GENERAL NOTE

Returns on Aged Cardinal.—On 7 September, 1946, I banded a juvenile male Cardinal (*Richmondena cardinalis*), evidently only a few weeks out of the nest, in my home yard—address below. This bird returned to the same traps 8 times in subsequent years; on his last appearance, 7 March, 1959, exactly 12½ years had elapsed since he had been banded. By the time of his 1954 appearance, the old band was badly beaten; it was easily removed, and a new band was substituted. Two other Cardinals were more than 10 and 9 years old respectively. See "Returns on Aged Cardinal", *Bird-Banding*, **35**: 41; and several summaries on the ages of birds, *EBBA News*, **26**: 223-230.

Band Number: 41-206287
Date banded: 7 September, 1946

Date of Return
1 March, 1947
23 July, 1950
6 May, 1951
8 March, 1953

New Band Number: 52-111060

Date of Return
23 March, 1954
21 November, 1956
16 January, 1958
7 March, 1959

—Arthur H. Fast, 4924 Rock Spring Road, Arlington 7, Virginia.

RECENT LITERATURE

BANDING

(See also 15, 17, 31, 34, 40, 61)

1. A Technique for Banding Day-old Ducklings. G. T. Leinish. 1963. *Ornitologiya*, No. 6: 394-397. (In Russian). To solve the problem of one band for ducks of all ages, a group in the Ornithological Laboratory of Latvian SSR devised a method of attaching adult-size bands sized down with a lining to fit the duckling's tarsus. The lining wears away as the duckling grows larger. Of 1013 ducklings banded in 1962, 39 returns were received with only one instance of a tarsus damaged by too tight a band. Examination of nests in which 1466 ducklings were banded revealed only two instances of dropped bands.—Leon Kelso.

2. Tenth Ringing Report. G. R. McLachlan. *Ostrich*, **35** (2): 101-110. The report covers from July 1, 1959 to June 30, 1960 and shows that there were 11,510 individuals of 234 species banded. A four-page list presents data for the recoveries of 31 birds. Some recoveries were from parts of Russia, Northern Rhodesia, and Tanganyika.—David W. Johnston.

3. Ringverslag van het vogeltrekstation. A. C. Perdeck and B. J. Speek. 1964. *Limosa*, **37** (1-2): 96-186. This is an extensive paper on recent banding operations in the Netherlands and recoveries. In 1962 about 76,000 birds were banded in the country, and in that year the millionth bird was banded. Some interesting recoveries were: Mute Swan from France, White-fronted Goose from Italy, Pintails from Greece and Turkey, Short-eared Owl in Finland and Spain, and Brambling in Czechoslovakia. Longevity records included Herring Gull (29 years old), Glaucous Gull (21), Black-headed Gull (30), and Starling (11). Some recovery maps (Little Bittern and Stonechat) are given. Most of the paper is in the form of tables of species banded and specific recovery sites and dates.—David W. Johnston.

4. Third annual report on bird-banding in Belgium 1962. (Troisième Rapport annuel de l'OEuvre Belge de baguement des oiseaux 1962.) R. Arnheim. 1963. *De Giervalk*, **53**: 430-437. A total of 190,808 birds of 181 species were banded. Among these were ten new species. An exceptional invasion of Crossbills (*Loxia curvirostra*) increased from 4 to 511 the number of Crossbills hitherto banded in this country. They remained in the forests all winter.—Louise de K. Lawrence.

5. Second annual report from the Bird-Banding Station Brasschaat. (Tweede jaarverslag van het Ringstation "Brasschaat".) R. Arnheim. 1963. *De Giervalk,* **53**: 466-476. (From French summary.) A total of 15,908 birds were banded. Local returns amounted to 97. Thirty-six birds were recovered abroad, and 17 foreign birds were trapped and controlled at the station.

Recoveries proved the many advantages accrued by the new technique of placing the band above the "knee" joint. Bands, especially those worn by shore birds, wear less. It is easier to band nestlings and birds with short tarsi in this way and it causes no harm and less irritation to the wearers. Two photographs show a rail and a falcon banded in this novel fashion.—Louise de K. Lawrence.

6. Notes on the destruction of banded Evening Grosbeaks in Quebec in 1960. B. M. Shaub. 1964. *Wilson Bull.,* **76:** 179-185. In the summer of 1959, 94 Evening Grosbeaks were collected in a small area of Quebec and subsequently reported on by Shaub (*Bird-Banding,* **31:** 150-156. 1960). Unfortunately another 104 birds were shot in 1960 in the western part of the Gaspé Peninsula, data from which appear in the present paper. From a study of these banded birds, Shaub gives a survival chart and stations where the birds had been banded (from as far away as North Carolina and Wisconsin).—David W. Johnston.

