My notes were sent to Mr. Aaron M. Bagg, Dover, Mass., by Mrs. Walter Garrey, of Waban, Mass. His comments are quoted:

"When I started to read them, I thought that I would find that the birds which came aboard included some items such as Indigos [Indigo Buntings], tanagers, grosbeaks, etc. And, when I saw that the list included none of these species, there was—momentarily—some disappointment. But I quickly realized that the list of species coming aboard is interesting and helpful, *precisely because of* the absence from it of buntings, tanagers, etc.

That is, a check of the weather maps for the period involved shows that the "Explorer" birds were in migratory movement under conditions involving *non*-tropical air. When Indigos, tanagers, and grosbeaks are carried up, in April, to coastal New England and the Maritimes, an essential ingredient of the weather situation is the presence of tropical air. I won't go into all the details here. But the point is that the "Explorer" birds provide a very nice insight into the weather backgrounds of *their* being carried offshore, and into the contrast between *their* doing so *vs.* the weather mechanisms of a flight to the northeastern coastal areas of the buntings, tanagers and grosbeaks."—John S. Rankin, Jr., Director, University of Connecticut Marine Research Laboratory, Noank, Connecticut. Contribution No. 12.

Ed. note: a briefer account of this incident has appeared in Aaron Bagg's report in the August, 1961 issue of *Audubon Field Notes*. We are indebted to him for permission to quote his comments, above.

RECENT LITERATURE

MIGRATION

(See also No. 37.)

1. Birds' celestial navigation. Clarence F. Stasz. 1958 [published in 1960]. *Cassinia*, No. 43: 10-12. Here a bird student who is an industrial scientist by profession makes the difficulties of celestial navigation by birds vivid by comparing them with the problems of a man adrift on a raft—equipped with a chronometer, a plumb bob, and an improvised mast—trying to deduce his location from the shadow of the mast. This man would be in a bad fix if he lacked an astronomical almanac, if he lost track of the date, or if his timepiece ran a few minutes fast or a few minutes slow. Even without such misfortunes, according to Stasz, he would need to make superhuman discriminations. He would need, for instance, to measure the angle between the sun's position and a line passing both through the center of the earth and his own position. He would need to do so to an accuracy of half a degree (the radial distance that the minute hand of a watch moves while the second hand is moving only 5 seconds).

To object that a particular hypothesis of avian navigation calls for superhuman faculties is not to demolish that hypothesis. Let ornithologists at large hope that the eventual answer will involve such faculties. Otherwise they will be deeply embarrassed by having taken so long to solve an easy puzzle and by having produced too much spurious evidence against simplicity. Whatever the final outcome, Stasz is to be commended for having made the ultrafine demands of celestial navigation a bit more real, for having subjected that process to the test of skepticism.—R. J. Newman.

2. The most probable method of wind orientation of migrating Chaffinches *(Fringilla coelebs).* Über die wahrscheinlichste Method der Wind-Orientierung ziehender Buchfinken. D. A. Vleugel. 1959. *Ornis Fennica*, **36**(3/4) : 78-88. Vleugel, like Stasz, feels that deriving direction from the movement of the sun is too difficult for a flying bird and too inaccurate; still he does consider the sun the primary source of orientational information. In 1952 he suggested that Chaffinches identify their proper migration direction by reference to the rising sun, assess the angle between this direction and the direc-

tion of the wind before taking wing, and thereafter follow the proper course by maintaining an appropriate constant angle to the wind.

Here he elaborates how such a feat might be accomplished. The major difficulty to be overcome is that, once in the air, a bird supposedly cannot feel the force or direction of the wind except during moments of sudden increase or sudden decrease. Vleugel suggests ways in which a flying migrant might recheck the movement of the wind more or less directly but is not himself very hopeful of their efficacy. The solution he most favors is based instead on the well-known principle that a bird's track, or effective course, is the resultant of two vectors—one supplied by the bird's air speed and heading, the other by the speed and direction of the wind. Thus a bird that maintains a constant air speed and a constant angle between its direction of movement with respect to the terrain and the direction in which its bill is pointing will automatically also maintain a constant angle with an unchanging wind. It will remain on course.

Questionable aspects of even this method are several. First, in order to estimate the critical angle closely, the bird must seemingly visualize its track in terms of the terrain. If it can do this, could it not also even more simply perform the visualization directly at the outset, when taking its bearings from the sun, and thereafter maintain direction by establishing a series of aiming points? Vleugel claims to have shown elsewhere that the bird could not do this, but his present summary of that analysis is not conclusive. Second, in simple form at least, the Vleugel method would produce correct results only if the bird were able to maintain an unvarying air speed and only as long as the wind remained the same. Third, the sun rises at different points on the horizon on different dates; so the bird would still need a built-in ephemeris accurately to make the judgments required at take-off. Thus the wind-orientation hypothesis does not simplify matters as much as might first appear.

Movements of air are certainly deeply involved in the orientation of flying things—if not as an asset, at least as a liability. Many analysts of bird navigation tend to forget the wind as a potent factor in the problem, and Vleugel has done great service by the attention he has focussed on its importance. Yet his theory, even if correct, does not solve the basic enigmas of avian navigation. It does not explain how birds can home from unfamiliar territory or even how they can recover from displacement during migration. A hypothesis that could account for these things to everyone's satisfaction would probably render Vleugel's suggestions superfluous.—R. J. Newman.

3. Observations of the falling off of seaward ultra-high migration, especially along the Dutch coast, during calm or with very weak wind. Waarnemingen over het uitvallen van zee gaande (ultrahoge) trek, vooral aan de Hollandse Kust, bij windstilte en zeer zwakke wind. D. A. Vleugel. 1960. *Ardea*, **48**(3/4): 150-160. (With English summary.) In this sequel to the paper just reviewed, Vleugel develops a somewhat different theme. He assembles data to show that few birds set out across the North Sea from Holland during calm or near-calm. For 29 dates with winds of Beaufort 1-3, the average number of seaward departures per hour is 68. For 15 dates with calm or winds of less than Beaufort 1, the average is less than a single bird.

As imposing as the contrast is on its face, its real significance is made somewhat obscure by the statements of the author in the preceding year. Then, in advancing his wind-orientation theory, he indicated that according to his experience very little migration of any kind occurs during periods of calm. To what extent does the decrease in seaward departures in windless weather reflect the reluctance of birds to fly out over water at such times and to what extent does it represent merely the general decrease in migratory movement when the wind fails? The numerous particulate data in the present paper do not answer the question.

