediterranean, was found in only one turtle, and then in small numbers.

Further discussions of these trematodes with descriptions of those which are as yet insufficiently known will be published in the *Archives de Parasitologie*.

J. W. SCOTT (Kansas Agricultural College): *Note Concerning the Origin of the Introvert in Cirratulus.*

R. M. STRONG (University of Chicago): *Further Observations on the Olfactory Organs of Birds.*

In a study of the olfactory organs of birds, I found that the fulmar has very large olfactory lobes which are in immediate contact at their anterior ends with the posterior ends of the nasal chambers. There are no so-called olfactory nerves.[2] Since the paper which described that condition was published I have studied the olfactory organs of a number of species of the order to which the fulmar belongs, *i. e.*, the Tubinares. In all of these species similar conditions prevail, though the relative size and form of the olfactory lobes varies. The anterior turbinal is small in the Tubinares, but the other two turbinals are well developed. The posterior turbinal, to which most of the olfactory epithelium is apparently confined, is relatively large, especially in the storm petrels. The results of this work will be published later in connection with a study of the anatomy of the Tubinares.

A. W. MEYER (Stanford University): *Degenerative and Obliterative Changes in the Fetal Vessels and Ligaments.*

The observations which I desire to report were made quite incidentally in connection with other investigations. Hence in spite of the fact that a rather large series of animals were examined, they should not be considered as being exhaustive. The first matter of some interest in connection with these fetal structures is the entire absence of a ligamentum teretis hepatis and a ligamentum suspensorium hepatis in *Canis familiaris* and *Ovis aries* and probably also in bovines. In view of current descriptions and conceptions this seemed a rather surprising fact and I was further surprised that the statement also holds for old specimens of *Felis domestica* and *Cavia cabaya*, although in them the complete disappearance of these structures is comparatively slower. In *Canis familiaris* and *Ovis aries* both the vena umbilicalis and the ligamentum suspensorium hepatis disappear by the end of the second or third month of fetal life, as a rule, but they persist much longer in the other animals mentioned.

Since the umbilical vein disappears so early in both the dog and sheep it would of course be incorrect to say that a ligamentum teres was ever formed or existed in them. On the other hand, in cats, rabbits, guinea pigs, rats, etc., in which the degeneration is much slower and where it may be partial, a more or less temporary round hepatic ligament may hence be formed.

In the dog and the sheep the degeneration and regression of the umbilical vein and suspensory ligament of the liver take place *pari passu* as a rule, and they may even be somewhat interdependent or at least inter-related processes.

[2] See Strong, 1911, *Jr. Morph.*, Vol. 22, No. 3, pp. 619–660.

Moreover, the distal extremity of the degenerating umbilical vein after being freed from the abdominal wall may obtain a secondary attachment as a result of the formation of adhesions, to the parietal peritoneum usually somewhat more cranial to the umbilicus; to the liver or gall bladder; or most commonly to the extensive fold of extra-peritoneal fat lying ventrally in the median line between the processus xiphoideus and the umbilicus. Besides, such secondary attachments—which are, of course, purely temporary—may nevertheless retard the progress of the degenerative changes in the umbilical and omphalo mesenteric veins considerably. This is especially well illustrated in case of the omphalo mesenteric veins of the cat which are not rarely present still in cats one to two years old because they have come into more or less permanent relations to, and function as part of the systemic venous system. This rather surprising fact was especially well illustrated in two cats in which one of the omphalo mesenteric veins had obtained a secondary attachment to the apex of the bladder and arose in several vesicle veins. In these cases the omphalo mesenteric vein was patent throughout, filled with blood which could be forced into the superior mesenteric vein very easily by pressure and which was later expelled spontaneously by contraction in response to cooling of the vessels after death. A similar phenomenon was noticed in case of the umbilical vein of the cat, the distal degenerated and retracted extremity of which obtained a similar connection with the extra-peritoneal veins of the ventral body wall. It is evident, of course, that the establishment of such secondary vascular connections on part of the umbilical vein might and does materially affect the rate of regression, not only of the vein itself, but of the suspensory ligament as well. This is particularly true if, as is not infrequently the case in cats, a very large lymphatic vessel lying between the layers of the suspensory ligament extends parallel to its concave and free caudal border.

The extremely late disappearance of the omphalo mesenteric vessels in the cat not uncommonly observed is as remarkable as the early disappearance of the umbilical vein in the dog and sheep. Indeed it is not rare to find the omphalo mesenteric vessels persisting as fine fibrous strands which may contain no remnant of the lumen and which have obtained a secondary attachment elsewhere, in cats half a year to a year old.

