REVIEWS

EDITED BY KENNETH C. PARKES

Die Einbürgerung von Säugetieren und Vögeln in Europa.—G. Niethammer. 1963. Hamburg and Berlin, Paul Parey. 319 pp. 26 distribution maps, 54 text-figs. 54 DM.—The story of the introduction of European mammals and birds into New Zealand, Hawaii, Australia, North America, and other places has often been told. It is less well known that there is a reciprocal story, which has never before been treated adequately. Niethammer presents the full details of the fate of 47 introductions of mammals and of at least 85 introductions of birds into Europe. In the case of mammals, two thirds were successful, while only 13 successful establishments for birds are recorded. If one wants to be quite strict, the Ring-necked Pheasant is the only truly successful introduction. The Whooper Swan, although native in parts of Europe, owes much of its present area of distribution to introductions. In the case of 7 of the other 11 "successful" releases, the success is restricted to England. This includes several species of ducks, geese, and grouse, and the Little Owl. The main reason why most releases of birds were unsuccessful is, perhaps, that they were migratory and never returned after the first fall migration. Only 6 non-European species of birds have been successfully introduced into Europe.

In an introductory section (31 pages), Niethammer gives a critical discussion of the pros and cons of such introductions, the effect they have on the native fauna, and the reasons for the lack of success of most introductions. Dispersal flights of wild birds are another potential source of colonization in addition to man-made introductions. No less than 46 species of North American land birds have so far been reported from Europe as strays, but this has not resulted in a single colonization. The same is true for the occasional arrival of African and Asiatic birds in Europe.

The main body of the volume is devoted to a detailed discussion of introduced species, giving the exact dates and places where releases were made and the fate of each release. Pages 169–305 are devoted to birds.

Although the story of mammalian introduction is far more fascinating than that of birds, nevertheless, the bird ecologist and bird geographer will find much of great interest in this meticulously documented volume. It should be of particular value for those who want to import and release alien game birds, as well as to those who are opposed to this practice.—ERNST MAYR.

Les oiseaux du nord-ouest de l'Afrique Distribution géographique, écologie, migration, reproduction.—Henri Heim de Balsac and Noël Mayaud. 1962. Encyclopédie Ornithologique X, Paris, Éditions Paul Lechevalier. Pp. 1–487, 59 figs. —Many books there are on the birds of the Ethiopian Region and of various sections of the African continent. The Ethiopian Region, however, is usually considered to end with the "Sahel," an arid band fringing the Sahara on the south. From there northward the avifauna is predominantly Palearctic, and has long been of special interest to European ornithologists.

Ernst Hartert was deeply concerned with this northern section of Africa, and it is well covered also by Charles Vaurie's recent check-list, *The birds of the Palearctic fauna.* With the great progress in the exploration of the Sahara it has become possible to expand our knowledge of the detailed distribution, ecology, and behavior of birds in a vast northwestern part of Africa that was not covered by Richard Meinertzhagen's excellent work on the birds of Egypt.

The present volume thus fills the need for an up-to-date treatment in some detail

of the birds living to the west of Egypt. Its senior author during the past four decades has made ten different expeditions into northwestern Africa, studying both mammals and birds, their ecology and distribution, and has published a long series of reports on the birds he observed. The junior author is well known as a specialist on Palearctic birds.

The area covered in this important work extends approximately from 22° E Long in eastern Libya to the shores of the Atlantic, and from the southern coast of the Mediterranean to the Sahel, varying between 18° and 20° of north latitude as it runs from Nouakchott in Mauretania eastward to Ennedi. The largely desertic nature of this quadrant of Africa is emphasized by the enumeration of only about 430 bird species, most of them characteristically Palearctic. But certain species mainly of Ethiopian distribution—we are told—were omitted even though they do occupy the massifs of Aïr and Ennedi.