One of the subsidiary topics that Vleugel discusses is whether the failure to record much seaward migration during calm might be due to the passage of the birds at such great heights that they are invisible even through binoculars. The possibilities in this regard depend at least in part on the kind of binoculars and the manner in which they are employed. Studies of ultra-high diurnal migration in the United States have revealed great flights beyond the range of the binoculars ordinarily used in bird work. The American procedure is to lie prostrate and peer upward through a vertical 20-power spotting scope at a fixed

portion of the open sky. The introduction of this method into the Netherlands, where so much fine work on the daytime movement of birds has already been done, might provide extremely interesting comparisons. Vleugel meanwhile has found evidence that the number of grounded migrants along the Dutch coast increases during calm and considers this evidence a good indication that no unseen movements are occurring high aloft.—R. J. Newman.

4. Notes on the nocturnal migration of Motacillids. Notes sur la migracion nocturne de Motacillides. Christopher Clapham. 1961. *L'Oiseau et la Revue Francaise d'Ornithologie*, **31**(2): 161-163. Observations at the lighthouse on the Ile D'Ouessant, the westermost bit of France, and at English ornithological stations show that Tree and Meadow Pipits *(Anthus trivialis* and *A. pratensis)* and White and Blue-headed Wagtails *(Motacilla alba* and *M. flava)* at least sometimes migrate at night. The birds occur at the lighthouse chiefly when weather that at first has been favorable for migration later becomes unfavorable.—R. J. Newman.

5. Weather and fall migration of hawks at Cedar Grove, Wisconsin. Helmut C. Mueller and Daniel D. Berger. 1961. *Wilson Bulletin*, **73**(2): 171-192. Movements of hawks along the shores of the Great Lakes are spring and autumn events which yearly attract many observers. Local ornithological societies have their favorite lookout points where such flights, some of them spectacular, may be watched advantageously. Few attempt, as have Mueller and Berger, to correlate these hawk migrations with weather conditions. The writers employ data obtained on 256 observation days during the autumns of 1952 through 1957 at the Cedar Grove Ornithological Station on the west shore of Lake Michigan. In their preliminary discussion they find attractive the view that the impetus for migration in general lies entirely in physiological factors and that weather acts indirectly by simply aiding, permitting, halting, or otherwise modifying the pattern of migration. The fact that their correlations of hawk migrations with individual factors associated with frontal passage are not so good as correlations with cold fronts per se suggests to them that these factors act additively in effecting migration. Well taken is their point that a high correlation between a given meteorological factor and bird migration does not necessarily imply a direct causal relationship.

Of the approximately 29,061 birds of 17 species recorded in the 6 autumns, more than half were Broad-winged Hawks. This species and three others accounted for more than 90 percent of the individuals observed. Graphs show the average number of hawks seen per observation day (highest on 19 and 20 September) and also the general relation between weather conditions and magnitude of hawk flights in regard to observation days. The occurrence of various meteorological and other factors and temperature changes are correlated with numbers of hawks (Class I—more than 100 birds observed in a day, Class II—25 to 100 birds in a day) and weather patterns (Class A—days with westerly winds, a cold front to the east and southeast, and a low pressure center to the north or northeast, Class B—similar winds but lacking the Class A meteorological pattern). Of the hawks observed on 131 of the 256 observation days, 97 percent are included in these four classes. In Table 2 the general similarity in numbers of hawks per day between section B with Class A weather and less than 100 hawks per day and section C with Class B weather and more than 25 hawks per day is apparent. At this point, with the relatively more frequent occurrence of the southwest wind quarter component on these Class B days in mind, one speculates on the greater concentration of birds due to more drift or wonders if the explanation might lie in the actual Class B weather patterns.

Most of the observed migration occurred between 14 September and 20 October. Before and after these dates good migration weather often fails to produce good hawk flights. More than 92 percent of the migration took place on 84 days characterized by recent passage of a cold front and westerly winds, the latter serving to concentrate migration along the guiding line formed by the west shore of Lake Michigan. Similar concentrations along the shores of the other Great Lakes in both spring and fall at times exhibit this guiding line action relative to wind direction. At Cedar Grove wind direction yielded perhaps

the best correlation with hawk migration. A table shows that the highest total number of hawks observed was on west-northwest winds of 10 to 15 miles per hour. Wind velocities greater than 30 miles per hour seem to inhibit the migration progressively, first affecting the buteonine hawks.

One major flight, which occurred on a southwest wind *before* the passage of a cold front and without a Class A weather pattern, was unique to the authors' experience. They propose that the hawks began migrating in Canada during a cold front several days before and continued southward as this front halted and remained stationary to the north. Observations include two instances of reverse migration which apparently relate to the northward movement of warm fronts. Of interest is the discussion of updraft formation and the existence of longitudinal updraft cells over a suitably warm ground surface in relation to horizontal wind velocities. In this regard, Mueller and Berger's proposition is that the relation of fall hawk migration to cold fronts and winds of 15 to 25 miles per hour is, simply, a correlation with the occurrence of conditions suitable for updraft formation—hence, with good conditions for soaring and gliding. It seems to express a relationship discussed at length by other watchers but possibly not so simple when Great Lakes weather factors are considered.

The authors' statement that it is exceedingly doubtful that more than a dozen hawks passed by unseen on any observation day would perhaps be clearer if some idea was given of the observation methods and equipment employed and even of the topographic situation in the vicinity of the station. Experience at the hawk observation stations on the north and south shores of Lakes Erie and Ontario indicates that a good number of migrating hawks escape observation as well as positive specific identification despite the efforts of skilled observers using optical equipment of high magnification.

The relationships between hawk migrations and the vagaries of Great Lakes region weather undoubtedly will continue to provoke thought as they have for many years; the data and correlations presented here contribute some interesting material to the subject and should stimulate further investigations at other lake shore hawk watching locations.—R. F. Andrle.

