RECENT LITERATURE

BANDING AND LONGEVITY

(See also 36, 37, 56)

1. **The Australian bird-banding scheme -- its problems and future.** D. Purchase. 1970. *Ring*, **63**(2): 25-31.—The first of a series of articles on national banding schemes (see **2** and **3** below), this article details early history, recruitment, dealings with the public with respect to recovery-reporting, and so on. The scheme now bands about 100,000 birds per year, gets 5,000 recoveries.—Jack P. Hailman.

2. **The future of bird ringing in Asia.** H. E. McClure. 1970. *Ring*, **63**(2): 32-34.—A listing by countries, including Soviet Siberia and North Korea. Activities are stimulated primarily by pathological surveys to determine disease and parasite vectors.—Jack P. Hailman.

3. **Bird ringing in southern Africa.** M. K. Rowan. 1970. *Ring*, **63**(2): 34-38.—The third of regional overviews (see above) shows that about 100,000 birds per year are banded now (roughly comparable to Australia- review **1**).—Jack P. Hailman.

4. ***Point Reyes Bird Observatory Fifth Annual Report.*** J. Smail (ed.). (1970.) 24 pp. — Summarizes station activities, banding and recoveries.—Jack P. Hailman.

5. **Weight loss of bands used on Grey Teal.** F. I. Norman. 1970. *Austr. Bird Bander*, **8**(2): 29-31.—There is always the problem that life tables of banded birds may be confounded with band degeneration. Most band-wear studies have been done on seabirds, but this was on *Anas gibberifrons*. Basically, the average band is down to 3/4 original weight in 40 months, although there is considerable variation. For long-lived species figures such as these are a bit depressing.—Jack P. Hailman.

6. **Longevity of Dominican Gulls.** W. J. Merilees. 1969. *Austr. Bird Bander*, 7(3): 60-61.—The oldest *Larus dominicanus* was more than 13 years.—Jack P. Hailman.

7. **Longevity records and banding data on Short-tailed Shearwaters.** D. L. Serventy. 1970. *Austr. Bird Bander*, **8**(3): 61-62.—Three living 28-30 year old *Puffinus tenuirostris* are claimed as the oldest banded birds in Australia. Birds banded as fledglings on Fisher Island (Bass Strait) now compose 38% of the breeding population there. Consistent with other procellariiform species, delayed maturity is indicated for *P. tenuirostris* by a male first breeding at age seven, and a female at age six.

Those planning a sojourn in Australia may wish to answer the author's call for volunteer field assistants (take your flashlight!).—Thomas C. Grubb, Jr.

8. **Notes on the Gould Petrel.** A. F. D'Ombrain. 1970. *Austr. Bird Bander*, **84**(4): 82-84.—*Pterodroma leucoptera* is known to breed only on Cabbage Tree Island off Australia's southeast coast. Banding data since 1964 are reported; no recoveries away from the island as yet. Two additions to our knowledge of procellariiform behavior come from nocturnal observations. Returning birds circled at "fairly high" altitude, then dropped lower and circled again before landing in the tree-covered colony. A recently-arrived petrel fed another adult which had emerged from a nest site under a pile of stones (courtship feeding?). It is suggested that Peregrine Falcons [*Falco peregrinus macropus*] seen hunting just after dusk may contribute to the mortality of early-arriving petrels.—Thomas C. Grubb, Jr.

9. Bird in the hand: Dominican Gull (*Larus dominicanus*). W. J. Merilees. 1969. *Austr. Bird Bander,* **7**(3): 62-63.—One tells four age classes by plumage, sex by bill measurements (which are very close to my published figures: *Behav. Suppl.,* **15**, p. 155, 1967). We draw attention once again to this fine banding column for identification of species in the hand.—Jack P. Hailman.

10. Standards for banders. M. Carins. 1970. *Austr. Bird Bander,* **8**(3): 59-60.—Mainly how to measure birds to conform to techniques used in Britain and the U. S.—Jack P. Hailman.

11. Readable band numbers and "scotchlite" colour bands for the Silver Gull. R. Carrick and D. Murray. 1970. *Austr. Bird Bander,* **8**(3): 51-56.—Ordinary color bands are difficult to read, since they reflect only a portion of the ambient illumination that falls upon them. The authors used scotchlite bands: the sort of material of which some road signs and other very bright markings are now manufactured. (The mechanism of such materials is to reflect not only the visible light falling upon them, but also to absorb ultraviolet radiation and re-radiate it as visible light, greatly increasing the apparent brightness.) Sight records with these new bands have revealed that the dispersal patterns of *Larus novaehollandiae* are much more complex than ordinary banding-recovery techniques indicated in the past.—Jack P. Hailman.

12. Banding system and technique in the field. M. Carins. 1970. *Austr. Bird Bander,* **8**(4): 85-86.—Notes on equipment and methods for a permanent banding station.—Jack P. Hailman.

MIGRATION, ORIENTATION AND HOMING

(See also 11, 62)

13. Bird recognition by radar: a study in quantitative radar ornithology. G. W. Schaefer. 1968. In: *The Problems of Birds as Pests,* R. K. Murton and E. N. Wright (eds.), Academic Press, London and New York, pp. 53-86.—This paper undertakes the daunting task of calculating theoretically the strength of the radar signal reflected from a bird under various conditions. To make calculations possible, the bird's body is idealized as a prolate spheroid (i.e., a shape like a football). The radar echo from a spheroid, obtained after lengthy calculations, has three main features. (1) Its strength does not increase smoothly with increasing size, but shows a number of large peaks, which occur when the circumference of the spheroid is a whole number of wavelengths; hence a small spheroid may give a larger echo than a much larger one. (2) The signal reflected in the side-on position is much larger than that in the head-on position. (3) At aspects between the side-on and head-on positions there are a number of secondary peaks of echo strength. All these phenomena were known from measurements on birds, and Schaefer is able to fit the available measurements to his numerical predictions with fair agreement (although in fact many more measurements are required for a full test of the theory).

Echoes from flying birds are observed to oscillate, often through large amplitudes, in synchrony with the beating of the wings. This phenomenon is unlikely to rise from echoes from the wings themselves, which are known to be very weak. Schaefer suggests that it results from changes in the shape of the body as the breast muscles expand and contract. (Incidentally this undermines much of the agreement of the measurements with the basic theory, which treats the body-shape as fixed.) Wing-beat frequencies can thus be measured with great accuracy: they are found to be constant in individual birds, with some variation between species. Measurement of wing-beat frequency and air-speed should permit identification of a single target as one of, at worst, three or four species. (Flocks, however, will be much more difficult to identify.)

Schaefer suggests that S-band radar (10 cm wavelength) is generally the best for studying birds, as it covers the entire range of bird sizes with potentially good discrimination. X-band (3 cm) detects more insects and L-band (23 cm) screens out small birds. He points out that echoes from weather, insects and birds are more similar than is often recognized. Radar meteorologists tend to identify them too uncritically as weather, entomologists treat them as insects and ornithologists treat them as birds. Even Schaefer, however, overlooks bats!—I. C. T. Nisbet.

14. Recording and interpretation of echo signatures with a 3-cm tracking radar. (Zur Registrierung und Interpretation van Echosignaturen an einem 3-cm-Zielfolgungsradar.) B. Bruderer. 1969. *Orn. Beob.,* **66**(3): 70-88. (English summary.)— Using a tracking radar in northern Switzerland, echo "signatures" (the variation in time of the strength of the echo received from a target) were recorded on a tape recorder. Wing-beat patterns were recorded from a number of species, and related to approximate theoretical predictions in much the same way as in Schaefer's study (see previous review). Some additional complexities are attributed to the short wavelength of the radar. Bruderer believes that, with sufficient information about their flight behavior, birds can be identified to species with 3-cm. radar.—I. C. T. Nisbet.

15. Methods and problems of determining radar cross-sections of free-flying birds. (Methoden und Probleme der Bestimmung von Radarquerschnitten frei fliegender Vogel). B. Bruderer and J. Joss. 1969. *Rev. Suisse Zool.,* **76**: 1106-1118. (German with French and English summaries.)—Further investigations of the radar returns from birds were made using the Automatic Gain Control record of a tracking radar (see previous review). Changes in the echo strength result from wing beats, from changes in aspect, and from movements of birds within flocks. Single birds and flocks of birds may easily be distinguished by means of the rate and amplitude of echo fluctuations. The average cross-section of a target indicates its total mass, and can be used to estimate the size of bird or size of flock.—I. C. T. Nisbet.

16. A radar and direct visual study of passerine spring migration in southern Louisiana. S. A. Gauthreaux, Jr. 1971. *Auk,* **88**(2): 343-366.—Migrants were tracked during three springs at New Orleans and Cape Charles, Louisiana, using radar and direct telescopic observations. Migrating passerines arrived from the south (over the Gulf of Mexico) on 95 of 113 days of observation. On days with strong southerly winds the peak of arrivals was in the late morning; in "normal" weather the peak was in mid-afternoon; with rain or adverse winds over the Gulf the peak was in the evening. Most birds landed in wooded areas 50-150 km inland, but on a few occasions with adverse winds or rain (even when local) many birds landed in small scattered woodlands on or near the coast. On the 18 days when no arrivals were seen, cold fronts or strong east winds were over the southern Gulf: only 3 of these occasions were within the period 8 April-15 May.

Birds which settled in the area of observation during the day almost always departed again the same evening. Departures took place abruptly 30-45 minutes after sunset. The most significant finding is that departures were almost independent of weather: only rain and (in a few cases) bad weather preceding arrival were associated with reduced or delayed departures. This "suggests that the nightly initiation of migration in spring depends upon the absence of inhibitory factors rather than the presence of stimulating ones."—I. C. T. Nisbet.

17. The distribution of nocturnal migration in the air space. F. C. Bellrose. 1971. *Auk,* **88**(2): 397-424.—This paper describes a new method of sampling nocturnal migrants: flying a light aircraft in systematic transects and counting those visible in modified landing lights. Numbers of birds seen range up to 20 or even 40 birds per mile. Waterfowl and other large birds appear to avoid the approaching plane, but small birds are thought to be sampled adequately. The technique samples low-flying birds better than other methods, but gives no information on species or directions of flight.

Systematic surveys were made of altitudinal and geographical distribution of migrants. The greatest densities were regularly encountered at about 1,000 feet above ground level, with few above 3,000 feet (generally lower than indicated by previous publications). Mean heights of flight were slightly higher under clear skies than under overcast, and slightly higher with favorable than with unfavorable winds. Mean densities were similar under overcast and under clear skies, but considerably larger with favorable than with unfavorable winds. Birds were seen on a broad front, with no indication of concentration over river valleys. Birds were seen both singly and in loose groups. On several nights more birds were seen in strata of turbulent air than in strata of smooth air.—I. C. T. Nisbet.

18. Irruptions of Crossbills in Europe. I. Newton. 1970. *In*: A. Watson (ed.), *Animal Populations in Relation to their Food Resources*, Blackwell Scientific Publications, Edinburgh, pp. 337-353.—This is an important review of irruptive migration in *Loxia curvirostra*, which at last begins to pull together the many local studies into a coherent whole. Crossbills feed on spruce seeds except during April and May, when the spruce seeds are shed and the birds change to pine seeds. In general, a good spruce crop is usually followed, at least locally, by a poor crop: hence the birds move every summer. They usually breed in late winter, but may breed continuously for 9 months (September-May). The movements follow breeding but precede molt in July-August.