In its manner of presentation the volume is best suited to students already well versed in the birds of Europe. To avoid repetition of descriptions which can readily be found elsewhere, of plumages, nests, and eggs, the text has been condensed to a point that may not always please readers in other lands, if no other books are available for reference. Unless one is already familiar with the names of the bird genera he may regret the omission of family headings, which would have served as handy guideposts. The generic names, to be sure, do appear in capitals, followed by original references. Emphasis is placed on the binomial species, for which references and type localities are provided. Nomenclature may not be quite up to date in some cases, but will cause little confusion.

All geographic races known to occur within the scope of the book are mentioned in the running comment under these binomial headings. This may be the wise method, because in many cases the migrant races from Europe at certain seasons render sight identification difficult. Indeed a few records of rarities accepted here without specimens are questionable. Special attention is given to breeding ranges and seasons for each form, and to the number of eggs laid, for comparison with those of more northerly races. Only for non-European species are the nests described briefly. Details of distribution are carefully explained with reference to ecological niches.

It is demonstrated that the timing of the reproductive cycle is less dependent on length of daylight than on the regrowth of vegetation with the annual rains. From the Atlantic coast to Morocco these rains are autumnal; the vegetation is activated in late December. So the sexual cycle of birds there is stimulated about two months earlier than in the region near the Gulf of Sidra, farther east, where rains, come only in winter and spring. With species which occur also in Europe the number of eggs laid is apt to be smaller to the south of the Mediterranean, and dates of oviposition rather earlier. Of particular interest is the actual fecundity of birds in very dry areas, where a second laying may depend on a good year's rain and clutches show a tendency to be smaller than in more fertile regions. In exceptionally dry years breeding may not take place. Population dynamics will depend also on juvenile mortality, and birds migrating from Europe to tropical Africa perhaps require large broods to offset losses during such long voyages.

The Sahara is a formidable obstacle, yet most migrants cross it on broad fronts, rapidly, because of the scarcity of water and food. At least 150 species make the crossing regularly, while scarcely a half-dozen remain to winter there.

The systematic section of the book occupies 409 pages, and cannot here be discussed in detail. Only the species which do not reach Europe are figured in line

drawings by P. Barruel and J. A. Valverde. Those by Barruel are particularly attractive. The bibliography seems quite complete, the gazetteer excellent, with the localities often explained by latitude and longitude. But the map provided omits all meridians and parallels, so that full use of the gazetteer requires another map which includes these lines. While the "limit of 'cram-cram'" is indicated on the map by a heavy black line, which we are told coincides roughly with the southern limit of the Palearctic, there is no explanation of "cram-cram." Elsewhere I learn that it is a species of bur-grass (*Cenchrus*) very characteristic of the Sahara.

The table of contents is relegated to the very last page of the book. In view of the omission of family headings, this table seems blank from page 13 to page 415. One must consult the index for generic names.

Despite these minor criticisms, I am happy to say that the volume is an extremely valuable work on the region of Africa to which it is devoted, and very helpful to students of the Palearctic avifauna as a whole.—JAMES P. CHAPIN.

Thrushes, wrens, and mockingbirds of eastern North America.—12″ 33 rpm LP recording. 1963. Boston, Houghton Mifflin. $5.95. Vol. 8 of the *Sounds of Nature* series recorded by Donald J. Borror and William W. H. Gunn and produced in association with the Laboratory of Ornithology at Cornell University by the Federation of Ontario Naturalists, Edwards Gardens, Don Mills, Ontario, Canada (U. S. address: Curtiss and Weir, 54 Priscilla Place, Trumbell, Conn.).—This recording, together with volumes 4 (warblers) and 6 (finches), is part of a group in the series designed to present the characteristic songs and calls of each species for use by those who wish to improve their recognition skills, and by those who are engaged in comparative studies of vocalizations. These purposes are well fulfilled, by the present recording, for eastern North American representatives of the families Turdidae (eight species), Troglodytidae (six species), and Mimidae (three species). As explained in the accompanying supplementary notes, each species within each family is presented in an order designed to compare like songs or to show a progression from simpler to more complex, rather than in the usual taxonomic order. Each species is represented by from 2 to 19 recordings from various localities, each containing from 1 to 17 separate songs or calls.

