

RECENT LITERATURE

The Hawaiian Honeycreepers (Aves, Drepaniidae).—DEAN AMADON. Bull. Amer. Mus. Nat. Hist., 95 (4): 151–262, text-figs. 1–23, pls. 9–15, tables 1–15. December 11, 1950. Price, \$1.75.—In the Hawaiian honeycreepers, Dean Amadon saw an opportunity to apply current ideas of evolution to a group of birds long considered to present one of the striking examples of avian evolutionary radiation. He enjoyed first-hand study of the large Rothschild collection of Drepaniidae in the American Museum of Natural History and the Bishop Museum collection in Honolulu. He also had a chance to see certain of the honeycreepers in their native environment on Oahu and Hawaii, where on the latter island he and I participated in a diligent field trip together. In his monograph he has presented a body of previously unpublished data consisting mainly of measurements and of descriptions of molt. He has reviewed and added to our stock of data on plumages and anatomy. For the parts of his study dealing with natural history, he has placed extensive and fully justified reliance on the writings of R. C. L. Perkins, primarily, and other naturalists who in collecting these birds in the 1890's recorded much information on distribution, foods, and behavior.

Amadon's first major task was to review the entire family to formulate his own judgments as to the proper systematic arrangement of the subfamilies, genera, and species, and to decide upon the status of the closely related differentiates. A sound feature of Amadon's approach is his use of a wide variety of criteria in formulating his judgments. These include data pertaining to structure (external and internal), color and pattern, distribution, feeding habits, habitat, behavior, and any other items he could find. Thereby he avoided and corrected errors made by some of his predecessors in attaching too much importance to particular criteria, such as structure alone.

A genus of broad nature as delimited by Amadon is *Loxops* (combined from approximately six genera). His treatment of these confusing forms is quite successful; however, some parts of the genus are better known and better handled than others. To me the least satisfactory decision he made here is the combining of several creeper-like members into the single species *maculata*. There are arguments for this action, however, including their "replacing nature" from island to island and their similarity in size and shape of bill. Against it are the rather great differences in coloration, usually expressed in the presence or absence of secondary sexual differences in plumage, and differences in behavior, voice, and feeding traits. Knowing the Maui and Hawaii "races" well in the field, I constantly felt that these were distinctly different birds; whereas, by contrast, in the case of the Maui and Hawaii races of *L. virens* I was strongly impressed with their essential similarity, if not identity, on behavioral grounds. I cannot visualize the Maui and Hawaii races of *L. maculata* interbreeding should one of them become transported to the other island, but of course this is a risky surmise, the validity of which remains to be established. Perhaps a special effort should be made to test the forms of the species *maculata* by breeding experiments to see if they will interbreed in captivity readily, unwillingly, or not at all, and to expose any intersterility or other phenomena associated with sexual isolation. The current arrangement as far as this species is concerned should not be viewed with finality, since several races are still extant and fairly common today in the Hawaiian forests, leaving a real possibility that some investigator may go after and obtain data which will elucidate the nature of evolution within this "species."

For the most part Amadon has treated his data with great care, but occasionally he disregards fine distinctions, as when he states that *Loxops maculata mana* is "very similar in all details of coloration to *L. v. virens* of the same island" (p. 165). Had he made this of general import rather than specifying "all details," it would have been a safe statement. Actually there are easily discernible and well-known differences in coloration of the lores, face, throat and underparts, and back such that it would be difficult or impossible to mistake one of the typical bright yellowish male *virens* for a *mana* of any age or sex.

Although I found it hard to accept his conception of the genus *Psittirostra* (combined from five genera and six species), I now recognize its convenience. In our present state of fragmentary knowledge it does no violence to the finch-billed group to think of it as a monophyletic assemblage of well-differentiated species. It remains as an unsatisfactory feature of his arrangement that any known interrelations among the several members of this group have been obscured by such lumping; had Amadon found some basis for the use of subgenera this difficulty might have been surmounted. That he did not reflect the baffling nature of the assemblage of characters possessed by this group. Additional knowledge will be required of anatomy and behavior, as well as the history of the group to understand the interrelations of the finch-billed drepaniids.

It would be of great help, not only in the two instances just discussed, but in the entire family, to know much more than we do about the physiology of color and pattern and their genetic control. Amadon makes the likely suggestion that color changes are easily accomplished in the Drepaniidae. He seems to be right, judging from the fact that no adaptive basis has been perceived for the many color changes together with the frequency of such changes and the great range of colors resulting (greens, grays, yellows, oranges, reds, browns, black). Amadon further suggests that since reds are found in both of the subfamilies of this group it must have been a basic and typical color in the ancestral stock at least prior to the time of the divergence resulting in the present-day subfamilial lines. This may be questioned, however, on the basis that the bright yellows-oranges-reds of the Psittirostrinae are primarily associated with the male sex (though exceptions occur), whereas in the Drepaniinae these colors are, so far as known, always associated with both sexes. Could this indicate a basic difference in the physiology of color control between these two subfamilies that would invalidate the thought that similarity of color reveals an identical trait common to the two lines? May this not show that the reds here are in fact not of the same character in the two groups?

An outstanding handicap to Amadon in his work on measurements was the small series of specimens available for each discreet population he studied. The organization of the work and the statistical methods employed seem very competent, yet the reader becomes discouraged at finding it pointed out so frequently that some certain suggestion is based on inadequate evidence and may be invalid because of possible sampling error. Of course, the author is right in keeping the reader reminded of this, but it makes the latter wonder if the data were adequate in the first instance for such an intensive statistical analysis. Probably much of this work will have to stand for lack of additional material of the rarer and extinct species, but other parts of it are subject to verification in the future through the analysis of more specimens, either those now in collections not used by Amadon or those which may be obtained by future workers in the field. In this chapter Amadon makes a wealth of suggestive interpretations which contribute toward our understanding as to how such relationships as tail-length and wing-length vary among adaptive feeding types which ap-

peared in this family. These serve to whet the mental appetite for a more thorough knowledge of the correlation between observable anatomical trends and behavioral changes.

Amadon has carried through a more extensive analysis of molt in the drepaniids than has previously been published. For this work he, of course, used the same assemblage of museum skins employed in the rest of his work. The larger and older collections of the Hawaiian honeycreepers were made by professional collectors who undertook expeditions to particular localities, collected for a few weeks and then moved on to some other locality where they repeated the procedure. The seeking out of rare birds was a primary objective in this work, and much time was given to special trips to promising localities for the species of more local distribution, where all individuals encountered were at once collected. Series for given species were amassed, therefore, which tended to represent adequately only a few months of the year. This was partly offset by the adding of smaller series of birds collected from various additional sources. It apparently was not possible to pick out adequate series to demonstrate fully the manner in which the rather lengthy molt of the drepaniids progressed. This meant that for the rarer species Amadon had to make difficult deductions from only scattered specimens of the kind he needed, while even for the species for which he studied the most specimens in molt (*e. g.*, *Vestiaria coccinea* and *Himatione sanguinea*), I should judge he had poor representation for some times of the year for certain age and sex groups. Notwithstanding these difficulties, he made many shrewd deductions about the nature of molt among most members of the two subfamilies, and he uncovered evidence to suggest that differences in the timing of molt may have developed within the family.

The scantiness of the factual background with which he had to deal has led to many disputable assertions. The basis for my own views is an independent analysis of molt (as yet unpublished) in three species of drepaniids, *Vestiaria coccinea* (54 specimens), *Himatione sanguinea* (113 specimens), and *Loxops v. virens* (113 specimens). These I collected evenly over all the months of the year on the Island of Hawaii. For the sake of the record, I shall indicate a number of the disagreements between his data and conclusions and mine.

In discussing the wing and tail quills in postjuvenile molt of *Vestiaria* he explains, "By the time the body plumage is molting, the juvenile wing and tail quills have become somewhat worn and brownish. They are not molted as a rule until after the body plumage has been nearly or quite replaced. In three specimens that still have a few immature feathers about the nape (February 18, March 26) the wing and tail feathers are beginning to be replaced" (page 193). I found in postjuvenile molt in *V. coccinea* that wing quills (primaries and secondaries) initiated their molt early in the process, in fact when the general body molt was just starting, rather than after the body plumage had been nearly or quite replaced. Such wing quill molt was always accomplished by September in my series (the latest was molting secondaries 7 and 9, on September 12). Any wing or body molt which I was able to detect after December appeared to be of adventitious character, a phenomenon not at all uncommon in birds in which feather follicles are injured or perhaps stimulated in some other way. I strongly suspect that some unusual cause operated to induce untimely molt in the wings of the three birds Amadon mentions, as such an occurrence is completely unlike the postjuvenile wing molt in my series of 22 first-year *Vestiaria*, 15 of which were actually undergoing postjuvenile molt. I was not able to detect any wing molt in six birds continuing postjuvenile molt later in the year than September. Also, there was no evidence of continued molt in five first-year birds collected be-

tween January 22 and July 4. All of the latter had undergone postjuvinal molt the preceding fall and retained some juvenal feathers either of body or wing type.

Continuing his discussion of postjuvinal molt in *Vestiaria*, Amadon deduces that, "Perhaps some specimens with fully adult body plumage retain juvenal wing and tail quills. The difficulty of separating worn adults from immatures by the shape of the primaries makes it impossible to prove this from specimens" (page 193). I can definitely state that some specimens with fully adult body plumage do retain some juvenal wing quills. A specimen collected March 3 showed such adult characters of plumage as red-edged greater secondary coverts (occasionally tan-edged juvenal greater secondary coverts persist after completion of postjuvinal molt), and no yellowish body feathers of juvenal character remaining. In this specimen all wing quills were of adult type, except secondaries 4 and 5 on both wings. Each of these secondaries was clearly lighter in hue and shorter than the other group, indicating they were retained juvenal quills. This appears to prove the case without the problem of distinguishing between worn adult and juvenal quills, since here we have a contrast between relatively fresh adult and worn juvenal quills. Normal retention of a varying number of remiges and greater upper secondary wing coverts was seen in other cases where wing molt had already ceased though body molt was not yet completed. This is a condition frequently observed in specimens collected in October and November.

Amadon believes it the normal situation that wing quill replacement is actually complete in postjuvinal molt. Therefore, the statement quoted in the paragraph above shows that he held some reservations to the effect that occasionally an individual retained juvenal quills. My material led me to believe that very frequently all juvenal remiges are retained (something less than half of the individuals I examined in postjuvinal molt), that more frequently some are molted, and perhaps in a not very large proportion of the population they may be entirely replaced, though this latter I could not prove with my material, as such individuals would have been indistinguishable to me from older adults. Were the latter situation more general than I supposed, then the older age groups must have had extremely small representation in my total sample, and this is unlikely. I feel Amadon's following statement needs modification: "The post-juvinal molt of *Vestiaria* as just described produces a plumage fully adult in all details. In addition to the complete change in color from yellowish green to scarlet, the rounded juvenal primaries are replaced by the truncate ones of adults . . ." (p. 193), since it appears that certain juvenal feathers are usually not replaced until the first adult fall molt.

It is again unsatisfactory to speak in this manner: "Molt in *Himatione sanguinea* is the same as in *Vestiaria*" (p. 194) for there are differences. In such closely related birds one would not be surprised at finding the differences slight; however, a rather striking discrepancy, as seen in my specimens, is the failure of primaries to molt in postjuvinal molt in *Himatione*. Thus, I found primaries not involved in postjuvinal molt in any of 22 molting specimens of *Himatione* or in any of 11 additional specimens which had just completed postjuvinal molt. Amadon, however, cites two examples in which primaries appeared to him to be involved in postjuvinal molt; judging from my material these would be exceptional. Further, the postjuvinal molt in the secondaries in *Himatione* appears to be less extensive than in the secondaries of *Vestiaria*, as in 33 specimens of *Himatione* never more than 4 secondaries (Nos. 6-9) were replaced, and none at all were replaced in 26 of these, whereas in 18 specimens of *Vestiaria* up to 7 secondaries (Nos. 1-3, 6-9) were replaced, and in only 9 of these specimens were none at all replaced. Likewise, the replacement of greater

upper secondary wing-coverts was generally less extensive in *Himatione*. Thus, extent of wing feather replacement is a valid difference between the postjuvinal molt of *Himatione* and *Vestiaria*.

