# ORNITHOLOGICAL LITERATURE

RECENT STUDIES IN AVIAN BIOLOGY. Edited by Albert Wolfson. University of Illinois Press, Urbana, 1955: 7 × 10¼ in., ix–479 pp. $7.50.

Under the inspiration and guidance of Dr. Albert Wolfson, former chairman of the Committee on Research, the American Ornithologists' Union has issued a book summarizing recent researches in many phases of ornithology. Begun in 1948, manuscripts were accepted from 13 different authors in as many different fields from January, 1952, until April, 1955. Coverage of literature is principally for the period from about 1933, the date of the last summary of researches prepared by the A. O. U. (Fifty Years' Progress of American Ornithology 1883–1933), to about 1952. All articles are comprehensive treatments and contain extensive bibliographies, even though they vary in length from 13 to 71 pages.

Of interest is the shift in emphasis in modern ornithological research since 1933. Eight of the twelve major subjects discussed in the earlier summary—those dealing with territorialism, economics, museum collections and exhibits, photography and art, conservation and education—receive only incidental mention in this one. Perhaps some measure of the increased volume of research that is now appearing is indicated by the present summary for less than twenty years including two and two-thirds times as many words as the summary published in 1933 for the preceding fifty years.

The topics are arranged in a logical sequence and in spite of the large group of collaborators there is considerable uniformity in the organization of the various articles and in matters of style. Proof-reading and editing have been critical, and mechanical errors of a typographical or grammatical nature are practically absent. The compendium could well serve as a textbook for advanced classes.

Alden H. Miller starts the discussion with a definition of the biologic concept of the species and points out how the change from the old strictly morphological concept has stimulated the identifying of isolating mechanisms, the recognition of different degrees to which populations have attained species ranking, and an understanding of the mechanics of speciation. Defects in the use of birds in such studies are the difficulties inherent in obtaining large-scale breeding experiments, lack of large masses of specimens for study compared, for instance, with those available to the ichthyologist or entomologist, deterioration of plumage pigments in stored specimens, inadequate use of statistics, and over-enthusiasm in naming subspecies. Remedies are suggested.

Herbert Friedmann lists modern tendencies in taxonomic practice for uniting and reducing the number of families recognized, for monographic revisions of various groups, and for analysis and interpretation of genera and species from the phylogenetical and geo-historical approaches. Various systems of classification are compared and evaluated.

Alexander Wetmore reveals several points of special interest in paleontology: the uncertainty whether *Ichthyornis* ever possessed teeth, the view that penguins are the most specialized of living birds, the evolution of the ratites from flying ancestors, a cursorial vulture with only weak powers of flight, and a condor with a wing spread of 16 to 17 feet.

Harvey I. Fisher stresses the importance of internal anatomy for defining major taxonomic categories and laments on the lack of such necessary anatomical studies in the present century. He points out, however, the gradual development of the new field of "functional anatomy," wherein comparative studies of structures are emphasized along with detailed correlations of structure with function and environment. The literature of the last quarter century is reviewed on weights, the respiratory system, produc-

tion of sound, comparative anatomy in relation to taxonomy, embryology of wild species, histology of the nervous system, mechanics of flight, and various other adaptive mechanisms.

John T. Emlen surveys bird behavior all the way from the elementary and obvious to the complex and involved, using as his basis the functions of the various behavior patterns. Our present knowledge of neural mechanisms is reviewed. In analyzing the nature and origin of behavior patterns he makes due acknowledgment of the modern ethological concepts developed by Lorenz, Tinbergen, and Thorpe, as well as the criticisms and different interpretations of Schnierla, Lehrman, and others.

In the treatment of bird navigation, Donald R. Griffin adequately disposes of the Coriolis Force, terrestrial magnetism, and infra-red vision in favor of ordinary vision. Three types of homing behavior in unfamiliar territory are described: I, a regular pattern of exploration until familiar landmarks are located; II, take-off and flight in the same direction to which the birds had previously been conditioned; and III, choosing of the correct direction homeward regardless of previous conditioning. Orientation from the sun is probably important with pattern II, while in pattern III, the most baffling of all, the sun may possibly be used both to tell direction and latitude. It is conjectured that the pecten in the eye may play some part in celestial navigation.