6. Annual autumn hawk count 1961. Thomas W. Finucane. 1961. *The Migrant*, **32**(2): 22-28. Observations by members of the Tennessee Ornithological Society at strategic points on the Appalachian ridges in the eastern part of the state yielded 10,273 raptors of 10 species in September and October 1960. Of the 10,135 Broad-winged Hawks tallied, 4,985 passed in a major flight on 25 September over Elder Mountain (1880 feet elevation) near Chattanooga. This was a day of scattered clouds and easterly winds. Five other localities recorded about 1,500 Broad-wings on this and the day before. Based upon the assumption that it was the same large group of hawks seen at each of two points 13 miles apart (on 24 September), the average flight velocity of the birds was 21 miles per hour, the timing being recorded with the aid of a shock wave from a supersonic aircraft.

The swift transit of fronts with a strong north-south tilt in the 1959 migration season compared to the more or less stationary or slow moving fronts in autumn 1960 provides a test of the author's hypothesis that the Broad-winged Hawks make rapid progress southwestward during such fast frontal movements. During periods of slower air mass progression, however, they move in a more southerly direction. In contrast with 1959, when there was a heavy early migration in the eastern part of Tennessee and a distinct westward movement along the Clinch Ridge, the autumn flight in 1960 was later and more southerly with only light migration in the eastern section of the territory. As Finucane indicates, the location of these migration lookouts at the southern part of the 1,500 mile linear ridge and valley system, which often serves as a route for major hawk migrations, affords good opportunity for comparison with weather factors and reports from the more northerly observation points. Included is a table of the total hawk count by species and one showing localities, elevations, hours of observation, weather and species noted on each day. It is of interest to see the very small number of Bald Eagles recorded. The excitement and satisfaction of hawk migration study from a lofty point are eminently rewarding, especially in cooperation with others in a planned project which perhaps may yield new ornithological information.—R. F. Andrle.

7. The migration of Lapland Longspurs to Alaska. Laurence Irving. 1961. *Auk.* **78**(3): 327-342. Laurence Irving, associated with Arctic Research Center of the Department of Health, Education and Welfare in Anchorage, Alaska, has compiled data over a number of years on the spring arrival dates of Lapland Longspurs in Alaska and Canada's neighboring Yukon Territory and has also attempted to chronicle the passage of large migratory flocks of these birds to their breeding grounds on the arctic tundra of coastal northwestern Canada, northwestern and western Alaska and the Aleutian Islands.

Observations made between 1948 and 1960 at Anaktuvuk Pass—above the Arctic Circle in the central Brooks Range of northern Alaska—disclosed an "average" arrival date of 5 May. Flocks of from 40 to 2,000 birds were seen funneling northward through the pass to the tundra of the Arctic Slope for about 10 days following an "average date" of 17 May. Longspurs are known to migrate northward through at least six other passes in the Brooks Range in vast numbers comparable to or exceeding those in the great migration through Anaktuvuk.

Considerable Longspur migration has also been observed by Irving and others in the vicinity of the upper reaches of the Yukon and Tanana Rivers in the southwestern Yukon Territory and extreme northwestern British Colombia. Migrant flocks of Longspurs have been seen there moving northward and westward in the last week of April and the first week in May. The dates of migration in this area are felt by Irving to be consistent with those at Anaktuvuk and northern and western Alaska north of the Alaska Range, so it is possible that these birds may have reached northern and western Alaska via the headwater valleys. Although there is no direct evidence for this westward migration, Irving is able to rule out other alternatives such as that of coastwise migration. He points out that arrival dates in other areas of Alaska south and west of the Alaska Range are not consistent with the Yukon dates, so it is not likely that birds found in these areas arrived by the Yukon route.—Stuart L. Warter.

8. An enigmatic northward migratory flight off North Carolina in September. Jack P. Hailman. 1961. *Auk*, **78**(3): 431-433. The Atlantic Ocean indents the North Carolina coast in a series of long, gentle curves that have the shape of over-tilted italic parentheses. Aboard ship 2 miles offshore in one of these indentations, called Onslow "Bay," Hailman recorded 27 migrant flickers and passerines in the 130 minutes following dawn on 26 September 1960. The mean flight direction for the 15 birds sufficiently well observed on the wing to permit directional estimates was 65 degrees—toward north of east though 40 degrees closer to east than to north.

The weather conditions associated with these puzzling observations are in themselves puzzling. Hailman emphasizes with his own italics that the flight "was to north*east* after a night of north*east* winds, and was *parallel* to the mainland coast, not directed toward it" and seems to imply that the presence of the birds out over the ocean could hardly have resulted from drift during the night. Yet in a preceding paragraph he states: "The migration on the morning of the 26th followed a night with clear skies and a north-northwest wind." Direct reference to the Daily Weather Map for 1 a.m. on 26 September does not completely resolve the contradiction but does reveal winds in eastern North Carolina that could have produced offshore drift. The reasons for the flight directions observed remain obscure, though the curvature of the coast is such that a 65-degree course would eventually have brought the birds back to land.—R. J. Newman.

9. The Bombay Natural History Society's spring migration study in Kutch, 1960. Salim Ali. 1961. *The Ring*, **2**(25): 270-272. Following an exceptionally heavy monsoon, a field station for the study of spring migration in western India was established on Kuar Bet, a small scrubby "island" in the region known as the Great Rann of Kutch. During the period of operation (10-18 March) 1,001 birds representing 39 forms were netted. Of these 54 percent (21 species) were migratory; 32.2 percent of the individuals (322) were migratory. —Stuart L. Warter.

10. Bombay Natural History Society bird migration studies, autumn, 1960. Salim Ali. 1961. *The Ring*, **3**(26): 1-3. Two stations for the study of fall migration in western India were established on the Saurashtra peninsula in Gujarat, which lies astride the path of migrants moving northwestward into India. In 18 days of operation (8-25 September), the station at Jalander Bat, a small sandy "island" in the area known as the Little Rann of Kutch, 1,008 birds of 46 species and subspecies were taken in nets; 22 of these forms represented migrants. The station at Hingolgadh, an "island" of thorny vegetation, obtained in 20 days of operation (8-28 September) 1,232 birds of 72 forms, of which "over 50 percent were migratory."—Stuart L. Warter.

11. "Cattle Egret" proves to be a Little Egret. J. M. Hewitt. 1961. *Emu*, **61**(2): 96. The egret recently cited in the *Emu* as having been banded in Spain and recovered in Trinidad (see *Bird-Banding* **32**(4): Review 32) was actually an example of *Egretta garzetta*—the one, in fact, correctly reported in the *Auk*, **76**(2): 241-242.—R. J. Newman.