In his discussion of molt of adults appears the assertion: "In the subfamily Drepaniinae the primaries usually molt in August . . ." (p. 195). The majority of Amadon's data on this subfamily came from his work on *Vestiaria* and *Himatione*. To test this against my own series I have tabulated my data as follows:

NUMBER OF SPECIMENS WITH PRIMARIES MOLTING IN ADULT FALL MOLT

	June	July	August	September	October
<i>Vestiaria</i>	1	7	2	6	2
<i>Himatione</i>	1	3	3	3	2

Specimens which had completed the replacement of primaries but were still molting in other feather tracts were found in October (1 *Vestiaria*, 10 *Himatione*) and November (5 *Himatione*). It is evident that the primaries are in molt over a much longer period than Amadon visualized.

Amadon based his analysis of molt in adult drepaniids primarily on molt of the wing and tail quills ("Body molt is difficult to detect in the material examined, so the following remarks refer chiefly to molt of the wing and tail," he says on page 195). He goes on to cite data regarding wing and tail molt with only occasional remarks on body molt. Yet in rounding out his conclusions he seems to refer to molt in its entirety. Is it safe to make inclusive inferences from a restricted analysis of molt?

The reader is informed (p. 195): "In the subfamily Psittirostrinae, too, the annual molt usually occurs in late summer or early fall. Because of individual variation in the time of beginning of the molt, the molting period of each species is prolonged over roughly three months." Had Amadon analyzed body molt in adults, I think he would have realized that molt continues until October and November, whereas his "early fall" seems to imply September. He cites data on a series of *Loxops v. virens* to show that wing molt is usually completed before or in September, and then he adds, "October birds were in fresh plumage" (p. 195). My series of 40 adult *virens* which exemplify adult fall molt bear out the truth of his thought that wing quills have usually completed their molt by or in September, but they provide grounds for objection to the implication that October birds have completed their annual molt. In 14 adult *virens* I collected in October, only one had not yet completed molting of the remiges, while all 14 were undergoing extensive (for the most part) body molt. In 13 adult *virens* collected in November, five were still molting in various body tracts, whereas eight had terminated annual fall molt. This shows that body molt continues some weeks later than molt of the remiges.

On similar grounds the inception of annual molt in *virens* might be placed at mid-summer (June) rather than "late summer" (my earliest specimen had started annual molt by May 11).

Referring back to the last part of the above quotation on Psittirostrinae, I disagree on the length of molting period which Amadon has suggested as three months. In *L. v. virens*, my conception of the duration of molt is that annual molt extends over roughly three months in *individual birds*; however, because of individual variation in the time of beginning of the molt, the molting period of the *population* is prolonged over six to seven months (May to November). My data on *Vestiaria* and *Himatione* are in agreement with a more lengthy period for adult molt than Amadon suspected. I feel that the long period of molt seen in these birds of a tropical locality has sig-

nificance in indicating a "lax" type of physiological adjustment to the environment, a relation which would be less forcefully evident if we accepted an unduly restricted view of the duration of molt.

Some questionable statements are made in the section on plumages, especially the one implying great variability and prolongation of postjuvinal molt and those implying that in general drepaniids undergo a complete postjuvinal molt. Elsewhere, along with seemingly valid ones, certain suspect generalizations are advanced con-

SEX RATIOS OF JUVENILE VERSUS ADULT DREPANIIDS

	Juveniles	Adults
<i>Vestiaria</i>	11 ♂ : 8 ♀	23 ♂ : 16 ♀
<i>Himatione</i>	15 ♂ : 21 ♀	52 ♂ : 31 ♀
<i>Loxops v. virens</i>	10 ♂ : 20 ♀	61 ♂ : 32 ♀

cerning molt in several species of drepaniids which I have not mentioned in these comments on molt. My suspicions are founded on small series of *Psittirostra bailleui*, *Hemignathus wilsoni*, and *Loxops maculata mana* which I collected on Hawaii. It would be worthwhile to assemble as much material as possible for these other less well known species of drepaniids to test Amadon's interesting ideas concerning the comparative timing of their molt.

Analyzing sex ratios of museum skins, Amadon found a peculiar preponderance of males in *Vestiaria* (73 ♂ : 27 ♀) in the Bishop Museum series, though not in the series in the American Museum (16 ♂ : 12 ♀). He felt that this "preponderance of males is sufficient to suggest that a real disparity exists in nature" (p. 207), though he also mentions the possibility that "the males are more active and vocal and hence are collected more often" (p. 207).

I have tabulated the sex ratios for three species of drepaniids obtained in my collecting on Hawaii. These include juveniles and adults: *Vestiaria coccinea* (34 ♂ : 24 ♀), *Himatione sanguinea* (67 ♂ : 52 ♀), and *Loxops v. virens* (71 ♂ : 52 ♀). The total ratio of males to females in all these cases combined is 100 : 74. Thus the striking preponderance of males seen in one of the series of *Vestiaria* utilized by Amadon was not repeated in my material, and it seems highly doubtful that any such extreme disparity between the sexes exists in nature.

Proof of the effect of sex on conspicuousness in adult drepaniids can be obtained by comparing the incidence of the two sexes in skins of juveniles versus adults, which I have done for my series.

It seems reasonable that the larger numbers of adult males taken is accountable entirely on the basis of greater conspicuousness. In *Vestiaria* and *Himatione* the sexes look alike, but the males are slightly larger and probably more active and vocal; however, in *Loxops v. virens*, the males are definitely more vocal and also more brightly colored, hence the disparity in sex representation in my series was greatest of all for *virens*. As for the juveniles, the samples no doubt approach the random condition, where considerable variation toward either sex might be anticipated for samples of 36 specimens or smaller. The adult samples are not random in sex representation, and there is no valid reason to suppose that any such preponderance of males occurs in the wild among these species.

It is in the chapters on speciation and macro-evolution that Amadon brings to fruit his investigations. His outstanding contributions are the outlining of probable evolutionary mechanisms involved in producing differentiates within the two genera *Loxops* and *Hemignathus*. Great importance is attached to the rôles of geographic

isolation, to size and diversity of habitats, to sporadic dispersal of the birds to different islands, and to reverse dispersal to the original habitat with subsequent ecological divergence. His application of these and similar ideas is convincing.

The genus *Psittirostra* has not been so fully explained. Here is a situation where five species (the distinctness of which Amadon upholds) all occur on the one island, Hawaii. Only one of these species extends its range to other islands in the group. A sixth species occurs as two races on two leeward islands far removed from the main group of Hawaiian Islands. How could the sympatric existence of the five species on Hawaii have come about? Amadon briefly suggests that a series of dispersals to other islands, slight divergences occurring while there, and then reinvasions of Hawaii probably account for it. There are available few facts either to support or to gainsay this proposal. It might be further suggested that the several mountain peaks of the island of Hawaii itself were capable of providing isolated habitats between which gene flow could have been sharply reduced. It is interesting to note that this situation of multiple sympatry has not tempted Amadon to mention the possibility of initial habitat isolation, which Emerson (Allee, Emerson, Park, Park, Schmidt. Principles of Animal Ecology (Saunders Co., Phila.), p. 616) maintains is a theoretical possibility.

I can confirm Amadon's diagnosis of the parallelism in the sickle bill in the Drepaniinae and the Psittirostrinae, for I have found the bony support within the horny maxillary sheath differs markedly in its development in the two subfamilies. In *Vestiaria*, of the Drepaniinae, the internal bony support is stout and follows the bill outward nearly to the tip, whereas in *Hemignathus wilsoni*, of the Psittirostrinae, the bony support is quite slender and short and does not extend outward very far. The long, decurved bill of the Psittirostrinae may be a horny development primarily, whereas considerable growth of the supporting bone itself accompanies the enlarged sheath in the Drepaniinae. This would clearly constitute a proof of parallelism should the same relations be demonstrated in other long-billed members of the two subfamilies.

Amadon has included a chapter on phylogeny of the genera and of the family. Of course, the differentiation leading to the larger subdivisions of the family occurred long ago. His interpretations are illuminating and reasonable, but we can look forward to a more precise conception of the history of the Drepaniidae when geologists and botanists will have provided us with more information on the developmental history of the islands themselves and of their vegetation. Such data would permit us to know something of the succession of habitats available for colonization. Knowing the plant composition of these habitats would allow us to make inferences concerning the nature of selective forces which guided the adaptive radiation of the group.

Comprehensive though his approach has been, the scantiness of his data along some lines may not have warranted certain interpretations made, for many of these are based on slender evidence in the extreme. However, his important deductions on the mechanisms of evolution seem little or not at all affected by these shortcomings in much of his factual stock-pile. Now that such an assiduous study of speciation in this group has been carried out, it remains to amplify our knowledge of the Hawaiian honeycreepers along such lines as comparative functional anatomy, comparative behavior and its evolutionary development, comparative ecology and physiology, and historical origins of the group in correlation with the development of the environment.—PAUL H. BALDWIN.

Body insulation, heat regulation, and adaptation to cold in arctic and tropical mammals and birds.—P. F. SCHOLANDER, RAYMOND HOCK, VLADIMIR

WALTERS, LAURENCE IRVING, AND FRED JOHNSON. Biol. Bull., 99 (2): 225-271, 20 figs., 5 tables, October, 1950.—This general topic is discussed in three separate but consecutive papers and is an important contribution to an understanding of the physiological ecology of warm-blooded animals. Experimental studies were carried out on 18 species of Arctic mammals and five species of Arctic birds at Point Barrow, Alaska (latitude 71° N.), and on 16 species of tropical mammals and two species of tropical birds in the Canal Zone, Panama (latitude 9° N.). Mean monthly air-temperatures at the Arctic station varied in 1948 from - 29° C. in December to + 5° C. in July with the daily minimum going as low as - 43° C. On the other hand temperatures at the tropical station varied only slightly from + 28° C. Both oxygen consumption and carbon dioxide output were measured for Arctic animals but only carbon dioxide output for tropical ones. It is unfortunate that the techniques used at the two localities were not the same. There is an extensive analysis of literature dealing with temperate species.

No evidence was found for adaptive changes in body-temperature or in basal (standard) metabolism in the different climates. Body-temperature remains constant while the basal metabolic rate of terrestrial animals is fundamentally determined by an exponential relation to body size. The conclusion is arrived at that "phylogenetic adaptation to cold or hot climate has taken place only through factors that regulate the heat dissipation, notably the fur and skin insulation." In addition there are some behavior-adjustments that affect the rate of heat-loss from the body, such as nest-building, burrowing, and hibernation.

This basic assumption, that variations only in insulation are important in adapting animals to different climates, is not altogether convincing. The authors, themselves, note that in certain species the basal metabolism shows adaptive variation in different climates and that basal metabolism varies inversely with the efficiency of the body-insulation. They likewise acknowledge that acclimation in basal metabolism to different environmental temperatures can be obtained experimentally within the same individual and that seasonal changes in basal metabolism have been demonstrated in some species.

As air-temperature drops below 35° C., a zone of thermo-neutrality is described where body-temperature is maintained constant only through the physical regulation of heat-loss. This is effected through increasing the thickness of pelage or plumage by raising the hair or fluffing the feathers, by contracting the exposed body surface to decrease heat-radiation, by reducing the ventilation of the lungs, and by diminishing the amount of blood circulation through the legs, other appendages, or skin. Eventually, however, a critical air-temperature is reached where the maximum conservation of body-heat has been obtained and below which heat-production must be augmented if body-temperature is to remain constant. These critical air-temperatures for different species of tropical mammals are shown at 28° to 22° C., for tropical birds at 23° to 20° C. In Arctic species the critical temperature is reached at 18° C. for the least weasel, *Mustela rixosa*, which has the least effective insulation, at about 10° C. for the Snow Bunting, *Plectrophenax nivalis*, at - 5° C. for the Canada Jay, *Perisoreus canadensis*, and possibly at - 40° C. for the Glaucous Gull, *Larus hyperboreus*, and white fox, *Alopex lagopus*.

