

## ORNITHOLOGICAL LITERATURE

THE BIRDS OF CANADA. By W. Earl Godfrey. National Museum of Canada Bulletin No. 203, Biological Series No. 73, Ottawa, 1966:  $8\frac{1}{2} \times 11$  in., 428 pp., 69 col. pls. by John A. Crosby, many line drawings by Stewart D. MacDonald, 2 endpaper maps, 380 small distributional maps. \$12.50. (Checks should be made out to the Receiver General of Canada and order mailed to the Queen's Printer, Ottawa.)

Many of the most exciting days of my life have been lived in Canada. Icebergs, seals, fulmar petrels, and shearwaters "down north" along the Labrador; treacherous "white water," with long portages to match, along the Abitibi and the Missinaibi; vast mudflats and a skyful of waxies at the south end of James Bay; Eskimos, husky dogs, walruses, and polar bears on Southampton Island; clouds of mosquitoes and brown muskeg water at Churchill; Black Oystercatchers and a dripping jungle of salal at the north end of Vancouver Island; Clark's Nutcrackers, mountain goats, and hoary marmots in high country near Red Pass, British Columbia; ocean whirlpools in Richmond Gulf and Frobisher Bay; bands of caribou at Amadjuak; cliffs towering above the ocean ice along the north coast of Victoria Island; Solitary Sandpiper eggs in a waxwing nest near Rocky Mountain House, Alberta; recently hatched Knots on Jenny Lind Island; Ross's Geese circling over their nests in the Perry River district south of Queen Maud Gulf—all these have been part of my experience during the past fifty years. Memories of them are vivid and important. Small wonder that I open so eagerly this new "Birds of Canada" with its eye-catching jacket photograph of an Arctic Tern. The picture itself rouses memories—of a newly hatched baby tern crouched on the sand, of an irate parent directly above me, and of blood enough on my forehead to convince me that I was not wanted there.

Except for the somewhat surprising omission of habitat photographs, Earl Godfrey's book is no disappointment. Most of the 518 species covered are exceptionally well illustrated in color. Three forms considered full species in the A. O. U. Check-list of North American Birds (1957)—the Blue Goose, Black Brant, and Harlan's Hawk—are believed by Godfrey to be conspecific with the Snow Goose, Brant, and Red-tailed Hawk, respectively; one form, Thayer's Gull, which the Check-list considers a race of Herring Gull, Godfrey believes to be a full species. For each of 380 species there is a good map showing breeding distribution in red. Species writeups, each with measurements and a discussion of field marks, habitat, nesting, over-all range, range in Canada, and subspecies found in Canada, cover the ground effectively. Maps prepared by the Surveys and Mapping Branch of the Department of Mines and Technical Surveys in Ottawa serve as endpapers. The map at the front gives the position of hundreds of localities—though I look in vain for Killinek and Indian Harbor on the Labrador, for Masset on the Queen Charlotte Islands, and for Taylor Island, off the eastern end of Victoria Island, place-names which are important ornithologically. The map at the back shows the distribution of forest regions, grassland, and tundra. The treeline merits careful study. The fact that forest extends northward to the mouth of the Mackenzie has long been known and documented; but the "fingers" of forest extending almost to the Arctic Ocean along the Anderson and Coppermine rivers, the "island" of forest along the Thelon River, and the straight, southwestward-pointing "finger" of forest along the Leaf River, between the head of Ungava Bay and the east coast of Hudson Bay, have received comparatively

little attention in ornithological literature. Maps giving in detail the breeding distribution of such hardy woodland species as the Boreal Chickadee, Ruby-crowned Kinglet, and Pine Grosbeak probably would show some or all of these "fingers" and "islands."