The technical quality of the recording is truly remarkable, whether one considers the intricate song patterns of some of the thrushes at very high frequencies, the chattering notes of the wrens, or the more full-bodied, lower-pitched tones of the mimids. Each recording stands out clearly against a background silent except for the distant warblings of associated species just audible beneath the notes of the primary performer. In one delightful sequence a Veery is singing, accompanied by the sound of falling rain. If one wishes to be informed of the publication of a detailed study of the sounds on the recording now being prepared by Donald J. Borror, he is advised in the supplementary notes to send a postcard to the Federation.—JOYCE L. WILDENTHAL.

The return of the Osprey.—Philip Brown and George Waterston [with contributions by Gwen Davies, Peter Conder, and R. S. R. Fitter]. 1962. London, Collins. 223 pp., 18 photos. 21 s.—One pair of Ospreys is still attempting to nest in Great Britain, and the story of the strenuous and eventually successful efforts to preserve them from the frenzied attention of the egg-collecting fraternity has received considerable publicity. As related here by Mr. Brown, it will be of interest to conservationists and contains some new data (for example, regarding renesting attempts). G. Waterston has written a detailed account of the natural history of the Osprey. The

remaining chapters by Brown, P. Conder, and R. S. R. Fitter recount the stories of other birds, especially the Avocet and Black-tailed Godwit, which have become reestablished in England. All contain interesting data on natural history.

We are sometimes amazed at the percentage of people in England who are interested in natural history. On the other hand, the affliction of egg-snatching persists there much more than in the United States. Is there any connection? In the entire United States one is hard pressed to think of five oölogists who deserve a collecting license, and even of this handful, only two (I think) are still publishing anything. Of course, there are a few other furtive practitioners, all, perhaps, more to be pitied than censured.—DEAN AMADON.

Animal populations.—T. O. Browning. 1963. New York, Harper & Row, Science Today Series. Pp. 1–127, 20 figs. 5 × 7½ in. $2.50.—The stated purpose of this little book is to outline the study of animal populations for a reader with no previous knowledge of ecology but with a background of biology and the physical sciences. Browning's approach is interesting in that he does not employ the usual sequence of a statement of general principles followed by illustrative examples. Instead he presents a long first chapter describing the ecology of the sheep-tick *Ixodes ricinus* and then uses this case study from which to draw general propositions. The author's concepts of "population" and "environment" are discussed, and he presents a skillful introduction to the subject of probability, necessary in the increasingly mathematical field of ecology. The environment is divided into five categories and discussed in detail: weather, resources, members of the same species, members of different species, and hazards. In his attempt to simplify these environmental factors, the author strains some of the terminology, e.g., including under "weather" water current and salinity for aquatic animals. The final chapters discuss the environment as a whole, the interactions of its various components, and the influence of man upon the natural world and upon himself.

For many years the study of populations has been controversial. As a member of the "Andrewartha and Birch" school, Browning states frankly in the Preface that he is taking a partisan stand. For the sake of brevity he intentionally omits discussion of opposing viewpoints, although he refers the reader to six works by authors belonging to other schools. It is this reviewer's opinion that a sentence or two in the text outlining dissenting opinions where appropriate would have been valuable. The lay audience for which this book was written cannot be critical and is not likely to go to the other references without having been told where the points of dissension lie.

Partisanship aside, the book is exceptionally interesting, clear and readable, particularly appealing to an American reader because of the wide variety of illustrative examples taken from the Australian insect and mammal faunas.—MARY A. HEIMERDINGER.