12. White-crowned Sparrow Crossing Atlantic on Board Ship. A. L. Parish. 1961. *British Birds*, **54**(6): 253-254. An individual *Zonotrichia leucophrys* attached itself to a ship a day out from Newfoundland on May 30, 1948 and stayed by until the day Ireland was sighted. "Other passengers supplied it with vast amounts of food and water, enough to satisfy a pelican!" The editors mention similar crossings of White-throated Sparrows *(Z. albicollis)*, Myrtle Warblers *(Dendroica coronata)* and others. Mr. Parish says: "My own opinion is that, in almost every case, the small American Passerines found in Britain and Ireland have had an assisted passage."—M. M. Nice.

13. The migration through Europe of the Wood Sandpiper. (Report No. 31 from Ottenby Bird Station.) (Grönbenans *(Tringa glareola)* sträck genom Europa.) Harry Myrberg. 1961. *Vår Fågelvärld*, **20**: 115-145. (English summary.) This is a careful analysis based on recoveries of birds banded in Sweden, Finland, Denmark, Belgium, Switzerland, and France. Special attention is given the migration and banding at Ottenby, the fall migration with arrival, peak, and departure dates, the speed of travel, wintering, the spring migration, and migration routes. The Wood Sandpiper appears to migrate on a broad front. No evidence indicates special routes being taken by certain populations. Instead the data suggest remarkably constant north-south and south-north directions of flight. Data and calculations on mortality conclude the paper. Tables, charts, and diagrams help to make this a well organized study, comprehensibly summarized in English.—Louise de K. Lawrence.

14. The influence of atmospheric pressures on the activities of an Ortolan Bunting during spring migration. (Lufttryckets inverkan på ortolan sparvens (*Emberiza hortulana* L.) aktivitet under vårflyttningsperioden.) Jan W. Mascher and Bengt-Olof Stolt. 1961. *Vår Fågelvärld*, **20**: 97-111. (English summary.) Experiments were carried out during two successive spring migration periods with an Ortolan Bunting under highly controlled conditions in an endeavor to find what correlation, if any, exists between atmospheric pressure and the daily activities of this bird. Methods and mathematical formulae are described in full detail. A correlation of statistical significance emerged between falling pressure and increased activity as well as between rising pressure and decreased activity. The preliminary nature of this experiment is emphasized.—Louise de K. Lawrence.

POPULATION DYNAMICS

(See also Nos. 13, 37)

15. A Study of the Mortality of the Starling Based on Ringing Recoveries. J. C. Coulson. 1960. *Journal of Animal Ecology*, **29**(2): 251-271. More individuals of *Sturnus vulgaris* have been ringed and recovered in Great

Britain than any other species of bird; 207,000 had been ringed by the end of 1957; 7,451 recovered. The annual mortality rate in Great Britain is estimated as 52.8 ± 1.0 percent. The sex ratio, apparently starting in favor of the females, changes towards the end of the first year and results in a marked preponderance of males. Male mortality during the first year must be 39 percent, female mortality 70 percent. This differential mortality would seem to be due to more females than males breeding during the first year. "The number of recoveries reaches a peak during the breeding season, mainly owing to the capture of starlings by cats. It is likely that the act of breeding increases the risk of death to starlings since they need to spend more time on the ground collecting food for their young." This is an impressive paper, utilizing the information from the Old and New Worlds, and presenting 6 figures and 13 tables.—M. M. Nice.

16. Movements and Seasonal Variation in Mortality of Shags and Cormorants Ringed on the Farne Islands, Northumberland. J. C. Coulson. 1961. *British Birds*, **54**(6): 225-235. The Cormorant *(Phalacrocorax carbo)* and the smaller Shag *(Ph. aristotelis)* are examples of two species of the same genus living in the same area. They have been shown (Lack, 1945) to differ in nest-site preference and in food. The present analysis of recoveries of 230 Cormorants and 127 Shags ringed on the Farne Islands shows further ecological differences in the dispersal patterns of the two species. It is interesting to read that "most individuals which survive to breed, do so in their natal area." There are four maps giving place of recoveries. The paper closes with a discussion of Gause's theories as to two closely related species living in the same area.—M. M. Nice.

17. Some observations on the biology of the Marsh Tit. (Några observationer över entitans *(Parus palustris)* biologi.) Bertil Anvin. 1961. *Vår Fågelvärld*, **20**: 145-151. (English summary.) In a 2-acre study area in southwestern Sweden 22 Marsh Tits were marked with colored bands over a period of 11 years. Numerous retakes established the sedentary habits of the species. The single territory enclosed within this area was continuously occupied during all this time by only 2 males and 3 females. One of the males lived to be at least 7½ years old. This is a preliminary report on a continuing study.—Louise de K. Lawrence.

NIDIFICATION AND REPRODUCTION

(See also Nos. 21, 25, 26, 27, 28, 37.)

18. Breeding Biology of the Magpie Goose. Paul A. Johnsgard. 1961. *The Wildfowl Trust Twelfth Annual Report* 1959-1960: 92-103. A very interesting study of a captive pair of *Anseranas semipalmatus* at Slimbridge. These curious birds, natives of Australia, have some characteristics of other Anatidae and some of the Anhimidae (South American screamers), as well as resemblances to the Cracidae (curassows). There seem to be records of only two pairs breeding in captivity—one at San Diego in 1945 and 1946, and one at the Wildfowl Trust from 1956 on. The female of this pair was at least 20 years old when she first laid, her mate at least 10 years old. Both parents built the nest; both incubated, the male usually at night; both cared for the young.

"The body plumage of the gosling is grey, but the head, neck and upper breast are a rather bright cinnamon red, and are almost the same colour as the orange facial skin, bill and feet." Although the goslings forage for themselves from the first they also beg by tilting their bills upwards, gaping, and uttering a loud whistle, whereupon a parent responds with food. It is suggested that the brilliant coloring of the heads and bills of the young is correlated with this feeding of the young, something virtually unknown among other Anatidae. The author has found no record of whether screamers feed their young, "but since downy screamers lack any special head or bill markings it is possible that they do not." Another peculiar habit of the adults was to pull grass over the downies whenever they stopped foraging to rest or sleep, in this way forming a brood nest. The unusual sequence of plumages in these birds is described.— M. M. Nice.