The parts of the book headed "Range in Canada" must have involved a staggeringly large amount of work. I have not gone over much of this material in detail, for checking many records would be impossible without visiting the National Museum of Canada, where "the source of any particular distributional or other data" is available (p. 7); but the records for certain species in which I have long had special interest (e.g., Snow Goose, Marbled Murrelet, Yellow Rail, Le Conte's Sparrow) are thoroughly covered. The nesting habits of the Marbled Murrelet continue to be virtually unknown despite the finding of full-formed eggs in oviducts, of flightless young, and of "an adult with a broken partly-incubated egg in debris of a felled tree," and "numerous observations of adults carrying food inland" (p. 200). Another puzzling bird is the large, dark form of White-fronted Goose, *Anser albifrons gambelli*, possibly a full species rather than a race of *A. albifrons*, which has been "recorded from Mackenzie Delta, Repulse Bay, and the arctic coast east of Fort Anderson" but whose "breeding range remains to be found" (p. 52).

The small distributional maps are an invaluable feature of the book. Very few persons are familiar enough with the Canadian Arctic Archipelago to remember at all accurately where the many islands are, so limits of distribution as set by long lists of place-names (islands, trading posts, missions, weather stations, Dewline stations, etc.) might be difficult indeed to work out, even with the best of maps at hand for reference. In this connection, consider for a moment the breeding distribution of the jaegers. How easy it is, using the maps, to see that the Long-tailed species is decidedly the most northward-ranging; that the Parasitic is the most southward- and eastward-ranging; that the Pomarine, despite its being the heaviest and supposedly the "toughest" of the three, is considerably the most restricted in its summer distribution. How utterly impossible it would be, using place-names only, to convey these concepts promptly! Incidentally, my own experience with the Pomarine Jaeger leads me to suspect that from time to time, depending largely, perhaps, on the abundance of lemmings, it may nest in many areas not marked with red on the map (p. 171).

Comparison of maps pertaining to certain well-known birds may bring surprising facts into focus. Take, for example, the Least and Semipalmated sandpipers, new world forms which breed almost literally side-by-side throughout a considerable northern part of continental North America. The breeding-habitat requirements of the two must be much the same, yet a glance at the maps (pp. 155, 160) instantly reveals that the Semipalmated breeds northward well beyond the northern limits of the other. Is the Semipalmated therefore the hardier? The answer to this question might be an unequivocal yes—were reproductive success at high latitudinal limits-of-breeding the only possible criterion. But observe that in Oklahoma the Least Sandpiper has been recorded repeatedly between 21 December and 1 March (specimens taken 15 January 1955, 26 February 1955, 26 February 1961), whereas there are few sight records for, and not a single specimen of, the Semipalmated Sandpiper for the same dead-of-winter period. My own feeling about this discrepancy is that although the nesting-habitat requirements of the two species are much the same, the winter-habitat requirements may differ considerably.

Puzzling indeed is the fact that although there are several acceptable old world records for the two scolopacids just discussed there are few, *if any*, new world records for the Little Stint (*Erolia minuta*), only two (one of them unpublished) for the Long-

toed Stint (*E. subminuta*), and only one (unpublished) for Temminck's Stint (*E. temminckii*). Here I cannot dispel suspicion that all three have been taken from time to time in America but that the specimens have been misidentified. In any event we find no mention of them in this compendious work; nor do we find a record for the Ringed Plover (*Charadrius hiaticula*) from any locality south of the much-restricted new world part of that species' breeding range (pp. 131-132). At this point I must make clear that Godfrey considers the Ringed Plover and Semipalmated Plover (*C. semipalmatus*) distinct species.

Among the many surprises afforded by the maps are the red spots indicating small discrete breeding populations far removed from the principal breeding areas. See, for example, the Northern Mockingbird map (p. 292) with its red spots scattered from southern Alberta to easternmost Newfoundland; the Clay-colored Sparrow map (p. 393) with its red spot in southwestern Quebec; the Field Sparrow map (p. 395) with its red spot in southern Manitoba; and the Brown-headed Cowbird map (p. 361) with its red spot at the mouth of the Great Whale River on the east coast of Hudson Bay. Well may one wonder whether these small populations are truly discrete. The point of my comment is not, however, that future work may show them to be not wholly discrete after all, but rather that the maps present so effectively the facts as these are known today.