Preliminary field guide to the birds of the Indian Ocean.—George E. Watson, Richard L. Zusi, and Robert E. [*sic*; = W.] Storer. 1963. Washington, D. C., Smithsonian Institution. x + 214 pp., 6 "preparation plates," 19 "identification plates," 17 maps. 10¼ × 7 13/16 in. Free.—This work is frankly a rather hasty compilation, prepared under the auspices of the National Science Foundation for the International Indian Ocean Expedition of 1963–1964; it is not intended as a definitive publication. Nevertheless, it is an extremely valuable work; another reminder of the immense saving in time and energy made possible by a well-organized summary

of widely scattered earlier information. This is the more so because a continuous effort is made to point out lacunae in existing knowledge. There is, of course, some new material, including the entire section on field identification with crude but usually adequate Seton–Peterson type illustrations by Dr. Zusi. This part will be useful in tropical and subtropical seas anywhere.

The other sections are: (1) Directions for preparing specimens of birds. (2) An indexed list of all of the birds of the Indian Ocean with brief indication of general as well as local ranges. (3) Annotated lists of the birds of each island group, with valuable general information on the islands, including maps.—DEAN AMADON.

Review Editor's note.—This publication is furnished free of charge by the Smithsonian Institution to all participants in the International Indian Ocean Expedition, and may be obtained by any interested workers in the field of Indian Ocean ornithology. Under date of 15 July 1963, an Addendum to this publication was issued, based on correspondence received by the authors from various specialists. Several additional species are included, with notes on identification and distribution, and a list is supplied of rare or endangered species (answering the criticism of W. R. P. B[ourne]., *Ibis*, 105, 1963: 411–412).

Birds in the sun.—Malcolm MacDonald. Photographs by Christina Loke. 1962. London, H. F. & G. Witherby, Ltd. 128 pp., 49 color pls., 6 black-and-white photos. 11½ × 8¾ in. 48 shillings.—Readers of books and periodicals dealing with North American and European birds have become rather sophisticated about bird photography in recent years. Only a really striking picture, if the subject is a common species, will make us sit up and take notice. It must be admitted, therefore, that at least some of the initial fascination of Christina Loke's photographs in this handsome new book is based on the unfamiliarity to us of her subjects. Upon second thought, however, we realize that certain of the photographs are so brilliantly composed, or catch the bird so neatly in action, that we would exclaim over them if their subjects were catbirds and flickers instead of tailor-birds and barbets.

This is unashamedly a picture book; Malcolm MacDonald's text consists of a few pages of introduction and acknowledgments, and a page or two of observations from his own experience about each of the Indian species portrayed. His style is lively and informal, not infrequently verging on the anthropomorphic (as he is fully aware), but without being offensive.

Christina Loke, whose husband Loke Wan Tho is also a world-famous bird photographer, is ranked by Roger Tory Peterson in a dust-jacket blurb as ". . . ahead of any other female bird photographer in the world." This reviewer believes that Dr. Peterson, ordinarily among the most gallant of gentlemen, was unnecessarily restrictive in his statement. Surely there can be but a handful of *male* photographers who would willingly spend hour after hour in a small blind during the peak of a Delhi summer, with air temperatures *outside* the blind sometimes reaching 114°F. During the first few days of the summer of 1959, when these pictures were taken, Mme. Loke's weight dropped from 104 pounds to 92 pounds. Adding to simple heat such other hazards as dust storms and monsoon rains, rickety scaffolds 40 feet high, and hordes of curious villagers, one can but wonder at the beauty of the final product.

All of the photographs are not classics, of course, but their quality as a whole (and the excellence of their reproduction) makes this one of the most attractive books of bird photographs to have appeared in recent years, with the added fillip, as mentioned above, that so many are so unfamiliar to American readers. The color plates

illustrate 44 species, arranged in phylogenetic sequence. Only vernacular names are used in the text, but English, Hindi, and scientific names are given in the index. The only misprint noted occurs in the latter: *Columba "iiaria"* for *Columba livia*. The coated paper used is exceptionally heavy; the binding is inadequate and is already badly warped in the review copy.