Large-scale emigrations (eruptions) from the breeding range have occurred in years of widespread crop-failure, but there is some evidence that other factors, such as population levels, are also involved. Some emigrations follow years of poor breeding success and involve largely adult birds. It was formerly thought that the emigrants from the normal range were doomed to certain death. However, recent banding has shown that some do return to the area of origin, but in a subsequent year.

Crossbills are contrasted with the other northern finches that migrate irregularly. The Crossbill is the only species which feeds on the same type of food (conifer seeds) throughout the year. Correspondingly, it is the only species that migrates only once each year, and it is the only species known to migrate in opposite directions in alternate years.—I. C. T. Nisbet.

19. Orientation in gulls: effect of distance, direction of release, and wind. W. E. Southern. 1970. *Living Bird*, **9**: 75-96.—This is one of several papers by Southern reporting intensive study of homing of *Larus argentatus* and *L. delawarensis* in Michigan. Generally returns were slow, the courses taken were often meandering, and a substantial proportion of birds failed to return from distances of only 25-120 km. There were slight differences in the homing peformance according to the distance and direction of release, and the wind. These species do not appear promising for the study of homing—which is disappointing in view of the good results obtained by Matthews with *L. fuscus*.—I. C. T. Nisbet.

20. The nightly initiation of passerine migration in spring: a direct visual study. J. J. Hebrard. 1971. *Ibis*, **113**(1): 8-18.—Birds departing from a woodlot on the Louisiana coast were illuminated with a searchlight shone horizontally a few feet above the treetops. The peak of the exodus was usually 40-45 minutes after sunset. No local weather conditions were found to be directly inhibitory to nocturnal migration.—I. C. T. Nisbet.

21. On swallow orientation capacity when the sun is invisible. (O sposobnosti lastochek k orientatsii pri nevidomom solntse.) L. Smogorzhevskii. 1970. *Vestnik zool.*, 4(6): 46-49. (In Russian, English summary.).—Of the Common Swallow, *Hirundo rustica*, 45 nesting birds were released 4-30km from home, 21 in sunny, and 10 in cloudy weather, rate of return was about even, average 13 km/hr. Of the House Martin, *Delichon urbica*, 174 were released, 119 in sunny, 55 in cloudy weather. Rate of return was about the same, 5-10 km/hr. Release over land and water, Black Sea, resulted in about identical return rate, 13 km/hr. Windy and rainy weather accompanying some of the returns made no definite difference.—Leon Kelso.

POPULATION DYNAMICS

(See also 39, 40, 44, 62)

22. Dominance, spacing behavior and aggression in relation to population limitation in vertebrates. A Watson and R. Moss. 1970. *Symp. Brit. Ecol. Soc.*, **10**: 167-220.—The question of what factors limit populations in natural environments is a complex one, and one that does not seem near solution. It remains unclear, even in populations commonly acknowledged to be potentially food-limited, whether food does in fact become limiting, or whether agnostic behavior or some other factor, increasing in response to decreased resource abundance or availability, acts instead. What holds for one population or species may not hold for another. Lastly, it is not clear exactly how much relevance a number of carefully-controlled laboratory studies have to the field situation. They have in a number of cases documented the braking effects of excessive crowding in limiting animal numbers, even if food resources were adequate. Here is a mechanism that could act as a brake in natural populations; the question is, does it?

Against this background Watson and Moss have put together a great amount of information (an important part of it being from their own studies of Red Grouse, *Lagopus lagopus*) into an extensive *critical* review of the state of the situation at the present time. In the reviewer's estimation this paper represents one of the most important contributions made in recent years to the topic of population regulation. It includes over 200 carefully selected references and a short discussion by participants at the symposium at which the paper was presented. Since a large proportion of this type of work has been done with birds, it is not surprising that they receive much attention.

Basically, the authors' main points are the following ones. While there are many papers dealing with territorial behavior and with other forms of dominance and spacing behavior in vertebrates, many dealing with population phenomena, and many dealing with basically nutritional problems, very few consider any two of these aspects together, much less all three together. Consequently, much of the thought in this area is speculation and will remain that until the proper critical studies are performed. These conclusions do not indicate that Watson and Moss doubt the importance of behavioral factors in regulating vertebrate populations. They conclude by indicating that behavioral factors probably frequently do act in population regulation, but that much more intensive work is needed to unravel the problem in detail. Particularly, they feel that more experimental work must be conducted in the field.

This paper serves as a useful guidepost in the study of population limitation in vertebrate animals, summing up the state of the subject at present and pointing out directions for progress to take.—Douglass H. Morse.

23. Differences in population density, territoriality, and food supply of Dunlin on arctic and subarctic tundra. R. T. Holmes. 1970. *Symp. Brit. Ecol. Soc.*, **10**: 303-319.—Holmes has used the comparative method to attempt to relate territory size, density, and food supply in the Dunlin (*Calidris alpina* = *Erolia* in A. O. U. Check-list, 1957). Two study areas were used, one in the arctic tundra at 71° N (Barrow, Alaska) and the other in subarctic marshland at 61° N (Kolomak River, Alaska). At Barrow breeding pairs are confined to territories until eggs hatch; in the Kolomak region most activity is confined to territories, but some individuals feed at ponds outside their territories late in the incubation period. Mean territory size was five times as large at Barrow as at Kolomak (6.5 ha vs 1.3 ha). Holmes concludes that the direct correlation between territory size (and density) and the abundance and diversity of the food supply has a causal basis. In addition to the Kolomak birds having a richer and more diverse food supply, the environmental conditions are more stable there. Three other species of *Calidris* [Baird's, Pectoral (*C. bairdii* and *C. melanotos*, both = *Erolia* in A. O. U. Check-list 1957), and Semipalmated sandpipers (*C. pusillus* = *Ereunetes* in A. O. U. Check-list, 1957)] are found in the study sites at Barrow, while there are no congeners at Kolomak. However, since the number of Dunlins remained constant despite year-to-year marked variations in density of Pectoral Sandpipers, Holmes tentatively discounts the importance of interspecific competition as a factor in determining territory size and density. These data are of course suggestive, rather than conclusive. Several lines of evidence, including removal experiments, suggest that territorial behavior is limiting the size of the breeding population. Thus, while regulation may be occurring at other seasons, it occurs on the breeding grounds as well. After considering a number of other possible explanations (predation, disease, etc.) Holmes concludes that the main function of territorial behavior in Dunlin lies in dispersing the population in relation to food. While all alternative explanations have not been completely laid to rest, Holmes' work brings us closer to a cause-and-effect analysis than most studies on this subject.—Douglass H. Morse.

24. Population density and seasonal changes of the avifauna in a tropical forest before and after gamma irradiation. H. F. Recher, 1970. In: *A Tropical Rain Forest: A Study of Irradiation and Ecology at El Verde, Puerto Rico*. H. T. Odum (ed.). U. S. Atomic Energy Comm, pp. E-69-E-93.—Recher has provided, as part of the massive radioecology program at El Verde, census data upon the density and composition of bird populations in two tropical forests in Puerto Rico. One of these two forests was censused both before and after gamma irradiation. While the two habitats differed rather markedly (a lower montane rain forest at 450 m and a palm forest at 850 m), there was a remarkable similarity of bird species found in the two areas, ascribable, according to Recher, to the depauperate character of the Puerto Rican avifauna.

In comparison with temperate-zone forests, changes in composition were minimal during the two years that the areas were censused (1964-1966). Bananaquits (*Coereba flaveola*) regularly made up one-half to two-thirds of the total density. Only one migratory species, the Black-whiskered Vireo (*Vireo altiloguus*), bred in the study areas; this species winters in South America. One of the most conspicuous phenomena is the presence of wintering wood warblers from North America. The problem of potential competition of residents and the migrants is briefly aired, though no conclusions are drawn. Breeding is seasonal, with most of the activity centering in the period of March through May. At other times Red-necked Pigeons (*Columba squamosa*) and Ruddy Quail Doves (*Geotrygon montana*) often aggregated in the vicinity of fruiting trees. Mixed-species foraging flocks were also characteristic of the nonbreeding seasons.

Some change was noted immediately after irradiation in the close vicinity (within 30m) of the gamma source. No bananaquits included that area in their territories, though they did before and after. However, Black-whiskered Vireos used the area immediately after irradiation. Being migratory, the latter species was not present during part of the 92-day period of irradiation. No other changes in the bird fauna clearly ascribable to the irradiation were documented.

An appendix by the author and J. T. Recher consists essentially of an annotated list of the species present in and about the study areas. The authors report an apparent decrease in numbers of the Puerto Rican Parrot (*Amazona vittata*) since 1959 and predict its imminent extinction. No Whitenecked Crows (*Corvus leucopnaphalus*) were seen, and they believe that this species is now extinct. —Douglass H. Morse.

25. Responses of Red Grouse populations to experimental improvement of their food. G. R. Miller, A. Watson, and D. Jenkins. 1970. *Symp. Brit. Ecol. Soc.*, **10:** 323-335.—This is a preliminary report on two experiments testing the relationships of Red Grouse (*Lagopus lagopus*) and their food supply of heather (*Calluna vulgaris*), the latest in an extensive set of studies upon this bird by the authors and other colleagues in Scotland. (See Review **22** on experiments in the field.) The authors compared the effects of burning and fertilization of heather (by nitrogen fertilizer) upon populations of Red Grouse. It is well known from earlier studies that young shoots of treated heather, a major food of the Red Grouse, have a higher nutrient content than untreated shoots. Results of the present experiments as of this time are not totally explicable. While both treatments increased the density of breeding grouse, the mechanisms of increase were different. On the fertilized plots, increase in density was preceded by improved breeding success; on the burnt areas an increased density occurred despite a breeding success similar to that of the untreated control areas. In the former areas the main outcome was to increase the production of young birds and subsequently to increase the size of the breeding population; in the latter areas the increase in breeding density was probably due to improved survival of the resident grouse or to immigration.

The results of these and other experiments (in progress at the time of writing) are to be published in detail at a later time. By then, the authors may have accounted for the total significance of these differences.—Douglass H. Morse.

NESTING AND REPRODUCTION

(See also 23, 36)

26. Biology and ethology of *Alectura lathami*, with special reference to behavior during incubation. (Zur Biologie und Ethologie des Talegalla-Huhns (*Allectura lathami* Gray) unter besonderer Berücksichtigung des Verhaltens während der Brutperiode.). S. Baltin. 1969. *Z. Tierpsychol.*, **26** (5): 524-572. (In German, English summary.)—This long and detailed study of a megapod in the Frankfurt Zoo reveals some misconceptions about mound building and adds greatly to our knowledge of this barely believable adaptation in incubation. The male builds a compost-heap some 4 m in diameter and a meter high in which the female lays the eggs to be incubated by heat of fermentation. Some highlights are: the male does not, apparently, sense the temperature, but merely opens the mound each morning, which has the effect of allowing air to penetrate and the temperature to fall. Early in the season the temperature fluctuates, but later remains about 33-36 °C. The 28 or so eggs laid are positioned vertically, and the embryos possess a special air-sac in lieu of the ordinary air space. Development requires about 7 weeks, and the young break out of the eggs with their feet, not bills. The chick burrows through the mound with the same two motor patterns used by the male to build it, and then emerges completely alone in the world as there is no parental care. By the first evening, the chick is flying to some extent. It almost sounds like science-fiction.—Jack P. Hailman.