So very useful are these distributional maps that I am tempted to comment—in a way which may sound like adverse criticism, though it is not intended as that at all—on what a *magnum opus* of this sort might accomplish. Scores, literally scores, of these small distributional maps chop the poor birds off at the Alaska international line in a way which is downright painful to the zoogeographer. Might it not have been possible to combine forces in such a way as to map the distribution of species throughout the whole of northern America? The part titled "range" in each species writeup covers this ground, to be sure, but words lack the direct power of maps—as I have said above. Leaving Alaska (and Greenland) out is an unfortunate by-product of nationalism which should be foreign to scientific investigation. Were this book about a single province or island, or about, say, eastern Canada or western Canada, the omission of Alaska and Greenland would seem less glaring; but as the maps stand they seem to say only part of what they really ought to say. Canadians will counter with the statement that Canada was footing the bill. Godfrey will argue, and justifiably, that including Alaska and Greenland would have tripled the work. Well, might not the money and the man-power to help have been found in the United States and in Denmark?

Zoogeographically considered, the important lines are almost never political; they are tree-lines, soil-lines, permafrost-lines, continental divides, and the like. The distribution of birdlife in the far north has interested me deeply for a long time. As I examine these excellent, these truly inspiring, maps, I cannot help feeling that rather than showing what is known about bird distribution in the governmental entity called Canada they should declare the universality of the forces which determine bird distribution throughout a vast and important northern part of the world.

Finally, some comments on the color plates and the other bird drawings. John A. Crosby, whose work is quite new to me, has obviously paid very close attention to the facial expressions and feather-patterns of living birds and to the colors of their fleshy parts. His choice of background tones and accessory material deserves special praise. The stippled paper on which he drew the sandpipers of Plate 27 is wonderfully effective as background. So exquisitely done are the eleven "peeps" shown on this plate that I find myself turning to them for refreshment and inspiration. They form a remarkably convincing *ensemble*. So satisfying are the individual birds that one does not worry

about the mixup of seasons they represent, or about the laws of perspective which might *force* the figures at the top to be smaller than those at the bottom. The two species figured at the top are actually the smallest of the six shown, so the general effect is pleasing and accurate. The more I study the plate the more certain I am that the arrangement of bird-figures was no accident. Plate 27 is the work of a genius.

A quality possessed by the plates as a whole is their freshness, their freedom from any straining for effect. As one studies them one does not feel that the artist has tired of his subject matter, or become "fed-up" with the problems of artificial arrangements, pieces of branches, patches of forest, etc. The simple profiles are not monotonous because they are profiles of living birds. The way in which water, dead leaves, and bits of debris have been "whisked in" is, in my opinion, remarkable.

The engravers and printers deserve much credit for their part in producing these fine plates. I call attention particularly to the Yellow-breasted Chat on Plate 59. Here the yellow of the breast is perceptibly richer in tone than that of the yellowest parts of the other warblers shown in the same plate. The color is precisely as it should be; what is noteworthy is that artist, engraver, and printer have so successfully collaborated as to do this beautiful bird full justice.

Crosby will not resent my calling attention to certain shortcomings. Heavy birds such as the Band-tailed Pigeon in Plate 37 should not be shown at the very tip of a twig so slender that it would sag, thus forcing the bird to flutter in maintaining a foothold. Woodpecker feet should be drawn with great care, for the functional beauty of the powerful toes is something no artist should miss. In four-toed woodpeckers the hallux (first toe) is, according to my observations, invariably the shortest; the inner is somewhat the shorter of the two front toes; and the outer of the hind toes is about as long as, but never shorter than, the outer front toe. In Crosby's adult male Yellow-bellied Sapsucker (6a in Plate 42) the hallux is far too long and the outer hind toe far too short; in the Red-bellied Woodpecker on the same plate the inner front toe is much too long and the outer hind toe much too short. In the Horned Lark and Skylark (Plate 50) the hind claws should be only slightly curved. Straightness of the long hind claw is a dependable family character throughout the Alaudidae.