The reviewer cannot resist a comment on the remarkable abundance of birds in Delhi. If the well-known Hindu reverence for life is responsible for Mr. MacDonald's being able to observe no less than 15 species of diurnal birds of prey from his garden in the heart of the city, then perhaps India should send missionaries to a country in which federal legislation is necessary to reduce ("stop" is too optimistic) the slaughter of eagles, and in which 60 per cent of the states still pay bounties on predators.—KENNETH C. PARKES.

The birds of northern Shantung Province, China.—Rufus H. LeFevre. Privately printed by Rufus H. LeFevre, 54 North Lehman Street, York, Pennsylvania, 1962. Pp. 1–151, 11 × 8½ in.—This is an annotated list of birds collected by the author between 1923 and 1927 in Shantung, an important area for migratory species, especially as it lies south of three funnel areas, the Korean peninsula, the Kuantung peninsula, and the Manchurian coast across the Gulf of Pechili. Mr. LeFevre became interested in collecting due to Dr. George Wilder, the missionary–naturalist, and was presented with the latter's manuscript notes, many of which are incorporated in this work. These consist mainly of dates of arrival and departure which should be of great interest to anyone compiling a handbook of birds of eastern Asia in the future.

It is curious that Mr. LeFevre was not able to receive institutional sponsorship for this list, especially as his collection has been given to the Academy of Natural Sciences of Philadelphia. Some additional editing and proofreading as well as modernizing of the nomenclature would have considerably aided this publication which, in view of the scarcity of current literature on birds of China, is a welcome one. Records such as the ruddy form, *rubescens*, of *Locustella certhiola*, occurring on migration in China; the Aberrant Bush Warbler, *Cettia flavolivacea*; Von Schrenck's or Black-browed Reed Warbler, *Acrocephalus bistrigiceps*; Chinese Willow Warbler, *Phylloscopus subaffinis*; Grey-browed or Milne-Edward's Warbler, *P. armandii*; Crowned Willow Warbler, *P. occipitalis coronatus*; all of these, for example, would have been of the greatest use in the compiling of Vaurie's Palearctic check-list, 1959, from which they are of course presently omitted. This list then must be added to the supplemental current Palearctic literature which all of us concerned try to keep abreast of. Would that such a publication was a little better done.—S. DILLON RIPLEY.

Species limits in the woodpecker genus *Centurus* (Aves).—Robert K. Selander and Donald R. Giller. 1963. Bull. Amer. Mus. Nat. Hist., **124:** 213–274. 17 figs., 4 plates. $1.50.—This carefully documented paper is a welcome addition to the literature dealing with species interactions. Results of field investigations provide the authors' major contribution, and concern interactions among several of these melanerpine woodpeckers.

One third of the report deals with *Centurus aurifrons*. Five (not four as stated on p. 234) subspecies of *aurifrons* are recognized: *aurifrons, dubius, grateloupensis, santacruzi,* and *polygrammus*. Valid reasons dictated merger of several others in these. Some well-marked forms not sanctioned by the authors may merit recognition, notably the insular *leei*, and *pauperi* of Honduras. The question of recognition of certain insular forms they did not study is left unanswered. Intergradation is conclusively demonstrated between *aurifrons* and *dubius* (considered by some a full

species), through the intergrade race *grateloupensis* in east-central Mexico. Further investigation of southern Mexican populations is needed to better document intergradation among four races. Few or no specimens exist from critical areas where *polygrammus–grateloupensis*, *santacruzi–polygrammus*, and *polygrammus–dubius* meet, or are presumed to meet. Variation within and among populations of this species is strikingly great, particularly in Central America. Features of color pattern are correlated with xeric versus moist environments occupied by the northern races. Perhaps the great variability of *santacruzi* reflects the fact that its populations inhabit diverse areas within a small region. Adaptation to arid or moist environment would suffer continuing interference as genes flow into populations in these environments from surrounding populations, perhaps existing under environmental conditions at the opposite extreme.