19. Ecology of Wild Ducks in Inland Australia. H. J. Frith. 1961. The Wildfowl Trust Twelfth Annual Report 1959-1960: 81-91. Those species of Australian ducks that nest in permanent swamps have regular breeding seasons, but those depending on the erratic flooding of the rivers in the arid interior are highly nomadic and irregular in their breeding. The Grey Teal *(Anas gibberifrons)*, the commonest, most widespread and mobile of all the ducks, has a very varied diet; it is stimulated to breed by rising levels of water, and its ducklings feed entirely on aquatic insects. The Pink-eared Duck *(Malacorhynchus membranaceus)* is completely nomadic; its sexual cycle does not start until actual flooding of low-lying land takes place. Its ducklings feed entirely on plankton that is only abundant in drying flood waters. This very interesting report is based upon the examination of some 4,000 gizzards of the six commonest species of ducks in the inland. "From this study it was apparent that most of the movements of wild ducks could be explained by fluctuations in the food supply due to flooding or rainfall."—M. M. Nice.

BEHAVIOR

(See also Nos. 18, 36, 37, 28)

20. Phylogenetic Adaptation and Adaptive Modification of Behavior. (Phylogenetische Anpassung und Adaptive Modifikation des Verhaltens). Konrad Lorenz. 1961. *Zeitschrift für Tierpsychologie*, **18**(2): 138-187. (4½ page summary in English.) The first part of this long and convincing paper discusses and refutes the concept which some "modern ethologists who, for terminological and other reasons, refrain from using the word 'innate' are associating with the expression 'what we formerly called innate'." The second part deals with "deprivation" experiments. Dr. Lorenz says in part: "The investigator must be thoroughly familiar with the action system of the species used in the experiment and he must have an experienced 'clinical eye,' watching over the perfect health of his subject, and enabling him to get thoroughly conversant with the symptomatology of the pathological disturbances above discussed." Finally he points out the fallacy of expecting agreement of results regarding inherited *(erbgebundene)* behavior when genetically different animals are used in the experiments. "It is on principle impossible to check results gained with pheasants and turkeys by using white leghorn chickens."—M. M. Nice.

21. The Behaviour of the Bengalese Finch in the Nest. Erica Eisner. 1961. *Ardea*, **49**(1/2): 51-69. Nesting pairs of the domesticated form of the estrildine finch *Lonchura striata* were watched through a glass panel. Both parents incubate and brood about equally, often at the same time. "Though the ventral skin is bare of feathers, there is no development of a true blood patch either in male or female. When anything was introduced into the nest the parent went into "a backwards and forwards rocking which may develop into quite powerful rapid forward lunges and pecks with the beak."

The chicks are blind for the first two weeks; begging is released by tactile stimuli from the parents. Begging behaviour is carefully described, as well as sanitation procedures. Preening usually appears on the 11th or 12th day, head scratching and the two types of stretching a day or two later. Fear appears at about day 18; fledging takes place on day 24 or 25. The parents feed the chicks for at least 10 more days. "At about three months old the birds can be considered mature." An interesting, detailed study.—M. M. Nice.

22. On the Geographical Variation of Behavior. (Zur geographischen Variation von Verhaltensweisen.) Eberhard Curio. 1961. *Die Vogelwelt*, **82**(2): 33-48. Dr. Curio has studied intensively the behavior of the Pied Flycatcher *(Fiducela h. hypoleuca)* in Germany and compared it with the Collared Flycatcher *(F. albicollis)* as well as with the Semicollared Flycatcher *(F. semitorquatus)* in Macedonia. Now he extends his researches to the Spanish subspecies of the Pied Flycatcher *(F. h. iberiae)*. From 28 April to 11 June, 1960 he watched a group of nesting individuals in La Granja, Prov. Segovia. A striking difference was apparent in pairing relationships. Whereas the *F. h. hypoleuca* male, both

in Germany and Finland (Lars von Haartman), after winning one mate continues claiming holes and singing, thereby a few gaining extra mates, the male of the Spanish race is satisfied with one mate and stops singing abruptly after she accepts him. Although both subspecies mobbed a mounted Tawny Owl *(Strix aluco)*, only the nominate race did so when confronted with a mounted Red-backed Shrike *(Lanius collurio)* which is an enemy in Germany but does not occur in the range of the Spanish subspecies.—M. M. Nice.

23. The Orientation of Pecking in Very Young Magpie Geese *Anseranas semipalmatus*. S. J. J. F. Davis, 1961. *Ibis*, **103a**(2): 277-283. Experiments on 68 goslings hatched in incubators in Australia showed a strong preference for pecking at high, light, green and yellow objects rather than at low, dark, blue or red ones. "It is suggested that these generalized orientation tendencies suffice to direct the goslings' pecks towards potential food, the seed heads of swamp plants."—M. M. Nice.

24. Pecking in Young Magpie Geese *Anseranas semipalmatus*. Janet Kear. 1961. *Ibis*, **103a**(3): 472. Commenting upon Mr. Davis' paper (No. 23) the author calls attention to Mr. Johnsgard's paper (No. 18) on young of this species raised by their parents; she suggests that as the parent's bill is yellow and normally above the gosling the pecking orientation might "parallel that of gull chicks described by Tinbergen rather than be related to independent food seeking." Young gulls, however, do not normally get food for themselves for several weeks, while Magpie Geese do so from their first day. Another experiment on this subject is of interest: E. H. Hess (1956, *Psychological Reports*, **2**: 477-483) found that day-old Pekin ducklings preferred green and yellow-green objects to those of other colors.—M. M. Nice.

25. Displays of the Spruce Grouse. Harry G. Lumsden. 1961. *Canadian Field-Naturalist*, **75**(3): 152-160. Observations from 16 to 18 May, 1960 on 2 male *Canachites canadensis* in northern Ontario. "The flutter-jump display, head and tail-down display elicited with the use of a mirror, strutting, tail-flick, and head-jerk displays are described." The cock tried to copulate with both male and female study skins. "Sex recognition in the Spruce Grouse is probably normally accomplished largely by posture and movement." Two photographs and 2 sketches are given of displays.—M. M. Nice.