The umbilical arteries which retract intra-abdominally instantaneously at the time of rupture of the cord in *Bos taurus* and *Ovis aries* were never found to have secured such a secondary attachment, but in *Canis familiaris, Felis domestica, Lepus cuniculus, Mus rattus* and *Cavia cobaya,* in which they remain attached to the abdominal wall at the umbilicus and become detached only one to two weeks *post natum,* their free ends obtain a firm secondary attachment to the apex of the bladder in the majority of cases. Yet they were never observed to come into relation to the systemic arterial system with their free ends or their degenerating trunks.

The early complete disappearance of the umbilical vein of the dog and sheep was due to a degeneration of its musculature and consequent absorption. These degenerative processes which in these animals were sometimes accompanied by a certain amount of connective tissue invasion never ended in the formation of a truly ligamentous structure, however. In the cat, rabbit and guinea-pig, on the contrary, such a transformation into connective tissue of at least the distal portion of the umbilical vein was not uncommon.

In case of the umbilical arteries in any of these animals two methods of transformation were observed. The connective tissue which displaced the musculature arose either of subintimal or adventitial origin. In the first case it formed between the intima and the elastica interna when present, which was usually the case, while in the second case it displaced and invaded the media from without. However, since there is a great deal of connective tissue between the fasciculi and concentric layers of muscle fibers of fœtal vessels, both these processes may also be accompanied by proliferation of the inter-fascicular, intra-medial connective tissue. Moreover, it is evident that these processes may all be combined. Nevertheless, this was usually not the case and instances were observed in which the musculature was plainly degenerating and being displaced only from within, for the outer layers were well preserved, while in other cases exactly the opposite conditions were present.

No evidence whatever for the origin of connective tissue from endothelium was obtained and the initiation of degeneration and transformation were apparently independent of thrombus formation, but apparently not of the presence of non-coagulated blood in the lumen of the vessel.

L. B. WALTON (Kenyon College): *The Anatomy of the North American Land Planarians.*

A. M. REESE (West Virginia University): *The Histology of the Enteron of the Alligator while Hibernating and while Feeding.*

The chief object of this investigation was to determine the effect of hibernation upon the digestive tract of the alligator, and incidentally to study the histology of these structures, which has not, so far as the author is aware, been done before in any detail.

The material used was taken from young animals at the end of a feeding period of about five months, and towards the end of the hibernating period after fasting for four or five months.

The regions of the enteron that were studied were as follows: the tip and base of the tongue; the anterior and posterior regions of the roof of the mouth; the anterior and posterior regions of the esophagus; the cardiac, fundic and pyloric regions of the stomach; the anterior, middle and posterior regions of the small intestine; the anterior and posterior regions of the rectum.

Since the work was started at the end of the hibernating period the tissues of that period were studied and drawn first.

The only difference between the structure of the tip of the tongue during hibernation and during the feeding season is that the scaly epithelium with which it is covered is somewhat thicker and more compact in the former than in the latter condition, though even this difference may have been due to differences in the ages of the animals used. The base of the tongue differs from the tip in having a thicker epithelium and in having compound, tubulo-alveolar glands. These glands in the hibernating animal have many more alveoli than in the feeding animal, though this, again, may have been due to the difference in age.

The lining of the roof of the mouth is essentially the same as that of the tongue. The glands are found only in the posterior region. The slight differences in the papillæ here found may easily be due to the difference in age.

The esophagus shows the usual layers for that region. Its epithelium is partly ciliated in the anterior part. The muscularis mucosa is very scant in the anterior region. The only difference between the two stages is that in the feeding the muscularis mucosa in the anterior region is much more strongly developed than in the hibernating stage; and in the former the nuclei are not arranged in two zones as in the latter.

The stomach has the usual layers, and has essentially the same structure in the three regions studied, except that the wall in the fundic region is much the thickest, due mainly to the great thickness of the middle muscular layer. Only one kind of cell is found in the gastric glands. No difference is to be noted between the hibernating and the feeding conditions.

The chief peculiarity of the small intestine is the apparent entire absence of the submucosa. Goblet cells are also wanting. The greater diameter of the anterior region is due both to the greater diameter of the lumen and to the greater thickness of the walls. The middle and posterior regions have about the same diameter, though the mucosa becomes thinner and less complicated caudad. There is practically no difference between the hibernating and feeding stages.

The anterior and posterior regions of the rectum have essentially the same structure. No difference can be seen between the hibernating and feeding conditions.

The differences, then, between the digestive tracts of the hibernating and feeding animals are so slight that it may be said that hibernation has practically no effect upon the enteron of the alligator, at least in captivity.

F. W. CARPENTER (University of Illinois): *Methylene Blue Preparations of Nerve Endings in Cranial Autonomic Ganglia.* (Demonstration.)