27. On the breeding biology and postembryonal development of the European Snipe. (K biologii razmnozheniya i postembrionalnomy razvitiyii bekasa.) N. S. Ivanova. 1970. *Vestnik leningr. universiteta,* **1970**(15): 24-35. (In Russian, English summary.)—Near Rakovye Lakes, Leningrad region, 1966-1967, 11 nests of *Gallinago gallinago* were observed, four under close and continual surveillance. They were each surrounded by low screen pens to confine young until nearly able to fly while admitting parents. Previous life history data was supplemented or confirmed: number of eggs, four per clutch; incubation, 20-22 days; hatching between midnight and 0600; time from initial pipping to complete hatching or freeing of nestling from egg in individual nests varied, 8-60 hr., but time of emergence of young of same clutch was only 1-6 hrs.; on feet and able to move in 4-13 hrs.; able to fly at about 25 days age. They would pick or snatch food on the first day but only from the parent's bill. In addition to the usual precocial features such altricial trends as brooding for at least a week after hatching and caring for young until nearly able to fly were noted, the male sharing this from the second day onward. There was no instance of carrying young in the feet, as previously reported.—Leon Kelso.

28. The Problem of nest height recording. J. Cooper. 1970. *Bokmakierie,* **22**(3): 68.—The South African Ornithological Society's nest record scheme has revealed some interesting things about the way in which observers record nest heights. While 10 feet and 12 feet are common, 11 feet hardly exists. Between a dozen and 20 feet there are virtually no records. Clearly persons are guestimating, and their guesses or estimates are biased. The author suggests learning one's own height, and also indicating an error estimate: 47 $\pm$ 4 feet. Even more encouraged is a switch to metric units; the author notes that the distance to one's belt is about one meter. He also raises the question as to how to specify nests above water, where water level may rise or fall with daily tides or through the breeding season, but provides no solid solutions.—Jack P. Hailman.

ETHOLOGY AND PSYCHOLOGY

(See also 8, 22, 23, 26, 27, 45, 64, 65, 71, 76, 77, 78, 79, 80, 81)

29. Effectiveness of different colors in the elicitation and development of approach behavior in chicks. J. K. Kovach. 1971. *Behaviour*, **38**: 154-168.—Probably no single specific question about animal behavior is as common as: "Does X see colors?" And, by the same token, no question is as poorly answered by behavioral scientists. At the base of the problem is usually an absence of understanding of some crucial facts about the responses of eyes and light meters to light. This paper is reasonably typical of studies that fail to achieve the necessary stimulus control in an otherwise fine experiment.

Domestic chicks (*Gallus gallus*) were reared under various light conditions, and then their approach to various stimuli was tested. In experiment 1 chicks reared in the dark and in various levels of white light approached green less than other colors; light-rearing enhanced responsiveness shown in the test over the dark-reared controls. In experiment 2 chicks were reared under different colored stimuli and then tested. The blue-, yellow- and red-reared chicks showed about the same response as white-light-reared chicks: green-avoidance with higher responsiveness at the ends of the spectrum. Green-reared chicks, however, showed a rather different curve, humped upward in the center of the spectrum (peaking at yellow), with red and blue receiving the least instead of most responsiveness.

Experiment 3 was like 2 except that chicks were reared at a different level of light intensity and the results compared with the previous experiment, using rearing-intensity as the independent variable. Result: the higher the rearing intensity, the greater the following, except in the green-reared group, where the lower intensity of rearing light produced the stronger responders. The general conclusion from this paper is that "there are some essential . . . differences between responding to green stimulus and responding to blue, yellow, red and white stimuli." (p. 165). The imbedded assumption is that the birds are in fact distinguishing colors.

The assumption is questionable, or at least unproven. To see why, note that the rearing-intensities were equated by means of a light meter reading in footcandles. There are two problems here: (1) The footcandle is a standardized measure of brightness to the human eye (a photometric measurement, not a radiometric one such as energy). Only if the chicks have the same spectral sensitivity as the human eye will the stimuli appear equally bright to them. The empirical data on this point are not clean, but it appears that there are real differences between the spectral sensitivities of the human and chicken eye. This means those rearing intensities under different colors did not appear equally bright to the chicks of the various groups.

(2) Footcandle-meters are almost always calibrated for white light only. They incorporate the assumption that the measurements will be made of white daylight (or possibly high energy tungsten), and so they are adjusted accordingly —even though their own spectral response to light may be quite *different* from the human eye. The point is that when such meters are used with colored light they are *completely* uncalibrated.

What does this mean for the experiments reviewed here (and others like them that are published so frequently)? Generally, it means that there has in fact been absolutely no control over the intensity of the colored lights. This fact, in turn, means that any responsiveness to stimuli may be based on apparent brightness rather than color. For instance, in experiment 1 of the present study, it is possible that green (being near the peak of spectral sensitivity) is merely a very bright light, so the chicks avoid it. In experiment 2, most of the chicks are still avoiding the green light, except for the green-reared group. If its rearing condition was very bright (as suspected here), then perhaps the responsiveness of these chicks to bright light was elevated by the rearing conditions, making them choose the two brightest test stimuli (green and yellow) over the others. Finally, in experiment 3, brighter rearing compartments elevated all the responses higher yet, except for the green-reared animals, which may simply have reached some upper limit.

The alternative interpretation offered here may not be correct, but it is just as correct as the author's interpretation, which is based on the unproven assumption that the chicks are responding to color. A chick reared at "1 ftc" red light may have a much dimmer compartment than one reared at "1 ftc" green light— there is no way to know from this experiment. Basically, there is just not a shred of evidence that chicks treat green (as a color) any differently than they treat anything else.

In fairness to the author, I hasten to point out that this lengthy criticism is not directed merely at this study, but at a whole host of studies of avian "color preferences." For instance, a similar confounding of stimuli occurred in a study of light on oviposition in Japanese quail (see Hailman, J. P., *Wilson Bull.*, **80**: 112-113, 1968) and similar comments were made with regard to a paper on ducks (see *Bird-Banding*, **40**: 270-272, 1969). In fact, this sort of methodological naivete is found in experiments on all animals (see Hailman, J. P. and R. G. Jaeger, *J. Herpteol.*, in press, 1971 for comments on an experiment about turtle "color preferences"). It is my hope that by giving wide exposure to this commonly committed series of errors, experimentation on animal color vision may reach the point of the reader being able to believe in the conclusions of the authors.—Jack P. Hailman.

30. Acquisition of colour preferences by chicks at different temperatures. M. Herbert and W. Slickin. 1969. *Anim. Behav.*, **17**: 213-216.—No such thing has been proven by these experiments. Chicks (*Gallus gallus*) placed in a colored box at an optimum temperature then chose that same "color" in later tests. Yes, chicks acquired a stimulus-preference, but there was absolutely no control over the relative brightnesses of the "colors." This experiment is fairly typical of the glib talk about color preferences by behaviorists.—Jack P. Hailman.

31. Brightness dependence of colour preferences in Herring Gull chicks. J. D. Delius and G. Thompson. 1970. *Z. Tierpsychol.*, **27**(7): 842-849.—Here is an experiment on color vision with adequate stimulus control, but other kinds of problems. Chicks of *Larus argentatus* were given a choice between narrow band red and green stimulus screens, and the intensity of the two stimuli were varied over a range of one log unit. While the relative preference for the red over the green was independent of the intensity of red, green of an intermediate intensity appeared to be less effective than higher or lower intensities in eliciting approach responses. Similar experiments show the same intensity-dependence for white light when paired with red. There is a lengthy discussion that jumps back and forth between the pecking response and this approach response in gull chicks. This study was published about the same time as I (*Development and Evolution of Behavior*, p. 141, 1970) reported an inversely monotonic pecking response over four (not one) log units of intensity, for two different wavelengths, a finding contrary to much of the theorizing in this paper.

Because red is chosen over green and white in this study, the authors implicitly assume that they are tapping the same preference as shown by the begging gull chick. There are, however, really important differences. The pecking studies are done on newly-hatched chicks that are visually naive, while these approach-studies are on older, hand-reared chicks of unspecified age. They were reared with infra-red heaters, and all my infra-red heat lamps give off much red light as well as infra-red. Furthermore, the rearing pens were illuminated with 60 W bulbs, which have a very red spectrum compared with higher energy projector bulbs, such as used in creating the stimuli in this experiment. Therefore, the chicks were used to being warmed and fed in an environment of red light, probably of varying intensity, since they could move around in the pens. It is not surprizing, then, that they preferred red in the tests, and furthermore did not discriminate intensities in this preference. While the conditioning I am suggesting here may not account entirely for this approach-preference, it seems likely to have played an important role. Any comparisons between this approach-response and preferences in pecking appear to be of dubious validity, which renders most of the theorizing in this paper highly speculative.—Jack P. Hailman.

32. Differences in learning and abstraction in hens with monocular and binocular vision. (Unterschiede im Lern— und Abstraktionsvermögen von binokular und monokular sehenden Hühnern.) E.-H. Schulte. 1970. *Z. Tierpsychol.*, **27**(8): 946-970. (In German, English summary)—Domestic hens (*Gallus gallus*) were fitted with hoods covering one eye, and such birds learned various discrimination tests better than binocular controls. The differences are not spectacular, but they are very consistent.—Jack P. Hailman.

33. Sick bird attains top dominance rank through misunderstanding. (Ein kranker Vogel gelangt durch ein Missverständnis an die Spitze der Rangordnung.) J. Kneutgen. 1970. *Z. Tierpsychol.*, **27**(7): 840-841. (In German, English summary.)—A Chiff-chaff (*Phylloscopus collybita*) defectively reared had its wings permanently spread and lowered, and tail cocked upright, as in the aggressive display of the species. It apparently inadvertently become dominant over three cagemates.—Jack P. Hailman.

34. Mechanisms and phylogeny of avian predator-recognition by some Darwin's Finches (Geospizinae). (Funktionsweise und Stammesgeschichte des Flugfeinderkennes einiger Darwinfinken (Geospizinae) .) E. Curio. 1969. *Z. Tierpsychol.*, **26**(4): 394-484. (In German, English summary.) — Here is a huge and important study of the geographic variation in behavior, its functional meaning and phylogeny. Curio had already done an important study on geographic variation of behavior in European flycatchers (*Vogelwelt*, **2**: 33-47, 1961), but the present study is far more experimental and provocative. Basically, it is a study of the reactions of Darwin's finches of various species to various predator-models. The interesting aspect is that the predators of the Galapagos do not all occur on every island in the archipelago, so that it is possible to test on islands that do and do not possess certain potential predators.

Some dynamics of the responses to predators include: (a) differentiation between two predator-stimuli is more acute when the reaction to them is stronger; (b) finches habituate (motorically) to repetitive stimuli more rapidly when their initial reaction is stronger; (c) all new objects elicit predator-responses; (d) the finch habituates to frequently-encountered, harmless species, unless the predator outnumbers all harmless species combined (as happens on some islands); and (e) direct experience with predators plays little role, as the Wenman Finch, which has no predators, maintains a vigorous response while there are only weak responses to the Mockingbird (*Nesomimus trifasciatus*), which "hunts after them viciously."