In discussing relationships of *Centurus hoffmanni*, the authors agree with Wetmore (*Proc. U.S. Natl. Mus.*, 93: 274, 1943)that *hoffmanni* and *C. aurifrons aurifrons–C. a. polygrammus* once formed a continuous population, which was split by invasion (from where?) of *santacruzi* populations. The latter subspecies intergrades through *C. a. dubius* with the race *aurifrons*. In view of this intergradation of *aurifrons* populations in the north (and also, limited interbreeding of *C. aurifrons* with *C. uropygialis*), it seems crucial to secure information from the possible area of contact between *santacruzi* and *hoffmanni* before deciding on the latter's status. Selander and Giller note that the two approach within 55 miles of each other in northern Nicaragua. They have recently been found even closer together in southwestern Honduras (B. L. Monroe, Jr., pers. comm.). *Hoffmanni* may prove conspecific with *aurifrons*; it may even be an allopatric form of the *rubricapillus–pygmaeus* complex. There is considerable variation evident in *C. rubricapillus*, and in some respects *hoffmanni* resembles certain of its races more than does *pygmaeus*.

Although not discussing subspecies of *Centurus uropygialis*, the authors indirectly hint that some are of doubtful validity (i.e., compared with *C. aurifrons*, of which they recognize five races; *uropygialis* with its seven races is "not by any means highly variable geographically" [p. 241]). This may be true, but one gets an impression that systematists working with extremely differentiated forms interbreeding in secondary contacts tend to change their criteria, perhaps overly raising their standards of divergence required for subspecies recognition. Indeed, these authors' concept of subspecies as "to some meaningful degree semi-independent evolutionary units not distantly removed from the species level of evolution" (p. 234) is contrary to the perhaps prevailing view of subspecies as primarily tools of the taxonomist, expressed most recently by Ernst Mayr (*Animal species and evolution*, Cambridge, Harvard Univ. Press, 1963; see p. 349): "It must be realized . . . that in many cases the subspecies is an artifact and that it is not a 'unit of evolution'."

Centurus uropygialis is sympatric with *C. aurifrons* near Aguascalientes, and also Guadalajara, Jalisco. One hybrid was obtained in the former area. Van Rossem had earlier (*Bull. Mus. Comp. Zool.*, 77: 410, 1934) called to attention two others in the British Museum, one from each general area in which Selander and Giller worked. On the basis of these three presumed hybrids, the authors calculate that 5 per cent of specimens from the two contact areas are products of interbreeding. With no suggestion of introgression, and no evidence of backcrossing, they conclude that the two are separate species.

Convincing arguments are offered for the recognition (contrary to the view of J. L. Peters, *Check-list of the birds of the world*, vol. 6, 1948. Cambridge, Harvard Univ. Press; see pp. 160–161) of *C. hypopolius* and *C. uropygialis* as separate species.

Various features of the former suggest instead relationships with species of "*Tripsurus*" (including *C. chrysogenys*). Even more strongly than *hypopolius*, *C. chrysogenys* tends toward *Tripsurus*. The brief consideration of *C. rubricapillus* and *C. pygmaeus* suffers from failure to compare these with *C. hoffmanni*. West Indian *Centurus* receive somewhat cursory treatment. The authors justifiably merge *caymanensis* with the Cuban and Bahaman *C. superciliaris*. *Centurus radiolatus* is too briefly passed over as simply showing " 'exaggeration' of characters" (p. 256) found in *C. aurifrons dubius*. Despite similarity to *dubius* in features they note, *radiolatus* is one of the most distinctive species of *Centurus*. The Haitian Woodpecker, *C. striatus*, is considered so striking a form as to be *non-melanerpine*. The authors place it in W. D. Miller's genus "*Chryserpes*" (*Bull. Amer. Mus. Nat. Hist.*, 34: 515–520, 1915), stating that "there is some possibility that its affinities are with '*Chloronerpes*' (= *Piculus* part, of Peters 1948)." Interestingly, Miller, though proposing the monotypic genus *Chryserpes* (at a time when generic splitting was in vogue), in the same paper (p. 519) considered the form melanerpine, and related most closely to *Centurus*.