7. Research on methods of trapping the Red-winged Blackbird (Agelaius phoeniceus). John L. Seubert. 1963. *Angewandte Ornithologie,* **1**(1-3): 163-170. The author discusses the use of mist nets, blackbird decoy traps, small ground traps, nest traps, hand nets, cannon nets, and floodlight traps. The latter trap is most effective in capturing large numbers of blackbirds for banding purposes. Some 671,700 blackbirds were caught with floodlight traps at the Patuxent Wildlife Research Center between 1957-1962. A map shows the location in 1961-1962 of 227 blackbird-starling winter roosts in the United States.—David W. Johnston.

MIGRATION

(See also 3, 6, 31, 32, 40, 51)

8. The Inland Observation Points, February - May 1963. Humphrey M. Dobinson. 1963. *Bird Migration,* **2**(5): 325-328. This is the second report on a long-term project, whose object is to detect large-scale movements of birds by means of a network of over 100 small inland observation stations. So far Dobinson's analysis has been comparatively superficial, and the statistical value of his data needs to be tested carefully before detailed analysis is justified. Like most workers on migration, he uses increases in numbers as his sole criterion of "movement," but it might be profitable to investigate whether the records of decreases give a more self-consistent sample.—I. C. T. Nisbet.

9. Aspects of Spring Migration at the Bird Observatories, 1963. Peter Davis. 1963. *Bird Migration,* **2**(5): 279-318. This paper marks the end of an era in British migration studies. As a result of re-organization of the British Trust for Ornithology, Kenneth Williamson has switched his attention to population problems, *Bird Migration* has ceased being published, and the bi-annual reports on events at the bird observatories are now to be written by Peter Davis and published in *Bird Study.*

In its five years of life, *Bird Migration* was perhaps most notable for the development of Williamson's vigorous, but controversial, interpretations of observations at the British coastal stations. Davis' cautious first report evades the controversies, and provides a useful summary of the season's events. It does not go far towards solving the main problem posed by the bird observatory records: the relation between arrivals of migrants at the coast and passage overhead. For this purpose observations inland (see previous review) seem necessary.—I. C. T. Nisbet.

10. A Remarkable Fall of American Land-birds on the 'Mauretania', New York to Southampton, October 1962. Alan L. Durand. 1963. *British Birds,* **56**(5): 157-163. More than 130 American land-birds of 34 species landed on

board the ship in the western half of the Atlantic during October 7-10, 1962, in the wake of hurricane "Daisy." Fed by the stewards, at least nine birds (six sparrows, a junco, a Baltimore Oriole, and a flicker) reached the Irish coast alive, and several were seen to fly ashore in Ireland, France, and England.—I. C. T. Nisbet.

11. American Passerines in Western Europe, 1951-1962. I. C. T. Nisbet. 1963. *British Birds*, **56** (6): 204-217. Twenty-four records of American passerines in western Europe in autumn and winter are discussed. On the basis of the breeding ranges and migration-periods of the species concerned, it is suggested that most of the birds left the North American coast south of latitude 45°N. Many of the birds probably reached Europe after reversed migrations (oriented northeast). A few of the records were directly associated with tropical hurricanes moving into the temperate North Atlantic.

Birds seen to cross the Atlantic on ships comprise a different group of species, and occur at different dates, from those seen on the west coast of Europe. Most of the latter crossed the Atlantic unaided.

Most spring records have been of buntings (Emberizidae), which have not been recorded at all in autumn, but which frequently cross on ships. (From Author's Summary).

12. Factors Concentrating Fall Migrants at an Alpine Pass. François Vuilleumier. 1963. *Proc. XIIIth Intern. Ornith. Congr.*: 485-492. Spectacular concentrations of daytime migrants at a 6,315-foot pass in southwestern Switzerland appear to be due in part to the westward diversion of broad-front migrants by the Bernese Alps. Migration is usually heavier in high-pressure weather, especially if this lasts for two or more days, and movements are suppressed by cyclonic weather (including cold fronts). Although strong migration is observed with easterly winds, migration is more conspicuous with westerly winds (and hence with high temperatures). In a rather speculative discussion, Vuilleumier suggests that westerly winds make the birds fly lower, and drift them more against diversion lines, both effects tending to increase the degree of concentration at the pass. Hence the numbers seen do not reflect the total migration through the region. "Foehn" conditions occasionally lead to spectacular concentrations of swallows, up to 300,000 passing in a day.—I. C. T. Nisbet.