The eyes and mottled color pattern of the Short-eared Owl (*Asio flammeus galapagoensis*) are the key stimuli that release responses. These two stimuli neither summate arithmetically (Seitz's so-called Law of hererogeneous summation) nor resist experimental analysis into stimulus components (Lorenz's concepts of Gestalt-like perception).

Curio cites the following lines of evidence demonstrating that the predator-responses must have evolved under selection pressures from the predators: (i) they do not avoid mammalian predators that have recently been introduced into the Galapagos, or which were never a part of the fauna; (ii) all species respond to all avian predators, but those on islands with heavy predation (e.g., *Geospiza fuliginosa*) respond more vigorously than those in predator-free environments (e.g., *G. difficilis*); and (iii) there has been a convergence in unrelated Galapagos passerines toward highly similar mobbing behavior.

The responsiveness and the variability in responsiveness is, as noted above, a function of the predation-pressure on a given island. When weakened by the absence of a predator, the response not only becomes weaker, but also more variable and less specific. Curio postulates a general law that the strength of the response is proportional to the specificity of the perceptual coding for the sign stimuli of the predator; i.e., a more responsive finch perceives and differentiates more critical stimuli signaling "owl" than does a less responsive finch on an island lacking owls.

This is an extraordinary study, conducted under the worst of physical conditions, in which Curio and his companion Peter Kramer nearly lost their lives in a landslide that carried away most of their food while they were isolated for a week on an uninhabited island. Among other things, this study points up as clearly as any I know the necessity of saving the Galapagos Islands as a laboratory for evolutionary studies. Surely, Curio's study there ranks among the very best studies of the evolution of behavior in any animal group.—Jack P. Hailman.

35. Roadrunners: activity of captive individuals. J. L. Kavanau and J. Ramos. 1970. *Science*, **169**: 870-782.—Provide them with a giant running wheel, and away they go! But only during the day.—Jack P. Hailman.

36. Behaviour of the male Satin Bower-bird at the bower. R. E. Vellenga. 1970. *Austr. Bird Bander*, **8**(1): 3-11, + color photo on cover.—This study of color-banded birds clarifies the fact that young males visit bowers of adults and may learn aspects of bower-building. *Ptilonorhynchus violaceus* is promiscuous, with copulation being performed either within the bower or on the platform. There are observations on the construction and orientation of the bower, seasonal activities, painting and so on. A fine amateur study.—Jack P. Hailman.

37. Winter territoriality in a Ruby-crowned Kinglet. A. M. Rea 1970. *Western Bird Bander*, **45**(1): 4-7.—Three years of observations show that a banded male *Regulus c. calendula* defended a territory, without ever singing. It centered along a hedgerow, and there is a map of the area.—Jack P. Hailman.

ECOLOGY

(See also 22, 23, 24, 25, 63, 72, 88)

38. Preliminary comparison of bird species diversity and density in Luquillo and Guanica Forests. C. B. Kepler and A. K. Kepler. 1970. *In: A Tropical Rain Forest: A Study of Irradiation and Ecology at El Verde, Puerto Rico.* H. T. Odum (ed). U. S. Atomic Energy Comm., pp. E-183-E-191.—The authors find that a dry structurally-simple forest has a considerably higher number of both species and individuals than does a structurally more complex forest. They believe this to be a result of the relatively depauperate nature of the Puerto Rican avifauna (also discussed in review **24**). They reason that xeric land birds may have a greater ability to colonize oceanic islands than do species of the thick forests.

This paper has two appendices, the first being a status report upon the Puerto Rican Parrot (*Amazona vittata*) by C. B. Kepler. These parrots are now totally confined to the general vicinity of the Luquillo Forest. The maximum number recorded at one time was 24, on a coordinated census. Success of a number of nests is reported. Approximately one young is being fledged per pair per year. Major sources of nest destruction are the black rat (*Rattus rattus*) (seven of 25 young lost to them) and the Pearly-eyed Thrasher (*Margarops fuscatus*), which competes for nesting holes and also may eat eggs and young of the parrot. Kepler feels that most predation may occur upon individuals in the nest. He agrees with Recher and Recher (review **24**) that this species is in true danger of becoming extinct.

A. K. Kepler has contributed the second appendix, a progress report upon the life history of the Puerto Rican Tody (*Todus mexinanus*).—Douglass H. Morse.

39. A census of a breeding bird population in a virgin spruce fir forest on Mt. Guyot, Great Smoky Mountains National Park. F. J. Alsop, III. 1970. *Migrant*, **41**(3): 49-55.—A balsam aphid was introduced accidentally into New England in 1908 and was discovered in the Smokies in 1963. The bird census was taken to discover the densities of potential predators on this pest, and the census was compared with a strip census on Mt. Mitchell (highest point east of the Mississippi). The Mt. Mitchell forests have been burned and logged, showing a dramatic decrease in species diversity over earlier censuses. A 1959 census showed 340 males/100 acres; Alsop's 1967 census is less than 100; by comparison, undisturbed Mt. Guyot has 281 males/100 acres. The census serves as a baseline for ecological studies of the bird-aphid interactions.—Jack P. Hailman.

WILDLIFE MANAGEMENT AND ECONOMIC ORNITHOLOGY

(See 39, 75)

CONSERVATION AND ENVIRONMENTAL QUALITY

(See also 24, 50, 83, 84, 85, 86, 87)

40. **Measurements of Brown Pelican eggshells from Florida and South Carolina.** L. J. Blus. 1970. *BioScience*, **20**(15): 867-869.—Another study showing significant thinning of eggshells of *Pelecanus occidentalis* from a number of localities.—Jack P. Hailman.

41. **p, p'-DDT: effect on calcium metabolism and concentration of estradiol in the blood.** D. B. Peakall. 1970. *Science*, **168**: 592-594.—Ring Doves (*Streptopelia risoria*) given 10 ppm showed a decrease in blood estradiol, in egg-laying, and in eggshell weight (as well as other disasterous effects).—Jack P. Hailman.

42. **DDT-induced inhibition of avian shell gland carbonic anhydrase: a mechanism for thin eggshells.** J. Bitman, H. C. Cecil and G. F. Fries. 1970. *Science*, **168**: 594-596.—These experiments on Japanese Quail (*Coturnix coturnix japonica*) are similar to the preceding with regard to eggshells. The carbonic anhyrase is believed to be necessary for supplying the carbonate ions required to calcium carbonate deposition of the eggshell.—Jack P. Hailman.

43. **Some trends in accumulation of artificial radioactive isotopes by birds of the forest biocenose.** (Nekotorye zakonomernosti kontsentratsii iskustvennykh radioaktivnykh izotopov ptitsami lesnogo biotsenoza.) A. I. Ilenko. 1970. *Z. zhurn.*, **49**(12): 1884-1886. (In Russian, English summary.)—In an area artifically contaminated by strontium-90, 1.8:3.4 microcuries per 1 m^2, and cesium-137, 4.8 microcuries per 1 m^2, their accumulation in 14 passerine species and in the Wryneck, *Jynx torquilla*, White-backed Woodpecker, *Dendrocopos leucotos*, Nightjar, *Caprimulgus europaeus*, Black Grouse, *Lyrurus tetrix*, Kestrel, *Falco tinnunculus*, Tawny Owl, *Strix aluco*, and Long-eared Owl, *Asio otus*, in stomach contents, skeleton, and muscles, was determined. Many details were brought out: ground feeders accumulated more than tree foragers; the Nightjar took up the least; in the Black Grouse skeleton strontium was higher than in its vegetable food while cesium was lower; in owl bones strontium was lower than in those of its rodent prey, owing possibly to ejection in pellets.—Leon Kelso.

PARASITES AND DISEASES

44. **Nest parasitism, productivity, and clutch size in Purple Martins.** W. W. Moss and J. H. Camin. 1970. *Science*, **168**: 1000-1002.—Basically, parasitism by the mite *Dermanyssus progenephilus* has the effect of reducing productivity of *Progne subis* by about one young per nest, showing that food-availability is not the only factor controlling clutch size (see review **88**).—Jack P. Hailman.

PHYSIOLOGY

(See also 26, 31, 42, 43)

45. **Formation flight of birds.** B. B. S. Lissaman and C. A. Shollenberger. 1970. *Science*, **168**: 1003-1005.—This is an attempt to explain why some birds fly in a V-formation. Aerodynamic efficiency is increased by streamlining of air about the wings, such that "25 birds could have a range increase of about 70 percent as compared with a lone bird." The reduction in drag leads to a prediction of optimal spacing between wingtips of adjacent birds of the order of a quarter of the wingspan, which is in agreement with actual formations.—Jack P. Hailman.

46. **Bird flight physiology study.** Anonymous. 1970. *Science dimension*, **1**(1): 28-30.—Or perhaps Dr. J. S. Hart, director of the project so named for the National Research Council of Canada, may be considered author. The chief point of concern is a refined electronic multi-recording, multichannel transmitter (well photographed) fitted for carrying on the back of pigeons, sensing and projecting heart, respiration, temperature and energy expenditure rates to receivers and recorders on the ground. "With the high energy expenditure, the

heat dissipation during flight becomes a problem, particularly under warm conditions." Contrary to older theories it was found that about 85% of this heat is lost by convection. In other words, it is dissipated mainly by air cooling through the feathers rather than by water cooling, by evaporation from lungs and the many air sacs in the bird's body. It has the advantage of greatly reducing dehydration in long migratory flights, but raises the problem of how this is accomplished in a heavily feathered bird. "The results of these studies indicate that heat loss must be so precisely regulated in flight that it is relatively independent of environmental temperature. How this is accomplished is still a mystery." Yes, and it may remain a mystery as long as we are influenced by ancient ideas of feather physiology.—Leon Kelso.

47. The co-ordination between respiration and wing beats in birds. M. Berger, O. Z. Roy, and J. S. Hart. 1970. *Z. vergl. Physiol.*, **66:** 190-200.—The authors found general co-ordination (defined in terms of the transition from inspiration to expiration or vice versa relative to the position of the wing) between respiration and wing beats in nine species. Usually, the beginning of inspiration was co-ordinated with the end of upstroke and the beginning of expiration with the end of downstroke. Co-ordination of respiration and wing stroke was rarely 1:1 (found in pigeons and crows) and showed great variability. Most flights had periods in which co-ordination did not exist.—Joel Cracraft.

48. Respiration, oxygen consumption and heart rate in some birds during rest and flight. M. Berger, J. S. Hart, and O. Z. Roy. 1970. *Zeit. vergl. Physiol.*, **66:** 201-214.—Twelve species of birds were examined. As might be expected heart rate, respiratory frequency, and tidal volume were higher in flight than rest. Small birds increase their heart rate less (2 times) during flight than do large birds (up to 3-4 times).—Joel Cracraft.

