

The impression made by this general examination of the present bird population of the state of Illinois was that of a remarkable flexibility and tenacity of the associate and ecological relationships of birds in the face of revolutionary changes in their environment. Apart from the results of the introduction of the English sparrow, and the direct destruction of game birds and birds of prey, the main effect of human occupation seems to have been the withdrawal of most of the prairie birds from the area devoted to Indian corn, and their concentration in pastures, meadows, and fields of small grain—situations which most nearly resemble their original habitat.

Significant Changes in the Breeding Ranges of Certain Birds of the Ohio Valley and Lower Lake Region: LYNDY JONES, Oberlin College.

These changes, during a period of seventy years, are a gradual but decided shifting northward of the breeding areas of twenty-five species of birds, or fully twenty per cent. of the breeding birds of the state of Ohio. The movement can not be accounted for by the changes attendant upon the settlement of the region, because the breeding habitats have not been materially changed. Rather the northward movement seems to be the expression of a gradual elimination of the less fit and as gradual an improvement of the species.

The Relation of Ecology to General Biological Problems: A symposium by H. C. COWLES, V. E. SHELFORD, C. C. ADAMS, the University of Chicago. To be published in full in SCIENCE.

A Study in the Sex-ratio in Drosophila Ampelophila: W. J. MOENKHAUS, University of Indiana.

The sex-ratio in *Drosophila ampelophila* is 1 male to 1.14 females. The sex-ratio is inherited. If the sex-ratio of many pairs

of this species taken from the same parents as determined in different pairs shows a wide range of variation in this respect. The ratio may vary from a slight preponderance of males to a strong preponderance of females in a proportion of 1 to 2 or greater. By breeding the offspring from pairs showing a selected ratio, these again show a ratio approaching that of their parents. Thus, by selection, a strain in which the females bore a relation 1.6 to 1 male was produced. This ratio, by selection, can be maintained. A male strain has not yet been attempted.

By mating females from the "female" strain with males from a strain in which the sex-ratio is 1 to 1, and *vice versa*, the sex-ratio of the offspring is in every case that of the strain from which the females were selected. From the results in five such experiments it is concluded that in this creature the sex is determined altogether, or nearly so, by the female, the male having nothing or little to do with it.

The objection that might easily be brought forward, that the selection in these experiments may be nothing more than the selection of those pairs in which one sex or the other tended to die and, hence, led to a preponderance of one sex or the other, has not been met satisfactorily experimentally, but it is not regarded as a factor of any importance.

THOMAS G. LEE,
Secretary

UNIVERSITY OF MINNESOTA
(To be concluded)

SCIENTIFIC BOOKS

SCIENTIFIC PUBLICATIONS OF THE AMERICAN
MUSEUM OF NATURAL HISTORY FOR 1907

IN Volume XXIII. of the *Bulletin* of the museum there are almost one thousand—978, to be exact—printed pages, comprising thirty-six separate papers from nineteen authors, with fifty-three plates and eighty-three text figures. Many papers are of typical tech-

nality, others have a wider range and engage popular attention.

The very enviable fame enjoyed by the American Museum for its unsurpassed halls of vertebrate paleontology suggests the precedence of the papers on this topic; indeed, by enumeration, over one third of the titles belong here.

The first paper is by Dr. L. Hussakof: a short description of the fossil surgeon fish, *Zebrasoma deani* n. sp., from the West Indies, and significant as the first instance of a fossil of the family being found in America. It is hypothetically referred to the Eocene. The second paper is by Dr. W. D. Matthew, devoted to the elaboration of a lower Miocene fauna from South Dakota, which, it is contended, connects the latest of the White River beds (Oligocene) with the Loup Fork sediments (upper Miocene) and which is characterized by two rather sharply contrasted faunas, that of the lower Rosebud beds and that of the upper, in both of which are found Carnivora, Rodentia, Perisso and Artiodactyles and (in the upper Rosebud) Insectivora, and of which finally the author says: "It is peculiarly satisfactory therefore to find a fauna which is intermediate between two stages hitherto disconnected, and enables us to perceive the exact relationships between genera which could until now be connected only in a general or provisional way." The details given in this paper are very interesting, as that the resemblance of the Oligocene and lower Miocene Canidæ (Canidæ and Mustelidæ alone appear in the Carnivora) to species inhabiting South America is marked, that the specialization of the limbs and feet of lower Miocene hares "were practically as far advanced as any of their modern descendants," and the description of a new genus of mustelines, *Megalictis*, and of which "the teeth indicate an animal fully as predaceous as the wolverene but the skeleton points to more fossorial habits." At many places in this important contribution there is impressed upon the reader the sense of the writer's detached judgment, his freedom from preconception or prejudice, and a willing deliberation in drawing conclusions.