13. An Investigation of Fall-migrating Dowitchers in New Jersey. Joseph R. Jehl, Jr. 1963. *Wilson Bull.* **75** (3): 250-261. Mainly on the basis of field identification of adults in breeding-plumage, it is estimated that *Limnodromus g. griseus* outnumbers *L. g. hendersoni* by 8 or 10 to one during the main passage in July. The first peak of migration around July 10 consists largely of females, the second peak in early August largely of males. Juveniles arrive from mid-August onwards. Newly-arrived birds weigh about 90 grams, but increase to about 145 grams within 10-14 days before departing south. Females must spend only about five weeks on the breeding grounds, and this gives them little time for sharing in incubation and no time for caring for the young.—I. C. T. Nisbet.

14. Migration in Iraq. S. Marchant. 1963. *Ibis*, **105**(4): 369-398. A thorough study of the occurrence and relative abundance of northern transients in Iraq, based on three years' residence in Baghdad and comparisons with the literature. Baghdad lies just within the northern fringe of the Arabian desert, and the records of grounded migrants are compared with those summarized by Moreau (*Ibis*, **103**: 373, 580. 1961) for the Mediterranean—Saharan region to the west. In general, most species of night-migrants are much more numerous in Iraq in spring than in autumn, a fact which is consistent with Moreau's hypothesis of long unbroken flights over the desert in autumn. A summary of wind-records suggests that (much as in the Sahara) the winds are largely favorable for NE migration at high levels in spring, and for S or SW migration at low levels in autumn. For most species, the relative abundance in spring and in autumn is similar to that in North Africa, summarized by Moreau. The exceptions are mainly the few species (shrikes and warblers) which make a detour around the east end of the Mediterranean at both seasons. These species are more abundant in autumn in the east Mediterranean area, but much more numerous in spring in Iraq. Marchant considers that "Iraq seems to be much too far to the east to have any part in

migration [of these species] in and out of Europe." However, this possibility should not be dismissed too hastily, for Moreau's data suggest that at least the shrikes skirt well to the east of Egypt in spring.

Other exceptions were mainly diurnal migrants (Turtle Doves, Barn Swallows, Yellow Wagtails, and larks) which have a large *westward* visible movement through the Baghdad area in autumn. Marchant suggests that these birds may follow the route of the "Fertile Crescent" west into Jordan and thence south, but the advantages of such a circuitous route seem obscure for the long-distance migrants. Other diurnal migrants were seen flying north and south.

Migration of water-birds and raptors is summarized briefly, but not discussed in detail.—I. C. T. Nisbet.

15. Trans-Saharan Passerine Migrants in Iberia. (Sobre migración de nuestros passeriformes transaharianos.) F. Bernis. 1963. *Ardeola,* **8:** 41-119. (English Summary.) Banding recoveries, visual observations, and moon-watching results suggest that many European passerine species migrate southwest or west to the Atlantic coast of Europe in autumn before turning south toward their winter quarters in tropical Africa. In a new analysis of more than 2,100 recoveries, Bernis shows that nearly all of the Iberian recoveries of these species have been in the north and west of the peninsula. By itself, this distribution could merely reflect a local concentration of bird-catchers, rather than a concentration of birds. Bernis refutes this idea by showing that nearly all the recoveries of species which winter north of the Sahara desert have been in the south and east of the peninsula, or in the Balearic Islands to the east. The difference is very striking, but it does not refute Moreau's suggestion (*Ibis,* **103:** 373, 580. 1961) that many trans-Saharan migrants may migrate *non-stop* over eastern Spain. A fundamental limitation of the banding method is that it can provide positive evidence for migration directions, but not negative evidence.

Accepting the conclusion that large numbers of birds migrate west through northern Iberia to the Atlantic coast, by what process do they change their direction there? Bernis proposes an ingenious new hypothesis—a bird which finds itself over the sea would progressively turn toward the east, whereas a bird over the land would turn toward the west. In this way a mass of birds might follow the general trend of the coast, without the necessity either of precise navigation or of rigid adherence to the visible local coastline.—I. C. T. Nisbet.