Stewart D. MacDonald's drawings add pleasing variety. Values in the two meadow-lark heads (Fig. 67) are not consistent. We read as yellow the dark tone of the chin and throat, yet the same dark tone, as used on the top of the head, is restricted not to the yellow forepart of the superciliary, as it should be, but to brown parts of the crown and auriculars. In all adult Pomarine Jaegers that I have handled, the two middle rectrices "twist" in opposite directions in such a way as to give the tips of the feathers a "roofed" arrangement (Fig. 52). In both the Brown Creeper (Fig. 63) and Bobolink (Fig. 66) the tail has twelve rectrices rather than ten. The line drawings showing the modification of the sternum in the Whistling and Trumpeter swans (Figs. 17 and 18), the drawings of the foot of the Ruffed Grouse in winter and in summer (Fig. 43), and the drawing of the outermost primary in the Whimbrel and the Eskimo Curlew (Fig. 49) strike me as being especially well done.—GEORGE MIKSCH SUTTON.

THE BIRDS OF GUYANA (formerly British Guiana): A CHECK LIST OF 720 SPECIES, WITH BRIEF DESCRIPTIONS, VOICE AND DISTRIBUTION. By Dorothy E. Snyder. Peabody Museum, Salem, Massachusetts, 1966: 5¼ × 7¾ in., 308 pp., endpaper map. \$6.00.

The main value of this small book is that it gives a complete list of the birds of Guyana. This was long overdue as nothing of the kind has been published since Charles Chubb's monumental two-volume work, "The Birds of British Guiana" (London,

1916, 1921). The records seem to have been compiled carefully and critically and are based mostly on specimens, though this is not always quite clear. We should have liked more definite data—e.g., on the ibises of the genera *Theresticus*, *Cercibis*, and *Phimosus*, as there has been some confusion in their identification by some authors.

The lack of regular field observations is apparent in the case of many waders. The records certainly do not give a true picture of the actual situation.

The short descriptions will be valuable in identifying the more "easy" species, but those of certain flycatchers and antbirds, to mention only a few, will hardly help the field observer. However, we cannot blame the author for this because even the experts with specimens before them make sometimes contradictory identifications.

There is also a special section on "voice" which will be especially useful for the English-speaking readers of the book. For this reviewer who "hears in Dutch" it was once more evident that the method of rendering bird songs and calls in words or phonetics is impractical. I tried all the songs and calls of the species with which I am familiar, but I failed to recognize practically all of them as presented in the book. I fear that it will be even worse for readers who speak the Latin languages.

The bibliography at the end of the book contains a number of publications scarcely relevant to the subject. One would have wished for a complete bibliography of the ornithology of Guyana.

For such a small book without illustrations, its price is high.—F. HAVERSCHMIDT.

BIRDS IN OUR LIVES. Edited by Alfred Stefferud. U. S. Department of Interior, Bureau of Sport Fisheries and Wildlife, Washington, D. C. 1966: 8 × 11 in., xiii + 561 pp., 1 col. pl. and 80 wash drawings by Bob Hines, 372 photos. \$9.00 (for sale by the Superintendent of Documents, Washington, D. C.).

This elaborate book is the second effort of the Bureau of Sport Fisheries and Wildlife to make available for the general public a semi-technical publication on North American wildlife, the first having been the 1964 publication, "Waterfowl for Tomorrow." Many readers will recognize the ancestry of the present volume in the popular "Yearbooks of Agriculture" sponsored over the years by the Department of Agriculture. The general format as well as the method of presentation of the subject matter are very similar, and it comes as no surprise to learn that Editor Stefferud had also served as editor of the Yearbooks.

