

RECENT LITERATURE

BANDING

(See also 19, 33, 34, 35)

1. **The Activities at Hartsö-Enskär Bird Station 1965-1967. Report No. 1.** (Verksamheten vid Hartsö-Enskär fågelstation 1965-1967). Ingemar Nord. 1968. *Vår Fågelvärld*, 27: 52-61. (English summary.) A total of 7,363 birds of 75 species were banded at this new station on one of the outer islands of central Sweden's eastcoast archipelago. The report also contains data on the 1966 crossbill and 1967 owl invasions. Of 27 recoveries, a Red Crossbill (*Loxia curvirostris*) was twice checked and released in Austria.—Louise de K. Lawrence.

2. **Bird-ringing in Southern Africa.** M. K. Rowan. 1967. *Bokmakerie*, 19(2): 35-39, 50. Bird-banding progress in S. Africa is discussed. Among percentages of banding returns, for ducks, geese and vultures the figures were 3-4 percent; for swallows, 33 percent, and for the Little Stint (*Calidris minuta*) having nested in Siberia, 0.05 percent.—Leon Kelso.

3. **A Radio-controlled Trap for Bluebirds and Other Hole-nesting Birds.** Lewis F. Kibler. 1968. *EBBA News*, 31: 167-173. In recent years a number of nestbox projects have been started to combat the decline of the Eastern Bluebird (*Sialia sialis*). Trapping adult males has always been time-consuming and incomplete, as the male doesn't incubate and enters the box much less often than the female does. Kibler devised a shutter controlled from as much as 1,000 feet away, by the sort of radio components used to control model airplanes in flight. The cost of components came to \$65, but might be reduced to \$35 by some substitutions. The equipment took a much higher proportion of males than other methods, and took females with less disturbance than by hand trapping. This approach also saved a good deal of time for the bander, which may be critical in covering a long route of nestboxes at just the right time in the nesting cycle.—E. Alexander Bergstrom.

4. **Trapping Nesting Arctic Terns.** Martin McNicholl. 1968. *Inland Bird Banding News*, 40: 8-11. Methods suitable for trapping adult Common Terns (*Sterna hirundo*) at the nest are rather inefficient for Arctic Terns (*S. paradisaea*). The latter does not sit as close on the nest as the Common Tern, and usually alights directly on the nest rather than beside it. A trap for adults must be portable and easily set, not deter the bird from going to the nest, not permit the bird to escape once inside, and not result in injury to the adult or damage to the eggs. Speed in trapping is desirable, to minimize the time the bander must disturb the colony.

A walk-in shorebird trap was modified by adding a top entrance, and proved highly efficient, on limited tests in 1967. The trap was made of one-inch chicken wire, 30" in diameter and 18" in height, circular in shape. The two ground-level entrances, in opposite sides, each "extended upwards six inches from the bottom edge, and consisted of a three-inch section bent out, and another three-inch section bent in, to provide a passageway which could be traversed readily from the outside, but not from the inside. A hole 12 inches in diameter in the top of the trap allowed the tern enough room to drop into the trap with wings raised obliquely upwards but was too narrow for it to leave due to the characteristically more horizontal, widespread position of the wings during the initial stages of flight." The top was sloped inwards, toward the hole, to facilitate the tern's entry." McNicholl suggests flaring the bottom out slightly to make it easier to nest traps together, permit carrying several into the colony at once, and thus reduce the time needed to trap a given number of birds, so as to reduce disturbance. A smaller-diameter trap would increase danger of damage to eggs.

The bibliography is garbled. The 1938 Austin paper cited as in *Bird Study*, 41: 197-207 was actually in *Bird-Banding*, 9: 12-25. The 1957 Cullen paper cited as in *Bird Study*, 41: 197-207 should refer to 4: 197-207 of that journal.—E. Alexander Bergstrom.

5. A Method of Dropping the Bal-Chatri. Jim Grier. 1965. *IBBA News*, **37**: 23-25. In 1959 Daniel D. Berger and Helmut C. Mueller (*Bird-Banding*, **30**: 18-26) described the bal-chatri trap for birds of prey, preferably to be dropped from a moving vehicle in sight of a prospective capture. Grier experimented with ways of dropping the trap while driving alone. He recommends "a chute or slide mounted on the side of the car. There is a board across the front with a hole drilled in it. A wire attached to a bal-chatri is looped so that the loop will extend through the hole at the front of the slide. Another piece of wire or a nail is then put through this loop, serving as a 'pin', thus holding the bal-chatri at the top of the slide. . . . When a drop is desired, the wire through the loop is pulled out by means of a string which goes to the inside of the car through the window. Not being held back, the bal-chatri slides down and off the chute and lands at the side of the road." He found it desirable to keep the trap itself, with live bait, inside the car until just before use.—E. Alexander Bergstrom.

6. Modification of the Bal-Chatri Trap for Shrikes. William S. Clark. 1967. *EBBA News*, **30**: 147-149. The classic bal-chatri trap design (see review no. 5) proved ineffective for Loggerhead Shrikes (*Lanius ludovicianus*) because that species lands beside the trap instead of on top of it. A modification of this design proved highly effective. A flat section of hardware cloth 10 x 10" serves as a base, with a hardware-cloth box 8x8" mounted in the center to hold bait. Nooses of 8-pound-test nylon monofilament fishing line, each between 1 1/4" and 1 3/4" in diameter, and mounted to stand upright, are used; 20 on the box and 20 around the base. The design is also effective for the Sparrow Hawk (*Falco sparverius*).—E. Alexander Bergstrom.

MIGRATION

(See also 34, 42)

7. The Migration of Raptors and Storks through the Near East in Autumn. R. A. D. Cameron, L. Cornwallis, M. J. L. Percival and A. R. E. Sinclair. 1967. *Ibis*, **109**(4): 489-501. The results of three expeditions to Jordan, Lebanon and Turkey indicate that the raptors and storks which emigrate from Eastern Europe in autumn fly around the northeast corner of the Mediterranean (Gulf of Iskenderun) before turning south towards Africa.—I. C. T. Nisbet.