16. On the North-Western Migration Divide of the White Stork. Ernst Schüz. 1963. *Proc. XIIIth Intern. Ornith. Congr.*: 475-480. Storks from eastern Europe migrate southeast in autumn, whereas those from western Europe migrate southwest. The two populations overlap in west-central Europe in a zone of varying width (up to 200 miles wide in places). In the eastern part of the zone most, but not all, migrate southeast; in the western part most, but not all, migrate southwest. A very small number migrate south. The direction adopted by an individual bird appears to be influenced both by hereditary factors and by imitation of experienced birds (not necessarily its parents) from the area around its breeding place.—I. C. T. Nisbet.

17. Recent studies of bird migration and bird ticks in India. Salim Ali. 1963. *Proc. XIIIth Intern. Ornith. Congr.,* 354-361. During 1959-62, 19, 262 birds were banded in India, of which two-thirds were northern migrants, mostly wagtails and sparrows. Two wagtails have been recovered to the northwest in the U. S. S. R., a fact which is consistent with the author's belief that most migrants to India by-pass the Himalayas. The project was started in order to study the relation of birds to tick-borne virus diseases. The disease-carrying ticks, however, had not (by 1962) been found on the netted birds, although much information on other species of ticks had been obtained.—I. C. T. Nisbet.

18. "Nonsense" orientation as a population variant. G. V. T. Matthews. 1962. *Ibis,* **105** (2): 185-197. In 1961 Matthews found that Mallards from a sedentary population in southwest England always fly northwest when released away from "home," irrespective of the direction of displacement. This result extended the similar discovery by Bellrose (*Bird-Banding,* **29:** 75-90, 1958) for migratory Mallards in Illinois. In this paper Matthews reports that two other

Mallard populations, from southeast England and from Sweden, always fly southeast on release. In winter the Swedish birds mix with an English population which flies northwest, causing confusion in the experiments. In an attempt to test whether the differences between populations might be conditioned by the topography of their home lakes, he hand-reared ducklings from two of the populations at the same place. Although the hand-reared birds did not fly far on release, there were significant differences between the directions adopted by the two populations, suggesting that the differences must be innate.—I. C. T. Nisbet.

19. The astronomical basis of "Nonsense" orientation. G. V. T. Matthews. 1963. *Proc. XIIIth Intern. Ornith. Congr.*: 415-429. This significant paper analyzes the means by which Mallards orient in a fixed direction on release away from "home" (see previous review). Mallards orient equally well by day or night. In each case they are disoriented by heavy overcast, but they seem able to orient if clouds are sufficiently thin to permit approximate location of the sun, or sight of a few stars. When the birds' "internal clocks" were shifted by holding them under an artificial light-dark regime, their orientation on release was shifted in exactly the way expected if they use the sun simply as a compass. However, birds released at night oriented in the same direction however much their "internal clocks" were shifted: this suggests that they oriented by reference to the *pattern* formed by the stars, not by reference to the azimuths of individual stars.—I. C. T. Nisbet.

20. The orientation of Pigeons as affected by the learning of landmarks and by the distance of displacement. G. V. T. Matthews. 1963. *Animal Behaviour*, **11** (2-3): 310-317. A report on some old experiments involving two small groups of pigeons which were experienced and successful homers. Tests at short ranges suggested that they could learn landmarks within about 10 miles (in one case 18 miles) of their home loft. Repeated releases at the same point suggested that they were able to learn the local landmarks after three to five releases. Between 23 and 35 miles the birds did not orient, but they oriented towards home when released at distances of more than 50 miles. Matthews attributes these results to bi-coordinate navigation by means of a "grid" reference system.—I. C. T. Nisbet.

21. Initial orientation and distance of displacement in pigeon homing. Klaus Schmidt-Koenig. 1964. *Nature*, **201** (4919): 638. Groups of pigeons were released at various distances from their home loft in each of the four cardinal directions. Each group oriented well around a mean direction which was moderately close to the home direction, provided that the distance from home was either less than 12 miles or more than 75 miles. In the intermediate range of distances the groups either scattered at random or oriented in the wrong direction. These results suggest that pigeons may use two distinct methods of orientation, which both break down (or perhaps interfere) at ranges of 12-75 miles (compare with previous paper by Matthews).

Schmidt-Koenig stresses that his pigeons never oriented *exactly* towards home, despite a series of 67 releases. This contrasts with the results of Matthews, who reported exact homeward orientation at the longer ranges. The discrepancy is important, because the evidence that pigeons home by means of genuine bi-coordinate navigation is still very slight, and is based largely on the results of experiments by Matthews. A review of the subject by an impartial critic seems desirable.—I. C. T. Nisbet.