In a section on speciation, ecology, and distribution, the authors compare similarities between ecological arguments involving the effects of competition between closely related species in secondary contact, with the controversy among systematists concerning reinforcement of isolating mechanisms when partially reproductively isolated populations come into contact. The only case of extensive sympatry in *Centurus* (excluding "*Tripsurus*" species) involves *dubius* and *pygmaeus* on the Yucatan peninsula. These are at opposite size extremes for *Centurus*, and differ in foraging behavior and habitat preference. Other *Centurus* exhibit little or no sympatry. The authors conclude that morphologically similar species such as those of this genus "may be ecologically incompatible" (p. 258), ecologically adjusting with difficulty to sympatry.

Insular forms of certain woodpeckers are shown to exhibit marked sexual dimorphism of the bill (females having on the average 16 to 21 per cent shorter bills than males). All highly dimorphic, and all but one moderately dimorphic (over 10 per cent dimorphism) species are melanerpine. It is concluded that this dimorphism does not "exemplify a principle of broad application to insular faunal types" (p. 266). The suggested ecological significance of the bill dimorphism is that it may increase the total span of food sizes taken by the species and reduce overlap in size of items taken by the sexes, perhaps thus allowing for greater population density. It is noted that closely related species (possible competitors) are lacking on islands where the more dimorphic species occur. Data at my disposal for certain colaptine woodpeckers included in their table (table 6) suggest that their bill dimorphism percentages may be too high by 2.5–3 per cent in cases where sample sizes are small, or samples drawn from too large an area. The well-marked insular race *gundlachi* of *Colaptes auratus*, not included in their table, shows no marked dimorphism in bill length (3.9 per cent).

The paper is unusually free from errors, though not completely so. I note the misspelling of "measurements" (p. 247), "Sinaloa" (p. 253), "*Picumnus*" (p. 262; and table, p. 263) and "*Nesoceleus*" (table, p. 263). On page 261, "16 per cent" should read "15 percent." Maps and tables are clear, and the former well executed. Photographic plates show specimens of most forms mentioned in the text.

This lucidly presented report is an important contribution in the field of species evolution, meriting a wide audience. Several critical problems in the *Centurus* group are solved, although others demand attention. It is hoped that those remaining are attacked as diligently, and reported upon as effectively, as Selander and Giller have done here.—Lester L. Short, Jr.

The Mourning Dove in Illinois.—Harold C. Hanson and Charles W. Kossack. 1963. Southern Illinois University Press for Illinois Dept. of Conservation (Tech. Bull. 2) and Illinois Nat. Hist. Survey. xvi + 133 pp. $5.00 (available in paper covers free from Illinois Nat. Hist. Survey, Urbana, Ill.).—This attractively prepared little book brings together the significant work on the Mourning Dove (*Zenaidura macroura*) conducted by these authors over about a decade. It includes pioneering investigations of Mourning Dove biology, particularly as it relates to the status of this species as a game bird, including experimentation in developing censusing by call count, captive rearing, and nestling banding. The authors were among the first to show through behavior of captive birds that unmated males do much more calling than mated ones, a fact significant in census work. A combination of nesting study areas with the standard call count census method was considered effective in determining changes in dove populations.