Following a foreword by Secretary of the Interior, Stewart Udall, and an editor's preface, the main portion of the book consists of 54 chapters divided under nine topical headings: In Perspective, Literature and Arts, Sports and Recreation, In Nature's Scheme, Science and Husbandry, The Hand of Man, For Better or Worse, Answers to Conflicts, and For Their Survival. A total of 61 authors contributed to the work and a listing of their names reads like a Who's Who in modern ornithology, conservation, and wildlife management.

There is hardly a subject that even lightly touches on birds that is not included. The reader is treated to a wide gamut of interesting reading on such things as the use of birds on postage stamps and coins, as well as other artistic representations; the references to birds in the Bible and other literature; aspects of aviculture; falconry, waterfowl hunting, and such bird-watching sports as Christmas Counts, as well as such fundamental topics as bird biology, ecology, conservation, and management. The level of presentation is directed towards the general reader who may wish to learn something about birds. If he is not floored by the encyclopedic nature of the book this reader

can learn an awful lot from this book. It would seem to have attained its general purpose very well, but one does wonder how many of those for whom the book was intended will accept the offering.

There is some unevenness about the various chapters, and while most of them deal adequately with their topics a few seem hardly worth including. To my mind the most effective chapters are the three introductory ones: "What Are Birds For?" by Roger Tory Peterson; "Masters of the Air" by Olin Sewall Pettingill, Jr.; and "Birds and Science" by Ernst Mayr. The chapters on conservation by Roland Clement and John Aldrich are also effective. As might be expected most of the chapters on management are devoted to some of the specific problems with which the sponsoring Bureau is currently concerned, some of which are only of transitory or minor importance.

I have two major criticisms of the book. Despite the many chapters on conservation I do not feel that the book gives a balanced ecological picture. While the pesticide problem (which is probably temporary) and such things as the casualties at TV towers (a minor problem despite the impressiveness of the numbers of birds killed) are fully discussed, there is no place in the book which makes any attempt to discuss the major problem facing all forms of wildlife today—uncontrolled habitat destruction. In the long run this destruction (often sponsored by the very governmental Department which published this book) will account for greater population decreases than will pesticides, TV towers, and some of the other matters that are discussed.

Secondly I feel that there is too much emphasis on the type of "economic" ornithology that was prevalent in the 19th century. We are still told that there are "good" birds and "bad" birds and the time-honored stories about the great economic value of many species are paraded out. Is it not time that even the general public be made aware of the fact that there are no "good" and no "bad" birds; that all species have their proper places in a healthy biota; and that a biota that lacks some of its basic species is not a healthy one, and in the long run is an undesirable environment for every species, including man?—GEORGE A. HALL.

THE SHELL BIRD BOOK. By James Fisher. Ebury Press and Michael Joseph, London, 1966: 5 × 8 in., 344 pp., 20 col. pls., many bl. and wh. illus., maps. \$3.50.

For many years the Shell Oil Company in Britain has sponsored a series of beautifully produced nature guides and atlases, all generously illustrated in color. Aside from using the name "Shell" in the titles, and occasionally the familiar scallop-shell trademark on the jacket or cover, the company has been remarkably self-effacing in performing a great educational service. "The Shell Bird Book" is its latest and most voluminous contribution and, like some of its earlier publications, authored by England's eminent and scholarly ornithologist, James Fisher.

The book should have had a more revealing title. What I find between the covers is information in an astonishing amount and variety. Much of it will be illuminating and useful to anyone interested in British ornithology and to any bird-oriented person who will visit Britain and Ireland.

Most of the book is, in the author's apologetic words, "something of a rehash" of old themes and subjects updated and rewritten from some of his earlier and now out-of-print books such as "Watching Birds," "Birds in Britain," "Birds as Animals," and "A History of Birds"; it is also an attempt to make "new soup from old stock" that he had once published in various magazine articles. He has added new material, particularly on the fossil birds of Britain and Ireland. The total result is 12 chapters.