Professor H. Fairfield Osborn furnishes four articles, among which the "Tertiary Mammal Horizons of North America" easily claims preeminence. It is an effort at correlation which will be closely studied, and offers a résumé of the observations of a host of investigators in the field. The faunal currents indicated in the sixth phase, with South American land connections, and in the fifth and seventh phases with Eurasiatic invasions, suggest the speculations which the distinguished author has successfully associated with his name. The remaining three papers of Professor Osborn are "Mounted Skeleton of the Columbian Mammoth," "Points of the Skeleton of the Arab Horse" and "A Mounted Skeleton of *Naosaurus*," in which last the two plates, one of the skeleton and one of a restoration or model by Charles R. Knight, fairly startle the observer.

Mr. E. C. Case contributes three articles, two of systematic value, "The Skull of *Bolosaurus striatus* Cope," "The Genus *Zatrachys* Cope" and a geological estimate, of much interest, of the Permian beds of Texas. A very suggestive study, in so far as it is charged with a consideration of morphological changes and their possible causes, comes from the pen of Professor Earl Douglass; it is entitled "New Merycoidodonts of Montana," and discusses a fossil group of artiodactyles related to the Cervidæ. An excellent paper by Mr. Barnum Brown forms article XXXIII, and analyzes the contents and relations of "The Hell Creek Beds of Montana." Dr. O. P. Hay follows the last writer with the description of "Seven New Species of Turtles from the Tertiaries of the United States." These turtles prove to be of striking interest. One, *Macrochelys temminicki* Hay, was found in probable Pliocene deposits on the western coast of Florida. It was about the size of the alligator snapper which inhabits to-day the region from western Georgia to Texas, but is quite distinct in structure; another species is a new box-tortoise "found in Pliocene or early Pleistocene deposits near Savannah, Georgia, and which exceeded in size any living species of box-tortoise." Among these suggestive fossils an example of *Aspideretes* (A.

singularis Hay) possesses unusual value. "The specimen is beautifully preserved and furnishes the nearly complete skeleton. Only one other skull belonging to the Trionychoidea is at present known that is older, and no other trionychoid skull so old is known that is accompanied by the shell." The papers in vertebrate paleontology close with one by J. W. Gidley in which the author presents a "Revision of the Miocene and Pliocene Equidæ of North America."

Near the center of the volume is an imposing article by the editor, Dr. J. A. Allen, which recalls a conflict which lately occupied the pages of this journal. The article is entitled "The Types of the North American Genera of Birds," and is a vigorous plea for the principle, in nomenclature, of elimination.

There are two articles by Professor R. P. Whitfield, the founder of the *Bulletin*, and the veteran paleontologist of the United States, one describing, for the first time, a species of *Hoploparia* (a lobster) from the American Cretaceous, and the second upon the interesting *Unios* brought by Mr. Barnum Brown from the Laramie clays of Montana.

Entomology has in the recent issues of the *Bulletin* increased its claims upon the space of the publication; indeed a process of cleavage in the *Bulletin* itself might not inappositely follow, as a consequence of the swelling proportions of entomological themes. There are fourteen entomological papers, some of them of very considerable length and all noteworthy, with particular interest centering in those of Beutenmüller, Wheeler and Cockerell.

Mr. Beutenmüller contributes "Notes and Descriptions of New Forms of *Catocala*," "New Species of Gall-producing Cecidomyiidae," "Notes on North American Cynipidae" and an authoritative study of the "North American Species of *Rhodites* and their Galls."

Professor Wm. M. Wheeler is the author of two extended papers of unquestionable interest. The paper on "The Polymorphism of Ants" repays attentive perusal. The subject of course pertains to the most fascinating

chapters of science and the skillful and experienced author develops it with unmistakable attractiveness. The second paper of Professor Wheeler's introduces the reader to a second domain of entomology and leads him to the homes and environment of the "Fungus-growing Ants of North America." As Professor Wheeler almost instinctively remarks, "not only are these habits of interest as a most unusual specialization in diet—for all ants were originally and many are still exclusively entomophagous—but the successful cultivation of such delicate plants as fungi presupposes an astonishing range and complexity of adaptation even for these very plastic insects."

Professor T. D. A. Cockerell contributes four excellent articles dealing particularly with the fossil insects and spiders of Florissant, Colorado. Mr. James G. Needham describes two new genera of *Æschinæ* (dragon flies); Dr. W. D. Kearfott, "Microlepidoptera from the Black Mountain Region of North Carolina," and James A. G. Rehn, some Australian Orthoptera.