H. L. BRUNER (Butler College): *Jacobson's Organ and the Respiratory Mechanism of the Urodeles.*

In the amphibians the relation between respiration and smell is complicated by the peculiar nature of the respiratory mechanism, which includes an apparatus for closing the nasal passage. In this group Jacobson's organ, when present, is a blind sack or groove opening into the general olfactory cavity. According to the theory of Seydel (1895) it is stimulated by odorous material which passes through the choana from the mouth. The organ in question has been recognized in the *Anura* and *Salamandrida* and among the lower urodeles, in *Cryptobranchus* and *Amphiuma*. It is wanting in *Proteus* and *Necturus*.

Among the amphibians studied, the organ of Jacobson is present in all forms in which the expiratory media pass through the nose in adult life. In *Necturus* and *Proteus* access to the nasal cavity from the mouth is prevented by a mechanical breathing valve at the choana and the organ

of Jacobson is wanting. Seydel assumed that this simple condition of the olfactory organ of *Necturus* is a primitive one, but it seems more probable that the organ has degenerated on account of the presence of the choanal valve.

J. F. Daniel (University of California): *The Endoskeleton of Heterodontus francisci.*

F. D. Barker (University of Nebraska): *The Parasites of the Muskrat.* (Lantern slides and demonstration.)

With the exception of a brief note by Leidy, 1888: 126, there is no reference to or description of the parasites of our common muskrat.

A recent examination of 27 muskrats trapped along the Loup River in Nebraska revealed a heavy parasitic infection. Over 600 worms were found, including trematodes, cestodes and nematodes. Seven species of trematodes, one species of cestode and two species of nematodes were represented.

The work on the trematodes which is now completed shows all seven species to be new and heretofore undescribed with one possible exception, and in that case there is only the meager description of Leidy referred to above.

The large number of different and new species of parasites which occur in the muskrat but emphasizes the virgin and fertile nature of the field of parasitology for the investigator and also emphasizes the need and the value of a thorough survey of the parasitic fauna of our common animals by states, or better, by smaller units of area.

The description of one of the trematode parasites of the muskrat has been published and the descriptions of the other six species will appear soon.

R. J. Gilmore (introduced by F. C. Waite): *Variations in the Pelvic Girdle of Diemyctylus viridescens.*

W. E. Sullivan (introduced by F. C. Waite): *Zones of Growth in the Skeletal Structures of Pseudopleuronectes americanus (Walb).*

W. A. Willard (University of Nebraska): (1) *The Epidermal Sense Organs of Anolis carolinensis.* (2) *A Case of Complete Twin Formation in Squalus acanthias.*

COMPARATIVE PHYSIOLOGY

Max Morse (Trinity College): *The Rôle of Phagocytosis in the Process of Involution.*

Involuting organs, such as the tail of the anouridan larva, their gills, etc., have been described by Metchnikoff and others as atrophying through phagocytosis. Metchnikoff believed that the phagocytes arose from the muscle cells themselves, but sections through organs at the time of degeneration show no mitoses in the muscle cells. Others, such as Mercier, believe that the leucocytes act as phagocytes and cause the breaking down of the organs, but differential counts of blood from young larvæ, those during metamorphosis and from adults show no correlations which would indicate that polynuclear leucocytes, basophiles, eosinophiles, large or small mononuclear leucocytes play any rôle in the process. The process of atrophy here is similar in essential respects to the involution of the uterus in mammals, to the degeneration of the individuals of the bryozoan colony, etc., where the process is doubtless autolysis and experiments are in progress, which seem to show that this is the case in the metamorphosing amphibian larva.

A. G. Mayer (Carnegie Institution): *Some Effects of Ions upon the Movements of Marine Animals.*

J. F. Abbott (Washington University): *Reactions of Fiddler Crabs to Salt Solutions.*

H. M. MacCurdy (Alma College): *Some Effects of Sunlight on the Starfish Asterias forbesii.*

S. O. Mast (Johns Hopkins University): *The Reactions of Spondylomorum to Light, with Special Reference to the Question of Changes in the Sense of Reactions.*

H. W. Rand (Harvard University): *Reactions of the Tentacles of Sagartia luciæ to Tactile Stimulation.*

The reactions of tentacles of *Sagartia luciæ* to tactile stimulation vary from a minimum reaction consisting of a slight longitudinal contraction in a narrow zone at the level of the point stimulated, to a maximum contraction of the entire tentacle. Occasionally the response extends to neighboring tentacles or even involves the entire animal. In a certain animal at a certain time the degree of the response varies with the intensity of the stimulus. But in the same animal at different times, or in different animals at the same time and under similar conditions of experimentation, the reactions show great variation.