8. The Great Tit as an Invasion Bird. (Die Kohlmeise, *Parus major*, als Invasionsvogel.) Rudolf Berndt and Michael Henss. 1967. *Vogelwarte*, **24**(1): 17-37. (English summary.) Twelve autumn invasions of Great Tits have been recorded in Germany and South Sweden in the period 1927-1964; each one followed a peak in the breeding population on study-areas in Germany. Invasions are frequent in this species and in the Blue Tit because their high reproductive rate enables them to build up population quickly from a low level. Shortage of food due to overpopulation appears to be the "ultimate factor" causing invasions, but the invasions start while food is still plentiful, so the "proximate factor" is probably excess population itself. There is a speculative discussion of the biological significance of invasions.—I. C. T. Nisbet.

9. Bird Migration in the most Southern Part of the African Continent. Ger Broekhuysen. 1967. *Vogelwarte*, **24**(1): 6-16. Forty-eight Palaearctic species reach the southern part of Cape Province in the northern winter, and a number of these, mostly shorebirds, are present in numbers during the northern summer. Four species (the White Stork, European Bee-Eater, Whiskered Tern and Eared Grebe) are known to breed in Cape Province and migrate north at the end of the northern winter, at the same time as the Palaearctic birds of the same species. Another species, the Black Stork, breeds in small numbers in Cape Province, but is resident there and does not meet the Palaearctic birds which winter further north in Africa. Broekhuysen speculates that these examples throw light on the origin of migratory behavior in birds.—I. C. T. Nisbet.

10. Migration and Winter Quarters of Sabine's Gull in the Eastern Atlantic. (Beobachten zum Zug und Winterquartier der Schwalbenmöwe (*Xema sabini*) im östlichen Atlantik.) Kurt Lambert. 1967. *Vogelwarte*, 24(2): 99-106. (English summary.) Small numbers of Sabine's Gulls were seen in October off the coasts of Portugal and West Africa, and large numbers in winter off South-West Africa.—I. C. T. Nisbet.

11. Fat Deposition in the Scissor-tailed Flycatcher (*Muscivora t. tyrannus*) and the Small-billed Elaenia (*Elaenia parvirostris*) during the Austral Migratory Period in Northern Venezuela. Raymond McNeil and Mirian Carrera de Itriaga. 1968. *Canadian J. Zool.*, 46: 123-128. This is one of the first studies of trans-equatorial migrants on their wintering-grounds, and certainly the first of species which breed in the Southern and winter in the Northern Hemisphere. It is thus an important contribution to knowledge, but it is based on very small samples, and in the absence of data on statistical variations the conclusions are only of qualitative value.

The Elaenias arrived in their winter quarters before initiating molt, still carrying a substantial amount of fat, whereas the flycatchers arrived after the start of their molt and carried little fat. The water content and total weight of each species increased slightly during the period of most intense molt (July-August); heavy fat deposition was noted before "spring" migration.—I. C. T. Nisbet.

12. Report on Rare Birds in Great Britain in 1966 (with 1964 and 1965 additions). F. R. Smith and the Rarities Committee. 1967. *Brit. Birds*, 60(8): 309-338. This is the ninth in an annual series of reports in which all records of rare birds in Great Britain (not Ireland) are summarized after scrutiny by an expert committee. Twenty-four American species are listed (excluding the Pectoral Sandpiper which occurs too frequently to be considered), including 26 individuals of ten shorebird species and seven passerines. The Brown Thrasher, Parula Warbler and Rufous-sided Towhee are recorded in Europe for the first time.—I. C. T. Nisbet.

13. Factors affecting the Occurrence of the Eurasian Lapwing in Eastern North America. Aaron M. Bagg. 1967. *Living Bird*, 6: 87-121. (Including 12 weather maps by John H. Conover.) Thirty records of the Eurasian (*sic*) Lapwing in eastern North America are listed, in addition to the great flight which reached Labrador and Newfoundland in December 1927, and a smaller flight which reached Newfoundland and the Maritime Provinces in January 1966 and which occasioned this paper. Both flights followed the same sequence of weather changes: an incursion of cold air into western Europe from the east, causing mass westward movements of Lapwings towards Ireland, followed by the development of an unusually extensive low pressure across the Atlantic, causing strong easterly winds between Ireland and Newfoundland. Bagg suggests that birds which overshot Ireland maintained their westward heading and were able to cross the Atlantic in about 24 hours' flight. He further points out that the Atlantic lows also led to strong northwest winds in Nova Scotia and Maine: these would have diverted out to sea any birds which failed to settle in eastern Canada, and hence account for the extreme rarity of the species in the United States.—I. C. T. Nisbet.

14. Some Parameters of "Nonsense" Orientation in the Mallard. G. V. T. Matthews. 1967. *Wildfowl Trust 18th Ann. Rep.*: 88-97. The tendency for English Mallards to fly northwest when released away from home (see *Bird-Banding*, 36(1): 48-49, 1965, review no. 18) was further studied by a team of three observers disposed along a line extending northwest from the release point. After three or four miles' flight, the birds' general orientation was no longer northwest, and the great majority would have landed within ten miles or twenty minutes.—I. C. T. Nisbet.

15. Influence of Weather on Autumn Migration in the Jura. (Witterungs-abhängigkeit des Herbstzuges im Jura.) Bruno Bruderer. 1967. *Ornith. Beobachter*, 64(2/3): 57-90. (English summary.) Two seasons' counts of visible daytime migration at a station in the Jura mountains near Basel are compared with weather data. Peaks of migration were strikingly correlated with the passage of cold fronts, except in the case of pigeons and birds of prey, whose migration normally increased in volume after the clearance of cloudy weather. After discussing the correlation with individual weather variables, the author concludes that mass flights are released not by any single weather-element, but rather by the total of the atmospheric variations connected with a change of air-masses, interacting with a variable internal threshold.

The problem of bias against high-flying birds arises in any visual study of migration, and unfortunately Bruderer fails to quote a number of recent studies which have demonstrated this bias. He claims that migration at heights below 200 metres can be assessed quantitatively, and that birds can be identified "in good conditions" up to 1,000 metres. He attempts to forestall criticism by using records of species which normally fly low even in good weather, but his list includes the Chaffinch, which Dutch observers have reported flying even higher than 1,000 m. The question which must be answered, before visual counts of birds can be used for quantitative analysis, is not whether *some* birds can be seen at high altitudes, but whether *the same proportion* of high birds is seen. A quantitative answer to this question is still needed (see *Bird-Banding*, 37(1): 53, 1966, review no. 5.)—I. C. T. Nisbet.