Donald S. Farner is primarily concerned with proximate factors for the annual stimulus of migration. Hypotheses in which the gonads, thyroids, and anterior pituitary assume major roles are found wanting. Lengthening photoperiods in the spring stimulate the anterior pituitary, thereby activating the gonads, and along with rising temperatures produce a favorable energy balance. Whether this excess of productive energy is used for molting, immediate initiation of nesting, or deposited as fat preparatory for migration may be under endocrine control of the anterior pituitary. There is strong indication, but not certainty, that nightly unrest of caged birds is a reliable index of the migratory state. Before migration actually occurs, the additional stimulus of critical changes in environmental factors appears to be required.

George H. Lowery, Jr., and Robert J. Newman, describe the accumulating evidence that in nocturnal migration small birds are distributed through the sky with remarkable uniformity. Topographical features are followed only when they offer "leading lines" which the birds are reluctant to cross. The migration peak on any day generally comes during the hour before midnight. It appears that further development of this important field will depend on harmonizing the often contradictory information obtained by telescope counting of bird silhouettes passing across the face of the moon and "chip counting" of birds migrating at lower elevations.

David E. Davis compiles information on the breeding biology of miscellaneous species and emphasizes the need for adequate statistical analysis of data collected.

L. V. Domm cites evidence that embryonic sex differentiation is directly determined by the relative intensity of androgenic and estrogenic hormone secretion and that the intensity of secretion of these hormones is normally controlled by the hereditary genes.

In the longest article in the book, Joseph J. Hickey gives a comprehensive survey of population problems in gallinaceous birds. This includes techniques for measuring population size and analysis of nesting successes, sex and age ratios, cycles, and regulatory factors. Seventy to eighty per cent of the females raise at least one young during any year. Mortality of the young averages 20 to 50 per cent in the first two months and in adults is higher in bob-white (77–84% per year) than in any other species. Sex ratios tend to be balanced during the first autumn after hatching but in monogamous species become skewed towards the male by the second autumn. Annual

fluctuations involve increases with reproduction of less than 100 per cent and decreases with mortality of 50 per cent. North American grouse typically exhibit a 3.5 year cycle north of 55° latitude, but the 9.5 year cycle between 40° and 50° latitudes is less certain and may be due to random action of several environmental factors. California quail can stand only a 25 per cent hunting kill, but bob-white can take a kill of 40 to 55 per cent.

In a second article, Farner discusses problems involved in formulating life-tables. He emphasizes the importance of banding immature birds in order to accumulate a much larger mass of longevity and mortality data on birds of known age. Such data, as far as known, are summarized for a large number of species.

The final paper by Carlton M. Herman is a comprehensive review of the important diseases of wild birds. These diseases are produced by a variety of factors: ecto- and endo-parasites, bacteria and fungi, viruses, and nutritional inadequacies.

Criticisms of this book are difficult to find. The delay of three years or longer in the publication of some of the articles is regrettable. Some of the summaries are more complete and detailed than others, but on the whole, they attain a high standard of excellency. We find no mention in the Index of such important fields as ecology, genetics, social hierarchy, or song—fields in which there have been many recent advances. It is scarcely conceivable, however, that any serious bird student can afford not to have this book continually at hand and to have a thorough familiarity with its contents. Every young ornithologist should make this one of his first purchases.—S. CHARLES KENDEIGH.

THE MYOLOGY OF THE WHOOPING CRANE, *GRUS AMERICANA*. By Harvey I. Fisher and Donald C. Goodman. Illinois Biological Monographs (vol. 24, no. 2), Univ. Illinois Press, Urbana, December 30, 1955: $6^{11}/_{16} \times 10$ in., viii+127 pp., 40 figs. $3.50 cloth, $2.50 paper.

Doctors Fisher and Goodman have performed a great service to ornithology by writing this monograph, not only because they present data on the myology and neurology of a rare species, but also because they describe the entire muscular system. No longer need the student refer to the inaccurate work of Shufeldt. Nearly all students of avian myology have been misled, at one time or another, by accepting at face value certain statements made by Shufeldt in his "Myology of the Raven" (1890). Hudson and Lanzillotti (1955. *Amer. Midl. Nat.*, 53:2) politely referred to this problem when they stated that Shufeldt's "description of the flexor digitorum sublimus makes it quite apparent that he did not find any such muscle."