22. Migration across the Southern North Sea studied by radar. Part 5. Movements in August, Winter and Spring, and conclusion. David Lack. 1963. *Ibis*, **105** (4): 461-492. This paper terminates Lack's monumental five-year study, and includes a general summary of his findings. Most of the new information in Part 5 is concerned with two topics, the seasonal pattern of migration and the relation of migration to weather. A number of conclusions made in Parts 1 and 2 are corrected or modified in Part 5.

Almost all the observed movements were in one of six directions, W or E, NNW or SSE, NNE or SSW. With a few minor exceptions, movements in every one of these six directions were observed in every month of the year. This was

especially striking for the east-west movements between Britain and the continent, which continued almost daily throughout the winter, eastward with west winds and westward with east winds. This "shuttle service" appears to be composed of birds which feed in open fields and move out as frost and snow advance westwards. These birds return east in warm spells, presumably to avoid overcrowding near the Atlantic seaboard. By remaining in migratory condition throughout the winter they are thus able to exploit all the unfrozen ground in western Europe. "The westward arrivals . . . might be classified in December as a continuation of the autumn migration, in January as "hard-weather movements" and in February as "reversed movements", but the distinctions are somewhat unreal, and in all three months the birds travelled under very similar weather conditions." More genuinely "reversed" movements were rare, the average frequency of SSW or SSE movements in spring being less than three per cent, and the average frequency of NNE or NNW movements in autumn being less than one per cent.

The influence of the weather was tested for each movement and each season separately, using multiple regression analysis to separate the effects of closely-correlated weather factors. In almost every one of the movements thus tested, the most important factor was found to be the *direction of the wind.* In winter and in midsummer this influence was nearly absolute: virtually no migration was ever observed unless the wind was within 45° of the heading characteristic of the movement. Wind direction in autumn was still the paramount factor, but "much migration also occurs with opposed or cross-winds provided that the wind is very light." "In spring, as in autumn, more migration occurs with following than opposed winds, but the difference is less marked in spring, and in particular, sizable eastward departures occur with fairly strong cross and opposed winds in spring". Unfortunately the apparent correlation of migration with wind direction is exaggerated by the tendency for birds to fly higher with following winds, for Lack's radar appears to detect far more high birds than low birds. In a concluding Appendix (pp. 489-490), Lack discusses this effect, and concludes that the influence of wind direction must nevertheless be of major importance in winter, and of some importance in autumn. Lack's arguments seen convincing, but the point is only just proved.

Other weather factors correlated with migration density, independently of variations in other factors, were clear skies (for most movements), light wind-speeds (mainly for those movements which sometimes took place against the wind), and high temperatures in spring (but *not* low temperatures in autumn or winter). Weather factors such as atmospheric stability, wind-speed, temperature, and cloud-height may influence the average height of migration, so that the tendency for Lack's radar to miss high-flying birds might introduce spurious correlations (or mask genuine ones) with these factors.

Lack also tested the proposition that migration is influenced by the "general weather situation" in addition to the individual weather factors mentioned above. Dividing the weather into three categories, "anticyclonic," "transitional," and "disturbed," he found (in Parts 3 and 4) that some autumn movements were significantly correlated with anticyclonic weather, but in Part 5 he found no significant correlation in winter or spring. However, his divisions of the weather were very broad, and it is unlikely that they really tested his original proposition. In the context of a linear regression analysis, his positive result in autumn probably means simply that the effect of weather on migration is more than the sum of the effects of a few factors considered separately. The negative result of the spring test, however, does not necessarily mean that the effect of weather on migration is then fully described by the effects of the individual factors: as Lack admits (p. 489), it is possible that favorable factors in one part of a pressure system were counterbalanced in the test by unfavorable factors in another part.—I. C. T. Nisbet.

23. Quantitative study of migration with 23-centimetre radar. I. C. T. Nisbet. 1963. *Ibis*, **105**(4): 435-460. A quantitative study was made of the displays of "angels" on the screen of a 23-centimetre radar installation on Cape Cod. The birds responsible for the displays were nocturnal migrants, mainly passerines. The density of angels usually decreased roughly exponentially with distance from the center of the radar screen, being halved about every eight miles. The rate of decrease could be used to estimate the total number of bird targets in the air.