49. Bird respiration: flow patterns in the duck lung. W. L. Bretz and K. Schmidt-Neilsen. 1971. *J. Exp. Biol.*, **54:** 103-118.—A large number of opinions exist as to the exact flow pattern of air in the avian lung. The authors examined this problem with the placement of a specially designed air-flow direction probe in various parts of the lung of domestic Pekin ducks (*Anas platyrhynchos*). Inspired air flows directly to the posterior air sacs via the primary bronchi without passing through the tertiary bronchi (where gas exchange takes place) and simultaneously flows into the anterior air sacs by way of the caudodorsal secondary bronchi and the tertiary bronchi. With expiration air passes to the primary bronchus from the anterior sacs and from the posterior sacs via the tertiary bronchi and craniomedial secondary bronchi. Patterns under conditions of resting and hyperventilation were very similar.—Joel Cracraft.

50. How an eggshell is made. T. G. Taylor. 1970. *Sci. Amer.*, **222**(3): 88-95.—A good popular account on how the hen can draw up to 10% of her bone calcium for utilizing in the crystalline calcium carbonate of the eggshell.—Jack P. Hailman.

51. Composition of avian urine. E. J. Willoughby. 1970. *Science*, **169:** 1230-1231.—Previously (*Bird-Banding*, **41**(2): 147, 1970, no. **32**) we noted a paper by Folk indicating that avian urine is not uric acid after all. Willoughby here objects to the conclusion, partly on the basis that Folk used only the dried material, not the full wet urine. "Folk's data do not contradict the statements in the literature that 50 to 80 percent of urinary nitrogen is excreted in the form of uric acid . . .".—Jack P. Hailman.

52. Composition of avian urine. R. L. Folk. 1970. *Science*, **169:** 1231.—Folk replies to Willoughby's criticisms (previous review). "The white material I have examined is the solid that forms the bulk of avian urine and is indeed the main form of excreted nitrogen." Thus the basic argument now seems to be: where *is* the nitrogen? In the wet (unanalyzed) part of the urine, or the dry (analyzed) part? Folk apparently won't solve it for us: "Although bird feces are an interesting petrographic study in themselves, as a geologist I do not feel I can crane my neck out any further into this distinct field." While the pun is bad, one does wish that Folk would put his technical knowledge toward a conclusive solution to the problem.—Jack P. Hailman.

53. Centrifugal effects in the avian retina. F. A. Miles. 1970. *Science,* **170**: 992-995.—When fibers run back from the brain into the eye they are called centrifugal fibers, and birds are the only vertebrates known to have them. In this study of chickens, these fibers were stimulated electrically to see their effect on the photoreceptive properties of the eye. Among other effects, activity of the centrifugal fibers makes the ganglion cells of the retina fire more readily, as well as altering excitatory-inhibitory relationships in the eye. The functional significance of these avian fibers remains unelucidated.—Jack P. Hailman.

54. Photoperiodically significant photoreception in sparrows: is the retina involved? H. Underwood and M. Menaker. 1970. *Science,* **167**: 298-301.—Blinded *Passer domesticus* have the same gonadal response to light cycles as normal birds, suggesting that another functional photoreceptor is responsible. The location of this photoreceptor is elusive.—Jack P. Hailman.

55. Thermoresponsiveness of the preoptic region of the brain in House Sparrows. S. H. Mills and J. E. Heath. 1970. *Science,* **168**: 1008-1009.—Heating this region of *Passer domesticus* decreases metabolism and body temperature, cooling, the opposite effect.—Jack P. Hailman.

MORPHOLOGY AND ANATOMY

(See also 9, 62, 73, 81)

56. Correlation of standard bird measurements. (Korrelyatsiya standarthnykh promerov ptits.) P. V. Terentev. 1970. *Byull. moskovskogo obshch. isp. prirody, otdel. biol.,* **75**(6): 129-134. (In Russian, English summary.)—Wing, tail, bill and tarsus measurements of 2832 specimens of House Sparrow, *Passer domesticus,* Redpoll, *Acanthis flammea,* Raven, *Corvus corax,* Skylark, *Alauda arvensis,* Great Tit, *Parus major,* and Magpie, *Pica pica,* on mathematical analysis showed that wing length variation had closest correlation to that of the other three measurements in the first four species, while in the two latter species the tarsus was the most correlated feature.—Leon Kelso.

57. A comparative study of the appendicular musculature of the order Ciconiiformes. J. C. Vanden Berge. 1970. *Amer. Midl. Nat.,* **84**: 289-364.—Includes a comparative study of 21 genera in the ciconiiform families (except Scopidae) based on wing and leg myology. Descriptions include only origins and insertions. VandenBerge made hundreds of measurements on relative points of insertion but provides no interpretation. A number of statements are made regarding possible functional significance of some muscles, but most of these are merely correlations with supposed locomotor differences. Lack of detailed discussion and supportive evidence renders his conclusions very tenuous. No important conclusions were reached about the taxonomic value of his data.—Joel Cracraft.

PLUMAGES AND MOLTS

58. Wettability and phylogenetic development of feather structure in water birds. A. M. Rijke. 1970. *J. Exp. Biol.,* **52**: 469-479.—From a detailed examination and from measurements of the microscopic structure of feathers, Rijke believes that the "substructure of feathers conforms closely to the theoretical requirements of optimal water repellency. . . ." The latter are determined in part by the relationships of barb size and interbarb distance. Plotting his calculated values of water repellency for various families against the time at which the family is first recorded in the fossil record, Rijke concludes that there has been a clear trend toward increased water repellency and resistance to water penetration through time. Rijke discusses a number of problems associated with such an analysis but apparently considers them only as something to be mentioned and not taken seriously. The vagarious nature of the fossil record casts a long shadow over such interpretation.—Joel Cracraft.

59. Variability in body pterylosis, with special reference to the genus *Passer*. M. H. Clench. 1970. *Auk,* **87:** 650-691.—This paper constitutes an important contribution to the study of morphological variability. The author found no marked intraspecific variability in 176 specimens of *P. d. domesticus* with regard to the feather patterns of the dorsal and ventral body tracts. Variability was not influenced by sex, plumage stage, climate, season, or population after once having attained the first basic plumage. No statistically significant variation was found among the species of *Passer*. There appears to be little intraspecific variability among most passerines. This study serves as an introduction to a broader investigation of passerine pterylosis undertaken by the author, and it is expected that differences in feather patterns among higher categories will have some taxonomic importance.—Joel Cracraft.

60. Pigments in hybrid, variant and melanic tanagers (birds). A. H. Brush. 1970. *Comp. Biochem. Physiol.,* **36:** 785-793.—The pigments of several species of the genus *Ramphocelus* were examined using spectral and chromatographic analysis. The variability in color (lemon yellow to bright scarlet) of the feathers is due to concentration of the pigment rather than a qualitative difference in pigment structure. Melanistic tanagers have the same carotenoid structure in the feathers. Spectral data indicate that parental and hybrid feathers are indistinguishable.—Joel Cracraft.

61. Subjective estimates of colour attributes for surface colours. I. Ishak, H. Bouma, and H. van Bussel. 1970. *Vision res.,* **10**(6): 489-500.—In comparison with binocular or side-by-side color scale comparison to determine a questioned color, and other color determination means, ordinary visual judgments were found to be "fairly" accurate. This provides at least a summary of present studies of human color evaluation, an important element in descriptive and systematic biology.—Leon Kelso.

ZOOGEOGRAPHY AND DISTRIBUTION

(See also 63, 82)

62. Sea birds on open waters of the East China Sea. (Morskie ptitsy v otkrytykh vodakh vostochno-kitaiskogo morya.) V. P. Shuntov. 1970. *Ekologiya,* **1**(4): 47-54. 2 tables, 4 maps. Bibliography of 18 titles. (In Russian).—From 457 censuses, taken in 1961-1968, it was found that comparatively few species and individuals nest on its shores but in late fall and winter many gulls, shearwaters, auklets and others move into open waters from the north concentrating most densely at the Korea Strait, at the junction zone of the Yellow Sea and Kurosiwo waters. Many corollary details were revealed. In winter the jaeger population is composed of 90% pale and 10% dark morphs, with Black tailed Gulls (*Larus crassirostris*) population being 17% pale adults, and 83% gray juvenals. With coming of spring most gulls moved out to the north and shearwaters, mostly pale individuals, moved in. Average density per visual census, over the 752,000 sq. km. surveyed was: summer, 0.4; fall, 1.7; winter, 1.4, and spring, 2.3 individuals per 1 sq. km., considering all species combined; or in numerical totals, 300,000; 1,278,400; 1,052,800; and 1,729,600 respectively. Considerable correlation with favorable water temperature and food abundance was noted.—Leon Kelso.

SYSTEMATICS AND PALEONTOLOGY

(See also 57, 58, 59, 73, 74)

63. The genus *Sarothrura* (Aves, Rallidae). S. Keith, C. W. Benson and M. P. Stuart Irwin. 1970. *Bull. Amer. Mus. Nat. Hist.*, **143**: 1-84. $3.50.—On the African continent there is only one truly successful genus of rails; this being the genus *Sarothrura*, containing the minute crakes known sometimes as "flufftails". Like most rails, these are secretive in disposition and knowledge of their taxonomy, distribution, ecology, and habits has been sparse, scattered, and largely confusing. This situation has been greatly rectified now and the information is summarized and considerably augmented in usable fashion in the paper reviewed here. The authors' thoroughness is indicated by their examination of virtually every specimen of *Sarothrura* in existence, which, among other things, has enabled them to compile excellent range maps for each species, showing actual specimen localities. One also feels confident that most, if not all, pertinent references have been consulted and included. Another fine feature of the paper which adds much to comprehension and aesthetics is the two-page color plate depicting dorsal views of both sexes of all nine species in the genus; doubly useful in that in almost no single museum are there specimens of all nine available for comparison at a glance.

A number of taxonomic changes from Peters' Checklist have been made, mostly lumping of subspecies. On the specific level, the authors remove *ayresi* from *Coturnicops* and place it in *Sarothrura*, while combining *S. antonii* with *S. affinis* (=*lineata* in Peters). A peculiar sort of synonomy is given in Table 5, which assigns the various names used for populations of *Sarothrura* to currently recognized species, although there is no indication here of which subspecific names are in good standing. The spelling *lugeus* is not included in this list nor is there any reference to grounds for its emendation (no doubt justifiable) to *lugens*. Each species is treated separately and in each account is included what is known about distribution, habitat, food, breeding, subspecies, movements, voice and behavior, in addition to range maps and tables of measurements. Among the original contributions of the paper are the detailed (almost painfully so in some cases) descriptions of voice, including sonograms of 6 of the 9 species — a notable accomplishment when dealing with such a recondite group. Aside from voice, however, the data on behavior are aggrevatingly scanty (no fault of the authors) and information on displays, courtship, etc. is practically nil. There is no attempt made to explain the striking sexual dichromatism (an exceptional condition in the Rallidae) nor to explain such anatomical peculiarities as the conspicuous, fluffy tail of certain species. The authors cite ecological differences to explain all but one instance of sympatry. In the exceptional case they theorize that *S. rufa* and *S. lugens* are in direct competition to the detriment of the latter. The terminal section of the paper contains a "probable phylogeny" which the authors readily admit is "advanced with considerable diffidence." Four species groups are recognized in the genus, one of which (*ayresi-watersi*) in my opinion is almost certainly artificial. I disagree with much of this phylogeny and there are relationships outside the genus that the authors have not discussed which shed considerable light on the matter. I will hope to say more about this in a later paper, a task that I would have been unwilling or perhaps unable to perform without this clarifying and much needed summation of the genus and for which the authors are to be commended.—Storrs L. Olson.