16. Migration and Molt in Pallas's Grasshopper Warbler. I. C. T. Nisbet. 1967. *Bird Study*, 14(2): 96-103. Near Kuala Lumpur, Malaysia, *Locustella certhiola* is present from mid-September to mid-May. The September birds are passage migrants, but later birds remain within restricted areas throughout the winter, and return to the same areas in subsequent winters. The return rate probably exceeds 50 percent each year. The birds molt their wing- and tail-feathers during March and April, finishing about two weeks before spring migration. They are able to maintain and even increase their weight during molt.—(From author's summary.)

17. Waxwings in Britain and Europe during 1965/66. R. K. Cornwallis and A. D. Townsend. 1968. *Brit. Birds*, 61(3): 97-118. The invasion of western and southern Europe by (Bohemian) Waxwings in autumn 1965 was the largest ever recorded, and also the earliest in the season. This paper traces in detail the progress of the birds across Europe, with special reference to Britain and Ireland. Banding recoveries indicate movement oriented to the southwest in October and early November, followed by irregular wandering during the rest of the winter. In a discussion which incorporates records of migrating tits (*Parus* spp.), it is suggested that eruptive migration is not controlled primarily either by high population levels or by shortage of food, but by an "imbalance" between the two.—I. C. T. Nisbet.

18. Bird Mortality at KOMU-TV Tower, Columbia, Missouri, Fall 1965 and 1966. William H. Elder and James Hensen. 1967. *The Bluebird*, 34(1): 3-6. "The number of television towers, particularly tall towers, is rapidly increasing in the United States. There are now about 50 towers over 1,200 feet in height, and two that are 1,750 feet, in Georgia and Tennessee." The numbers of species and individuals, collected after three kills at this Missouri tower are tabulated. As so often happens it was the thrushes, warblers and Red-eyed Vireos that were the chief victims.—Margaret M. Nice.

19. Comments on Blackpoll Warbler Migration. Charles H. Blake. 1968. *EBBA News*, 31: 181-182. At Hillsborough, N. C., almost all captures of *Dendroica striata* have been made in spring, with only two in the fall. Of 67 taken in spring, 48 were males, clearly not representative of the entire population. While the females tend to move north a little later than the males, on the average, Blake implies that his spring netting covered both periods with similar thoroughness. His conclusion that the two sexes tend to have somewhat different migration paths, at least along some parts of the spring route, is a plausible one. As radar

studies (see, for example, reviews nos. 20 and 21 in this issue) indicate that broad-front movements are much more important than movement along certain routes, a differential in North Carolina would seem to imply different response of the sexes to disturbances, more than a difference in basic direction. For species where the difference between the time of peak movement of males and the time of peak movement of females is very great, it may be reasonable to expect to see more males, as the station would be taking largely birds grounded by poor weather, and such weather would be commoner early in the spring. For the Blackpoll, however, the peaks for both sexes in North Carolina fall in May, so that an explanation for the apparent greater susceptibility of males to interruption of migration is not apparent.

Blake's conclusions also imply no differential of the sexes in ease of capture in mist nets. This is certainly plausible for small migrants not on territory, but I'm not sure that it can be proven.

As in so many other papers, Blake has demonstrated how a little thought applied to a relatively modest number of birds handled can produce useful and stimulating results. Too many banders assume that their data can't amount to much because no large numbers of one species have been handled. Studies based on large numbers are the only way to approach certain problems (as for the tern studies by the Austins), but small samples have their own place, and an important one—witness the Richdale studies of penguins. With the increasing (and very proper) emphasis of Patuxent on purposeful banding, and the pressure on the federal budget to trim non-essentials, those banders who are not aiming at their own specific targets or consciously contributing to an overall problem (e.g., House Finch migratory movements—see review no. 22) may be hard-pressed to justify their existence. They may well encounter a bander's version of the academic "publish or perish⁶⁷" (This isn't asserted out of an editor's desperation for enough material to fill each issue, as in recent years *Bird-Banding* has been getting more good material than we can publish immediately, even with longer issues).—E. Alexander Bergstrom.

20. Scanning the Sky / Birds on Radar. Ian C. T. Nisbet and William H. Drury, Jr. 1967. *Massachusetts Audubon*, 51: 166-174. When Drury began radar studies for the Mass. Audubon Society in 1959, almost every first impression proved to be wrong. On most nights, the radar screen was saturated with a solid mass of echoes for the area within 15 miles of the station, thus not showing groups separately, let alone individual birds. Beyond that distance, groups can be noted, but only a small fraction of those present; out to about 45 miles, rough adjustments can be made in the data to reflect this.

First results from these radar studies seemed to parallel Lack's results in England, in which he concluded that many birds were drifted sideways by crosswinds. However, further years of radar studies in Massachusetts revealed six prime directions of movement through the area in autumn, and three in spring. They were constant night after night, regardless of the direction of the wind. Thus, what at first had looked like birds coming in over land after being drifted out to sea turned out to be a different group of birds maintaining a consistent direction without apparent drifting.

Secondly, the birds' orientation appeared to be unaffected by overcast skies, with very limited exceptions. While it isn't clear how the bird maintains its desired direction accurately, this finding seems to remove the need to explain the kind of more advanced navigational capability that would be needed to detect marked deviation from a given direction and determine the course necessary to get back to that direction.

The substantial numbers of small songbirds flying offshore (south-southeast or south-by-west from Cape Cod) at first suggested drift from the wind, implying either a sharp turn to get back to land within a reasonable distance, or death at sea. However, despite some confusing elements, it now appears that many small birds, such as the Blackpoll Warbler, are capable of flying directly to South America, well offshore.

Much of the paper is based on the more technical analysis presented in *Bird-Banding*, 34: 57-67 and 107-195; 35: 69-119; and 36: 173-186.—E. Alexander Bergstrom.

21. Weather and Migration. Ian C. T. Nisbet and William H. Drury, Jr. 1967. *Massachusetts Audubon*, **52**: 12-19. A continuation of the paper on radar studies discussed in review no. 20. Existing knowledge of the relation of the weather and migration in northeastern North America was modified in two main ways. Reverse migration proved to be commoner, both spring and fall, than other evidence had shown. At least in May, the peak of a northward movement tended to occur a day or two *before* the passage of the cold front, not in the tropical air near the front.

In spring, on the basis of radar data for three years, "migration was denser when the temperature was high, when the pressure was low or falling, when the humidity was not too high, and when the wind was from the south or east (rather than from the west or north)."