Two distinctly opposed physiological conditions were noted. In the one condition (designated as positive) the distinctive feature of the reaction is a bending of the tentacle at the point stimulated and toward the stimulated side. In this condition

the responses are, in general, like those involved in taking food. The distinctive feature of the second condition (negative) is a bending of the tentacle at the point stimulated but away from the stimulated side. The positive and negative conditions are not necessarily correlated with hunger and satiety, nor with the state of the medium in which the animal lives, nor with fatigue. While external conditions remain as nearly as possible constant, the animal may abruptly change back and forth from one condition to another. The reactions, therefore, while influenced by external conditions, depend essentially upon an internal physiological complex.

A. J. GOLDFARB (College of City of New York): *On the Effects of Changes in Density of Sea Water upon Growth and Regeneration.*

G. H. PARKER and E. M. STABLER (Harvard University): *Taste, Smell and Allied Senses.*

The statement that the stimulus for smell is material in the form of gas and for taste is material in solution is partially incorrect, for both sense organs are normally stimulated by solutions. It has been recently shown that fishes respond to their food by smell and taste much as air-breathing vertebrates do. What seems to be the chief difference between smell and taste is that the olfactory organs are stimulated by very dilute solutions, the organs of taste only by much stronger ones. To get some quantitative statement of this difference, the strength of the stimulating solution producing the minimum stimulus was determined for a substance that had both smell and taste. The substance tested was ethyl alcohol. In preliminary tests the following results were obtained. The weakest dilution that would stimulate the mucous surfaces of the mouth was a 15 mol. solution (aqueous). The weakest dilution that called forth the sweet taste when applied to the tongue was a 2 mol. solution (aqueous). The weakest dilution that could be smelled was 1/200,000 mol. (in air). Thus the olfactory apparatus responds to a dilution about 400,000 times greater than that for taste.

G. G. SCOTT (College of City of New York): *The Effect of Fresh Water upon Fundulus heteroclitus.*

It is now well established that *Fundulus heteroclitus* is found in both sea water and fresh water. The fact that few survive rapid transference from salt to fresh water while greater numbers survive gradual transference shows that we are here concerned with another application of DuBois Reymond's law of stimulation. Out of a lot of ten *F. heteroclitus* transferred from salt to fresh water, the present author kept one fish alive in fresh water for sixty days. When the caudal fin is removed at the time the fishes are transferred from salt to fresh water regeneration of new caudal fin tissue takes place, although in a month's time the amount is not as great as in sea water. Of greater interest from the point of view of the mechanism of adaptation are the results of experiments in which individual records were kept of changes in weight made at a number of intervals after immersion of *Fundulus* in fresh water. In some cases all members of a lot of fishes died soon after transfer. In each case a rapid increase in weight was noted. In other cases certain individuals gain weight rapidly and die. Other individuals of the lot after an initial gain in weight follow this with slight gains and losses—the net results in these survivors being a weight less than normal at the end of the experiment. The experiment apparently illustrates the power of *Fundulus heteroclitus* to change the organization of the limiting membranes and other structures of the body to the end that the fish becomes adapted to fresh water, a medium of very low osmotic pressure as compared with sea water.

MAX MORSE (Trinity College): *Factors Involved in the Metamorphosis of Amphibia.*

A. G. MAYER (Carnegie Institution): *The Vital Limits of Reef Corals in Respect to Temperature.*

S. O. MAST (Johns Hopkins University): *Thirteen Hundred Generations in Didinium without Conjugation.*

A. J. GOLDFARB (College of City of New York): *On a New Method of Grafting Embryos in Large Numbers.*

EMBRYOLOGY AND DEVELOPMENT, CYTOLOGY

ALBERT KUNTZ (University of Iowa): *The Histogenesis of the Cranial Sympathetic Ganglion in the Pig.*

H. L. CLARK (Harvard University): *Ontogenetic and Localized Stages in Ophiurans.*

C. M. CHILD (University of Chicago): *Senescence and Rejuvenescence in Planaria velata.*

B. M. ALLEN (University of Wisconsin): *Some Methods of Embryological Technique.* (Accompanied by a demonstration.)

CHARLES ZELENY (University of Illinois): *Experiments on the Control of Asymmetry in Young Serpulids.*

Caswell Grave (Johns Hopkins University): *The Egg of Ophiura, its Yolk Content and Course of Development.*

G. T. Hargitt (Northwestern University): *The Oogenesis of Campanularian Hydroids.*

The egg cells of *Campanularia flexuosa* arise from the basal half of an ordinary epithelial cell of the entoderm, the distal half remaining an epithelial cell; or else they arise by the transformation of an entire entoderm cell in the pedicel of the gonophore. In either case the cell so produced is transformed directly into an egg cell without any divisions occurring. Since the entodermal epithelial cells from which the egg cells arise are not different from the neighboring cells which retain their epithelial function, and since the distal half of a divided cell remains in position lining the cœlenteric cavity and retains its function (the proximal half forming an egg cell), there is clearly no continuity of the germ-plasm, the egg arising from a so-called somatic cell.