64. Ethology of *Cereopsis novaehollandiae*. (Zur Ethologie der Hünhergans.) Z. Veselovsky. 1970. *Z. Tierpsychol.*, **27**(8): 915-945. (In German, English summary.)—Utilizing behavior as a taxonomic character, this goose-like form is given a separate tribe, Cereopsini, as it is neither duck nor goose. The adults are nothing to look at, but the chicks (photograph, figure 17) are really cute.—Jack P. Hailman.

65. Evolution of behavioral patterns and vocalizations of estrilid finches. (Zur Evolution von Verhaltensweisen und Lautäusserungen bei Prachtfinken (Estrilididae).) H. R. Guttinger. 1970. *Z. Tierpsychol.*, **27**: 1011-1075. (In German, English summary.)—This is basically a taxonomic study utilizing motor patterns, social behavior and vocalizations as taxonomic characters. There are good photographs and descriptions of the behavior, which lead to the conclusions that *Lonchura* of the orient is not closely related to *Odontospiza*, *Sperm-*

estes and *Euocice*. The last is somewhat separate from the two before it, and resemblances are thought to be due to convergence.—Jack P. Hailman.

66. The application of bioacoustics to systematics. (Apport de la bioacoustique en systematique.) C. Chappuis. 1969. *Alauda*, **37**: 206-218. (In French, English summary).—The author argues that finding homologous vocalizations should be done by ear, not sonograph. He then applies this "method" to the Turdidae, Certhiidae, Sittidae and Fringillidae. Funny thing about someone else's auditory perceptions: they are not very communicable to me. Any first sort, I suppose, will be by ear, but sonograms do provide communicable evidence.—Jack P. Hailman.

67. Why quelea? C. J. Skead. 1970. *Bokmakierie*, **22**(1): 3.—Here's an ornithological mystery for you: Linnaeus first called the bird *Emberiza quelea* and someone later changed it to *Quelea quelea*. Despite a concerted effort, no one knows what "quelea" means or where Linnaeus got it.—Jack P. Hailman.

68. An Eocene puffbird from Wyoming. P. Brodkorb. 1970. *Univ. Wyo. Contr. Geol.*, **9**: 13-15.—This paper described a new genus and species of bucconid, *Primobucco macgrewi*, from the lower Eocene (Green River Formation). The new fossil is based on a flattened right wing and is the oldest record of the order Piciformes. Brodkorb also allocates the middle Eocene (Bridger Formation) species *Uintornis lucaris* to the Bucconidae.—Joel Cracraft.

69. Systematics and evolution of the Gruiformes (Class Aves). 2. Additional comments on the Bathornithidae, with descriptions of new species. J. Cracraft. 1971. *Novitates*, no. **2449**: 1-14.—A new genus, *Eutreptornis uintae*, and a new species, *Bathornis minor*, are described.—Jack P. Hailman.

70. A new species of *Telmobates* (Phoenicopteriformes) from the lower eocene of Patagonia. J. Cracraft. 1970. *Condor*, **72**: 479-470.—The new flamingo, *T. howardae*, is named for the well known avian paleontologist Hildegarde Howard.—Jack P. Hailman.

EVOLUTION AND GENETICS

(See also 34, 69)

71. Evolution of pair cooperation in a tropical hummingbird. L. L. Wolf and F. G. Stiles. 1970. *Evolution*, **24**(4): 759-773.—Most hummingbirds have a promiscuous mating system; however, the Fiery-throated Hummingbird (*Panterpe insignis*), an endemic of the Costa Rican mountains, appears to differ somewhat from this rule. During the breeding season males may defend food sources that only certain females are apparently allowed to utilize. This report documents studies by the authors upon three pairs of this species over a period of a little more than a week in August, 1969.

Why does the Fiery-throated Hummingbird's breeding system differ from most other members of its family? Wolf and Stiles hypothesize that this is related to the abundant but localized sources of food in the study area (nectar from *Macleania glabra*). A male usually will defend a concentration of these flowers, and if the female(s) that he mated with was allowed access to these stores of food, while all other males and females were not allowed access to them, then there should be an enhancement of the male's genes, even though he does not contribute directly to the care of young. In this case, females would probably be selected for if they chose the most favorable territories, this implying that pairing is the result of the selection of a territory by the female, rather than the male itself. (However, acceptance of the female by the male is essential.) This would then single out male-male territorial encounters as key factors in determining male fitness. In fact, Wolf and Stiles believe (along with others) that sexual differences in hummingbird plumages (particularly in the gorget) are involved largely with male-male hostile interactions, rather than in courtship of females.

It will be of interest to see if the breeding systems of hummingbirds turn out to be modified by the spatial distribution and abundance of resources, as is implied in this paper. Such a system as the one studied by Wolf and Stiles (with localized concentrations of easily-located flowers) should be relatively amenable to experimental manipulations, thus adding another dimension to the study of this fascinating question.—Douglass H. Morse.

72. On ecotypic variations in birds. R. C. Banks. 1970. *Evolution,* **24**(4): 829-831.—In this note, Banks questions the conclusions reached by Fretwell in a paper on ecotypic variation of migratory populations [*Evolution,* **23**(2): 406-420, 1969]. In that paper Fretwell attempted to demonstrate a correlation between tarsal length and feeding behavior, using the conclusions obtained as the basis for a rather extensive theoretical discussion.

The substance of Banks' objections arise largely from a number of unproved assertions found in Fretwell's paper. Some he feels to be the result of oversight or overstatement (i.e., Banks feels that to characterize all sparrows as insect eaters in the breeding season and seed eaters in the winter is a gross oversimplification) and others to be errors made in adapting other studies in the literature to his investigation (i.e., Fretwell's discussion insists throughout on random mating and complete migration, but several of his examples from the literature involve populations that are largely or entirely sedentary).

In summing up this controversy the reviewer would stress that none of Bank's arguments explicitly refute Fretwell's conclusions; however, they do point out clearly that much more work must be done in this area to test adequately these conclusions. Fretwell's paper under consideration, as well as other recent ones, has provided considerable grist for the present generation of field workers.—Douglass H. Morse.

73. Quantitative assessment of the flight of *Archaeopteryx*. W. B. Heptonstall. 1970. *Nature,* **228**: 185-186.—Using a theoretical analysis Heptonstall has calculated that *Archaeopteryx* was a very poor flier. The wing had a load factor of about 2.2 (compared to 8.8 for the domestic pigeon), and the fossil bird probably exhibited a high sinking speed. The author further concludes that the claws of the wing were disadvantageous aerodynamically and that the wings would have had to beat twice as fast as a pigeon in order to hover.—Joel Cracraft.

74. Mandible of *Archaeopteryx* provides an example of mosaic evolution. J. Cracraft. 1970. *Nature,* **226**: 1268.—The lower mandible of this crucial transitional animal has usually been called reptilian. However, a fossa (which is anatomical jargon for "hole") is bordered beneath by the dentary bone in both modern birds and *Archaeopteryx* while being bordered by the angular bone in reptiles. Thus the lower jaw has both primitive and advanced characteristics, illustrating the phenomenon of mosaic evolution.—Jack P. Hailman.

FOOD AND FEEDING

(See also 18, 23, 25)

75. On coccinellid beetle consumption by birds. (O poedemosti zhukov semeistva Coccinellidae ptitsami.) A. Mizer. 1970. *Vestnik zool.,* 4(6): 21-24. (In Russian, English summary.)—In stomachs of 6906 birds of 234 species, mostly passerines, collected in the Ukrainian area, 266 coccinelid beetles of 23 species were found. The proportion of occurrence in comparison to availability was apparently very low, yet this was only an estimate.—Leon Kelso.

SONG AND VOCALIZATIONS

(See also 66)

76. Laughing Gull chicks: recognition of their parents' voices. C. G. Beer. 1969. *Science,* **166**: 1030-1032.—Individual recognition is like the weather: everybody talks about it but nobody does anything about it—until now.

Chicks of *Larus atricilla* as young as 6 days old can distinguish their own parents' voices from the same kind of call by another adult, as evidenced by their approach to a speaker broadcasting the calls. This is an important study.—Jack P. Hailman.

77. Vocal imitation and individual recognition of finch calls. P. C. Mundinger. 1970. *Science*, **168**: 480-482.—The study concerns three species of *Carduelis*: European Siskins (*C. spinus*), American Goldfinch (*C. tristis*) and Pine Siskin (*C. pinus*). (Mundinger's report calls both siskins *pinus*, but gives no reference for the synonomy; it may have been a typographical error.) Two kinds of experiments are reported: female responses to male "flight notes" and learning of one another's notes.

In the first experiment incubating and brooding females were played their own mate's call for 10 sec, and then after 30 sec of silence played 10 sec of a similar call by another male. A footnote indicates that the text is actually incorrect, in that in ten tests the control call was played first, in four the mate's. No females "responded" to the other male, but seven of the 14 responded to their mate's recorded calls. One difficulty here is that there are no quantitative data about "responses." We are told these are "vocal and postural display." One would also liked to have seen the "mate first" sample increased to the same size as "other first", and to have known whether the responses were always to the "mate second" presentation. A warm-up phenomenon is quite likely in this situation, and the present experiment does not separate out this variable. Indeed, presentations with both calls being own mate and another with both calls being another male would be a needed control.

In the second experiment birds unfamiliar with one another were caged together, and their calls came to resemble one another's in five of six cases. In the examples illustrated, however, both breeding pairs came to have similar calls, so it is not clear whether a new call (similar in all individuals) is developed when breeding, or whether the mates' really learned one another's calls.

In a variation of the second experiment males were caged together in a flock. High ranking birds did not imitate, but low ranking birds courtship-fed one another and came to have similar calls. But again, the sonographic examples shown reveal that these "similar" calls are very much like the "similar" calls in the pairs of the previous experiment. So again, one wonders if the reproductive activity (evidenced in this experiment by courtship feeding) might simply bring about the development of a certain type of flight call.

On the basis of the evidence presented, it is rather difficult to accept the author's conclusions.—Jack P. Hailman

78. The social functions of different song types in the Pekin Robin. (Die sozialen Funktionen verschiedener Gesangsformen des Sonnenvogels (*Leiothrix lutea*).) G. Thielcke and H. Thielcke. 1970. *Z. Tierpsychol.*, **27**(2): 177-185. (In German, English summary).—Three song types were distinguished of which two were studied intensively. The longer, more variable one is used mainly in territorial defense, the shorter one as contact between mates. The authors note that "examples of clearly separated songs serving different social functions have rarely been described" but fail to cite the work of Morse (e.g., see review **90** in *Bird-Banding*, **42**: 72, 1971, for the latest of Morse's findings on this very issue, which date from 1967).—Jack P. Hailman.

79. Vocal mimicry in captive Budgerigars (*Melopsittacus undulatus*). A. F. Gramza. 1970. *Z. Tierpsychol.*, **28**(8): 971-983.—Birds tended to mimic the more complex of sounds given them, and to mimic more in an auditorily impoverished than in an enriched environment. The last finding reminds me of the common assertion that Mockingbirds (*Mimus polyglottos*) in northern states, where there are few of them, mimic other species much more than in southern states, where Mockingbirds are abundant.—Jack P. Hailman.