It is easy to conclude that birds choose favorable weather for taking off on a leg of their migration. Computer analysis indicates that they also perform a more difficult feat, that of predicting the weather at their destination, perhaps 200 miles and 12 hours away, striking a balance among the weather variables rather than picking the most favorable value of any one factor.

The studies indicated an appreciable bias in ground observation of migrants compared with the actual movements overhead. The largest numbers noticed on the ground usually result from interruption of migration, in relatively sparse movements in disturbed weather, while days of maximum movement generally appear uneventful on the ground. Ground observations did complement the radar results significantly, however, particularly when regular observations could be made in an area of uniform habitat.—E. Alexander Bergstrom.

22. A New Look at the House Finch Spring Migration. Elinor G. McEntee. 1966. *EBBA News*, **29**: 255-262. At Ridgewood, N. J., *Carpodacus mexicanus* banded in winter and spring have later been reported "in an easterly direction across the Hudson River into Westchester County in New York and lower Connecticut (Greenwich and Fairfield), and then, even more significantly, somewhat southeasterly to the western end of Long Island." This appears to be a northbound complement to the better-known fall movement, in which birds that have nested in the general vicinity of New York City move southwestward as far south as northern Virginia.

The population at Ridgewood from January through March is highly dynamic. Over 1,000 House Finches were banded by Mrs. McEntee in 1966, but not even on a single day were more than 10 percent of the birds she captured banded. It seems likely that the local topography funnels the birds to the vicinity of her station, by the effect of mountain ridges running northeast-southwest in western New Jersey. A separate—but much smaller—nesting population is increasing.

The House Finch in the Northeast is a prime example of a species which is likely to repay even more concentration of banding effort by any station which attracts the bird. As its history in this region goes back only to about 1940 (when captives were released), and as this population is separated by half a continent from the main population of the species in western North America, its development of migratory patterns can be watched with a minimum of uncertainty.—E. Alexander Bergstrom.

23. Dakota-banded Yellowhead Recovered in Florida. Joseph L. Guarino. 1967. *Inland Bird Banding Assn. News*, **39**: 160. An adult female Yellow-headed Blackbird (*Xanthocephalus xanthocephalus*) banded September 2, 1965 at Sand Lake National Wildlife Refuge, South Dakota was recovered at St. Petersburg, Fla., on December 17, 1966, about 1000 miles east of any previous recovery of the species. In fact, of 177 recoveries through August 31, 1966, only two were east of the Mississippi, one in Indiana and one in Michigan.—E. Alexander Bergstrom.

24. Black Skimmer Recoveries. Mabel Gillespie. 1968. *EBBA News*, **31**: 67-69. From 1923 through 1941, the late John A. Gillespie banded 447 Black Skimmer (*Rynchops nigra*) fledglings in southern New Jersey. Of these, 21 were subsequently reported, nearly five percent. Eight were reported from Florida, three in the Carolinas, and two on Long Island (New York).—E. Alexander Bergstrom.

POPULATION DYNAMICS

25. Breeding, Migration and Survival of Turtle Doves. R. K. Morton. 1968. *British Birds*, 61(5): 193-212. A study of *Streptopelia turtur*, a non-resident trans-equatorial migrant, largely from nest record cards and ringing recoveries collected by the British Trust for Ornithology. "Of the eggs laid, 47% hatch and 34% are taken by predators; 82% of the young hatched are fledged," giving a breeding success of 39%. In the United States, the breeding success of 9,018 eggs of the Mourning Dove (*Zenaidura macrura*) in four studies averaged 47.3 percent (Nice, *Auk*, 1957).

The mortality rate of the adult Turtle Dove is around 50 percent, which is higher than that of the three non-migratory British doves.—Margaret M. Nice.

26. An "Ancient" Herring Gull. Olin Sewell Pettingill, Jr. 1967. *Newsletter*, Cornell Laboratory of Ornithology, No. 44. A Herring Gull (*Larus argentatus*) banded as a ten-day-old chick on Duck Rock (near Monhegan Island), Maine on June 29, 1930 was found recently dead on June 20, 1966 at Little Traverse Bay near Petosky, Michigan. Its life span was thus almost exactly 36 years, the oldest known bird of this species, and possibly the oldest for any bird in the wild—E. Alexander Bergstrom.

27. 23-year-old Cormorant. Joseph M. Cadbury. 1966. *EBBA News*, 29: 18. A Double-crested Cormorant (*Phalacrocorax auritus*) banded as a young bird on July 14, 1941 in Maine was reported dead nine miles away, "summer 1964". This is believed to be the oldest known bird of the species.—E. Alexander Bergstrom.

NIDIFICATION AND REPRODUCTION

(See 42)

LIFE HISTORY

(See also 30, 31, 32)

28. Notes on the Postnatal Development of the Corn Crake and Moorhen of the Family Rallidae. N. S. Ivanova. 1968. *Vestnik Leningradskogo Universiteta*, 1968 (9): 89-95. (In Russian. English summary.). A study under the direction of A. S. Malchevskii, leading Russian authority on avian breeding biology. Moorhen (*Gallinula chloropus*) chicks show more features characteristic of altricial birds: bright colored head, bill and wings; a louder raucous voice and certain movements to draw parental attention at feeding periods. The Corn Crake (*Crex crex*) chicks show none of these features, and are self-sustaining by 3-4 days of age in contrast to 10 days for those of the Moorhen, by which time the bright colors have faded. In the latter, juvenal feathers first appear not as pins but as emergent tufts functioning as second generation down. In both species ability to fly is acquired at 30 days; juvenal feather growth halts at 50 days age in the Corn Crake, at 60 days age in the Moorhen.

Whatever the situation in the wild, in captivity the Corn Crake molted all but the quill feathers in September; the Moorhen only the head and neck. For the former, a prenuptial molt the following March and April; for the Moorhen, a December molt into a plumage which was retained to the end of the following summer, and presumed prenuptial. All in all the Crake young were much the more precocial of the two species, notwithstanding classification in the same family.—Leon Kelso.

29. The Breeding Behaviour of the Grey Phalarope in West Spitsbergen. Sven-Axel Bengtson. 1968. *Vår Fågelvärld*, 27: 1-13. (In English.) The Gray Phalarope (*Phalaropus fulicarius*) arrives on the breeding grounds in the middle of June. Some first arrivals were males, others were paired. Threat and alert postures are described. Of the courtship displays, only the female performs the Circle Flight, while both sexes perform the pre-copulation displays, such as Rattling, a kind of hovering, and Pushing. Copulation takes place on land with the female in prone position. Nests were found near small lagoons and in a colony of Arctic Terns (*Sterna paradisaea*). By the end of June complete clutches of four eggs were found. The male alone incubates. Although the male continues to guard and defend the young, soon after hatching parent and progeny start feeding apart.—Louise de K. Lawrence.