Coincident with the marked and rapid growth of the egg the nucleolus (which is partly chromatin) breaks up into many fragments of various sizes and shapes, and becomes highly vacuolated. At the same time there appear small granules in the cytoplasm against the membrane of the germinal vesicle, and also similar small granules are present inside the membrane; these are found to be nucleolar fragments, some of which are chromatic in character. In addition to these indications of the escape of chromatin from the germinal vesicle there are currents in the cytoplasm extending away from the nucleus, as shown by the arrangements of the cytoplasmic granules. These currents cease when the nucleolus has entirely disappeared from the nucleus through fragmentation and dissolution, and this period is also the end of the growth period of the egg. The nucleolar material which has left the nucleus goes to form the yolk spherules of the egg.

During the growth of the egg the nuclear reticulum has remained unchanged by the modifications and transformations of the nucleolar substance which has been dissolved and cast into the cytoplasm. When the nucleolus is practically all gone and the growth of the egg has ceased the chromatin of the reticulum produces the chromosomes of the polar spindle, which are ten in number. In spite of the extensive chromatin emission, coming from the dissolving nucleolus, the chromatin remaining in the nuclear reticulum is still more than is necessary for the formation of the chromosomes, and the greater part of it escapes into the cytoplasm in the form of granules when the germinal vesicle breaks. That which is not thus scattered forms the chromosomes.

To account for the large amount of chromatin which escapes from the nucleus there must be a formation of chromatin within the nucleus during the growth period of the egg, and the nucleolus is conceived to be the place where the chromatin is produced and transformed for the different functions it has to perform. In this origin of new chromatin, and in the extreme dissipation of chromatin during and after growth, it is believed that we have strong evidence against the continuity of chromatic material, and hence of the chromosomes. The chromatin is a metabolic product changing and transforming as all other constituents of the living cell.

J. F. Abbott (Washington University): *The Blood Cells and their Respiratory Pigment in Thallasema.*

H. E. Jordan (University of Virginia): *A Comparative Study of Mammalian Spermatogenesis with Special Reference to the Heterochromosomes.*

Among the forms examined, including mongoose, cat, squirrel, pig, rabbit, white mouse, sheep, horse, mule, bull and dog, heterochromosomes are lacking in the male germ-cells of the first five, and present in the remainder. The available evidence favors more the interpretation in terms of a bipartite or compound X-element than of an associated X and Y group (idiochromosomes).

In view of the fact that heterochromosomes have recently been reported in man and rat (Guyer), armadillo (Neuman and Patterson), guinea-pig (Stevens) and opossum and bat (Jordan), the evidence indicating similar elements in the above enumerated group of six common mammals would seem to warrant the conclusion that sex-chromosomes are very generally present in mammals. Universality of presence seems vitiated for the present by the fact that in another group of five mammals such elements seem unquestionably lacking. It might be assumed that such elements are actually present in the male germ-cells, but so small or labile as to elude detection by present methods, or not presenting the usual morphology of heterochromosomes during the prophase stages. The unmistakable presence, however, of a "split-accessory" in the female germ-cells (primary oocyte) of the cat, as recorded by Winiwarter and Sainmont, and the absence of

any *X*-element in the male, suggests very forcibly that sex-chromosomes are present in all mammals, generally in the male, exceptionally in the female. The same end would be attained, that of numerical sex-equality, whether present in the one or the other sex. If this hypothesis can be further sustained, it would seem cogently to reinforce the evidence for an essential sex-determining function of heterochromosomes. Interpreted in terms of Mendelian heredity-formulæ, in those mammals in which an *X*-element is present in the male, the female sex is homozygous, the male heterozygous. The facts would seem to fit the hypothesis that the accessory chromosome acts as a deterrent to the development of maleness; or more accurately, and in keeping with a quantitative interpretation of sex in the last analysis, the accessory with its egg-homologue (two *X*-elements) inhibits male sex development; the single egg-homologue in males being insufficient to counteract the male tendency, thus giving origin to male individuals.

The complete paper will appear in a Carnegie Institution publication.

A. W. MEYER (Stanford University): *Observations on Giant Cells in Hemal Nodes and Accessory Spleens.*

M. F. GUYER (University of Wisconsin): *Remarks on the "X" Element in Fowls.* (Demonstration.)

A reexamination of old material and a further study of new material from the Langshan cock abundantly confirms the original finding of an accessory chromosome which passes undivided to one pole of the spindle in the division of the primary spermatocyte. The element in question was demonstrated through the microscope to members of the society.