26. The Pair Relationship and Polygyny in the Stonechat. E. D. H. Johnson. 1961. *British Birds*, **54**(6): 213-225. For 12 years the author has studied the behavior of *Saxicola torquata* chiefly in Jersey in the Channel Islands, but also in Spain; he has color-banded some 510 birds. Stonechats are paired throughout the year but not necessarily with the same individuals. Birds of the year pair with one another or with older birds after the assumption of the first winter plumage, and territory is defended all winter. By spring, however, "the pair-bond is suddenly relaxed and, for a period varying from a few hours to three or four days, the birds of adjacent territories may be seen intermingling, with little or no aggressive behaviour. . . . The pair-bond is restored as suddenly as it was broken," but with some change of mates. The female builds the nest and incubates the eggs; the male is very attentive, guarding the territory and calling his mate off the nest every 45 to 75 minutes. He helps feed the young and usually takes full charge of them shortly after they leave the nest, while his mate busies herself with a second or third brood. Sometimes the male will have two or even three mates, faithfully carrying through his role with each and with her brood. One male paired with his mother.

"The male uses his advertisement patterning to defend the territory with the minimum of effort, while the female takes advantage of her cryptic coloration." Yet the behavior of the Song Sparrow pair *(Melospiza melodia)*, both cryptically colored, is remarkably similar to that of the dimorphic Stonechat. Mr. Johnson's statement that "the role of male is active and conspicuous and that of the female passive and inconspicuous," applies equally well to the North American birds. We will be looking for more papers based on this remarkably thorough, long-term study.—M. M. Nice.

27. The Display of the Capercaillie. Harry G. Lumsden. 1961. *British Birds*, **54**(7): 257-272. Displays of three territorial cock *Tetrao urogallus* were carefully studied from blinds in Scotland on early mornings from April 12 to 25, 1960. A table gives times of sunrise, cloud conditions, times of first calls of the cocks, as well as first songs of three species that wake earlier than the Capercaillie. Behavior of cock and hen is described—"the song, flutter jump, threat, bowing, pre-copulatory and post-copulatory displays." Three excellent sketches illustrate this well-documented paper.—M. M. Nice.

28. Display of the Black Cock *(Lyrurus tetrix).* (Orrlek). Erik Rosenberg and P. O. Swanberg. 1961. *Vår Fågelvärld*, **20:** plates 11-16. This picture series is worth mentioning because the photography as well as the captions are graphically instructive. Each cock has its own display territory. At the start of the display period, which begins in March and ends in June, the show is seemingly enacted by an "exclusive male club" until the "hen-weeks" begin about 1 May. The role of the hen is chiefly to stroll into the constricted display area of the male. In full display he woos her by turning around "carousel-like" to the accompaniment of a loud cooing chorus from all the cocks present. There, for the time being, the contact between the sexes ends and the hen strolls on. Mating, on the other hand, is a strictly private affair. Yearling cocks are not tolerated on the playgrounds. The lack of lyre tail-feathers is the distinguishing mark of the immature cock. An old male whose tail had been damaged by a Peregrine Falcon *(Falco peregrinus)* was likewise driven off, while another was tolerated whose breast-feathers had been badly torn in "honorable" inter-cock battle.—Louise de K. Lawrence.

CONSERVATION

(See also No. 37)

29. Present Status of the Bermuda Petrel (Cahow). David B. Wingate. 1961. *The Linnaean News Letter*, **15**(4): 1-3. *Pterodroma cahow* used to nest in vast numbers on the Bermuda Islands. The first disaster to the species came from the release of pigs on the islands by the Spaniards. The second was the arrival of the English colonists in 1609 and with them rats; these soon caused a famine so that the colonists had to eat the petrels until this practice was stopped in 1620 by order of the Governor. The species bred in ever diminishing numbers and was long considered extinct until in the early 1900s a few were rediscovered. In 1951 a determined effort was made to protect the remnant. Rats were eliminated with warfarin from the nesting islands. It was then found that the Cahows' worst enemy was a nest competitor, the White-tailed Tropic-bird *(Phaëthon lepturus)* that killed the newly hatched petrels. In 1954 "bafflers" with entrance holes too small to admit the tropic-birds were placed in the burrows of the six known pairs of petrels. Mr. Wingate is working on further schemes to increase the nesting success of this most interesting survival; he has good support from the government and the people.—M. M. Nice.

30. Pesticide Applications and the Public Welfare. William H. Drury, Jr. 1961. *Massachusetts Audubon*, **46**(1): 24-35. Contribution No. 39 from the Hatheway School of Conservation Education. It is now scarcely news to informed biologists that unwise use of pesticides is frequently doing serious damage. What we do need badly is a working theory of proper controls over the use of pesticides. Such a theory would of course restrict the use of these materials in some situations where their manufacturers fail to recognize the biological hazards. However, it will fall far short of the extremist position that any chemical control of pests out of doors is undesirable.

This paper suggests that the spraying of food crops is not the most serious part of the problem from a biological standpoint, and that the chief emphasis on proper controls should lie elsewhere. I might add that any bill for the control of pesticides is likely to have very heavy going if it includes new controls on what a farmer can spray on his own crops.

The discussion of effects of spraying upon a natural or seminatural community

includes a wealth of examples, in detail and supported by bibliographic references. These indicate that great caution is needed in the control of mosquitoes and forest insects, and in the spraying of shade trees.

The following points are outlined for a good spraying policy:

(1) "Countryside spraying should be done by license or permit under supervision that should include not only entomologists and agricultural biologists, but wildlife biologists. These men should know something about natural communities."

(2) "A landowner should be able, by registering with a central agency, to insure that his land will not be intentionally sprayed with insecticide;"

(3) "Spray programs other than those requested by an individual on his own land should be subject to review for damages to fish and wildlife and be approved by" the state department delegated to handle fish, game and other conservation problems;

(4) When a state sets up a pesticide control board (as Massachusetts is now doing), it should include a wildlife management specialist (generally from the state university);

(5) "Before a general spraying program by aircraft, misters, or foggers, of a city, county, township or town, a public meeting or hearing should be called to explain the purpose of the spraying program, and to allow questions to be asked by the public concerned;"

(6) "Before wholesale insect spraying is expanded further, reason and common sense call for a vigorous program of research on its effects;"

(7) "People concerned about damage to wildlife are in the majority. Those who put personal comfort or economic gain above concern for wildlife are in the minority. We must not hesitate to demand that use of pesticides requires justification, and reverse the widespread attitude that any objection to their use requires proof of local damage."