While there can be little doubt that a zone of relative thermoneutrality occurs for the large Arctic species, the authors appear to be forcing the data to fit their theories in indicating that for other species there are zones of temperature in which heat-production does not vary. There appear to be no zones of thermo-neutrality over any significant range of air-temperatures in the data presented for the least

weasel, for most of the tropical species, or for most of the species figured from data extracted from the literature. On the contrary, heat-production decreases progressively in these species until a high temperature is reached above which it again rises. A smooth curve can be fitted to the data that shows this change more accurately than do the straight lines that were drawn. It is very doubtful to the reviewer that physical and chemical heat-regulation are so sharply defined over different ranges of air-temperature and that the so-called "critical" temperature is really of as great significance as the authors make out. Admittedly, however, changes in physical regulation of heat-loss are relatively of greater importance at high air-temperatures and chemical regulation of heat-production of greater importance at low air-temperatures, but both types of regulation are probably functioning to some degree at all temperatures.

The rate of heat-loss from a hot plate at 37° C. through folds of skin and fur or plumage into air at 0° C. was measured quantitatively to test the effectiveness of body insulation. The insulating value of mammal-fur increased proportionately with its thickness in animals up to the size of the white fox. The fur of species larger than the fox was neither thicker nor of greater insulating value. The fur of some smaller Arctic mammals, such as the weasel, lemmings (*Dicrostonyx groenlandicus rubricatus* and *Lemmus trimucronatus*), ground squirrel (*Citellus parryi*), and shrew (*Sorex tundrensis*) was less effective insulation than that of some tropical species. These small mammals live in burrows during the winter, have well-insulated nests, or hibernate. They cannot sleep above ground in cold weather as do the larger species. The insulating value of the skin and plumage of birds was not accurately measured because of the difficulty of artificially fluffing out the feathers in a natural manner.

The legs of both mammals and birds are more poorly insulated than the body. The legs of most Arctic birds are naked (except for the Ptarmigan and Snowy Owl), yet acclimated Snow Buntings, Glaucous Gulls, and Ravens walked on snow at -40° to -50° C. without harm. A gull which had been kept indoors at +20° C. for several months and hence not acclimated to outdoor temperatures quickly froze its feet when it accidentally escaped. Indirect evidence indicated that in birds acclimated to cold there is just enough blood-circulation through the legs to maintain their temperature slightly above 0° C. At high air-temperature, however, when excess body heat must be eliminated, the amount of circulation through the legs may be greatly increased and may be an important means for maintaining a constant body-temperature.

Below the critical air-temperature, heat-production is increased to compensate for the faster rate of heat-loss from the body. The maximum rate of heat-production of which most animals are capable, when stimulated by cold, is three to four times the minimum or basal rate. This is brought about by increased muscle-tone, shivering, or gross activity. The authors calculate that the increase in heat-production, as air-temperatures drop, is proportional to the increasing gradient between body- and air-temperatures and follows essentially, as one would expect, Newton's law of cooling. Tropical species have faster rates of increase in heat-production at low temperatures because their cooling rates are greater, due to lesser insulation. They much more quickly reach the limits of their ability to produce more heat and hence are considerably more sensitive and intolerant of drops in air-temperature. On the other hand, owing to efficient insulation, the white fox, Eskimo dog, Glaucous Gull, and probably the Canada Jay would need only a moderate increase in heat production to tolerate the coldest temperature on record (-68° C.). Temperature-

regulation in the Snow Bunting is not as efficient and, under experimental conditions at -50° C., its body-temperature dropped seriously. It is the only species of Arctic bird studied that regularly migrates out of the region for the winter-season.

These papers provide much new information on how homoiotherms have become acclimatized to varying climates in different parts of the world. The comparative study of basal metabolism, balances between heat-production and heat-loss, and effectiveness of body insulations is fundamental for characterizing the species physiologically. The authors have provided a framework of theory that now needs to be tested by further experimentation and on a wider variety of species. There is need to determine how much of the difference noted is genetical and how much acquired by the individual during its life-time. Likewise it will be desirable to measure not only the heat-balance but also the total energy-balance of free-living animals over long periods of time under a variety of climatic conditions. This will require the measurement of voluntary food-consumption, the amount of energy in this food that is metabolized, and the total energy requirements under different simulated outdoor conditions. Only when we know, in each different climate, the amount of energy required for maintaining a normal existence and the amount of productive energy that an animal can or does acquire over and above that necessary for existence will we be in a position to interpret ecologically why animals are distributed the way that they are and why they behave as they do.—S. CHARLES KENDEIGH.

Speciation and Ecologic Distribution in American Jays of the Genus *Aphelocoma*.—FRANK A. PITELKA. Univ. of Calif. Publ. Zool., 50: 195-464, pls. 17-30, 21 figs. 1951.—During the past several years Pitelka has pursued an intensive field and museum study of the genus *Aphelocoma*. Almost 5000 specimens were compared and measured. The present volume is the principal result of this project, though there have been several preliminary or correlated published reports. *Aphelocoma* contains three species, two of which, the Scrub Jay, *coerulescens*, and the Arizona Jay, *ultramarina*, reach the southern United States. The third species, *unicolor*, apparently the most primitive of the three, is found in certain humid montane forests of Central America and southern Mexico. All three species occur in some parts of southern Mexico, though separated ecologically. After an introductory consideration of all the American jays and their distribution, each form of *Aphelocoma* is treated in great detail as regards plumage, measurements, geographical variation, distribution, and ecological requirements. No fewer than eight measurements were taken from each specimen and various methods of graphical and statistical presentation are employed to analyze individual, sexual, geographical, and other aspects of size variation. The color comparisons are of necessity somewhat more qualitative, but a colored plate by Sutton of six selected forms and photographs of specimens aid in evaluating shade and pattern. Variations in the bill, which seem to be correlated chiefly with differences in food, are also shown in photographs, as are characteristic habitats. There are many detailed distribution maps. Taxonomy and nomenclature are treated with equal thoroughness. New races described in this report are *A. coerulescens caurina* from Wedderburn, Oregon, and *A. coerulescens cana* from Eagle Mountain, Riverside County, California. Some 30 pages are devoted to a discussion of more general topics. Extent of variability and correlation between measurements agree, by and large, with what has been found in other passerine birds. The so-called ecological rules find but limited support. Type of habitat, whether dense scrub or more open growth, has had a greater effect on proportions, apparently, than has climate *per se*. Interspecific competition or absence of it has been of importance in some areas. In eastern Mexico, where *ultramarina* is absent, the resident races of

coerulescens resemble *ultramarina* in proportions and even, to some extent, in color and call notes. To the reviewer this is further evidence that parallelisms between races in related species often reflect similar responses to similar selective forces.

In a thought-provoking discussion of the ecological aspects of the species concept, Pitelka, while willing to retain the category of "superspecies" for strongly differentiated allopatric forms of common immediate ancestry, yet suggests tentatively that it may be best in some cases to regard allopatric forms as races when they seem unable to invade each other's ranges, even though there is reason to suspect that they may be intersterile. While this point of view is not without merit, it must be remembered that in some groups of animals there is evidence from fossils that related species even after they became *generically* distinct were unable to coexist but replaced one another in a time sequence. When two forms meet and, rather than merging by interbreeding, tend to compete or to replace one another there would seem no alternative but to call them species, regardless of how similar they are in ecology or (to our eyes) in appearance.

There is little room for serious criticism of this thorough and scholarly report. Indeed, the shortcomings of some other generic studies that have had ostensibly similar objectives become rather painfully evident by comparison. One must, however, question the wisdom of placing the detailed discussions of nomenclature, synonymy, etc. in a lengthy appendix, thus necessitating a rather large number of cross references. As a further consequence of this arrangement the general conclusions and summary are hidden somewhere in the middle of the volume, where the only one likely to see them (aside from reviewers who are morally obligated to read every page) is the tyro who consults the table of contents.—D. AMADON.

Ontario Birds.—L. L. SNYDER. Illustrated by T. M. Shortt. (Clarke, Irwin & Co. Ltd., Toronto, Canada), x + 248 pp., 146 line drawings, 1951. Price, \$4.50.—Those who have been associated with Mr. Snyder over the years have long been aware of his desire to see the publication of an authoritative work on the birds of Ontario for the use and guidance of the working ornithologist. Lest there be any misunderstanding, it should be said at once that *Ontario Birds* was not written to fill that rôle. Such a volume still lies in the future, and it is to be hoped that Mr. Snyder can find the time to put it together.

However, *Ontario Birds* is in itself a notable achievement. Intended as "a source book for teachers, pupils, amateur naturalists, and all out-of-doors people," it is naturally a reflection of the author's extensive experience in both museum and field work. The book is a smooth and successful blend of the field-man's first-hand knowledge of bird habits and distribution, the systematist's interest in classification, and the curator's awareness of the questions about birds most often asked by the museum visitor. The text is gratifyingly readable and sustained in interest. Technical and semi-technical terms are followed by explanatory synonyms in parentheses—a practice which will doubtless be of assistance to the uninitiated, but tends to interrupt the otherwise free flow of prose.

Four preliminary chapters deal in fairly general terms with the characteristics, distribution, migration, and classification of birds. The last of these chapters ends with a list, by order and family, of the 351 species known to have occurred in Ontario on the basis of collected specimens. Those considered to be relatively unimportant elements are placed in brackets.

The main body of the book is then devoted to a natural history of Ontario birds. Several features distinguish this section from the treatment usually found in books devoted to the birds of a particular geographic region: 1) a good deal of emphasis is

placed on the family as a major unit of classification; external morphological characters of the family receive prominent attention in both text and drawings; 2) selective measures give greater weight to the commoner and more important species of Ontario birds; those of rare or accidental occurrence are given only cursory recognition; and 3) an uncommonly wide knowledge and perceptive insight is displayed in descriptions of bird behavior and such matters as niche preference.

Such phenomena as, for example, population cycles, predator-prey relations, color reversal, and eclipse plumage are introduced and neatly outlined where their discussion fits in logically under relevant species. However, attempts to interpret birds songs in phrases, words or syllables emphasize the difficulties involved in employing the English language for this purpose. As always, the impression remains that, in all but a very few instances, familiarity with a bird's song is a requisite before the written word or phrase can provide the reader with even an approximate rendition of the real thing.

Those familiar with Mr. Shortt's bird paintings will be gratified by the many line drawings which illustrate the text. The amazingly life-like postures and accuracy of detail that one has come to associate with Mr. Shortt's work are again evident here.

The book closes with a useful table of average spring arrival dates for 50 common migrants at 11 localities distributed through Ontario; the average time-lag between these localities is also indicated.

The inclusion of a bibliography of major references dealing with Ontario birds and ornithological texts of general value to Ontario students might have added to the book's usefulness as a teaching source.

All in all, it is an excellent book, and one that will fill a long-standing need in Ontario.—WILLIAM W. H. GUNN.

Check-list of Birds of the World. Volume 7.—JAMES LEE PETERS. (Mus. Comp. Zool., Cambridge), pp. x + 318, 1951. Price, \$6.00.—With this volume Mr. Peters has begun the treatment of the Passeriformes, taking up the families Eurylaimidae, Dendrocolaptidae, Furnariidae, Formicariidae, Conopophagidae, and Rhinocryptidae. The first is strictly Old World in distribution and the remainder are New World.

In view of the extensive synonymies given by Hellmayr (Field Mus. Nat. Hist., Zool. Ser., 13, pts. 3 and 4, 1924 and 1925) for the American families, it has been thought unnecessary to repeat his references and there are thus given only the additions and changes developed since his volumes were published. In the families here concerned, these amount to some 300 names. For the Eurylaimidae, Sharpe's Hand-List (vol. 3, 1901) is continued as the basic work. In this family, the additional names, recognized or synonymized, amount to more than two and one-half times the number cited by Sharpe. Original references are, of course, given in every case.

The major groups, from order to family, follow Wetmore's classification as in previous volumes of the series. The arrangement of genera and species is the author's own, according to his studied beliefs as to natural affinities. Subspecies follow a geographical pattern. Bibliographic references are given under each genus to critical discussions where may be found reviews of the species concerned. Footnotes are added where new concepts are involved or where there are unsolved questions. The plan of the volume thus agrees with that of the preceding parts.

Work has been active in recent years in the field covered by volume 7, and the book shows the result of a careful examination of existing evidence, presenting a fresh view of the classification of the groups concerned. It maintains the high standard

set by the antecedent volumes and forms an important part of this *vade mecum* of the ornithological taxonomist.—JOHN T. ZIMMER.