T. S. PAINTER (introduced by A. PETRUNKEVITCH): *Spermatogenesis in Spiders.*

A cytological difference has been found in the spermatogenesis of the dimorphic males of the jumping spider, *Mœvia vittata.* The "gray variety" contains two supernumerary chromosomes which do not divide in the last spermatogonial division. During the first maturation division these bodies show a definite association for the accessory chromosome and pass with the latter to one pole of the cell at this time. For this reason these supernumeraries have been called "ctetosomes" (implying, are the property of, are associated with, some other body). During the second maturation division the accessory chromosome divides, but this could not be certainly determined for the "ctetosomes." As a result of the unequal spermatogonial division the sperm are of three types: (1) sperm which bear the accessory chromosome and "ctetosomes"; (2) sperm which bear the accessory chromosome only; (3) sperm which bear neither of these elements.

The "tufted variety" of male lacks the "ctetosomes" although a supernumerary chromosome may be present. This body shows no relation for the accessory chromosome and seems to follow no definite law of distribution. Hence it was called a "planosome" (indicating that it wandered through the cell mitoses).

"Planosomes" have been found in many families of spiders. Most abundant in *Amaurobius sylvestris,* which may carry as many as seven "planosomes" and three "ctetosomes."

The females of *Mœvia vittata* carry two doses of the accessory element.

G. L. KITE (introduced by OSCAR RIDDLE): *Studies on the Physical Properties of the Structural Components of Protoplasm.*

MARY T. HARMON (introduced by J. W. SCOTT): *The Character of Cell Division in the Sex Cells of Tænia teniæformis.*

GENETICS

H. H. NEWMAN (University of Chicago): *Five Generations of Congenital Night-blindness in an American Family.*

During the past two years the writer, in colaboration with Miss E. L. Brown, a former student of his and a member of the affected family, has obtained data concerning 76 individuals belonging to a family connection showing a peculiar type of hereditary night-blindness. The family originated in North Carolina, but now resides in Texas. The defect is present through life and is usually, though not always, associated with myopia and strabismus. This complex of optic affections is inherited from affected men through unaffected daughters to some of the grandsons, and in no other way. Thus, as in the case of color-blindness, the character gains expression only in alternate generations. The mechanism underlying this mode of inheritance is probably closely allied to that described by E. B. Wilson as underlying the inheritance of white eyes in *Drosophila.*[3] According to this scheme the factor for night-blindness is contained in the *X* chromosome, which Guyer has described for man. Frequently associated with night-blindness, but neither sex-limited nor

[3] See *Journ. Morph.*, Vol. 22, No. 1, p. 96.

linked with the night-blind complex is a fairly common optic disease known as pterygium. The factor for this defect is evidently not carried by the X chromosome.

F. E. Lutz (American Museum of Natural History): *The Offspring of Certain Wing-mutants X Normal Drosophila and Sexual Dimorphism.*

H. S. Jennings (Johns Hopkins University): *Biparental Inheritance and the Question of Sexuality, in Paramœcium.*

A. M. Banta (Station for Experimental Evolution): *Selection within Pure Lines in Daphnia.*

Conceiving that the modification of a physiological character by selection within a pure line may perhaps be more readily brought about than the molding of a structural or morphological change, if either is to be accomplished, selection within pure lines in *Daphnia* was attempted on the basis of a purely physiological character. The character chosen was the reaction time of the young daphnids under precise conditions to a definite intensity of light.

Selections were begun in 13 lines after they had been reared under laboratory conditions as pure lines, reproducing parthenogenetically, for from six to eight generations. The selections have continued through from 19 to 25 generations in the various lines with a + strain, a strain selected for greater reactiveness to light, and a — strain, selected in the reverse direction, in each pure line. Comparing corresponding + and — strains by broods there is considerable variation in the mean reaction time, the + strain sometimes having the lower reaction time, *i. e.,* being presumably the more reactive to light, and sometimes, *though less often,* the — strain having the lower reaction time. The general trend of the results is better shown by throwing the data into larger groups. Comparing all the + strains with all the — strains by two-month periods for the whole time during which the selection has continued it has been found that during two (the first and the third) of these five two-month periods the + strains had a higher general average reaction time by an average of 12 seconds. During the other three periods (second, fourth and fifth) the — strains had a higher reaction time by an average of 43 seconds. The general average reaction time of all the individuals of all the + strains for the entire period after selection began (944 individuals) has been 386 seconds and the corresponding average for the — strains involving 1,013 individuals has been 410 seconds, 29 seconds or 8 per cent. more than for the + strains. Compared with the + strain the average reaction time has been significantly larger (*i. e.,* $2\frac{1}{2}$ or more times the probable error) in the — strain in five of the lines. In another of the lines, however, an almost equally large difference in the reverse direction occurred.