BEHAVIOR

(See 28, 29)

ECOLOGY

30. On the Dynamics of Paridae Flocks in the Barguzinsk Reserve. K. P. Filonov. 1960. *Transactions (Trudy) of Barguzinsk Reserve*, 2: 101-108. Special attention to mixed, roving flocks of foraging birds in boreal forests of USSR goes back at least to 1932 (A. A. Gerke, *Zool. Zhurnal*, 11: 90-123.) Among others, Formozov (1950. Ptitsy i vrediteli lesa.), and Novikov (1959. *Ekologiya zveri i ptits lesostepnykh dubrav.*) dwelt on this topic at some length. The present study, based on observations of 219 Paridae flocks, numbering 3,089 individuals, in the winter of 1958-59, in the Lake Baikal region, finds that (1) wintering Paridae flocks develop out of the late summer gregariousness of roving fledged broods or family groups; (2) the number and size of mixed parid flocks in an area increases through fall into midwinter, and decreases from winter into spring (This corresponds closely to what was found in mixed species flocks in tropical rain forests 3° north of the equator in Malaya, McClure, 1967. *Wils. Bull.*, 79: 131-154.); (3) these flocks are quite variable in number of component species and individuals in the fall, less variable in midwinter; (4) in winter these flocks move about higher in the forest canopy; in fall and early spring they may forage in the undergrowth, and even on the ground; (5) in early spring they are more frequently prey of the Sable.

Among theories on reasons for this flocking behavior, in addition to instinct for sociability, ease in obtaining food, and ready warning against predators, advanced by Gerke and others, Novikov (*l. c.* pp. 256, 257) suggests that mixed flocking is the natural result of the more or less forced propinquity of numerous roving family groups of the various species abroad in forests in late summer, and their tendency to concentrate in richer feeding areas. He also suggests a unifying role in the "vocal contact" or chattering of the group members; and he notes particularly the habit of the Nuthatch (*Sitta europaea*), a frequent "nucleus species", to vociferously announce any food discovery, thus attracting others of the group to partake of it. In addition to *Parus* spp., the most frequent nucleus species (on which account they are termed locally parid, "sinichi" flocks), such secondary species as the Great Spotted Woodpecker, (*Dendrocopus major*), Lesser Spotted Woodpecker (*D. minor*), Tree Creeper (*Certhia familiaris*), and Kinglets (*Regulus* spp.) attend these flocks.—Leon Kelso.

31. Tetraonid Resources in the USSR. (Resursy terevinykh ptits v SSSR.) S. V. Kirikov and O. N. Shubinkova, editors. 1968. "Nauka" Publishing House, Moscow. 96 pp. Summaries of 72 papers of 1/4 to 4 pages length, presented at a conference, April 2-4, 1968 in Moscow, dealing with tetraonid ecology, population fluctuations, utilization, propagation and distribution. Of these 15 were on the Capercaillie; 8 each on the Willow Ptarmigan, Black Grouse, and Hazel Hen; 4, Rock Ptarmigan; 3, Rock Capercaillie; and 34 on several species, or tetraonids in general. Of special note are two articles (by Zinoviev and Žlobin, pp. 23-25) on censusing Black Grouse and Hazel Hens from an airplane.

In answer to the observation by many that from Russia this and other biological literature seems to be emerging en masse, Dr. F. J. Turček of Czechoslovakia writes: "I ascribe it to 1) the quantity of well-trained workers, 2) teamwork (i.e. not dog-eat-dog), 3) occupation of all available quarters by scientific workers, i. e. in schools, reserves, even small local museums, zooparks, agriculture and forestry stations, and 4) to modest requirements for workers, and the drive to compete with western nations." Last year he saw in a relatively small steppe reserve, a permanent staff of 3 zoologists, 2 botanists, and 1 forester, with a team of hydrobiologists, meteorologists, and pedologists, adequate living quarters, and laboratories.

"Finally, to your question, 'if a student scientist has arrived at a certain level of accomplishment is any place created for him?', I can say it is. I, myself, know of no scientific worker without an adequate job."—Leon Kelso.

32. The Ecology of Gallinaceous Birds of the High-montane Region of Northwest Caucasus. V. I. Tkachenko. 1966. *Trudy Teberdinskogo Gosudarstvennogo Zapovednika* No. 6: 1-144. 30 tables, 12 figures. Three species, Caucasian Black Grouse. *Lyrurus mlokosiewiczii*, Caucasian Ular, *Tetraogallus caucasicus*, and Caucasian Chukar, *Alectoris keklik caucasica*, all of limited and remote distribution, in the Teberdinsk State Reserve region, were studied on the same broad plan as were the Capercaillie, Black Grouse, Willow and Rock Ptarmigans, and Hazel Hen, in the "Ecology of Tetraonids" by O. I. Semenov-Tyan-Shanskii (reviewed in *J. Wildlife Management*, **28**: 600-602. 1964) although for a shorter time (four years). The work is detailed in 8 chapters: area of investigation; nature of habitat, with seasonal shifts and migrations; fluctuations of population; reproduction; foods; enemies and parasites; plumages, with molts, weights, and measurements; causes of fluctuations in numbers, and conclusions. The details of life history prove to be generally similar to those of the five species in the latter study cited, with the exceptions that the high-altitude species have lower fertility, and slower tempo of growth in young. *Tetraogallus caucasicus*, called by some writers "*gornaya indeika*" (Mountain Turkey), is of higher alpine distribution, and is the most exclusively vegetarian of all, taking no animal food at any age or season. There is a bibliography of 100 titles.—Leon Kelso.

CONSERVATION

(See also **3, 39**)

33. Another Experience with Evening Grosbeaks in Canada. G. Hapgood Parks. 1966. *EBBA News*, **29**: 155-158. A sequel to studies of the Evening Grosbeak (*Hesperiphona vespertina*) in Quebec, described in *Bird-Banding*, **34**: 22-30 and 73-86. In six days in June, 1965, the Parks' banded 272 grosbeaks and took 5 foreign retraps, at Astle, New Brunswick, in the Miramichi valley. Though this was the sixth successive year of aerial spraying for the spruce budworm in that area, the population of grosbeaks appeared large. This may have been correlated with more refined spray techniques than those the author had encountered in Quebec in earlier years.—E. Alexander Bergstrom.