Through their own banding and analysis of many other banding data they found that late-hatched young probably comprise the majority of wintering doves in Illinois. Census data indicated that in the breeding season there is a north–south increasing gradient in the density of doves. Migrants generally return to their birthplace in the last half of April, augmenting the population which has wintered there. The earliest movements of young of the year are evidently random, but a definite southward movement of this age group takes place during the breeding season. Thus the age ratio of doves in hunters' bags does not show production in Illinois.

Recoveries of banded doves show that the Mississippi valley tends to channel migration to the Gulf coast. Thence birds move both east and west but doves banded in Illinois winter chiefly east of the Mississippi.

Fat deposition was found to vary locally within the state and thought to be correlated with quality of food rather than physiological conditions preparatory to migration. Doves were found to be sensitive to temperature changes and these were thought to trigger fall migration and the onset of nesting. It was shown that major acceleration of nest initiation began during the week in which nighttime temperatures averaged 42° F.

Many species of trees were chosen by doves for nesting but evergreens seemed to be preferred, particularly two introduced species, the blue and Norway spruces.

An intensive study of egg laying turned up the interesting fact that the second egg laid of the two-egg set tends to be slightly longer and more pointed than the first. In captive doves a new clutch may be initiated as early as the second day after the hatching of the second egg of the first clutch. The most frequent interval between an unsuccessful nesting and re-laying was six days. In cases of renesting after successful nesting, the first egg of the new clutch in some instances was laid when the young of the previous clutch were only 10 or 11 days of age, but the most frequently occurring interval was 30 days.

In Illinois the Mourning Dove nesting period may have an extreme duration of 24 weeks beginning about April 1. Nesting peaks occur in late April and the first two weeks in May. By the second week in June usually one-half of all nestings have been initiated, and by mid-July all but five per cent of nestings have begun. The writers believe that the few dove nests active in late summer do not add significantly to the annual increment.

Productivity (fledglings per pair per year) over a nine-year period, 1950–1958, averaged 2.4. This was lower than for any other area for which data were available except Georgia (2.1 in 1950 and 1951, Hopkins and Odum; and 2.0 in 1954, Lowe). Other estimates ran as high as 7 fledglings per pair for Pennsylvania in 1956, Sheldon;

and 6.7 for 1949–51 in Texas, Swank. Nesting success for all years averaged 64 per cent and was higher in the summer than in the spring.

Techniques of keeping doves in captivity were devised. Nestlings over 6 or 7 days of age were reared successfully on a mixture of water and all grain Pablum fortified with Viosterol. Successful pairing in captivity took place between certain individuals, but others proved incompatible.

In discussing natural mortality factors it was not possible to assess the over-all effect of disease and parasites on the population. The Cooper's and Sharp-shinned hawks were believed to be the principal avian predators, and the latter species was estimated to be responsible for the loss of 10 to 15 per cent of the adult dove population at one study area where nesting was just beginning. Experiments on survival without food for varying lengths of time indicated that ice storms that deprive doves of food and water for a period of four days may cause extremely heavy losses. Temperature extremes, heavy rains, and high winds were believed to be the primary factors in lack of nesting success.

In discussing dove hunting in Illinois the authors noted that there is a higher percentage of young birds bagged in central than in northern Illinois. The number of doves killed by hunters in Illinois in relation to those which are raised in, or migrate through, that state is shown by banding data to be only about half that of some of the southern states.

In reviewing the philosophy as to whether doves should or should not be hunted, the authors point out that, despite hunting, dove populations in Illinois are not declining; that 50 to 70 per cent of the dove population annually produced normally dies within a year as a result of all mortality factors combined. The brief average life span of the Mourning Dove, less than one year, points up the fact that wildlife cannot be stockpiled for any appreciable period; the birds shot by hunters are necessarily derived largely from production of the current year. Furthermore, losses in the dove population would not necessarily be greatly reduced if all hunting were stopped. This compilation of facts about the Mourning Dove is based on much more data and actual experiment than most of the studies of this migratory game bird and should prove useful in future development of management practices.—JOHN W. ALDRICH.