The paper concludes with a summary of comparative toxicity of various insecticides, fungicides and herbicides. For home garden spraying, the following are recommended: rotenone (virtually non-toxic except to fish), pyrethrins (which will control flies and other insects around the home, though it will not kill them; individuals with pollen allergies may have an allergic response); methoxychlor (if a chlorinated hydrocarbon is to be used, this is much less toxic than DDT); and malathion (if an organophosphate must be used, this is the least toxic to warm-blooded animals, and it will also kill mites—which are spared by most insecticides). Materials to be avoided as highly toxic include Parathion, Aldrin, Dieldrin, and Heptachlor. Chlordane is less toxic than this group, but still hazardous, while Toxaphene and Lindane "should be regarded with deep suspicion."—E. Alexander Bergstrom.

31. Gardening Without Poisons. Beatrice Trum Hunter. 1961. Published by Friends of Nature, 346 Concord Ave., Belmont 78, Mass. 17 pp. 35c. This booklet is full of helpful information: biological control of insects through predators, parasites and disease; encouragement of birds; use of plants repellent to insects; maintenance of soil fertility and kindred subjects. "Remember that whenever we oversimplify the landscape we encourage the insect pests to develop into an infestation problem." The evils of chemical pesticides both to nature and man are set forth, and several harmless alternatives to chemical sprays are described. References are given to bulletins dealing at length with biological controls and with "Companionate Planting," and there is a valuable two page classified list of addresses where materials mentioned in the text may be obtained. "Gardening Without Poisons" is a mine of information; it deserves a wide distribution.—M. M. Nice.

PHYSIOLOGY AND ANATOMY

32. Postcranial Osteology of the Waterfowl. Glen E. Woolfenden. 1961. *Bull. Fla. State Mus.*, **6**(1):1-129. Describes and compares the main postcranial bones—humerus, carpometacarpus, sternum, coracoid, scapula, furculum, femur, tibiotarsus, tarsometatarsus, pelvis, and vertebral column—of nearly all the anseriform genera of the world, including those of 105 of the 165

species recognized by Peters. On this sound basis the author proposes several changes in the generally accepted classification of the group. Most important is the raising of *Anseranas* to monotypic family rank, the Anseranatidae. Other changes involve reassignment of such controversial genera as *Stictonetta, Cereopsis, Plectropterus, Tachyeres, Merganetta,* and *Rhodonessa* within the Anatidae.

Anatomical studies such as this form the firmest foundation for determining relationships and phylogeny. Woolfenden's conclusions clarify and lend the strongest of support to these and several other changes in waterfowl classification already proposed on other anatomical and on behavioral, electrophoretic, and other less certain grounds.—O. L. Austin, Jr.

33. Locomotor Mechanisms of Birds. Frank D. Hartman. 1961. *Smithsonian Misc. Coll.,* **143**(1):1-91. This interesting study correlates the relative flying, walking, running, and swimming abilities of birds with their body structure. Series of measurements and weights of 360 species in 70 families allow the author to figure ratios to body weight of heart weight, weight of wing and leg muscles, and area of wing and tail surfaces. These are presented in a long series of tables and plotted graphically by families. Most significant is relative heart to body weight, which shows conclusively that "heart size indicates staying power." Relatively largest hearts are found in the strongest, most capable fliers—hummingbirds, swallows, pipits, waxwings (no data were available for swifts). One of the smallest hearts is that of the tinamous, whose large strong breast muscles are able to drive them at tremendous bursts of speed but for very short distances. Significant is the relative heart size of the migratory quail (Coturnix), three times those of the nonmigratory species measured. Soaring species such as gulls and vultures have relatively smaller hearts than the related terns and falcons that beat their wings more actively.

The relative sizes of flight and of leg muscles reflect a species' abilities to perform in these departments. The significance to type of flying of the ratio of wing area to body weight has long been recognized, but Hartman finds "the relative weight of a muscle or group of muscles, and the wing areas together with their aspect ratios, appear to be just as characteristic of a species as is the body weight."—O. L. Austin, Jr.

PLUMAGES AND MOLTS

34. Polymorphism in the White-throated Sparrow, *Zonotrichia albicollis* (Gmelin). James K. Lowther. 1961. *Can. J. Zool.* **39:** 281-292. Review of a sample of 286 museum specimens and 199 live birds (on territory, in Algonquin Park) led Lowther to describe two types, which—once acquired—do not change with age. These are white-striped and tan-striped; "the tan-striped morphs of either sex have more streaking on the chest, less black on the lateral crown areas, a narrower and paler chest band, heavier throat markings, and duller yellow in the superciliary stripe."

While many authors have cited the duller plumage as an immature version of the brighter plumage, Lowther concludes that this is incorrect, on the basis of birds handled two successive years in the field and on the basis of published references to birds as old as 6½ years still in the duller plumage.

Of 110 mated pairs in Algonquin Park, all but four were composed of opposite types. "Furthermore, the plumage types of the first and second mates of 15 retrapped birds were recorded. These involved 31 pairs. In all but one case, the plumage types of the second mates were the same as those of the first." —E. Alexander Bergstrom.

SONG

35. Bird Songs in Your Garden. Arthur A. Allen and Peter Paul Kellogg. 1961. $5.95. Cornell University Records. Text (24 pp.) and photographs (53) by Allen, 10-inch 33 1/3 r.p.m. record by Kellogg. An excellent introduction for the beginner, particularly one interested in gardens. The text describes the 25

species whose songs are included, and adds basic information on bird houses, feeders and baths, plantings attractive to birds, and a bibliography. On one side of the record the species are identified; on the other, the same songs appear without comment. Record noise low, and fidelity good. More experienced bird watchers will prefer other Cornell records, particularly *A Field Guide to Bird Songs.*—E. Alexander Bergstrom.