34. Still Another Experience with Evening Grosbeaks in Canada. Mr. and Mrs. G. Hapgood Parks. 1967. *EBBA News*, **30**: 7-18. Banding at Astle, New Brunswick, in the Miramichi Valley, in 1966 (for the 1965 trip, see review no. 33). In eight days the Parks' banded 500 grosbeaks and took eight foreign retraps. The male/female ratio of 22 to 1 among banded birds actually greatly understated the preponderance of males, though a week or two earlier in the same area the sex ratio appeared balanced. As in 1965, the birds seemed to be moving from east to west, apart from a moderate number of residents. No overall counts were possible, but in one halfhour alone, some 2,000 birds moved by. The causes of the movement could not be determined. The total population noted was much higher than in 1965, though aerial spraying (for spruce budworm) was being carried on for the seventh year in a row. This species appears unusually susceptible to being hit by cars, partly because they tend to gather in flocks where salty gravel is found.—E. Alexander Bergstrom.

35. Evening Grosbeaks in New Brunswick - Chapter III. Mr. and Mrs. G. Hapgood Parks. 1968. *EBBA News*, **31**: 5-14. A 1967 visit to Astle, New Brunswick, in the Miramichi Valley; for the 1965 and 1966 visits, see reviews nos. 33 and 34. Numbers of the grosbeaks were much less than the 1965 and 1966 concentrations. Males predominated again, but by 8 to 1 instead of over 22 to 1 as in 1966. No evidence of migratory movement was noted, in sharp contrast to the previous years; perhaps this is related to a very heavy food crop the previous fall, reducing the need for movement. Killing of the birds by motor vehicles appeared much less than in the preceding years, probably because of the lower concentration of birds. Mist nets were effective in taking grosbeaks; however, use of short nets and constant vigilance are recommended, to minimize the chance of several birds hitting the net close together and biting each other.—E. Alexander Bergstrom.

MORPHOLOGY AND ANATOMY

36. On Morphophysiological Criteria of Evolutionary Transformations in Bird Populations. L. N. Dobrinskii. 1968. *Zool. Zhurn.*, **47**: 816-819. (In Russian. English summary.) An analysis of internal features of avian species shows that the relative weight of their internal organs decreases with increase of body weight, within limits of a given population. When, in populations at the limits of a bird's range, this does not occur, it indicates a shift in response to environmental pressure, and the evolutionary initiation of a subspecies is in process.—Leon Kelso.

PHYSIOLOGY

(See also 11)

37. Ageing and Sexing Harriers. Frances Hamerstrom. 1968. *Inland Bird Banding News*, **40**: 43-46. The grey adult male Marsh Hawk (*Circus cyaneus*) is distinctive at all times, but brown-plumaged birds may be adult females, sub-adult females, or subadult males. Wing measurements of 198 birds live-trapped in Wisconsin indicate that among the subadults, males have a wing under 362 millimeters in length (flattened) and females 362 or longer. In band sizes, if a size four band fits nicely, the odds are 99 to 1 the bird is a male; females take size 5, or occasionally size 6.

Eye color is also helpful. If the bird "has chocolate eyes, it is a female and less than two years old. A female . . . trapped in Wisconsin, having yellow irises with no more than 5% brown flecks is probably three years old or older. If a sub-adult has bright yellow or greyish eyes it is a male."—E. Alexander Bergstrom.

PLUMAGES AND MOLTS

(See also 17, 28, 37)

38. Geographically Correlated Variation in Lark Plumages and the History of this Family's Distribution. I. Volchanetskii. 1968. *Byull. Moskovskogo obshch. isp. prirody, otdel biol.*, **73**(2): 5-17. (In Russian, with English summary.) The color patterns of *Lullula arborea* and *Alauda arvensis* are considered the most primitive. Coloration in the family varies from darkening or lightening of longitudinal streaks and feather margins to total blackening or whitening of the whole feather. There may be contrastingly sharp dark patches, or upper parts dark in contrast to the under. The dark pattern may be suppressed by a general rufescence spreading from the head backward. It is suggested that the family originated in the Tertiary forest-steppe areas of the southern Palearctic, moving thence into African and Asian deserts.—Leon Kelso.

ZOOGEOGRAPHY

(See also 12, 33, 34, 35, 44, 45, 46, 47)

39. Changes in Status among Breeding Birds in Britain and Ireland. J. L. F. Parslow. 1967-68. *Brit. Birds*, **60**:, Nos. 1, 3, 5, 7, 10, 12; **61**: Nos. 1, 6. A monumental survey in eight sections. In the final paper we are told that of the 216 species which have nested in Great Britain since 1800, 19 are listed as sporadic breeders (table 8). Of the 197 regular breeders (table 9), "since 1940 only one species has ceased to breed, while nine have become established or re-established." "Two factors are probably responsible for this apparently satisfactory state of affairs:" preservation as bird reserves of some coastal and inland marshes, and the increase in observers. In summary, there have been large increases in several species of sea-birds and in most Anatidae, while the greatest losses have been in the birds of prey due to human persecution, as well as organochlorine insecticides. Evidently passerines have not suffered from pesticides as heavily in Great Britain as in North America. References (in abbreviated form) cover four and a half pages in the final section.—Margaret M. Nice.

40. The Occurrence of Bewick's Swan in Sweden and its Migration in the Baltic Region. (Mindre sångsvanens (*Cygnus columbianus bewickii* Yarrell) förekomst i Sverige jämte något om artens sträck i Östersjöområdet.) Stig Högström and Lars-Erik Wiss. 1968. *Vår Fågelvärld*, **27**: 14-42. (English summary.) From an average of three observations per decade during the latter part of the 19th century, the species is now observed sixty times a year during both the spring and fall migrations. A single wintering record has been obtained from Lake Tåkern. In the spring, the migration to the breeding grounds in northern Russia and Novaja Zemlja exhibits a two-pronged northeasterly course, one prong crossing central Sweden and the other skirting the southern provinces. The fall migration, running obliquely southeast across the Baltic Sea to the Atlantic coasts, only touches the southernmost parts of Sweden.—Louise de K. Lawrence.