80. The singing reaction time of the White Browed Robin Chat. (Zur gesanglichen Reaktion der Schmätzerdrossel.) D. Todt. 1971. *Behaviour*, **38**: 146-153. (In German, English summary).—The thrush *Cossypha heuglini* will interrupt its song when hearing the experimenter's whistle and resume when the whistle ceases. The reaction time at the onset is 0.1 to 0.6 sec, at the offset 0.35 to 0.65 sec (except if the whistle is continued for 10-30 sec, in which case the bird resumes singing before offset of the whistle). These are quite reasonable values compared with Greenewalt's (*Bird Song: Acoustics and Physiology*, pp. 138-140, 1968) calculation that birds can modulate by ear their own singing trill rates to a precision of about 0.5 msec, or roughly a thousand times more precisely than the singing reaction described here.—Jack P. Hailman.

81. Production, ontogeny and function of vocalizations of four species of geese. (Erzeugung, Ontogenie und Funktion der Lautäusserungen bei vier Gänsearten (*Anser indicus, A. caerulescens, A. albifrons* und *Branta canadensis*).) I. Würdinger. 1970. *Z. Tierpsychol.*, **27**(3): 257-302. (In German, English summary.)—Sounds and their development are described. Most significant, perhaps, is the finding that pressure on the saccus clavicularis (not the tracheal musculature as thought) causes the tension of the membranae tympaniformes necessary for sound-production. Frequency of the calls is inversely correlated with the size of the membrane typaniformes and intensity is inversely correlated with the diameter of the trachea. Both, however, are correlated positively with the pressure in the saccus clavicularis. It appears that the mystery of sound-production in various birds is beginning to be unraveled.—Jack P. Hailman.

PHOTOGRAPHY AND RECORDINGS

(See 64)

BOOKS AND MONOGRAPHS

82. *Where to Watch Birds in Britain and Europe.* John Gooders. 1970. Andre Deutsch, London. 299pp. £2.25.—This book expands to 27 countries the guidance provided in the author's *Where to Watch Birds* (in Great Britain), 1967 (favorably reviewed in *Bird-Banding*, **39**: 332-333, October 1968). They resemble in general purpose the Pettingill guides for the U. S.

Some readers have commented that the new guide is less useful than the earlier one, because it is less detailed. In about the same number of pages that covered some 500 birding spots in Britain, Gooders now covers all European countries west of Russia, with two exceptions. Obviously he can now describe a far smaller proportion of the worthwhile birding spots. However, the coverage of the two guides necessarily reflects the much greater average intensity of bird-watching in Britain compared with the rest of Europe. In U. S. terms, the detailed knowledge of birding areas is a hundred times greater in eastern Massachusetts or Long Island than in Idaho or Utah. We look forward to more guides for individual countries in Europe (such as those in preparation, according to Gooders, for Germany and Greece), but meanwhile can put this general survey to very good use.

For two countries, restrictions on travelers for political reasons make it impossible or unprofitable to discuss bird-watching areas: Albania and the German Democratic Republic (East Germany). Other Iron Curtain countries are discussed without general warnings: Bulgaria, Czechoslovakia, Hungary, Poland, Romania and Yugoslavia. However, the traveller should keep in mind that these countries are more sensitive than the rest of Europe to the use of binoculars or cameras near military bases or activities, and that frontier zones may involve patrols or mines.

The other countries dealt with are: Austria, Belgium, Britain, Denmark, Finland, France, German Federal Republic (West Germany), Greece, Holland, Iceland, Ireland, Italy, Malta, Norway, Portugal, Spain, Sweden, Switzerland, and Turkey (for the region around the Bosphorus). Malta is treated as one area and covered in a page, while at the other extreme 18 areas are discussed for France and 19 for Sweden. Many areas are sizeable, with a number of local subdivisions listed.

The guide makes an excellent companion to the Peterson-Mountfort-Hollom *Field Guide to the Birds of Britain and Europe.* For planning purposes, a general tourist guide such as one of the Fodor series will be very helpful in such matters as temperatures to be expected and which towns have comfortable hotels. Fodor will also suggest some of the conventional tourist sights, for those who are not constitutionally opposed to looking at Roman ruins (e.g.) except on the chance that Lesser Kestrels are nesting there. For smaller towns and for lower-priced accommodations, detailed hotel guides are often useful, such as the Michelin red guide in France, or the Swedish guide published by the tourist organization. As background, some of the college-level geography texts will give more perspective on habitat distribution; for example, F. J. Monkhouse, *The Geography of Northwestern Europe* (1967, Frederick A. Praeger, N. Y.); Michael Grant, *The Ancient Mediterranean* (1969, Scribner's, N. Y.); or D. S. Walker, *The Mediterranean Lands* (1965, third edition).

For maps, variation by country precluded giving standard map references for each birding spot, as was done for Britain in the earlier book. Good maps are essential for proper use of the guide, to supplement its 27 maps and extensive directions. My own preference would be to start with a scale of 1:1,000,000 or 1:500,000 for general planning of a trip covering a large area. Then a series at 1:200,000 is handy for general use on the trip (for example, most of the maps of Sweden in the atlas published by its Royal Automobile Club — *KAK Bilatlas*). For intensive work in a limited area, particularly for hiking trails, 1:50,000 or 1:33,333 is a desirable scale, and even 1:10,000 may be useful in special cases if available. It's normally a good idea to pick up most of your maps well in advance especially if your trip doesn't start (for a particular country) in a city with an excellent map store.

How informative are such guides? This may be considered in terms of accuracy, and of telling the reader what he could not readily learn elsewhere. While my own basis for comparison is limited, I looked at the guide most closely for Sweden and Norway, as we had spent a month there in the summer of 1970. Before the trip I had reviewed most of the sources readily available in English, both in tourist publications and in bird journals. The guide touches on a number of areas I had not known of. Within well-known areas, such as the island of Öland, it covers some spots not apparent from a local, large-scale tourist map. It has what appear to be clear directions to the wetlands at Kvismaren (near Örebro); our party circled the general area with local tourist map in hand but never did pinpoint the marshes. As for details, I noted only one slip: Häckebergar (p. 258) is not at Dalby Söderskog National Park but some 10 km. to the southeast (the park itself is properly described).

A general objection to any such guide is that it leads too many tourists to the same spot for rareties so that the birds are disturbed. See, for example, the review in *British Birds* (**63**(9): 394-395, 1970), which also considers that the guide promotes guided tours and thus shares some responsibility for instances in which trespassing by tour parties has led to the posting of land against all birdwatchers. These charges are doubtless true at times, but the guide also has strong countereffects. Many birdwatching tourists know of the Camargue in southern France or the Coto Doñana in southwestern Spain quite apart from the guide. Gooders specifically suggests a number of nearby spots as at least partial alternatives to each of the famous areas. For the traveller who prefers to move at his own pace, the guide makes it more practical to travel with his own small group of family or friends, and to avoid formal tours. Only rarely in the area covered by this book do formal tours seem to have a clear advantage, such as the advantage of tours in getting around in the waterways of the Danube delta conveniently at reasonable cost.

Many prospective travelers may feel that the advance preparation and planning suggested by the guide and this review are unnecessary and merely inhibit the relaxed pleasures of a vacation trip. After all, the birds are there, so why not move around without advance planning and see them anyway? However, once you get very far past the first-chaffinch stage, an increasing proportion of the most interesting birds will be found in special areas, such as protected marshes. Many of these areas are unlikely to be found by random wandering around the countryside. "Had we but world enough and time" the traveller might eventually catch up with all these birds. Even for those of us fortunate enough to have gone a-birding in distant lands more than once, time is never over-abundant. The lure of something of interest over the next hill always beckons. Some idea of where and when to look makes any trip much more satisfying. And much of the fun is in immersing yourself in books and maps in the long winter evenings beforehand.

Independent travel using this guide is most flexible with a car, as many areas described may be extremely difficult to reach by public transportation. This is of course an element in the choice between independent and guided travel, as some travellers may hesitate to drive on strange roads with strange signs. Travellers' German, for example, may not be quite what the average highschool teaches, at least in details of vocabulary such as *umleitung* (detour). My own experience has been that generally the cost of travel with a rented car (of medium size) is a little less than second-class rail tickets for three adults, so that—depending on the size of the party—travel by car may be an economy. While the guide is most useful if you do have a car, it also refers to many places where a moderate amount of walking can cover a variety of habitats from one town. Availability of public transportation tends to vary markedly by region, being (for example) rather limited in central and northern Sweden, but varied in much of Switzerland. The village of Murren in the Berner Oberland has no autos, but has access to a wide variety of transportation (by standard-gauge, narrow-gauge and cog railway, funiculars, and cable cars) so that the hiker can cover a variety of habitats at different elevations without extreme effort.

Gooders has spread out a real feast for every birdwatcher with wanderlust. Some emphasis is placed on birds scarce or absent in Britain, but the American birdwatcher can easily adjust to this. The range maps for a species in Peterson-Mountfort-Hollom are necessarily very general; this guide pinpoints where within the overall range it may be most worthwhile to look. For black storks, try, for example, Balchik on the Black Sea coast of Bulgaria, or the Hortobagy steppe of Hungary. For Egyptian and griffon vultures, lammergeier and golden eagle, try the Sierra Nevada in Spain. For eagles (golden, lesser spotted, short-toed, imperial, and booted), the Vihorlat hills at the eastern tip of Czechoslovakia are suggested.—E. Alexander Bergstrom.

83. ***Duty, Honor, Empire: The Life and Times of Colonel Richard Meinertzhagen.*** John Lord. 1970. Random House, New York. 413pp. $10.00. —From earliest times in ornithological history, of American anyhow, there have been disciples who were avid, even ravenous, for details of personalia, and biography of practitioners involved. This book, already well-reviewed in the press, twice each in the *N. Y. Times* and *Washington Post* for example, is decidedly a must for those readers. Yet, on reflection, can much or all be known about anyone, even by himself? And if you find that in addition to being a prodigious producer in the realm of birds, "bugs", and books (this subject wrote six about himself), that he was as deadly in personal combat as a combination of Wild Bill Hickok, Billy the Kid and Buffalo Bill, and perhaps did more killing of both animal and human life than they; what then? Some of us must have been long familiar with the polysyllabic and polysymphonic name in foreign ornithologists' lists and bibliographies, and supposed that like anybody he had some life outside of our sacred subject; but this! The reader must read for himself.

Yet J. Lord glosses over some parts that Col. Richard M. would not. The heart of Meinertzhagen is to be found in his *Kenya Diary*, Oliver and Boyd, London, 1957: "We collected altogether 25 baboon, only some fifteen or so escaping. We killed every full-grown male and I was pleased." (This for their faux-pas of killing his favorite dog.) "The hunting of big game gave me good healthy exercise when many of my brother officers were drinking rot-gut or running about with somebody else's wife; it taught me bushcraft and how to shoot straight. After all, the hunting of men—war—is but a form of hunting wild animals" (p. 149). "I have no belief in the sanctity of human life or in the dignity of the human race. Human life has never been sacred; nor has man, except in a few cases, been dignified" (p. 178). "I am sleeping under a huge tree in which there are lots of green pigeon. Their cooing is most restful" (p. 147). "My last remembrance of Kabwuren is of an old grey parrot sitting on the topmost limb of a tall tree in the grey dawn, chattering to himself in satisfaction that yet another day had dawned" (p. 170). Admitting the right of parrots to feel or even think contrary to contemporary belief, many a day was to dawn before he was to be allowed to see an adverse report against himself filed in the bureaucracy occasioning this departure from Kenya, on a bloody, though small-scale, war incident, about which he was never to hear the last. While attaining the reputation of one of the greatest ornithologists of his time, writing *Nicoll's Birds of Egypt*, and *Birds of Arabia*, many additional articles, and much autobiographical material, he proclaimed himself not literary. Yet he essayed or adopted some poetic lines:

"They say I'm a quarrelsome fellow.
God rot it how can't be?
For I never quarrel with any,
The whole world quarrels with me." (Kenya Diary, p. 10.)—Leon Kelso.