Raymond Pearl and H. M. Parshley (Maine Agricultural Experiment Station): *The Experimental Modification of the Sex-ratio in Cattle.*

A. F. Shull (University of Michigan): *The Life-cycle and Sex in Thysanoptera.*

Oscar Riddle (Carnegie Institution): *Chemical and Energy Differences between the Male- and Female-producing Ova of Pigeons.*

L. J. Cole and F. J. Kelley (University of Wisconsin): *The Inheritance of Certain Color-patterns in Pigeons.*

H. H. Newman (University of Chicago): *On the Unique Mode of Inheritance in the Nine Banded Armadillo.*

The study of 140 female armadillos and their offspring has shown that minute personal peculiarities, such as double, half and split scutes, double and fused bands, are strongly inherited though interchangeable in their inheritance. All of the 63 mothers that show any of these peculiarities have one or more affected offspring. About half of the unaffected mothers have affected offspring, due evidently to affected fathers, since the characters are in no way sex-limited. These characters appear sometimes unilaterally, sometimes bilaterally in the mothers. When unilateral in the mother it may reappear bilaterally in some of the offspring and unilaterally in others; or it may appear in some and be entirely wanting in others of the same set of quadruplets. When the character appears unilaterally in several of the offspring it is usually distributed so as to produce mirrored image effects between pairs or between the individuals of a pair. The characters appear to have been distributed among the four fœtuses by means of a series of dichotomies of some inheritance factor, which can be best conceived of as having a material and highly localized existence—in short as a Weismannian determiner. The facts may, however, be interpreted equally well, and perhaps more acceptably, by taking into account that the cells of all the fœtuses are heterozygotic in origin and that the appearance of an inherited character or its failure to appear may be due to varying degrees of success in the struggle for

supremacy between maternal and paternal inheritance forces.

OSCAR RIDDLE (Carnegie Institution): *Different Degrees of the Sex Character Indicated by the Sex Behavior of Some Female Pigeon Hybrids.*

L. J. COLE (University of Wisconsin): *Two Yellow Mutants of the Common Meadow-vole.*

H. D. GOODALE (introduced by A. M. BANTA): *Additional Cases of Ovariotomy in Fowls and Ducks.*

The development of male characters in three female birds following the removal of the ovary has been previously reported. It is the purpose of this note to present, very briefly indeed, additional data obtained from experiments made the past season on birds ranging from five to twenty weeks of age at the time of the removal of the ovary.

Ducks.—Fifteen females were operated on, not including a few that died as the result of the operation. In three of these cases, owing to hemorrhage, it was impossible to remove all the ovary. These three birds did not assume any male characters. In the twelve remaining cases, the birds all began to develop the male plumage, but after a short time three individuals reverted to their original type. The cause of this reversion became apparent, when, on examination, it was found that the ovaries had partially regenerated. The remaining nine individuals have continued to acquire the male's plumage, that is, as the female feathers drop out they are replaced by feathers like those of the corresponding male. In five of these last cases it has been ascertained by a second operation that the ovary was completely removed. Although in several of these cases, the transformed females are, externally at least, almost perfect replicas of the corresponding male; nevertheless, the voice remains that of the female even in those cases where the adult voice was acquired several weeks after the operation.

Fowls.—Operations were performed on 18 birds. Four disappeared, four are still too young to show male characters and in three cases only part of the ovary was removed. These last did not assume any male characters. In all the remaining cases but one the male habit is developing in its entirety, viz., plumage, spurs, comb and wattles. The one exception noted that reverted to the female type after a time was due, as examination showed, to the regeneration of the ovary.

Summing up all these cases in both kinds of birds, there is a total of 24 individuals which, at the time of writing, have assumed male characters following ovariotomy.

JOHN DETLEFSEN (introduced by J. H. GEROULD): *Genetic Studies on a Cavia Species Cross.*

O. L. JONES (introduced by L. J. COLE): *Some Results of a Study of Pigmentation in Pigeons.*

MISCELLANEOUS TITLES

JACOB REIGHARD (University of Michigan): (1) *On the Breeding Behavior of the Log Perch (Percina caprodes).* (2) *An Instance of Locality Memory in the Woodchuck.*

ELIZABETH M. DUNN (Nelson Morris Laboratory of Medical Research): *The Sensory Innervation of the Developing Hind Leg of Rana pipiens.*

F. L. LANDACRE (Ohio State University): *A Comparison of the Cerebral Ganglia of Ameiurus, Lepidosteus and Rana in Embryonic Stages.*