41. First Documented Breeding of Kittiwake in Sweden. (Tre-tåig mås (*Rissa tridactyla*) — för första gången påvisad häckning i Sverige.) Sven Mathiasson. 1968. *Vår Fågelvärld*, **27**: 43-51. (English summary.) In August 1967, on the isle of Nidingen in the westcoast archipelago, an adult Kittiwake banded as a nestling in 1963 on a Danish island west of Nidingen was found on a nest with a fledgling. The nest was placed on the ledge of the concrete base of a navigational sign. No second adult was present.—Louise de K. Lawrence.

SYSTEMATICS

(See 38)

FOOD

42. Dependence of *Falco eleonorae* on Trans-Mediterranean Bird Migration. (Zur Abhängigkeit des Eleonorenfalken (*Falco eleonorae*) vom mediterranen Vogelzug.) Hartmut Walter. 1968. *Jour. f. Ornith.*, **109**(3): 323-365. (Summary in English.) Observations were made on two breeding colonies of Eleonora's Falcons: one of more than 142 pairs on the isle Paximada north of Crete in 1965 and '66; the other of at least 168 pairs on the Isle de Mogodor off the Moroccan Atlantic coast in 1966. On Paximada the average clutch-size in 111 nests was 2.10; breeding success was 1.28 fledged young per nest. On Mogodor there were 168 eggs in 55 nests; estimated success was 2.32 young per pair. Most of the young hatched on Paximada on the 25th and 26th of August; on Mogodor between the 18th and 26th of August, averaging the 21st. The nestlings fledged at about 37 days and were cared for by their parents until 55 days of age.

"Before the autumn migration of passerines is fully under way in August the Eleonora's Falcons of Paximada hunt almost exclusively on flying insects." Shortly thereafter, they switch to migrating birds; these are caught by the male and fed

to the chicks by the female. Tables are given showing the large numbers of species and individuals identified as victims of the falcons by the author. A very interesting study.—Margaret M. Nice.

SONG

43. The Biological Meaning of Song in the Estrildidae. (Zur biologischen Bedeutung des Estrildidengesanges). K. Immelmann. 1968. *Jour. f. Ornith.*, **109**(3): 284-299. (Summary in English.) Many species of Grass Finches "sing not only during courtship (display song) but also on numerous other occasions (solitary song). In general the solitary song does not seem to possess any significant biological function seeming rather to be just a sign of a very tranquil mood, not influenced by any other motivation." Yet in some species it has acquired new "social functions," for instance, the great individuality of the male's song "may contribute to individual recognition within a pair or a breeding colony." In some genera both sexes sing, and some species sing all the year round. The author concludes that R. J. Andrews' (*Ibis*, 1961) definition of song as "vocalizations given persistently by a bird in breeding condition (and at no other time) before it acquires a mate (or when it loses contact with its mate)" is too restricted to be acceptable.—Margaret M. Nice.

BOOKS AND MONOGRAPHS

44. Birds of the USSR. (Ptitsy SSSR). V. E. Flint, R. L. Beme, Yu. V. Kostin, and A. A. Kuznetsov. 1968. "Mysl" Publishing House. Moscow. 637 pp., 48 color plates, 74 figures, 302 maps. Price 2 roubles, 12 kopecks (about \$5.00 U. S.). This is the third single-volume handbook of all USSR birds to appear in recent years, being smaller than the Gladkov-Dementiev key in size, weight and descriptive text (*Bird-Banding*, **36**: 284, 1965) and larger but not so thorough technically compared with the Ivanov-Stegmann "Short Key" (*Bird-Banding*, **36**: 130). The avowed emphasis in this key is on identification by colors, the 48 plates grouped at the back of the book and the distribution maps representing all their resident and migratory species, except those rare and accidental, in one or more plumages. There are as many as 18 species on a plate. There are chapters on "how to see birds", "how to use the key", "some terms", how to prepare bird skins, a list of USSR ornithological texts, general and regional, and indices of Russian and Latin names. In authorship, the text is divided between Flint and Beme; Kostin contributed the color plates, and Kuznetsov, the maps. Having been edited by Dementiev, with Spangenberg, Vorobev, Gladkov, Kuzyakin, Stephanyan, Abdusalyamov, Larionov, and Cheltsov-Bebutov as advisory board, adequacy and accuracy should be assured. The edition, 50,000 copies, exceeds that of the rival keys (10,500 and 26,000 respectively). For the native observer in the field, and the armchair student at home or abroad desiring to familiarize himself with USSR birds in advance, this book seems a good buy.—Leon Kelso.

45. Song Birds of the World. 319pp. \$2.95. / **Water and Marsh Birds of the World.** 223pp. \$2.45. Both by Oliver L. Austin, Jr. 1967, Golden Press, New York. Paperback. These are essentially excerpts from Austin's classic *Birds of the World*, 1961; for a review (generally favorable), see *Bird-Banding*, **33**: 118-120. They are attractively printed and bound. The plates are usually, but not always, in smaller size than in the larger book. A few of the species within these categories illustrated in the larger book are omitted here. The general quality of the color reproduction is surprisingly close to that of the original book, so that the reader can appreciate Singer's artistry. The text incorporates most of the text of the original for these categories, but "has been revised to include new material based on recent taxonomic researches and other developments of ornithological importance" during the intervening five or six years. Yardsticks like "ten years ago" in the text refer to the time of original writing, not the time of revision. Some of the changes are simple corrections of errors that plagued the original book; e.g., what is incorrectly called a Green-winged Teal on page 68 of the original is correctly captioned "Teal / *Anas crecca*" on page 124 of the waterbird paperback. Excellent value for the price.—E. Alexander Bergstrom.

46. A Field Guide to the Birds / Eastern Land and Water Birds. Roger Tory Peterson. 1968. Houghton Mifflin Co., Boston. xxiv + 290pp. \$2.95. Not a new book, but a paperback version of the second revised and enlarged edition; an ornithological classic in its 35th printing. The paper covers appear sturdy, the paper in the text is whiter than in the hardcover version, the same plates are used, and the publisher has even preserved the attractive endpapers. This version weighs 5/6 as much as the hardcover version. Judging by my copies of each, however, I prefer the coloring of the plates in the hardcover version. In many of the plates in the new version, the reds are somewhat pale and washed out. I must admit, however, that in at least one plate the new one is superior, with brighter and stronger blues. The book was good value in its hardcover version (which I believe is still available), and a bargain at this lower price.—E. Alexander Bergstrom.