The Birds of Newfoundland.—HAROLD S. PETERS AND THOMAS D. BURLEIGH. (Department of Natural Resources, Province of Newfoundland, St. John's), pp. xix + 431, 32 col. pls., 40 line drawings, and map end-papers by Roger Tory Peterson, 1951.—By far the greater part of this handsome book, the first really definitive work on the birds of the world's tenth largest island and "Canada's newest province," is devoted to writeups concerning the 47 resident, 74 summer resident, 17 winter resident, 14 transient, 13 visitant, 23 casual visitant, 37 accidental visitant, and 20 extinct birds believed by the authors to live (or have lived) there. The first 43 pages give us certain statistics about the island, briefly chronicle the ornithological work done there, and dip into such subjects as the development of plumage, the activities of birds (song, courtship, nest-building, etc.), aids to identification, geographical distribution and life zones, and conservation and protection of birds. The chapter on systematic classification ends with an interesting and useful list of 24 birds described from Newfoundland, with the type localities.

Some statements in this introductory part of the book should have been much more carefully worded. The sentence "Among most water birds the flight feathers are all molted at once, so the bird is flightless for a time after the nesting season" (p. 14) is misleading. Most (probably all) ducks, geese, swans, grebes, loons, and alcids certainly do become flightless during the post-nuptial molt; but what of the host of gulls, terns, pelicans, cormorants, albatrosses, petrels, herons, and shorebirds that do not? The sentence "The molt proceeds gradually from the nestling plumage to that of the juvenile then into the winter plumage" (p. 13) is anything but clear. Among passeriform birds that I have worked with, the nestling plumage (*i. e.*, either that immediately following the natal down or, in case the bird is hatched naked, the very first plumage it wears) is the juvenal plumage, and the molting of some or all this plumage results in the first winter plumage. It is true that some young passerines appear to wear a plumage intermediate to the juvenal plumage and the first winter plumage, but the more I study this particular plumage-stage the more convinced I am that the puzzling, new, non-plumulaceous feathers of the "juvenal" plumage are actually part of the first winter plumage.

As for the annotated list of species (pp. 46 to 399), persons desiring information about Newfoundland birds *as such* will be apt to feel that too much space has been given the accidental visitants (many of which have been recorded only once), and not nearly enough to such birds as—the Greater Yellow-legs, which breeds widely and in some numbers in the interior; the Greater Shearwater, a "common summer visitant offshore from May to October"; the Pigeon Hawk, whose breeding populations may well be more dense than any on the North American mainland; and the Yellow-bellied Flycatcher, which is—at least locally—very abundant in summer. Some readers will feel, too, that more space should have been given to birds of basic economic importance. By this I mean neither the Ptarmigan, which may lure hunters from afar, thus bringing the province a certain amount of business, nor the Ruffed Grouse and Spruce Grouse, which Peters and Burleigh recommend be introduced, but rather the Common Eider, which might, conceivably, become an important source of revenue if managed for its down, and the baccalieu birds (murres), tinkers (Razor-billed Auks), Kittiwakes, and Puffins which have been, and are, so widely used as food. Speaking for myself, I think more space should have been given certain species about whose nesting comparatively little has been written—*e. g.*, the Pine Grosbeak, Rusty Blackbird, and Fox Sparrow. No one can blame the authors

for wishing their work to be entirely inclusive—to give a complete picture of Newfoundland birdlife; the point is, do they emphasize the essential Newfoundland element sufficiently? Do they not, in giving so much space to the accidentals and casuals, and so little, comparatively, to birds best known among Newfoundlanders, throw the whole picture slightly out of focus?

The statement on the jacket to the effect that the book "covers half the species to be seen in northeastern North America" may be the key to the trouble. Surely what was needed was not another book dealing in general with any part of northeastern North America—but a book so centered on Newfoundland that every page would emphasize Newfoundland bird habits and habitats, Newfoundland nest-sites and nest materials, Newfoundland migrations, etc. There is not a photograph of Newfoundland in the book—a profound pity, not alone because good photographs would have shown bird habitats but because they would have added character and beauty.

Newfoundland's birdlife is, in certain ways, downright puzzling. One cannot help wondering why the Green-winged Teal should be a "common summer resident" while the American Widgeon is only accidental; or why the Ring-necked Duck should breed occasionally while the Lesser Scaup does not. The extreme rarity of the Killdeer is the more remarkable because the Spotted Sandpiper is so widely distributed and common. I, for one, would have been glad to read the authors' comments on some of these phenomena. I wish the book had included special discussions of the forests, the flat boggy parts of the high interior, the mountains, the beaches, the rocky coasts, and the fog-hung Grand Banks as ecological units. I wish there had been a relief map.

Some of the above has the sharp ring of adverse criticism, to be sure. Wholly in the book's favor we must say that it includes a very great deal which will be of value to Newfoundlanders. Many a user will have no other bird book in his library; for such as these the pages abound in useful and interesting reading. The descriptions and life history material have been written with care. The volume is highly presentable, with its decorative format and open, readable type. The color-plates represent Peterson at his best. Composites though they are—and as such the bane of the bird artist's existence—they are, nevertheless, well composed and ecologically sound. The gray background tones very accurately represent Newfoundland weather and scenery—a fact which will probably escape the notice of those who have never visited the island. Some of the backgrounds show actual landscapes and seascapes, thus taking the place of habitat photographs to some extent. The plate of the accipiters and falcons strikes me as being especially good. The hypothetical list and extensive bibliography will be of special value to those interested in pursuing further the subject of Newfoundland ornithology. The provincial government, for its determination to see a book on Newfoundland birds a *fait accompli*, and the authors for their able collaboration in the enterprise, are to be congratulated.—
GEORGE MIKSCH SUTTON.

Wildlife Management.—IRA N. GABRIELSON. (Macmillan Co., New York), xii + 274 pp., 40 illus., 8 tables. Price, \$4.50.—Dr. Gabrielson, who was director of the U. S. Fish and Wildlife Service for 11 years, includes not only birds and mammals in his definition of "wildlife" but fish as well. This no doubt will give the layman a clearer meaning of the term since "wildlife" is too generally understood to mean only land animals. Management is defined basically as "meeting the biological needs of wildlife" plus the modifying "of human activities that affect wildlife and human use of the wildlife resources."

The book is directed to those interested in wildlife and is well-written. The author presents an honest appraisal of both the weaknesses and strong points of wildlife management. The lack of technical terms is refreshing. Each chapter is a complete discussion of a topic—covering its history, its rôle in wildlife management, and its value. A list of basic references follows each chapter. The photographs are excellent but probably would be more effective if shown with the topic under discussion.

The author emphasizes repeatedly the need for better methods in biological research in game and fish management. Great improvements in methods of public education and state administration are also prime necessities. A much greater public participation in wildlife programs is called for.

The book consists of 13 chapters plus an index. The first three chapters discuss problems, research, and education in wildlife management, in that order. The next seven cover more specific methods of management. Chapters 11 and 12 discuss sportsmanship and administration in wildlife management. The final chapter attempts to answer the question "Can public hunting and fishing be maintained?" The author's "Yes—but . . ." answer gives a thought-provoking picture of what this comparatively new profession of wildlife management must strive for. This is a good book for the public, the student, and the professional management man.—LEONARD DURHAM.

Life Sciences at the University of Utah.—RALPH V. CHAMBERLIN. (Univ. Utah, Salt Lake City), xv + 417 pp., numerous figs., 1950. Price \$3.50.—An historical account detailing the educational and research activities in the biological field at the University of Utah. These have been in large part concerned with the study of the fauna and flora of the Great Basin region. The first chapters are devoted to the early natural history lore, such as ethnobiology, the explorers and early naturalists, nature and the pioneers, the development of museums, natural history teachings, and the early history of the University. This is followed by the subsequent history of courses and activities, the establishment of the Medical School as an offshoot of the biology work, the rôles of many individuals, and finally the later growth and fruition, including graduate degrees and theses and the fields and growth of research. A list of publications is included year by year. Perusal of this material will reveal that the University has been somewhat of a center of ornithological research throughout the years albeit largely on problems of local concern.

Although pointed in a different direction, this publication quite coincidentally serves as something of a companion volume to Ewan's 'Rocky Mountain Naturalists' which is devoted essentially to the east side of the region.—WILLIAM H. BEHLE.

ALLISON, F. R., M. A. BARRAS-SMITH, A. DARLINGTON, AND M. L. R. ROMER. 1951. Migrants observed from ocean weather ships, July–October, 1950. *Brit. Birds*, **44** (7): 219–222.

AMADON, DEAN. 1951. Le pseudo-souimanga de Madagascar. *Oiseau*, **21** (1): 59–63, 2 figs.—A study of the endemic genus *Neodrepanis* of Madagascar shows it to be a member of the Philepittidae rather than of the Nectariniidae. The chief differences between *Neodrepanis* and *Philepitta* are in the structure of the beak and tongue.—C. Vaurie.

ARMINGTON, SVEN. 1951. Polygami och polyterritorialism hos törnsångaren (*Sylvia communis* Lath.) (A case of bigamy and holding two territories by a Whitethroat). *Vår Fågelvärld*, **10** (1): 26–31, 2 figs. in text.—English summary. A five-year-old color-ringed male in 1945 established two breeding territories,

- about 300 yards apart and 750 yards from the ringing place. After the first hen had completed her clutch he copulated with a second but took part in the incubation and feeding of the young only in the first territory. The second hen succeeded in raising her brood without assistance from the bigamous male.—T. Malmberg.
- ARNOLD, JOHN W., RUTH M. HORNER, VERNA ROSS, AND MARY STUART. 1951. Breeding-bird census, 1950. *Can. Field-Nat.*, **65** (2): 81.—In Carleton Co., near Ottawa, Ontario.
- BAERG, W. J. 1951. Birds of Arkansas. Revised Ed. (Univ. Arkansas College Agric., Fayetteville) Bull. 258 Rev., pp. 1-188, 49 figs., 1 table.—The avowed intent of this publication is to furnish information to teachers of biology and nature study. The list of forms includes 354 species and subspecies; accounts of these give data on migration, song, nests, and food habits, as well as a description and the range occupied. A table shows the periods of song of certain species for five years.—H. I. Fisher.
- BAL, C. 1951. Prooien van Sperwers, *Accipiter nisus* L. in het roestbos. *Ardea*, **39**: 218-222.—Feeding habits of the European Sparrow Hawk.
- BARBOUR, ROGER W. 1951. Observations on the breeding habits of the Red-eyed Towhee [*Pipilo erythrophthalmus erythrophthalmus*]. *Amer. Midl. Nat.*, **45** (3): 672-678, 3 figs.
- BARRUEL, P. 1951. Vitesse de vol du Martin-pêcheur. *Oiseau*, **21** (1): 69-70.—*Alcedo atthis* observed flying at a speed of about 65 kilometers per hour.
- BARRUEL, P. 1951. Occupations successives d'un trou de Pic épeiche. *Oiseau*, **21** (1): 70-71.—Successive nesting of *Dryobates major* and *Passer montanus* in the same hole.
- BEDFORD, DUKE OF. 1951. Homing Budgerigars. *Avic. Mag.*, **57**: 47-50.—Normally, Budgerigars are wandering birds, and the domesticated stock has retained this habit of the wild ancestors, usually soon straying if given liberty. The Duke of Bedford has succeeded in establishing by selection a strain of these tiny parrots that have lost the lust for travel and that stay around the spot where they have been liberated.—J. Delacour.
- BEDFORD, DUKE OF. 1951. The breeding of the Blue Ringneck. *Avic. Mag.*, **57**: 143-144.—Blue phases of plumage occur at rare intervals in the wild state among dominantly green parrots, and strains of some of them have become well established in captivity, particularly of *Melopsittacus undulatus* and *Agapornis personata*. A few blue specimens of Ringnecks, *Psittacula krameri*, have been recorded from India, but none had bred in captivity before. From a pair received in 1949 from Calcutta, the Duke of Bedford obtained in 1951, three young of exactly the same blue color as the parents.—J. Delacour.
- BEIDLEMAN, RICHARD G. 1951. Recent bird records from northeastern Colorado. *Condor*, **53** (5): 260-261.—Annotated list of 14 species rare in Colorado and previously unreported from the northeastern portion of the state.
- BERLIOZ, J., AND P. ROUGEOT. 1951. Etude d'une collection d'oiseaux du Gabon. *Bull. Mus. Nat. Hist. Nat.*, **2** (23): 66-76.—List of birds collected at Oyem, Northern Gaboon, by P. Rougeot, with notes on several rare species.
- BERLIOZ, J. 1951. Réflexions sur la systématique ornithologique et la nomenclature. *Oiseau*, **21** (2): 135-144.
- BLAKE, CHARLES H. 1951. On the problem of the return of migratory birds. *Bird-Banding*, **22** (3): 114-117.