Chapter 1: A Bird's Eye View of Britain. Mainly a history of the avifauna from prehistoric times to be present. Chapter 2: The Naming of Birds. The identification, description, naming, recording, and study of birds from earliest historic times, and the principal persons who participated. Chapter 3: The Peculiarity of British Birds. The composition, origin, and distinctiveness of the avifauna. Chapter 4: Bird Migrants. The observatories for, and comments on the techniques in, the study of migration. Chapter 5: Bird Protection. Chapter 6: Bird Gardening. Information on how to attract and feed birds. Chapter 7: Bird Song. Chapter 8: Birds in Literature, Music and Art. Chapter 9: A List of Bird Watchers. Famous persons in British and Irish bird literature not now living. Chapter 10: The Ornithologists. Primarily an evaluation of the deceased figures in British ornithology.

Chapter 11, A Bird-Watcher's Guide to the Birds' Provinces, gives "all major accessible Bird Reserves, Wildfowl Refuges, Migration Watch Points, Bird Observatories, Zoos with birds, Museums with bird material, etc." known to the author in 1965, together with "a bibliography of the latest regional published works" and a list of "the major bird-watching societies, and natural history societies with bird interests or sections." The chapter is not really a guide in the usual sense since it fails to give directions on how to reach different places, where to go, and what to expect. Only to the extent that the places are located by vice-county numbers—referable to maps on the endpapers of the book—is the chapter helpful to anyone planning his itinerary and finding his way.

The final chapter, a "Shell List of British and Irish Birds," includes every species recorded from prehistoric times to 1964. Indeed, it is the first full British list to include fossil records and, if I am not mistaken, the first bird list ever to attempt summarizing both prehistoric and modern records for an area. The succinct and very precise annotations give, for fossil species, the prehistoric periods from which the fossils came and where they were found; and for extant species, the earliest prehistoric period, if known, and the earliest year, if available, of actual records—sightings or collected specimens. For all vagrant or extralimital species, the exact number of records (date of the first) is stated. All in all the list reflects the meticulous record-taking by so many people for so long a period. It is doubtful that such a list could come from any other country.

The writing throughout the book is strictly and recognizably James Fisher—discursive and verbose, with involved syntax, but always meaty and sparked every now and then by a pun, a cleverly turned phrase, or an outlandish personal opinion. It is never dull. I only wish that the type were larger for easier reading. But then, perhaps I am due for another appointment with my oculist.

The book is generously illustrated in black and white by many photographs, sketches, engravings, maps, etc., and in color by the work of Eric Ennion, Peter Scott, Charles Tunnicliffe, and five other artists. At the price of 25 shillings (\$3.50), it is a lot of book for the money.—OLIN SEWALL PETTINGILL, JR.

POPULATION STUDIES OF BIRDS. By David Lack. Oxford University Press, London, 1966: 6½ × 9½ in., v + 341 pp., 1 pl., 31 figs., 50 tables, 29 drawings. \$10.10.

In 1954, David Lack published "The Natural Regulation of Animal Numbers" in which he clearly set forth his concept that populations are regulated in a density-dependent manner, the ultimate factor limiting populations being the food supply. His ideas have since been repeatedly challenged; indeed, the entire concept of density-dependence of any kind has been rejected by some authors. Andrewartha and Birch ("The Distribution and Abundance of Animals") have favored density-independent

population regulation with climatic factors being the effective agents in population change. In 1962, Wynne-Edwards embraced density-dependence in his controversial "Animal Dispersion in Relation to Social Behaviour," but maintained that animals regulate their own populations below the limits of the food supply by behavioral means and that these behaviors have evolved through the unorthodox mechanism of group selection. It is against this background that Dr. Lack has set the present book. In an introductory chapter and a long appendix (32 pp.) he gives a very useful summary of his 1954 book (now out of print), maintains and expands his position in the light of recent work, and discusses, and gives his comments on, some of the attacks directed at his position. These two parts of the book provide a contextual framework for the whole work and should in themselves be useful in the libraries of all persons interested in the mechanisms of population regulation.