84. *Man's Dominion: The Story of Conservation in America.* Frank Graham. 1971. Introduction by E. J. Stahr, President, National Audubon Society. Lippincott, New York. $8.95.—Through this well-written and well published book it is good to know that there was some conservation of wildlife before the 1930's and the coming of the overwhelming New Deal forces. The task undertaken is large and involves the work of many persons and groups thereof. However it is at least surprising to find no reference to the work of various serious ornithological societies, which have been reproved for manifesting too little concern in conservation, or to such persons as T. S. Palmer, who loomed large in organizational and legislative efforts early in the century.—Leon Kelso.

85. *Environ / mental: Essays on the Planet as a Home.* P. Shepard and D. McKinley, editors. 1971. Houghton Mifflin Co., Boston. XII + 308 pp. $8.95.—Their *Subversive Science* in 1969 (reviewed, *Bird-Banding,* **40**(3): 272, 1969) having been favored with a phenomenal reception and sale, the editors present here 20 even more arresting and significant articles on the same plan, classed under the headings: Genesis and perception, Society and its creations, Positions, and The Crunch; with a foreword by A. S. Leopold; two prefaces by the editors, who also contribute introductions to the articles; followed by Biographical notes; and Additional readings, about 450 titles. Like the former work it should be an apt college text for conservation or English. Among the authors represented are: E. P. Odum, F. Fraser Darling, Paul Ehrlich, and *the* Charles A. Lindbergh. In the prefaces it is stated that this new collection intends to illustrate the scope of environmental disorder and the variety of possible perspectives on it. "We need to abandon our assumptions that anything which can be done ought to be done; that feelings have no value in the proceedings of the world; and that, for example, . . . a sea-level canal in Central America ought not to go unchallenged by those it would affect but not benefit." (McKinley, p. IX.)—Leon Kelso.

86. The Pine Barrens: A Preliminary Ecological Inventory. Jack McCormick. 1970. *N. J. State Mus. Res. Report,* No. **2**, 103 pp. $3.00.—I am always amazed to find how few persons are aware of one of the most accessible wild areas in North America. New Jersey, which is our most densely populated state, is roughly hour-glass shaped; its bottom half is largely taken up by 2000 square miles of essentially sparsely inhabited pine barren wild lands (which says something about the population density of the northern half of the hour-glass). On the east, only the barrier beaches and immediate coastal areas now given over mainly to resorts are not within this wild area, while on the west a moderately large strip of inhabited area parallels the Delaware River; the rest is the Pine Barrens. Thus, this area is bounded by huge population centers, such as Wilmington, Delaware; Philadelphia, Pennsylvania; Camden-Trenton-New Brunswick, New Jersey; and the New York City area.

This area has not remained wild purely by accident. A chunk of it was purchased long ago by an enterprizing Philadelphian to provide water reservoirs for his growing area, and when that became impossible, the land fell into the hands of New Jersey and became known as the Wharton Tract—an area preserved for water, forest, recreation and other multiple use. Other parts of the Pine Barrens became usual kinds of State Forests and State Parks. The military carved out a large chunk for Fort Dix, but post-Second World War attempts to build a jetport in the barrens have been beaten over and over again. McCormick's ecological survey was done at the bidding of the Academy of Natural Sciences of Philadelphia and the National Park Service. As a result of this survey, recommendations were made that a part of the Pine Barrens be designated a National

Landmark.

The report gives brief general information; a short history of colonial industries in the region; an annotated list of the insects, fishes, herps, birds and mammals; the flora and plant communities; and analysis of several specific ecological areas; and some recommendations for multiple use. The Pine Barrens contain species that reach their northern limit in the area, and others that reach their southern limit. The area is the principal refugium for Anderson's Treefrog (found elsewhere only in the sandhills of North Carolina), and the Carpenter frog (found in a few other small coastal swamps, principally one on the Delaware-Maryland border). There are also plants whose main population is now restricted to the Pine Barrens. In addition, many animals and plants have subspecies or distinct forms found only in this area. A total of 144 avian species is reported, and this is no doubt a minimum. There are many wildflowers and small plants that were first discovered here. Biologically, then, it is an area in need of permanent protection for all these species if for no other reason (and there are others).

Much of the area as a whole is dry pine-scrubby oak forest with its own natural beauty. However, my favorite areas are the low lying White Cedar Swamps along quietly flowing rivers that are perfect for canoeing. Many other habitats may be distinguished. The ecological survey was restricted to a central area that includes the Wading River ecosystem (about 10% of the total Pine Barrens). Of tbis area, only about a quarter of the land is State-owned (including an airport and a game area, as well as the Wharton Tract and three State Forests).

The pressures for "developing" this magnificent area will continue to increase. It is extraordinary that such an area still exists to be preserved permanently, and its preservation deserves to become a personal goal of every conservation-minded person on the eastern seaboard. McCormick's Inventory may be obtained from the Museum in Trenton, and should be the first item in your library about the Pine Barrens. Botany buffs may want to see if copies are still available of *Ferns, Plants and Shrubs of the Wharton Tract* (N. J. Dept. of Conservation and Economic Development, Trenton, 25c); my copy is much worn from pleasant nature-tramping in the Batsto area of the Tract.—Jack P. Hailman.

87. ***Assateague . . . the "Place Across.." A Saga of Assateague Island.*** Reginald V. Truitt. 1971. Natural Resources Institute, University of Maryland, College Park. 48pp. Paperback.—This is the history of an island that is not only one of our new National Seashores, but also contains one of the most spectacular National Wildlife Refuges on the Atlantic coast. Dr. Truitt grew up in the area that is now Assateague Island National Seashore and Chincoteague National Wildlife Refuge, and he played one of the key roles in finally securing the Seashore in 1965. This is a book about Indian names such as Assawoman, Sinepuxent and Accomack; about explorers such as Giovanni da Verrazzano and the Cabots; about early settlers; about geography, vegetation and animal life; about the Lifesaving Service and shipwrecks; about pirates and fishing; about development and Mother Nature, who Herself timely saved the Seashore. It is reminiscent of David Stick's *Outer Banks of North Carolina* (1958, Univ. of N. C. Press, Chapel Hill), a story of our first National Seashore and the Pea Island National Wildlife Refuge it contains.

Assateague is a frail strip of barrier beach, running south from Ocean City, Maryland to Chincoteague, Virginia, a growing village lying on its own island between Assateague and the mainland. Assateague is the home of famous "Misty of Chincoteague," animal hero of the children's book born to a pony mare said to be descended from animals escaped from an old Spanish shipwreck (no solid historical evidence). Truitt's is a fine story of an area near to my heart. Indeed, my "maiden publication"—if one could call it that—was an emotional letter to the *Washington Post* pleading that a bridge *not* be built between the town of Chincoteague and the island of Assateague. The arguments of a high school lad who would rather travel by boat than by car had the expected effect.

It is hard to quarrel with Truitt's account, for he probably knows the area better than any living man. The map, however, does not label all the localities he writes about, a critical one being Sandy Point, which can be found on the upper part of the map opposite Assateague State Park in Maryland. His section on the many inlets that have cut the island, only to silt in within months or years, fails to point out that the "inlets" are for sailors returning from sea. From the view-point of water-movement they are outlets of fresh water into the sea. Finally, I must question the wisdom of Truitt's apparent endorsement of a road between the north and south bridges. Access by bridge, yes; circuit roads spewing their noise and chemical pollution along the pristine ocean beach, no. No!

It is, alas, almost accident that Assateague Island is not a duplicate of Coney Island, or Atlantic City or even Ocean City. Repeated attempts to parcel and develop were timely met by frustrations of economic climates, wars and other difficult-to-predict events. But in the 1950's the well-organized Ocean Beach Corporation manuevered into control of most of the island—nearly all of it above the Maryland-Virginia border. Some 5,850 lots were actually sold, and by early 1962 nearly 50 houses had been built. Then came the Great March Storm of 1962, devasting the east coast from Virginia to New York, destroying completely as it went 30 of those 48 houses and seriously damaging the rest. Three years later Assateague belonged to us all.—Jack P. Hailman.

88. ***The Natural Regulation of Animal Numbers.*** David Lack. 1970. Oxford Univ. Press, London. viii + 343 pp. Paperback, $3.95.—Here is an inexpensive reprint of Lack's 1954 classic on population dynamics. If you missed it the first time around, read it now. Lack's basic thesis is that mortality increases with higher population densities primarily because food resources become scarce, and thus populations stabilize at some average density. Also included is his theory of the ultimate control of clutch size: birds lay as many eggs as possible, up to the point that food is spread too thinly among the young so that actual reproductive output begins to decline again. This book is not without active critics. Andrewartha and Birch challenged it on the grounds that environmental catastrophes "regulate" at least some animal populations, reducing densities to very low levels, which populations, then continue to rebuild until the next great event. Wynne-Edwards believes animals regulate their populations behaviorally by actually sensing the density of individuals and then adjusting reproduction accordingly. Lack's thesis seems, surprizingly after a decade and a half, still to occupy the middle ground of opinion in views on the very complex subject of population dynamics.—Jack P. Hailman.

NOTES AND NEWS

In a preface to the first Gooders guide to bird-watching areas (see review No. 82 in this issue), Roger Tory Peterson expressed the hope that the increased number of birdwatchers who might be led to visit the choicer habitats for birds might provide broader support for preservation of such spots. In part this may take the form of helping to move public opinion to make wise ecological decisions at the political level. In part it should take the form of direct personal commitment, including contributing money as far as possible. The wild places of the earth will not take care of themselves, and no country is isolated to the extent that the fate of wildlife in other countries is immaterial to it. For U. S. travelers in particular, enjoying so high a standard of material comfort relative to most of the rest of the world, it is certainly parasitic to enjoy the choice habitats—guided by Gooders or otherwise—but to do nothing to help ensure the survival of such habitats.

Fortunately, the cost of preserving such areas is often modest by U. S. cost levels, and small gifts have a real value. It is often difficult for the traveler to know where to send contributions for this purpose. Many areas either have no strong conservation groups at all, or the groups are highly specialized, or the campaign to save a particular area is brief and poorly publicized in the U. S. One of the best ways of overcoming these handicaps is by a contribution, of any size, to the World Wildlife Fund (U. S. address, 910 17th St., N. W., Washington, D. C. 20006).

The Fund has supported nearly 300 different projects since its founding in 1961, 42 in 1970 alone, not of course for birds alone. Many readers will recall its active part in the preservation of much of the Coto Doñana, at the mouth of the Guadalquiver in southwest Spain. It is currently working to help finance the