- BLAKE, CHARLES H. 1951. An example of sexual bias in trapping. *Bird-Banding*, **22** (3): 117-119.—Many more male Red-eyed Towhees, *Pipilo erythrophthalmus*, trapped than females.
- BLAKE, CHARLES H. 1951. A method of estimating association of individuals. *Bird-Banding*, **22** (3): 119-121.
- BOND, JAMES. 1951. First supplement to the check-list of birds of the West Indies (1950). (*Acad. Nat. Sci. Phila., Pa.*, August, 1951), pp. 1-22.
- BOND, JAMES. 1951. Notes on Peruvian Fringillidae. *Proc. Acad. Nat. Sci. Phila.*, **103**: 65-84.—Species accounts containing locality records and critical taxonomic comment based on external features.
- BOROVSKY, PAUL. 1951. L'époque des migrations et ses rapports avec l'histoire de certaines espèces. *Oiseau*, **21** (2): 146-148.
- BOUDOINT, YVES. 1951. Le vol du Circaète Jean le blanc, plus particulièrement dans le Massif central. *Alauda*, **19** (1): 1-18.—Detailed observations on the flight of *Circaetus g. gallicus*, illustrated by 14 excellent sketches by P. Barruel. Various types of flight are studied in detail. An interesting and valuable contribution.—C. Vaurie.
- BROEKHUYSEN, G. J. 1951. Some observations on the nesting activities of the Redwing Starling, *Onychognathus morio morio*. *Ostrich*, **22**: 6-16.
- BROOKS, MAURICE. 1951. English Sparrows [*Passer domesticus*] eating locust leaf-miners. *Wilson Bull.*, **63** (2): 116.
- BROWN, R. B. 1951. Rearing Regent Bower Bird in captivity. *Avic. Mag.*, **57**: 94-95.—Young Regent Birds were taken from the nest and hand reared in Australia. Valuable observations were made at the nest.—J. Delacour.
- BRYENS, OSCAR MCKINLEY. 1951. Some notes on activities of the Northern and Migrant shrikes. *Bird-Banding*, **22** (3): 121-125.—*Lanius b. borealis* and *Lanius ludovicianus migrans* at a banding station.
- CARPENTER, CHARLES C. 1951. Young Goldfinches [*Spinus tristis*] eaten by garter snake. *Wilson Bull.*, **63** (2): 117-118.
- COLQUHOUN, M. K. 1951. The Wood Pigeon [*Columba palumbus*] in Britain. *Agric. Res. Council (London)*, Rept. Series No. 10: vi + 69, 7 figs., 45 tables.—This is an abridged account of a comprehensive study made of this species by the British Trust for Ornithology. The study originally emphasized the control of the Wood Pigeon and its relations to agriculture and forestry, and this aspect is noted throughout. However, the present report includes data on many features of the pigeon—nests, breeding, habitat selection, populations, behavior, development and molts, age determination, weights, food habits—and special sections on relations to man and population problems. It is noted that control is not necessary at present, probably as a result of decreased predator control and increased hunting pressure during the war.—H. I. Fisher.
- CURRY-LINDAHL, KAI. 1951. Skruvflykt hos kråkfåglar (Gyration in corvines). *Vår Fågelvärld*, **10** (2): 75-78.—English summary. On May 19, 1949, near Windsor in England, examples of *Corvus c. corone* and *Corvus frugilegus* were observed some hours after noon ascending in gyration, sometimes disappearing above the clouds. All passing corvines, but never other birds, were drawn into the movement, where wings were moved only occasionally. Birds from a rookery in the vicinity seemed to use the air currents in order to rise and then headed towards the feeding places in a gliding manner, returning in their usual flight.—T. Malmberg.
- DAVIES, J. J. L. 1951. Some observations of the South African Harrier Hawk,

- Polyboroides typus typus* [*Gymnogenys typicus*]. Ostrich, **22**: 39-40.—Nesting in hole in cliff.
- DAVIS, DAVID E. 1951. The analysis of population by banding. *Bird-Banding*, **22** (3): 103-107.
- DE CHAVIGNY, J. 1951. Transport d'un jeune par une Poule d'eau *Gallinula chloropus* (L.). *Alauda*, **19** (1): 51-54.—An adult was observed in flight while carrying a young, apparently holding it in its toes. Other species that are known to displace their young are mentioned.—C. Vaurie.
- DELACOUR, J. 1951. Taxonomic notes on the Bean Geese, *Anser fabalis* Lath. *Ardea*, **39**: 135-142.—Distributional study of the complicated variations of the species, according to recent researches, particularly first-hand information from H. Johansen. Six subspecies recognized; one described as new—*Anser fabalis johanseni* from Tai-pai Shan, Tsinling Mountains, N. W. China.—C. Vaurie.
- DELACOUR, JEAN. 1951. Commentaires, modifications et additions à la liste des oiseaux de l'Indochine Française. *Oiseau*, **21** (1): 1-32; and (2): 81-119.—The nomenclature, status, and distribution of the rich avifauna is brought up to date. The list of genera is reduced, new records are noted, and two new subspecies are described: *Pellorneum ruficeps deignani*, Daban, southern Annam, and *P. r. dilloni*, Trangbom, Cochinchina. Among the most important systematic notes are: 1) a discussion of *Francolinus boineti*, which is well-depicted in a color plate and which is tentatively considered to be a color variant of *F. pintadeanus*; 2) a revision of the Indochinese races of *Pellorneum ruficeps*; and 3) a discussion of *Pycnonotus sinensis*.—C. Vaurie.
- DE MAERSCHALCK, J. 1951. Notes relatives à la nidification du blongios *Ixobrychus minutus* (L.). *Gerfaut*, **41** (1): 1-14.—Habitat, nesting, sounds, behavior, development of young, migration. Dutch summary.
- DENTON, J. FRED, AND ELON E. BYRD. 1951. The helminth parasites of birds, III: Dicrocoelid trematodes from North American birds. *Proc. U. S. Natl. Mus.*, **101**: 157-202, figs. 34-40, 1 table.—Survey of occurrence in more than 700 specimens of 134 species belonging to 40 families.
- DERAMOND, M. 1951. Quelques observations sur le petit pluvier a collier en Sologne. *Oiseau*, **21** (1): 55-58.—Notes on the nesting and behavior of *Charadrius dubius curonicus* in France.
- DESAI, P. K. 1951. Breeding Grey Parrots for thirty years. *Avic. Mag.*, **57**: 98-102.—Record of the nesting in captivity in India of the popular African Parrot, which is a shy breeder in confinement.
- DEXTER, RALPH W. 1951. Unusual nesting behavior of a Chimney Swift [*Chaetura pelagica*]. *Amer. Midl. Nat.*, **46** (1): 227-229.
- DEXTER, RALPH W. 1951. Diary of five Chimney Swifts [*Chaetura pelagica*]. *Ohio Journ. Sci.*, **51** (1): 42-46.—Records of successive matings and nest-sites of banded swifts.
- DORST, JEAN. 1951. Contribution à l'étude du plumage des Coucous métalliques du genre *Chrysococcyx* Boie. *Bull. Mus. Nat. Hist. Nat.*, (2) **23**: 173-180.—Microscopical study of the metallic feathers of these small African Cuckoos. The feathers of the brilliant *C. cupreus* are very different in structure from those of the less bright *C. caprius*.
- DORST, JEAN. 1951. Recherche sur la structure des plumes des Trochilidés. *Mém. Mus. Nat. Hist. Nat.*, N. S., A. Zoologie, **1**: 125-260.—There have long been in Paris ornithologists particularly interested in hummingbirds. Today, Prof. J. Berlioz not only has under his care the historic specimens of the Museum, but he

- also owns personally the finest private collection, the nucleus of which is constituted by the late Eugène Simon's famous series. It is therefore fitting that Dr. Dorst, his pupil and assistant, has undertaken a thorough study of the structure of the feathers of the Trochilidae, a subject which had so far been somewhat neglected despite the evident interest of their great peculiarity. It has necessitated an immense amount of microscopical work, conducted with great technical ingenuity. Contour feathers of hummingbirds are relatively few in number, and scale-like in appearance. Many show metallic hues which are caused by the very special structure of the "barbules." All aspects of the problem are investigated in detail and interpreted wisely in this most important contribution.—J. Delacour.
- DORST, JEAN. 1950. La coloration du plumage chez les Oiseaux. *Scientia*, **44**: 311-315.—A short general account of coloration in bird plumages, and of the structure and pigments of feathers.
- DURANGO, S. 1951. Om törnskatans (*Lanius collurio* L.) spetsning av bytesdjur (The impaling habits of the Red-backed Shrike). *Vår Fågelvärld*, **10** (2): 49-65, 5 figs. in text.—English summary. In literature the following interpretations of the cause of the impaling habit of the bird are proposed: a) the feet being too weak to hold the prey when cut into pieces; b) the impaled prey forming some kind of store; and c) manifestation of cruelty and rapacity or without real purpose. At once c) is rejected and even a) since the feet of the bird are unusually strong and it sometimes eats vertebrates without impaling them. The habit is never seen in winter quarters but only in the breeding area, where many individuals have to be fed by one or two providers, and for climatic reasons living prey can be difficult to find. The stores are often emptied during early morning hours or periods of rain and coldness, when insect activity is low. The habit seems to occur in all English shrikes, most often in central Sweden, but seldom on the island of Fårö north of Gotland, where the number of hours of sunshine compared with England is very high. Evidently the impaling habit has a meaning in procuring a store, though at times and in places of abundant food it seems supererogatory.—T. Malmberg.
- EAST, BEN. 1951. Enjoy them while they last. *Nat. Hist.*, **60** (7): 327-334, 11 ills.—Popular account of certain species which are "vanishing," primarily shore-birds.
- EGGELING, W. J. 1951. Ringed birds recovered in Uganda. *Uganda Journ.*, **15** (1): 17-25.—Data on 109 birds banded, chiefly in Europe, and recovered in Uganda up to Oct. 1, 1950, with particular details on the White Stork, Black Stork, Scandinavian Lesser Black-backed Gull, European Swallow, and Black Kite.—H. Friedmann.
- ELLENBERGER, P. M. 1951. Notes on some birds of the Ndanga (Zaka) district of Southern Rhodesia. *Ostrich*, **22**: 17-24.
- ENEHJELM, C. AF. 1951. Breeding of the Green-rumped Parrotlet (*Forpus passerinus passerinus*). *Avic. Mag.*, **57**: 53-56.—Observations on the nesting in captivity of this pigmy South American parrot.
- ERGENE, SAADET. 1945. Türkiye Kuslari. (Kenan Matbaasi, Istanbul), Istanbul Univ. Fen Fakültesi Monograf., **4**: 1-362, 35 pls., 1 col. map, 104 pls., 333 figs.—In modern Turkish. The birds of Turkey are treated in species accounts, with general range, measurements, description, occurrence in Turkey, biotope, and local occurrence of subspecies.
- FONTAINE, VIKING. 1951. Mindre liran, *Puffinus puffinus* (Brünnich), en för Sverige ny fågelart (The Manx Shearwater new to Sweden). *Vår Fågelvärld*, **10** (1): 16-26, 4 figs. in text.—English summary. First two records apart from sub-