36. Evolution and Geographical Variations of the Songs of Our Tree Creepers. (Stammesgeschichte und Geographische Variation des Gesanges unserer Baumläufer *(Certhia familiaris* L. und *Certhia brachydactyla* Brehm).) Gerhard Thielcke. 1961. *Zeitschrift für Tierpsychologie,* **18**(2): 183-204. (With English summary.) In Europe there are two species of tree creepers, one that the Germans call the Woods Tree Creeper *(Certhia familiaris)* of the same species as our Brown Creeper *(C. f. americana)* and the Garden Tree Creeper *(C. brachydactyla).* The present paper is a detailed study of 385 songs from 44 *C. brachydactyla* and 128 songs from 23 *C. familiaris,* as well as many calls of both species recorded on tape and analyzed with a sound spectograph. Many graphs are shown of the songs and calls of both species, some showing variety in a single individual, others geographic variation. When very excited the Garden Tree Creepers modified their songs markedly. Two examples of Brown Creeper song differ from those recorded of the Woods Tree Creeper. —M. M. Nice.

BOOKS

37. The Murres, their distribution, populations, and biology/ a study of the genus *Uria*. Leslie M. Tuck. 1960. *Canadian Wildlife Series,* No. 1, 260 pp., ill. (Available from the Queen's Printer, Ottawa, price $2.50.) This fine study is a most auspicious beginning for the new series of monographs it inaugurates for the Canadian Wildlife Service. A comprehensive and well-balanced account of the genus, it presents *Uria* as a zoological entity and shows its place in the biological scheme of things. The 21 chapters are grouped under 5 major headings: Evolution and Adaptation, Distribution and Populations, Breeding Biology, Factors Affecting Populations, and Economics. Its principal thesis and emphasis is on the ecological and economic position of the murres, and the final chapters stress what can and should be done to encourage the increase, maintenance, and wise use of this valuable renewable natural resource, which is of such great importance to man in the north.

The author has spent most of the past 10 years in first-hand field study of the two species in the genus, the Common and the Thick-billed Murres, mainly in Newfoundland and Labrador, also in Hudson and Ungava Bays and Lancaster Sound. He has also dug deeply into the literature to amass all the pertinent information on the genus throughout its circumpolar range. No comprehensive study of circumpolar northern species today can disregard the extensive Russian and Scandinavian writings on the subject, which the language barrier makes so difficult of access to most of us. The many important titles in these languages in the bibliography are welcome indeed, as is the extensive use the author makes of information from them in his text. The translation chores were certainly of no small magnitude!

Tuck marshals his data skillfully and presents them and his arguments and conclusions in clear, readable prose. The many maps, charts, graphs, and tables add greatly to the ready understanding of the material, as well as to the appearance of the book, which is further enhanced by a score of splendid black and white photographs, plus a superb double-page spread in full color of adults tending their young on a nesting ledge. I do wish the publishers had given the volume the hard cover it deserves, though this might have forced the price beyond attractiveness to much of the audience they hope, and I trust, they will reach with this important contribution both to ornithology and to conservation.

So thorough and careful has been the author's research that I had to hunt hard to find a minor lapse to criticise—and of course it would have to come to me, of all possible reviewers, to be noticed. In delineating the distribution of the Common Murre in the western Pacific, Tuck failed to find "any positive

recorded evidence" that the species breeds in Korea. The occurrence of breeding colonies on at least two islands off the northeast coast of Korea is adequately documented in the Japanese literature and proved by eggs from one of them I examined in the Li Wong Museum in Seoul in 1946 before it was destroyed. Somehow he missed my account of this, for my *Birds of Korea* (1948) does not appear in his useful bibliography of almost 250 titles.—O. L. Austin, Jr.

38. Instructions to Young Ornithologists. II. Bird Behaviour. Derek Goodwin. 1961. Museum Press Limited, 26 Old Brompton Road, London, S.W. 7. 123 pp. 12s6d. This is a delightful and refreshing book, based on keenest observation of bird behaviour and illuminating insights into its meaning. In clear and simple English Mr. Goodwin discusses most aspects of bird behavior, except for migration which is to be treated in this "Brompton Library Series" by another ornithologist. There are 11 figures—line drawings by the author—and 17 photographs, as well as a short list of suggested readings and an index.

Problems to be solved are pointed out and many parallels are drawn between avian and human behavior. How true that "people, even ourselves, can often be nearly as foolish as any bird."

I like the simplicity of this definition: "The terms 'instinctive' or 'innate' are used to denote behaviour which does not depend on learning or previous experience." As an example for birds he cites flying. "Much of the everyday behaviour of birds is a mixture of instinctive and learned behaviour."

The attachment of the Dunlin *(Calidris alpina)* to the European Golden Plover *(Charadrius apricarius)* on the nesting grounds may well be an example of a supra-normal stimulus for the smaller bird, the similarity of the plumage patterns being shown in a sketch. Three kinds of "tameness" in birds are contrasted: that of a budgerigar that considers its owner its mate; the "cupboard love" of a wild bird at a feeding station; and the innate lack of fear of man by birds on remote islands where there are no native mammalian land predators.

The chapter on Escaping Predators is especially interesting, treating as it does of danger in the air, from mammals, and from man, as well as recognition of predators. Later, in discussing courtship displays, Mr. Goodwin writes that some "seem to be 'built up' from the intention movements of attacking and of fleeing. . . . Whether the birds really feel frightened of their prospective mates we cannot know. Perhaps when they do it is not quite the same feeling as when they fear an enemy or a predator but more what we should call, in human relationships, 'shyness' or 'diffidence'. Many displays that are often termed 'threat displays' or 'courtship displays' might better be called 'self-assertive' displays since they appear just to express the general exuberance of the bird, usually a male, that is giving them," p.60. And he goes on to show that people behave in much the same way.

One admirable feature of the book is its emphasis on common birds. For a detailed description of courtship, that of the Feral Pigeon *(Columba livia)* was chosen and illustrated with telling sketches.

Do not be misled by the rather stilted title. This is a choice book, one that will rejoice and inform and inspire all readers who appreciate the beauty and wonder of birds.—M. M. Nice.

NOTES AND NEWS

The recent transfer of publication of *The Ring* from England to Poland made payment of subcriptions more difficult. This problem has now been overcome by establishing a network of agents accepting subscriptions in local currency. For the U. S. and Canada, the agent is: European Publishers Representatives Inc., Times Bldg., 1475 Broadway, New York 36, N. Y. (annual cost now reduced to $1.50). This bulletin deserves wider circulation. While it is of greatest value as a trade publication for administrators of ringing (banding) schemes, it has a great deal to offer the general reader with an interest in banding. It includes news and information on the activities of the various ringing schemes, problems receiving special attention, and new techniques. Its international scope