The body of the book is concerned with the interpretation and analysis of 13 published studies of bird populations. The studies were chosen on the basis of their duration (minimum study time of four years) and their thoroughness, and embrace a wide variety of bird species—herbivores, omnivores, frugivores, predators, and sea birds. In all, 12 families, representing nine orders, are discussed in detail. The paucity of studies in the tropics permitted the inclusion of only two species from that region—the Quelea of Africa and the Black and White Manakin of Trinidad. All the other species, no less than eight of them from the British Isles, breed in temperate regions: the Great Tit, Coal Tit, Pied Flycatcher, European Blackbird, Tawny Owl, Wood Pigeon, Red Grouse, White Stork, Black-legged Kittiwake, Mutton-birds (Sooty Shearwater and Slender-billed Shearwater), and Yellow-eyed Penguin. In most chapters, additional work with closely related species is discussed if it helps to elucidate the general theme. Thus the total number of studies reviewed is actually increased by 11.

The theme underlying Dr. Lack's review of all the studies is that populations are regulated by a density-dependent mortality upon nestlings, fledglings, or adults, brought about by the amount of accessible food. The reproductive rates that have evolved are such that the largest number of surviving young will be produced by each pair. Dr. Lack stresses the fact that mortality rates are a function of birth rates. One very significant finding is that some species (Great Tit and Pied Flycatcher) lay their eggs at a date later than one which would produce nestlings when food is most abundant. Dr. Lack thinks that females lay only when they can get enough food to form their eggs, and as a consequence they may sometimes rear young under sub-optimal conditions. This throws light on another possible role of courtship feeding: aside from its behavioral function in pair formation and maintenance, it may well assure the female the extra food necessary for her to start the clutch earlier and hence to bring forth her young at a time more favorable for food procural.

Dr. Lack's discussions strongly support his basic contentions. Animal populations usually fluctuate about some definite mean value and thus must be regulated in some density-dependent manner. The evidence points to the food supply as the most important limitation, but the author's discussions often demonstrate other mechanisms that may aid in effecting population regulation. For example, with increased densities of Great Tits and Wood Pigeons, there is increased predation. Black and White Manakins, with a year-round abundance of food (fruit), lost 86 per cent of their nests to predators during the study period. In addition, most of the 11-per-cent-per-year adult mortality was assumed to have resulted from predation. In both Great Tits and Coal Tits, pairs in dense breeding populations produced smaller clutches of eggs than those in sparse ones. In at least one area (Marley Woods, England), the population size of Tawny



Owls remained almost constant in spite of violent fluctuations in the number of prey. This stability is a function of territorial behavior (although young production dropped to zero in bad years). It is interesting that the fluctuations in the nearby populations of Short-eared Owls paralleled the abundance of their prey. Heavy mortality (Great Tits) or dispersion (Wood Pigeons) occurred with severe winters. Dr. Lack points out that in all the above examples the production of surviving young depended (or in the case of the Manakins, may depend) on the availability of food, and that these other mechanisms did not appreciably affect the number of young produced. It would be hasty to conclude, however, that they are never a primary factor in the population regulation of other species.

One is always disappointed to look up a reference in the text, only to find it unlisted in the bibliography. Hopefully the following will prevent this frustration: Richdale, 1965 (cited pp. 255 and 265) refers to "Biology of the Birds of Whero Island, New Zealand," *Trans. Zool. Soc. London* 31:1-155. Richdale, 1962 (cited p. 257) should be Richdale, 1952.—CAMERON B. KEPLER.

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