- fossil bones and remnants in Stone Age settlements, together with description and survey of distribution, migration, and breeding biology.—T. Malmberg.
- GABRIELSON, IRA N., AND FREDERICK C. LINCOLN. 1951. The races of song sparrows in Alaska. *Condor*, **53** (5): 250-255.—Systematic review of eight races including two new subspecies, *Melospiza melodia maxima*, a permanently resident form of the western Aleutians ranging from Atka to Attu, and *M. m. amaka* from Amak Island located north of the western end of the Alaska Peninsula.—W. H. Behle.
- GEORGE, JOHN L. 1951. Marsh Hawk [*Circus cyaneus*] catching a Mourning Dove [*Zenaidura macroura*]. *Wilson Bull.*, **63** (2): 112.
- GIBSON, J. A. 1951. The breeding distribution, population, and history of the birds of Ailsa Craig. *Scot. Nat.*, **63** (2): 73-100, 7 figs., 3 tables (to be cont.).
- GLENNY, FRED H. 1951. A systematic study of the main arteries in the region of the heart—Aves 22. Passeriformes—Corvidae, Part 1. *Amer. Midl. Nat.*, **45** (3): 679-682, 3 figs.
- GODFREY, W. EARL. 1951. Geographical variation in the Boreal Chickadee east of the Rockies. *Can. Field-Nat.*, **65** (1): 22-26.—Characters, measurements, and distribution given for four races, with relevant comment. *Parus hudsonicus farleyi*, resident in parts of Alberta, Mackenzie, Saskatchewan and Manitoba, is newly described.—W. W. H. Gunn.
- GOODWIN, DEREK. 1951. My Magpies, past and present. *Avic. Mag.*, **57**: 10-15.—Study of the habits and behavior of tame European Magpies.
- GRABER, RICHARD AND JEAN. 1951. Nesting of the Parula Warbler in Michigan. *Wilson Bull.*, **63** (2): 75-83, 1 fig.—Four active nests of *Parula americana* were found in Emmett Co., Michigan, and observations were made of the nesting habits and success.
- GUICHARD, G. 1951. Les flamants de Camargue. *Oiseau*, **21** (1): 48-54, 3 figs.—Notes on the nesting and behavior of this famous colony of Flamingos, which despite some setbacks seems to be flourishing.
- HACHISUKA, MASAUJI, AND TATSUO UDAGWA. 1951. Contribution to the ornithology of Formosa. Part II. *Quart. Journ. Taiwan Mus.*, **4** (1-2): 1-180.—The present part contains the systematic accounts by species. Most of the information is concerned with description of male and female plumages, with an occasional note on juvenal plumage, and with distribution. However, many of the accounts contain data on habitat, nest and eggs, migration, and behavior.
- HACHLER, EMIL M. 1951. A new local race of the Hazel-Grouse (*Tetrastes bonasia* [L.]) from the East-Carpathian Mountains. *Aquila*, **51-54**: 82-84, 1944-1947.—*Tetrastes bonasia horicei* from Jasina (the Polonins).
- HAMERSTROM, F. N., JR., AND FRANCES HAMERSTROM. 1951. Mobility of the Sharp-tailed Grouse [*Pedioecetes phasianellus*] in relation to its ecology and distribution. *Amer. Midl. Nat.*, **46** (1): 174-226, 12 figs., 5 tables.—The Hamerstroms have spent several years studying this and related species in Wisconsin and Michigan. Banding and intensive field study show that autumn coveys (8-30 birds) have definite ranges and a cruising radius of up to a mile. Packs form later in the fall, and the birds live in the edges of brush and open woods during the winter. The packs break up in spring and the birds move into open areas.
- Birds seldom move farther than three miles (one moved 21 miles). Dancing grounds for males that were retrapped were less than one and one-half miles from wintering quarters. Transplanted birds may move greater distances than those in the home area.

- This grouse is practically gone from the prairies, and the present range is in or adjoining brushlands, ravines, or small openings in the forest. Loss of range and decrease in numbers of grouse are proceeding hand in hand.—Harvey I. Fisher.
- HANŽÁK, JAN. 1951. Zpráva o hnízdění volavek červených, *Ardea purpurea* L., a volavek bílých, *Egretta alba* (L.). *Sylvia*, **11-12** (4): 85-97, 1949/50.—Breeding records of Purple Heron and Great White Heron in Bohemia; English summary of these records and some natural history notes.
- HAUSMAN, LEON A. 1951. Beginner's guide to attracting birds. (G. P. Putnam's Sons, New York), pp. 1-127, many figs. Price \$2.00.—Houses, feeding stations, foods, birdbaths, dust baths, and plantings for specific forms.
- HAVERSCHMIDT, FR. 1951. The nest and eggs of *Smaragdites t. theresiae*. *Wilson Bull.*, **63** (2): 114-115, 1 fig.—A hummingbird of Venezuela and Brazil.
- HEIM DE BALSAC, H. AND T. 1951. Les migrations des oiseaux dans l'ouest du continent africain. *Alauda*, **19** (1): 19-39.—A continuation of an article on migration in Africa, with dates and critical notes on migration.
- HERVOUET, L. 1951. Notes sur l'élevage et l'hybridation du bouvreuil. *Oiseau*, **21** (1): 64-68.—Successful crossing in captivity of a male canary with a female bullfinch.
- HOWARD, HILDEGARDE. 1951. Pleistocene duck bones from Ohio. *Condor*, **53** (4): 205.—Measurements of several bones of an anatine duck from Pleistocene lake beds at Lockland, Hamilton County, Ohio.
- HOYT, J. SOUTHGATE AND SALLY F. 1951. Age records of Pileated Woodpeckers. *Bird-Banding*, **22** (3): 125.—A banded *Dryocopus pileatus* was shot at an age of 10 years. A nestling raised by the authors died of kidney trouble at the age of nine and a half years.
- HUBBS, CARL L., AND GEORGE A. BARTHOLOMEW, JR. 1951. Persistence of a rare color aberration in the Heermann Gull. *Condor*, **53** (5): 221-227.—Summary of 20 records of birds with white patch near the bend of each wing, which character has been reappearing for nearly a century with great rareness, perhaps one in 10,000. Discussion of possible origin and evolutionary significance.—W. H. Behle.
- HUNT, O. D. 1951. Displacement display of female Great Tit evoking mating response by male Chiffchaff. *Brit. Birds*, **44** (8): 278.—A female *Parus major*, disturbed by the author's presence, perched 20 feet from her nest with her beak full of food, shivered her wings, and called continuously with a querulous note. Her mate ignored her, but a male *Phylloscopus collybita* mounted her three times; her behavior was not altered.—M. M. Nice.
- HURLBURT, W. E. 1950. An unusual collection of Canadian birds. *Avic. Mag.*, **57**: 18-21.—Account of the collection of live native birds of Mr. H. Roy Ivor, in southern Ontario. Longevity data are included.
- JOUANIN, CHRISTIAN. 1950. Catalogue systématique des types de Trochilidés du Museum National d'Histoire Naturelle de Paris. *Bull. Mus. Nat. Hist. Nat.*, **22** (2), suppl. 2: 1-27.—Annotated list of the types of hummingbirds in the Paris Museum, where a rich and historic collection is deposited.
- JOUANIN, CHRISTIAN. 1951. Des Cormorans à Paris. *Oiseau*, **21** (1): 71-73.—Unusual record of a small flock of *Phalacrocorax carbo* in the heart of Paris.
- JUNGE, G. C. A. 1951. Resultaten van het ringonderzoek betreffende de vogel-trek, ingesteld door het Rijksmuseum van Natuurlijke Histoire te Leiden, XXXVI (1949). *Limosa*, **24** (1-2): 27-53.—List of birds banded and recovered in the vicinity of Leiden.

- KAGELMANN, GERHART. 1951. Studien über Farbfelderung, Zeichnung und Färbung der Wild- und Hausenten. Zool. Jahrb., **62**: 513-630, 9 tables, 38 figs.—An investigation of the degree to which the diversity of form in domestic ducks is different from that in their wild relatives. With abundant figures he compares the color-fields, patterns, and pigmentation of the plumage based on studies of 1457 specimens of wild ducks and a smaller number of domestic varieties. The Mallard, *Anas platyrhynchos*, is considered the stem form of all culture varieties and shows that the domestic duck has the same pattern and variations. White-spotting in this form may produce extensive white areas, and melanism, superimposed on this albinism, may produce other patterns. He concludes that all of the pattern models can be derived from a single form—the female type of plumage. The diversity of domestic forms he considers explicable on a pluripotential concept of genetics but is unable to explain the fact that color fields, models, and pigments appear in domestic forms that are rare or lacking in the wild condition. He theorizes that domestication has its effect through disharmonious effects on the growth and pigmentation of the individual feather. His assumption that the female plumage is the basic type from which others are derived is suspect on the evidence of pattern alone, but it also does not fit well with studies of hormones in which it is shown that male plumage may be genetically basic. Whereas the male plumage may be unaffected by injection of female hormone, female plumage can be changed to male by injection of male hormone in certain species.—W. J. Beecher.
- KNOUFF, R. A., AND F. A. HARTMAN. 1951. A microscopic study of the adrenal of the Brown Pelican. Anat. Rec., **109**: 161-178, 4 pls.
- KELSO, LEON. 1951. Demonstrating the glandularity of the feather. Biol. Leaflet No. 57: 1-4.—Interesting and thought-provoking speculations about the functions of feathers.
- KIST, J. 1951. Zwartkopmeeuw, *Larus melanocephalus* Temm., op "De Beer." Larus, **24** (1-2): 3-6, 1 pl.—Third record of Mediterranean Black-headed Gull in the Netherlands.
- KLOMP, H. 1951. Over de achteruitgang van de Kievit, *Vanellus vanellus* (L.), in Nederland en gegevens over het legmechanisme en het eiproductie-vermogen. Ardea, **39**: 143-182. Summary in English.—Causes for present decrease in numbers of the Lapwing in Holland are studied. Gathering of eggs is not an important cause, as birds lay again several times if the nest is robbed, but are single-brooded when successful. Improvement of grasslands and other fields seems more significant. The species has tremendous power of recovery.—J. Delacour.
- KLUIJVER, H. N. 1951. The population ecology of the Great Tit, *Parus major major* L. Ardea, **39**: 1-135.—A detailed, exhaustive study of the population density, ecology, and breeding habits of the Great Tit, based on observations and experimentations started in 1912 in Holland. The economic importance of the species determined its being chosen for a thorough and lengthy survey. Population fluctuations are recorded and analyzed. This is a very important contribution to the life habits of this successful species, whose high rate of mortality is compensated for by large and numerous broods.—J. Delacour.
- KUBIK, V. 1951. Příspěvek k hnízdní biologii dudka (*Upupa epops*). Sylvia, **11-12** (4): 97-102, 1949/50.—Notes on the nest, eggs, development, and behavior of the Hoopoe.
- LABITTE, ANDRE. 1951. Notes sur la biologie de reproduction d'*Oriolus oriolus* en pays drouais. Alauda, **19** (1): 40-48.—Notes on behavior, nesting, and incuba-