W. B. WHERRY (introduced by H. McE. KNOWER): *Experimental Studies on Ameba.*

M. A. BRANNON (University of North Dakota): *An Examination of the Conditions of Life in Devils Lake.*

This report deals with experiments in acclimatizing fish at the North Dakota Biological Station, on the shores of Devils Lake, North Dakota. The experiments extended over a period of four summer seasons. The large-mouthed black bass, the sucker, bullhead, pickerel, yellow perch, steel head trout and rainbow trout, furnished the material for the experimental work. Their ages varied from fish that were only a few months of age to those that were several years old. The Devils Lake waters are about one and two hundredths per cent. saline with the three salts, sodium sulphate, magnesium sulphate and sodium chloride, representing the major part of the saline material in the water. None of these salts, in the percentage existing in Devils Lake waters, are toxic for fish, hence it seemed probable that it was a physical rather than a chemical condition which was inhibiting the fish life which I placed in the cultures of Devils Lake water. Proceeding on that hypothesis the fish were placed in waters that very gradually changed from the chemical composition of the sweet water, from which the fish came, to the percentage of salinity of that in Devils Lake.

The factors of heat and gas composition were found very important, as shown from the readings which were determined during the progress of the experiments.

Devils Lake was the home of millions of pickerel prior to the year 1888. Carloads were shipped away regularly each week during the winters when they were so abundant.

A series of dry years caused a lowering of the level in some fresh-water lakes formerly connected with Devils Lake. This in turn was followed by the drying up of the stream connecting Devils Lake with sweet water associates. These latter had served as breeding grounds for the pickerel which came in the autumn, like the anadromous fish to the ocean. They entered water that increased gradually in salinity. Having learned that this was the history of the former occupants of the lake the experiments of the North Dakota Biological Station were directed toward repeating artificially what had occurred in nature. Results have finally been obtained which are wholly successful. Evidences for this conclusion will be submitted in the complete discussion referred to in this abstract.

SERGIUS MORGULIS (Carnegie Nutrition Laboratory): (1) *The Influence of Protracted and Intermittent Fasting upon Growth.* (2) *The Nervous System and Regeneration.*

C. C. NUTTING (University of Iowa): *Can We get Together on the Nomenclature Question?*

The present situation is unsatisfactory, and a solution is greatly to be desired.

Points on which both parties are agreed: (1) That there should be definite laws of nomenclature, including priority. (2) That there should be a commission to interpret and administer these laws.

Position held by the International Commission on Zoological Nomenclature: (1) That no exception be allowed to the priority rule. (2) That no rule shall be modified except by unanimous vote of the commission. (3) That the commission be treated with the deference due an international court.

Position held by a large number of those who voted against the priority rule: (1) That there should be a reasonable "statute of limitation" by which names long in undisputed and general use should be excepted from priority rule. (2) That there should be an application of the principles of equity in special cases. (3) That a majority of the commission should have the power to propose changes in the rules of nomenclature, and to bring such changes to a vote by the International Commission. (4) That we retain the right of free criticism of the commission without being required to observe the etiquette supposed to govern international courts. The commission is the servant of its constituents the "common people" among the zoologists.

The present situation regarding the priority rule: (1) The commission "stands pat" in adhering to the position outlined above. (2) A majority of zoologists are opposed to the priority rule as administered. The commission has not secured the support of its constituency, and has no means of enforcing its decrees. There is a distinct tendency among working systematists to ignore the findings of the commission.

A tentative solution: (1) Adoption of a rule by which a two thirds majority of the commission can change any rule. (2) Recognition of the legal principles of (*a*) the statute of limitation and (*b*) the law of equity as applied to individual cases.

W. C. CURTIS,
Secretary

SOCIETIES AND ACADEMIES

THE SOCIETY OF RESEARCH WORKERS IN EXPERIMENTAL BIOLOGY

AT the meeting of this society held on December 18, 1912, at the University Club, Washington, D. C., Dr. William Salant, chief of the section of pharmacology, Bureau of Chemistry, U. S. Department of Agriculture, gave an exhaustive review of the literature on creatin and creatinine metabolism.

Especial stress was laid upon the elimination of creatin in various diseases affecting the muscles, the central nervous system and the liver.

The recent work of Mendel and his collaborators on the relation of carbohydrate metabolism to creatin, in which it was shown that a distinct relation probably exists between the formation of creatine and the amount of carbohydrates ingested, was discussed. In addition, the speaker gave a brief résumé of his own work on the influence of caffein on creatin and creatinine elimination, pointing out that under some conditions, such as starvation, caffein may cause a considerable increase in the output of creatine.

Other conditions affecting the elimination of creatine and creatinine such as temperature, the amount of age, the fate of ingested creatin and creatinine, and the metabolism of these substances in different animals, were dealt upon with some length.

LEWIS W. FETZER