A geological paper by Dr. E. O. Hovey upon the "Western Sierra Madre of the State of Chihuahua, Mexico," conducts the reader most instructively through regions of tropical tablelands, intervening bolsons; over "wastes of sand and arid soil, held in place to some extent by bunch grass, greasewood and mesquite"; across river-traversed or lake-dotted plains, the narrative being plentifully interspersed with geological studies of igneous intrusions, erosions, metamorphism, mines and physical features, of which perhaps the extremely level basin floors are not the least striking. The paper is well illustrated.

The volume also contains an interesting paper on Australian and Asiatic bees described from specimens belonging to the museum, and an especially informing and luminous article by Alexander G. Ruthven on a "Collection of Reptiles and Amphibians from Southern New Mexico and Arizona," a region which in several directions has furnished zoological novelties and stimulated the curiosity and zeal of collectors.

The anthropological publications of the mu-

seum comprise "Gros Ventre Myths and Tales," "Religion of the Arapaho" (the latter in the series of the Mrs. Morris K. Jesup Expedition), both by A. L. Kroeber, and "The Shasta," by Roland B. Dixon, under the results of the Huntington California Expedition.

L. P. GRATACAP

SOCIETIES AND ACADEMIES

THE AMERICAN CHEMICAL SOCIETY
NORTHEASTERN SECTION

THE eighty-fourth regular meeting of the section was held on Friday, April 24, at eight o'clock P.M., at the Tech Union, Boston. About fifty members were present. Professor W. H. Walker, of the Massachusetts Institute of Technology, presented a paper on "The Corrosion of Iron and Steel," with illustrations. Pure iron is very rare, but has been prepared by the reduction of pure ferrous oxalate in a vacuum furnace. Small amounts of sulphur, carbon, phosphorus, etc., have marked effects upon the properties and corrosion of iron. Iron and steel as made at the present time appear to corrode more rapidly than products made forty years ago. (A sample of iron known to have been exposed to the weather for thirty-four years was shown with little corrosion, while a sample of steel fence wire exposed only six years was very much corroded.)

The theories of corrosion were outlined as follows:

Carbon dioxide theory: this was the earliest and has been supported by many authorities and appears in the text-books. The reactions proposed are: $4(\text{Fe} + \text{H}_2\text{O} + \text{CO}_2) = 4\text{FeCO}_3 + 4\text{H}_2$, and $4\text{FeCO}_3 + 6\text{H}_2\text{O} + \text{O}_2 = 4\text{Fe}(\text{OH})_3 + \text{CO}_2$. This theory appears to account for the facts that corrosion is accelerated by the presence of carbon dioxide, and that alkalis inhibit corrosion. Certain experiments of G. T. Moody appeared to show that no corrosion occurs if carbon dioxide is absent.

Electrolytic theory proposed in 1903 by W. R. Whitney was based on the following experiments: Iron immersed in copper sul-

phate solution became plated with copper, since the copper ions with positive charges have a less electrolytic solution pressure than the iron. Since water is slightly dissociated, its hydrogen acts as a metal, and hence iron, when put into water, dissolves at a rate proportional to the concentration of hydrogen ions in the water, and to the relative ease with which hydrogen can be liberated upon the iron. Any acid which increases the concentration of the hydrogen ions will thus accelerate corrosion, while alkalis which decrease the hydrogen concentration will inhibit corrosion.

A repetition of Moody's experiments in detail established his observed facts but not his conclusions. Using phenolphthalein, it was found that alkali dissolved from the glass apparatus was sufficient to account for the slow action at first. Immersion of the iron in chromic acid renders the iron passive. But using Jena flasks carrying capillary tubes through the stoppers, and boiling the water, then quickly introducing a piece of iron and boiling again, all oxygen and carbon dioxide was expelled. While still boiling the capillary was sealed. After several days no corrosion could be observed, but on concentrating the water in a platinum dish, a good test for iron was obtained in each case, using sulphocyanate. Numerous repetitions of the experiments with elaborate precautions to prevent occlusion of gas in the iron, showed that iron went into solution every time. This supports the electrolytic theory. When bits of iron were immersed in water containing a little potassium ferricyanide and phenolphthalein, surfaces of opposite polarity on the iron soon became manifest; points at which hydrogen is liberated, *i. e.*, cathode points, became red, since hydroxyl ions are there set free. The anode points became blue, owing to the iron going into solution. The rate of solution of iron in water depends upon the electrolytic solution pressure of the iron and the hydrogen, upon the osmotic pressure of the iron ions in solution, and upon the "over-voltage" which must be overcome before the hydrogen ions pass from the ionized to the free state. The solution of iron in water becomes con-