- tion. The nest is built by the female alone, which may work on it for as much as 14 consecutive hours. The clutch consists normally of four eggs. The laying season does not exceed 37 days (May 20–June 26).—C. Vaurie.
- LABITTE, ANDRÉ. 1951. Notes biologiques sur la Chouette chevêche, *Carine noctua vidalii*. Oiseau, **21** (2): 120–126, 2 figs.—Observations on ecology, behavior, and nesting. The same nesting site is used year after year by the same pair. First laying dates are given for a period of 32 years, the average date being April 18. After hatching, the young occupy the nest for a minimum of 30 days.—C. Vaurie.
- LACK, DAVID AND ELIZABETH. 1951. Decouverte de la reproduction d'*Apus pallidus* en France. Alauda, **19** (1): 49.—First nesting record for France.
- LAW, JUAN THEUNE. 1951. Observaciones sobre la Lloica (*Pezites militaris militaris*). Invest. Zool. Chilenas, **1** (4): 6–7.—In Spanish; summaries in English and German. Records on food intake of a captive nestling.
- LAWSON, DOUGLAS F. 1951. Notes on breeding behaviour of Nightjar. Brit. Birds, **44** (8): 281–282.—Incubation period at a nest of *Caprimulgus europaeus* was 17 days; fledging 21 days.
- LEOPOLD, FREDERIC. 1951. A study of nesting wood ducks in Iowa. Condor, **53** (5): 209–220.—Utilization of nesting boxes, egg laying, incubation, hatching, departure from the nest, and travel of the brood to water.
- LINSDALE, JEAN M. 1951. Fifth ten year index to the Condor. Pacific Coast Avif. No. **30**: 1–117.—Covers volumes 41–50, 1939–1948.
- LINSDALE, JEAN M. 1951. A list of the birds of Nevada. Condor, **53** (5): 228–249.—Up-to-date entries to follow the author's summary of 1936 (Pacific Coast Avif. No. 23). The list now contains 309 full species and 87 additional races.—W. H. Behle.
- LUMSDEN, H. G. 1951. Breeding diving ducks on Lake St. Clair, Ontario. Can. Field-Nat., **65** (1): 31–32.—In 1949, small populations of Redheads and Ruddy Ducks nested in a marsh at the estuary of the St. Clair River.
- MACDONALD, J. D. 1951. Types and type localities of Alexander's Damaraland birds. Ostrich, **22**: 2–5.
- MACLEOD, J. G. R. 1951. The Maccoa Duck, *Oxyura jamaicensis maccoa*. Ostrich, **22**: 37.—Habits.
- MAYAUD, NOËL. 1951. Martinet pâle et Martinet noir. Alauda, **19** (1): 49–51.—Comments on the observations of Lack, D. and E. in Alauda, 19 (1): 49, 1951.
- MAYAUD, NOËL. 1951. Comportement bizarre chez un Coq domestique. Alauda, **19** (1): 56.—Queer behavior of a rooster and a goat fighting each other.
- MCCABE, ROBERT A. 1951. The song and song-flight of the Alder Flycatcher. Wilson Bull., **63** (2): 89–98, 1 fig., 1 table.—A discussion of the geographical variation of the song of *Empidonax t. traillii* and a description of a flight song and other features of its song.
- MEES, G. F. 1951. Het areaal van *Zosterops palpebrosa buxtoni* Nicholson op Java. Ardea, **39**: 196–218. Summary in English.—The grey-bellied *Z. p. buxtoni* is found on high ground in a few localities in western Java, while the yellow-bellied *Z. p. gallio* occupies the rest of the island. The author considers *buxtoni* as also occupying Sumatra (*Z. p. sumatrana* Kloss is a synonym).
- MILLER, ALDEN H., AND LOYE MILLER. 1951. Geographic variation of the screech owls of the deserts of western North America. Condor, **53** (4): 161–177.—Analysis of variable characters and distribution of eight races in the lower Colorado River drainage basin, adjoining parts of the Great Basin and the watersheds of the

- trough of the Gulf of California. Clines are featured. *Otus asio yumanensis* is described from lower Colorado River Valley.—W. H. Behle.
- MOORE, HILARY B. 1951. The seasonal distribution of oceanic birds in the western North Atlantic. Bull. Marine Sci. Gulf and Caribbean (Univ. Miami Press), **1** (1): 1-14.—Log of observations from the Woods Hole Oceanographic Institution vessel *Atlantis*.
- MOREAU, R. E. 1951. The British status of the quail and some problems of its biology. Brit. Birds, **44** (8): 257-276.—*Coturnix coturnix* is now comparatively rare due to excessive capture in spring and fall; the little that is known of its life history is summarized and a two-and-a-half-page bibliography appended.
- NAETHER, CARL A. 1950. The Book of the Racing Pigeon. (McKay Co. Inc., New York), x + 244 pp., 24 pls. Price, \$3.50.—Pigeon fanciers will welcome the information presented here in easy-to-read fashion. The literature has been searched for pertinent data, to which the author has added salient facts from his 40 years' experience with pigeons.
- Starting with a history of the subject, Mr. Naether proceeds to write of the pigeon in war, peace, racing, training, and breeding. The last two chapters are devoted to magazines and books dealing with the racing pigeon.—H. I. Fisher.
- NERO, ROBERT W. 1951. Pattern and rate of cranial 'ossification' in the House Sparrow. Wilson Bull., **63** (2): 84-88, 3 figs.—In *Passer domesticus* the ossification of the skull is progressive and symmetrical, becoming complete at an age of approximately 200 days.
- NORRIS, ROBERT A. 1951. Distribution and population of summer birds in south-western Georgia. Occ. Publ. Georgia Orn. Soc. (Athens), No. **3**: 1-67, 15 figs. Price \$1.25.—Annotated list with brief discussions of affinities and "invasions." Pages 38 to 50 are devoted to summer populations in three plant communities—old field and fence row; mature longleaf pine forest; and beech-magnolia hammock.
- ÖSTERLÖF, STEN. 1951. Fiskgjusens, *Pandion haliaëtus* (L.), flyttning (The migration of Swedish ospreys). Vår Fågelvärld, **10** (1): 1-15, 6 figs. in text, 3 tables. English summary.—Of 1805 ringed birds 236 were recovered, 130 of these during first autumnal migration taking place in August-September on a broad front from Sweden towards the south-southwest. Lack of autumn recoveries of old birds in Spain and Italy is deemed dependent on these birds' less pronounced aversion to crossing the Mediterranean, but the material is probably too little for such a conclusion. Only five recoveries during the second year after hatching, all from Africa, suggest that the birds do not leave the winter quarters prior to that age. At two years the ospreys are roaming northwards but with very few exceptions they do not reach the breeding area. The bird evidently matures at three years and from that age on there are numerous recoveries within 100 km. of the ringing-place.—T. Malmberg.
- PENNIE, IAN D. 1951. The history and distribution of the Capercaillie in Scotland. Part 3. Scot. Nat., **63** (1): 4-17.
- PENNIE, I. D. 1951. The Clo Mor bird cliffs. 1951. Scot. Nat., **63** (1): 26-32, 2 figs.—Species accounts.
- PHELPS, WILLIAM H., AND WILLIAM H. PHELPS, JR. 1951. Las aves de Bonaire. Bol. Soc. Venezolana Ciencias Nat., **13** (77): 161-187, 5 photos, map, 1950.—Short historical discussion and accounts of 71 specimens of 19 species taken November 26-30, 1947, on island of Bonaire.
- PHILLIPS, ALLAN R. 1951. Complexities of migration: a review, with original data from Arizona. Wilson Bull., **63** (2): 129-136.

- PITELKA, FRANK A. 1951. Breeding seasons of hummingbirds near Santa Barbara, California. *Condor*, **53** (4): 198-201.—Data based on a total of 331 dates for nests and eggs presented for *Calypte anna*, *Selasphorus sasin*, *Archilochus alexandri*, and *Calypte costae*, together with a brief exploratory discussion of ecological overlap between the species.
- PLATH, KARL. 1951. Breeding of Goldie's Lorikeet (*Psitteuteles goldiei*). *Avic. Mag.*, **57**: 133-135.—Record of the first breeding in captivity of a small species of nectar-eating parrot from New Guinea.
- PLOWES, D. C. H. 1951. A new race of Cape Bunting from Mashonaland. *Ostrich*, **22**: 35.—*Fringillaria capensis smilthersii* from Martin Forest Reserve, Chimanimani Mts., on border Southern Rhodesia and Portuguese East Africa.
- PORSILD, A. E. 1951. Bird notes from Banks and Victoria islands. *Can. Field-Nat.*, **65** (1): 40-42.—Observations made in July-August, 1949.
- PRESTWICH, ARTHUR A. 1951. Records of parrots bred in captivity. Part II (Cockatoos and Macaws). (A. A. Prestwich, London), pp. 33-69.
- PRESTWICH, ARTHUR A. 1951. Records of parrots bred in captivity. Part III (Conures, Parrotlets, and Parrots). (A. A. Prestwich, London), pp. 70-121.
- PULICH, WARREN M., AND ALLAN R. PHILLIPS. 1951. Autumn bird notes from the Charleston Mountains, Nevada. *Condor*, **53** (4): 205-206.—Additional records and comparisons with earlier observations of van Rossem (*Pacific Coast Avif.* No. 24, 1936).
- RAND, A. L. 1951. Birds of Negros Island. *Fieldiana. Zool.*, **31** (48): 571-596.—Based on Dr. D. S. Rabor's recent collecting, 13 new records are listed for Negros, and the variation in a number of Philippine species is discussed. It is shown that there are differences between many island populations, and there are gradual progressive changes from island to island. These clines are not always parallel and similar end products may exist in distant islands.
- RAND, A. L. 1951. Review of the subspecies of the Sunbird *Nectarinia jugularis*. *Fieldiana. Zool.*, **31** (49): 597-607.—Philippine Islands forms only are treated; four races are recognized. The central form from southern Luzon to Mindanao is very variable. Color characters are assigned numbers and these are plotted on a map to show that the population of each island is different, but overlap in characters prevents recognition by name of any of them.
- RAO, N. S. KRISHNA. 1951. *Paracuaria macdonaldi* n. g., n. sp. (Family Acuariidae, Subfamily Acuariinae) from the Sea Gull (*Larus argentatus*). *Can. Journ. Zool.*, **29** (3): 167-172.—A nematode found in the gizzard of 14 Herring Gulls from the Ottawa River, near Ste. Anne de Bellevue, Que.—W. W. H. Gunn.
- RAO, N. S. KRISHNA. 1951. *Cosmocephalus firlottei* n. sp. (Family Acuariidae) from the Sea Gull (*Larus argentatus*). *Can. Journ. Zool.*, **29** (3): 173-177.—A nematode found in the esophagus of each of 14 Herring Gulls from the Ottawa River.
- RAO, N. S. KRISHNA. 1951. *Echinochasmus cohensi* n. sp. (Family Echinostomidae, Subfamily Echinostominae) from the Sea Gull, *Larus argentatus*. *Can. Journ. Zool.*, **29** (3): 215-218.—A trematode found in the intestine; Ottawa River.
- RASHEVSKY, N. 1948. *Mathematical Biophysics* (Rev. Ed.). (Univ. of Chicago Press, Chicago), 669 pp.—Chapter 52 is a mathematical analysis of the "flight of birds and insects in relation to their form."
- RINEY, THANE. 1951. Relationships between birds and deer. *Condor*, **53** (4): 178-185.—Observations on birds and mule deer made in the central Sierra Nevada involving bird-deer contacts and food relationships.

- ROUGEOT, P. C. 1951. Nouvelles observations sur le *Melichneutes robustus*. Oiseau, **21** (1): 127-143, 1 fig.—Interesting observations on the flight behavior of this rare honey-guide in northern Gaboon.
- SALOMONSEN, FINN. 1951. Grønlands/Fugle/The Birds of Greenland. Part II. Paintings by Gitz-Johansen. (Einar Munksgaard, Copenhagen), pp. 159-348, 19 col. pls. Price, \$9.00.—The present volume includes ptarmigan, plovers, sandpipers, phalaropes, gulls, etc. See 'The Auk' (68 (1): 119-120, 1951) for review of Volume I.
- SAUNDERS, ARETAS A. 1951. The song of the Song Sparrow. Wilson Bull., **63** (2): 99-109, 3 figs., 1 table.—An analysis of the similarities and differences in 884 records of songs of *Melospiza melodia*.
- SAVILE, D. B. O. 1951. Christmas bird census—1950. Can. Field-Nat., **65** (2): 68-76.—Censuses from 27 locations across Canada. Some of these also appear in 'Audubon Field Notes,' but many do not. A useful additional source for those working over Christmas census data.—W. W. H. Gunn.
- SERGEANT, DAVID E., AND RICHARD F. WHIDBORNE. 1951. Birds on Mingulay in the summer of 1949. Scot. Nat., **63** (1): 18-25, 3 figs.—Species accounts.
- SKALLER, F., AND G. W. GRIGG. 1950. The effect of orally administered synthetic oestrogen (hexoestrol) on the male fowl. Australian Journ. Agric. Res., **1** (4): 496-516, 3 figs., 9 tables, 2 pls.—Controlled experiments with 141 male chickens showed that oestrogen was a stimulator of the anterior pituitary gland during the first phases of its administration and a depressor of this gland after a certain level had been reached. Effects of administration varied with age, with breed, and with tissue involved. For example, the testis responded to a greater extent than did the comb or epidermis of the rooster. Fat from the birds treated with 25 mg. of hexoestrol daily for three weeks did not produce oestrogenic effects when injected into mice.—H. I. Fisher.
- STEINBACHER, GEORG. 1951. Die Zungenborsten der Loris. Zool. Anz., **146**: 57-65, 7 figs.—An interesting study in functional and microscopic anatomy. The feeding, brush-tongued lorises plunge the almost-closed bill into flower-heads, then open the mandibles and protrude the bristle-armed tongues. The lever-mechanics of tongue architecture and musculature, especially by which the bristle field of the tip is opened and closed, are illustrated schematically.
- STEINBACHER, JOACHIM. 1951. Vogelzug und Vogelzugforschung. (Waldemar Kramer & Co., Frankfurt am Main), 184 pp.—This is a brief summary of some of the factors involved in migration—weather, season, flight direction, instinct, wintering grounds, race, speed of flight, migratory unrest, magnetism, age, sex, body weight, etc. Short accounts of banding and of some of the more important banding stations are included. For certain species, for example the larks, gulls, ducks, cranes, and the Golden Plover, the data are detailed.—H. I. Fisher.
- STIRLING, W. T. 1951. Great Skua [*Stercorarius skua*] using its feet in an attack upon a Gannet. Scot. Nat., **63** (2): 133-135.
- STOTT, KEN. 1951. A nesting record of Hornbills in captivity. Avic. Mag., **57**: 113-118.—Observation of the first instance of the nesting of the Great Hornbill, *Buceros bicornis*, in the San Diego Zoo, with many interesting details. Both male and female worked at plastering the hole. The female died in the hole before the two eggs hatched. Few records of Hornbills nesting in captivity exist so far.
- STORER, ROBERT W. 1951. The seasonal occurrence of shorebirds on Bay Farm Island, Alameda County, California. Condor, **53** (4): 186-193.—Results of periodic censuses for a year beginning July 1, 1949, in this area of concentration of