Fisher and Goodman give the known history of the three specimens on which their report is based. They present detailed descriptions of the musculature of the following regions: skull and jaws; tongue; orbit and ear; wing; tail; leg; body wall; vertebral column. Synonymy of muscles is given except in the discussions of the myology of the tail and the pectoral and pelvic appendages, for which the synonymy was given earlier by Fisher (1946. *Amer. Midl. Nat.*, 35:tables 19, 23, and 42).

The authors state (p. 39): "Montagna (1945) [*Jour. Morph.*, 76:87–113] demonstrated that the digits of the avian hand are numbers II, III, and IV rather than I, II, and III as in most current literature. Thus is settled, at least to our satisfaction, the hundred-year-old controversy." They have proposed, after consultation with other anatomists, new names for certain muscles inserting on those digits; they list the old names and the new names on page 39.

"The Myology of the Whooping Crane" now becomes the standard reference for the

complete myology of a species. Most myological studies, for several important reasons, deal with the pectoral and pelvic appendages. Consequently, I feel that it is important to point out certain probable omissions and misconceptions of muscle complexes in this otherwise excellent monograph.

Fisher and Goodman do not mention M. expansor secundariorum, a muscle widely used in taxonomic diagnoses. Beddard (1898. "Structure and Classification of Birds," p. 366) states that this muscle is present in the Gruidae and I found it in *Grus canadensis tabida*. It surely is present in *G. americana*. A small muscle closely associated with M. expansor secundariorum is Fürbringer's M. anconaeus coracoideus. This muscle I have described for the Sandhill Crane in two papers now in press; it probably is also present in the Whooping Crane.

M. flexor digitorum sublimus is not mentioned by this name in the paper, but it is described (pp. 65–67) as the "anterior part" of M. flexor carpi ulnaris. The muscle which Fisher and Goodman (p. 52) and Fisher (1946:584) describe as M. proscapulo-humeralis is actually the external head of M. subscapularis. The muscle which Fisher (1946:587–588) described as "M. proscapulohumeralis brevis" in the Cathartidae is the proscapulohumeralis (=scapulohumeralis anterior) muscle in that group. Fisher and Goodman (p. 53) also describe a proscapulohumeralis brevis muscle in the Whooping Crane; Fisher informs me (letter dated May 5, 1955) that this muscle was "not found uniformly in the Whooping Cranes." This rudimentary muscle probably represents M. proscapulohumeralis in the cranes.

I believe that it is misleading to refer as these authors do to the *biceps slip* as the belly of M. tensor patagii longus. This is a matter of interpretation, but except when the contrary evidence is overwhelming it is obviously desirable to retain the traditional interpretation of muscles, especially for those which have been used in taxonomic diagnoses.

Fisher and Goodman seem to admit (pp. 89–90) some confusion in the descriptions of their muscles vastus lateralis, vastus medialis, and femoritibialis externus. Fisher (1946:Table 42) stated that his vastus lateralis was the same as the femoritibialis externus of Gadow and of Hudson; his vastus medialis, the same as their femoritibialis medius. Fisher and Goodman (Figs. 29 and 30) illustrate the vastus lateralis (=Gadow's femoritibialis externus) and the vastus medialis (=Gadow's femoritibialis medius) in *G. americana*. The relationships shown in the figures are typical for these muscles. Gadow's M. femoritibialis medius, therefore, is not "apparently lacking" in *G. americana*, as Fisher and Goodman suggest (p. 90). They describe that muscle under their name, M. vastus medialis, on pages 81 and 82.

The muscle which Fisher and Goodman (p. 90 and Fig. 31) describe as M. femoritibialis externus is probably best considered simply a distal head of their vastus lateralis, especially since this would obviate the necessity of lengthening its name to M. femoritibialis externus sensu Fisher nec Gadow. (Fisher did not use the term in his 1946 paper. He illustrated the muscle but did not name it.)

This monograph would be invaluable solely for the 40 excellent illustrations. There are, for example, two figures each of the brachial and sacral plexuses. One of the most significant features of this paper may prove to be the emphasis which is placed on intraspecific anatomical variation. Every taxonomist and anatomist should read and re-read the "Discussion" (pages 119–124) until the implications therein are fully understood. This is, indeed, the type of paper that one wishes one had written. —ANDREW J. BERGER

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