47. Where to Watch Birds. John Gooders. 1967. Andre Deutsch, Ltd., London. 313pp. 30s (=US \$3.60, but slightly more in the U. S.). A guide to over 500 bird-watching spots in England, Wales and Scotland, telling how to get there, where to go at the site, what species to expect at different seasons, the times of high tides, whose permission to ask, where permits are available, and whether overnight accommodations are available locally.

Most Americans who have watched birds in Britain will join in Roger Tory Peterson's lament (in the introduction to this book) that such a guide was not available for their first visit. Even those who have found their way to such prime birding areas as Minsmere in Suffolk have felt that they must be passing up good spots for lack of knowledge on the right sideroad to take or what access is permitted. While Gooders lists such obvious tourist meccas as Snowdonia in Wales, he also catalogues many spots that the casual observer would pass up as too close to an industrial plant or rubbish tip (= dump). A prize example is Southend amusement pier in Essex, at the mouth of the Thames Estuary, for migrating terns and skuas (mostly = jaegers) in September. The book is a fine antidote to any impression that Britain's many centuries of human impact on the landscape necessarily imply poorer conditions for the birds and for birdwatchers. Many choice spots listed involve reservoirs, or ponds resulting from mining subsidence or digging gravel or peat, or old-style open sewage-treatment lagoons. And any impression that the relatively small size of Britain implies limited numbers of birds is quickly dispelled by some of the peak counts given; e.g., up to 120,000 Oystercatchers at Morecambe Bay in Lancashire.

Some birdwatchers object to any publicity about their favorite haunts, either to keep down the number of other visitors for their own convenience, or to keep down disturbance to the birds. Gooders appears to have avoided pinpointing nesting sites of the rarer species, as on Salisbury Plain; Britain is still plagued by some illegal egg collecting. He repeatedly stresses the need to avoid disturbing certain breeding or winter aggregations. The effect of the book is likely to be to spread birdwatchers over more of the likely spots, rather than concentrating on the most famous ones, and thus to reduce pressure on the latter. Many areas have been suffering from trespass by birdwatchers and others, thus alienating landowners. Readers who follow the book's warnings to keep to public footpaths or to observe from a public road should improve the whole situation. And, to quote Peterson in the Introduction, the book "will aid the conservationist in his perennial fight to preserve key wildlife areas against deterioration or outright destruction. The more people travel about to see birds the more they become a recreational resource to be reckoned with and preserved."

Gooders is alert to problems of good relations with farmers. For example, for the Dee Valley, he comments: "All of these areas contain valuable farm land and watchers should not enter fields or disturb stock without permission. Many farmers dislike the geese and carelessness or lack of understanding of other interests by birdwatchers will make things worse for the birds in the end." In our increasingly urbanized society, more and more birdwatchers have little or no realization that they may be damaging crops or disturbing farm animals. More awareness of these problems can even be of immediate benefit to the birdwatcher. I once watched tourists in the Camargue blithely climbing through a barbed-wire fence to get closer pictures of the famous black cattle, the *toros de combat*—fighting bulls, as fast as deer. How those tourists ever got back to the road in one piece has always puzzled me.

Each description should be read with care, partly to avoid missing such casual comments as (under Studland Heath in Dorset), "There is some danger from unexploded missiles". That phrase brought to mind my own mixed emotions once in Austria, east of the Neusiedlersee, at reliable reports of Great Bustards the day before—in dense cover in the shadow of Hungarian border watchtowers, in an area said to have a few land mines almost anywhere but in the narrow road itself.

For each spot, the number of the appropriate map in the one-inch Ordnance Survey series is listed (supplemented by 27 maps in the book, in more detail). Any local guidebooks of special value are also listed. For a tourist making a rather brief visit, it may be tempting to try to get by with less detailed maps. However, in reading the Dorset and Somerset place descriptions against an Ordnance Survey quarter-inch map, I found a number where the smaller-scale map would get the visitor only to the general vicinity of the site, and leave the last two to five miles rather fuzzy. For example, some place names or landmarks in the descriptions don't appear on the smaller-scale map. From considerable experience in birdwatching in strange places both with excellent maps and with passable maps, I strongly recommend the best maps you can find. The slight extra cost, and need to plan farther ahead, are more than offset by avoiding frustration and saving time. The need of permits calls for some advanced planning anyway. In reviewing the Suffolk descriptions against one-inch maps, I found that they matched very well indeed. Two minor points of warning: (a) "one mile" is a rather flexible term—see the Westleton Heath directions; and (b) the map number shown is that of the site proper, while the detailed directions may start on another map not named (for the Alde-Ore Estuary, the first four items in the directions involve a different map).

Even the American visitor generally familiar with the Queen's English may need a glossary to get the most out of the descriptions. He will probably know what downs, firths and meres are. It is perhaps less obvious that a salt marsh is a salting, and that meadows not invaded by salt water are [fresh] water meadows. A ness is a headland, and a stack is an isolated rocky islet or pillar. Hanging woods (or a hanger) are those on steeply sloping ground. A moss is a peat bog, and a slack is a hollow among sand dunes. A flash is a pool of water, though apparently not necessarily either shallow or temporary. And finally, a merse is a marsh, though witness deponeth not just what special kind of marsh.

All in all, the prospective reader should be warned that this may be a very costly book for an American birdwatcher. The cost of the book itself is modest, but he will require unusual willpower not to have to invest in a transatlantic crossing at the first opportunity, to visit a few of the spots so temptingly described. Only the Peterson-Mountfort-Hollam *Field Guide to the Birds of Britain and Europe* outranks the Gooders book as a necessity on any such trip.—E. Alexander Bergstrom.

PUBLISHER'S STYLE IN AMERICAN JOURNALS OF ORNITHOLOGY

The editors of *The Auk*, *Bird-Banding*, *The Condor*, and *The Wilson Bulletin* have agreed to make some minor stylistic revisions leading to identical or very similar practices in the four journals in matters, principally, of abbreviations and bibliographic citations. The main objective of this concordat is to make it possible for authors to learn and to apply a single style in the preparation of manuscripts intended for publication in American ornithological journals. The following practices and standards will apply henceforth.

For bibliographic citations in a terminal list of references, authors should use forms stipulated by the *Style Manual for Biological Journals*, Second Edition (Council of Biology Editors, published by the American Institute of Biological Sciences, Washington, D. C. 1964).