- birds. Twenty-three species were observed, the data being presented in species accounts for each.
- STORER, ROBERT W. 1951. Variation in the Painted Bunting (*Passerina ciris*), with special reference to wintering populations. Occ. Papers Mus. Zool. Univ. Mich., No. 532: 1-12.
- STRESEMANN, ERWIN. 1951. On the supposed identity of *Emberiza hyperborea* Pallas with *Pipilo fuscus* Swainson. Condor, 53 (5): 257.—Proposes that the name *Emberiza hyperborea* Pallas be relegated to the rank of obligatory synonym.—W. H. Behle.
- STRESEMANN, ERWIN. 1951. Histoire des origines des "Planches Coloriées" de Temminck et Laugier. Oiseau, 21 (1): 33-47.—These letters of Temminck and Laugier to Lichtenstein between the years 1819 and 1821 are of great interest and give the genesis of a great ornithological classic with revealing insights into the psychology of the ornithologists of that time. Temminck is self-revealed as pompous and pretentious and Lichtenstein as being a very lazy correspondent. Vieillot is dismissed contemptuously as a "petit savant à appointement," a term which might be translated as a "cheap little scientist for hire." History has reversed this verdict. It is to be hoped that Dr. Stresemann will publish more of these interesting correspondences.—C. Vaurie.
- SUTTON, GEORGE MIKSCH. 1951. *Caprimulgus ridgwayi* in Michoacan, Mexico. Condor, 53 (5): 261-262.—Four specimens collected; discussion of color variation.
- SUTTON, GEORGE M. 1951. The Rufescent Tinamou. Wilson Bull., 63 (2): 67-68, 1 pl.—Notes on the habitat and nesting and other habits of *Crypturellus cinnamomeus*.
- TABER, WENDELL. 1951. The northern element in the summer bird life of south-central New England. Wilson Bull., 63 (2): 69-74.
- TAYLOR, LOIS CHAMBERS. 1951. Prior description of two Mexican birds by Andrew Jackson Grayson. Condor, 53 (4): 194-197.—The Socorro Towhee, *Pipilo carmani* Lawrence, 1871, becomes a synonym of *Pipilo socorroensis* Grayson, 1867. The Socorro Wren, *Troglodytes insularis* Lawrence, 1871, becomes a synonym of *Thryothorus sissonii* Grayson, 1868.
- TAYLOR, WALTER P., AND ALLAN J. DUVALL. 1951. The Lucifer Hummingbird in the United States. Condor, 53 (4): 202-203.—Summary of the eight specimens (one newly reported), six of which are from the Chisos Mountains, Texas. No certain breeding records for the United States.
- TENER, JOHN S. 1951. Sixth census of non-passerine birds in the bird sanctuaries of the north shore of the Gulf of St. Lawrence. Can. Field-Nat., 65 (2): 65-68.
- TORDOFF, HARRISON B. 1951. A quail from the Oligocene of Colorado, Condor, 53 (4): 203-204.—Discussion of the characters of the distal end of a left tarsometatarsus from Logan County, Colorado, which most closely resembles the corresponding element of *Colinus* and *Lophortyx*. The specimen is left unnamed.
- TRAYLOR, M. A. 1951. A review of the Woodpeckers *Chrysoptilus melanochloros* and *C. melanolaimus*. Fieldiana. Zool., 31 (41): 421-437.—Five races of each species are recognized. Though often considered as forming one species, the pattern of variation and distribution in the subspecies indicates two groups, best treated as species.
- TURČEK, FRANTIŠEK J. 1951. Galls and gall-insects as food of certain birds and mammals. Suomen Hyonteistieteellinen Aikakauskirja, 17 (1): 17-22, 10 photos.
- VERHEYEN, R. 1951. Phaenologisch onderzoek over de terugkeer van trekvogels

- in Belgie. Gerfaut, **41** (4): 14-43.—Studies, by species, of migrating birds returning to Belgium. There is also some general discussion. French summary.
- VERHEYEN, R. 1951. Particularités relatives à la migration et au quartier d'hiver du coucou d'Europe (*Cuculus canorus* L.). Gerfaut, **41** (1): 44-61, 3 figs.—Dutch summary.
- VON BOETTICHER, HANS. 1951. Etwas über Zehenreduktion bei Vögeln. Zool. Anz., **146**: 113-118.—The author believes that "trans-specific macroevolution," as seen in the involution of the hind toe in plovers and other birds, requires no special evolutionary explanation other than mutation. In the ostrich, loss of the hind toe and reduction of an anterior one by pleiotropic mutation has resulted in enlargement of an inner toe and the sole of the foot. Toe reduction, taken alone, has no taxonomic value because it occurs generally as a spontaneous mutation in unrelated species.
- VOOUS, K. H. 1951. Distributional and evolutionary study of the Kingfisher genus *Ceyx* in Malaysia. Ardea, **39**: 182-196.—Plausible explanation of the puzzling distribution of *Ceyx erithacus* and *Ceyx rufidorsus*, and their relationship with related forms, confirming previous opinions of authors, particularly S. D. Ripley.—J. Delacour.
- WALTERS, J. 1951. De Avifauna in "Plan Tuinstad Slotermee" (Amsterdam-West) in de periode October 1948 tot October 1949. Limosa, **24** (1-2): 12-26, 4 figs.—Changes in the avifauna with man-made changes in the habitat west of Amsterdam.
- WEBB, C. S. 1951. The Wattled Starling (*Creatophora carunculata*). Avic. Mag., **57**: 79-82.—Observation of the seasonal changes in the head caruncles and feathering of this interesting starling, observed at liberty and in captivity; excellent colored plate by D. M. Henry.—J. Delacour.
- WETMORE, ALEXANDER, AND WILLIAM H. PHELPS, JR. 1951. Observations on the geographic races of the Tinamou *Crypturellus noctivagus* in Venezuela and Colombia. Bol. Soc. Venezolana Ciencias Nat., **13** (77): 115-119, map, 1950.—Critical review of forms based on "nearly 50 skins."
- WETMORE, ALEXANDER. 1951. The identity of two Asiatic birds recorded from Nunivak Island, Alaska. Condor, **53** (4): 206-207.—The Grasshopper-Warbler, *Locustella ochotensis*, is referable to the race *L. o. ochotensis* (Middendorff) and the Accentor, *Prunella montanella*, although slightly intermediate toward *montanella* is referred to *P. m. badia* Portenko.—W. H. Behle.
- WHITE, C. M. N. 1951. Systematic notes on African birds. Ostrich, **22**: 25-26.—Generic limits.
- WIGMAN, A. B. 1951. Waarneming van de noordse waterspreeuw, *Cinclus c. cinclus* (L.), in Gelderland. Limosa, **24** (1-2): 1-2, 1 pl.—One of five or six records of the Black-bellied Dipper in the Netherlands.
- WILLIAMS, J. G. 1951. The birds of Bwamba: Some additions. Uganda Journ., **15** (1), 107-111.—Four birds new to Uganda—*Cuculus gabonicus*, *Chaetura ussheri sharpei*, *Melanopteryx maxwelli*, and *Spermospiza poliogenys*. Other notes are supplemental to the van Someren's 1949 report on the Bwamba avifauna.—H. Friedmann.
- WILLIAMSON, KENNETH. 1951. The moorland birds of Unst, Shetland. Scot. Nat., **63** (1): 37-44.—General account.
- WILSON, N. H. 1951. Hybrid Glaucous x Great Black-backed Gull at Limerick. Brit. Birds, **44** (8): 286-287.—Description of an immature *Larus marinus* by *L. hyperboreus* watched in August, 1948.

- WOLFE, L. R. 1951. Eggs of the Falconiformes. Part II. Ool. Rec., **25** (3): 36-42.
- YEALLAND, J. 1951. Notes on some birds of Hawaii. Avic. Mag., **57**: 39-46.—The author went to Hawaii in 1949 to assist in the project of propagation of the nearly extinct Hawaiian Goose or Nene. He also observed a number of native and naturalized birds.
- ZIMMER, JOHN T., AND WILLIAM H. PHELPS. 1951. New subspecies of birds from Surinam and Venezuela. Amer. Mus. Novit., No. **1511**: 1-10.—*Aratinga pertinax surinama* from Surinam; *Aratinga pertinax venezuelae* from Altagracia, Río Orinoco, Bolívar, Venezuela; and *Amazilia fimbriata obscuricauda* from Guasualito, State of Apure, Venezuela.
- ZIMMER, JOHN T. 1951. Studies of Peruvian birds. No. 60. The genera *Heliodoxa*, *Phlogophilus*, *Urosticte*, *Polyplancta*, *Adelomyia*, *Coeligena*, *Ensifera*, *Oreotrochilus*, and *Topaza*. Amer. Mus. Novit., No. **1513**: 1-45.—The following monotypic genera are considered inseparable from *Heliodoxa*: *Phaiolaïma*, *Ionolaïma*, *Agapeta*, *Lampraster*, and *Eugenes*. Hence the Rivoli's Hummingbird of the A.O.U. list will be known as *Heliodoxa fulgens* by those who follow Zimmer in this decision. New subspecies: *Coeligena iris flagrans* from Chigur, Dept. of Cajamarca, Perú.—D. Amadon.

OBITUARIES

ANNIE MONTAGUE ALEXANDER, a Life Associate of the A.O.U. from 1911, died in Oakland, California, on September 10, 1950, at the age of 83. Born in Honolulu, Oahu, Hawaii, December 29, 1867, she was the daughter of Samuel T. Alexander and Martha E. Cooke, both children of early American missionaries in Hawaii and the Marquesas.

Miss Alexander was educated at Punahou School in Honolulu, the Oakland High School, California, Lasell Seminary, Massachusetts, and abroad, in Berlin and Paris, where her major interests were art and music. Serious eye trouble, however, forced her to relinquish these studies and never permitted her to resume them. Returning to Oakland, she audited classes at the nearby University of California at Berkeley. Among these happened to be the paleontological classes of John C. Merriam. It was he who inspired her with a life-long interest in the vertebrates and impressed upon her the university's need for comparative osteological material of Recent birds and mammals.

For 50 years Miss Alexander made generous contributions toward the field expenses of groups exploring fossil localities in the western United States. Many times she accompanied field parties and always proved to be a patient and diligent worker. With her life-long friend and companion, Miss Louise Kellogg, she made trips to Alaska, British Columbia, Hawaii, Samoa, Egypt, Baja California, and many of our western States, collecting, taking notes, and personally preparing approximately 3,300 specimens for the university.

In 1907 her hope of securing and housing Recent material for the University was realized in the establishment by her of the Museum of Vertebrate Zoology at the University at Berkeley. This and the Museum of Paleontology were amply endowed by Miss Alexander. In addition, in 1948 she deeded to the University Regents property which, when sold, resulted in a fund of nearly \$33,000, divided at her request, for the support of student research in the two museums. Through her frequent