Estimates obtained by this means were compared with estimates of migration density obtained from moonwatching observations, which were reduced by a new method of calculation, one that incorporates radar measurements of the height of flight. Each angel corresponded to between two and twelve birds. After considering and rejecting other observations, it is concluded that many birds migrate in groups at night. There is evidence that many species migrate in small groups, rather than a few species in large groups.

Once the average group-size has been determined in this way, radar can be used to estimate the density of migration over a large area. Estimates of low migration density have a standard error of about 25 per cent, but estimates of high migration density are less accurate, and very high migration densities cannot be estimated at all, although they can be reliably identified as such. (From author's summary.)

24. Radar and field observations of diurnal migration in Switzerland. (Radar und Feldbeobachtungen über den Verlauf des Vogelzuges im Schweizerischen Mittelland: der Tagzug im Herbst (1957-1961).) Walter Gehring. 1963. *Ornithologische Beobachter*, **60** (2): 35-68. (English Summary.) Observations of migration were made with the Zürich airport radar on 100 autumn days during a five-year period. By simultaneous watching in the field the species involved (mainly finches and pigeons) were identified, and a quantitative scale for the radar observations was established.

Migration usually started about one-half hour before sunrise, and reached a peak within the first hour. The earlier in the morning that migration begins, the greater is the migration density which follows. Large movements were usually seen by radar in anticyclonic weather with light winds. In variable weather with moderate to strong headwinds, migration was seen in the field but was usually too low to be detected by radar. The latter result is similar to one reported by Lack in England, but whereas Lack assumed that the low-level visible movements must be much smaller than the high-level movements seen by radar, Gehring found that in fact the numbers of birds in the two movements were similar. Hence there was no correlation between migration strength and wind-direction (Gehring did not analyze other weather factors in detail).

The direction of movement on calm days was usually about SW, shifting significantly towards WSW in the middle of the day and returning to SW in the evening. Gehring suggests that the shifts were due to the birds failing to compensate properly for the complex azimuthal movements of the sun. Disorientation was observed twice under thick overcast. Cross-winds caused the birds to drift laterally (though it is not stated by how much); with strong headwinds high-flying birds regularly reversed their orientation and flew downwind.—I. C. T. Nisbet.

25. Calculation of migratory flight speed with special reference to the Eider. Report 43 from Ottenby Bird Station. (Beräkning av eiderns (*Somateria mollissima*) sträckhastighet.) Olof Rydén and Hans Källander. 1964. *Vår Fågelvärld*, **23**: 151-158. (English summary.) This investigation was carried out in the Sound of Kalmar where the direction and intensity of bird migration are comparatively stable. Observation posts A and B were erected at which two observers were stationed. Field telephones were used as means of communication. The birds' flight was then timed as they crossed two reference lines A-a and B-b drawn at right angles to the general direction of flight. From this figure the flight speed was calculated and correction made for various sources of error such as wind speed and direction. Suggestions are made for further refinements of this method, as, for instance, the use of recording instruments for the uninterrupted registration of wind speed and wind direction. A table of the average still-air speed of 13 species including loons, herons, ducks, shore birds, and gulls, is given as well as the mathematical formula used and geometrical diagrams.—Louise de K. Lawrence.

26. Strong fall movement of Buzzards Observed along the Coast of east Central Sweden. (Kraftigt höststräck av ormvråk (*Buteo buteo*) vid Sörmlandskusten.) Ingemar Nord. 1964. *Vår Fågelvärld*, **23**: 136-142. (English summary.) On October 9, 1962 the observer chanced upon a concentrated migration

of Buzzards in the archipelago of the province of Södermanland. A total of 509 Buzzards and 17 other hawks passed the observation point within four hours, aided by strong thermal updrafts. The migration was evidently favored by weather conditions featuring an area of high barometric pressure which followed the passage of a cold front together with moderate predominantly westerly winds. Observations are to continue in order to establish whether concentrated fall migrations of this type is a normal occurrence along this part of Sweden's Baltic coast.—Louise de K. Lawrence.

27. The fall migration in Belgium 1961 and 1962. (De herfstrek/La migration d'automne 1961 en/et 1962.) A. Rappe and P. Herroelen. 1963. *De Giervalk*, **53:** 508-552. This is an annotated list of the migrants that passed through and from Belgium. The season in 1962 was generally dry, but in October snow fell at Uccle on eight days, at Ostende on two, and at Baraque Michel on 11 days. Special attention should go to the shift to the interior of the country of the Cormorant (*Phalacrocorax carbo*) and the great number of observations of the Purple Heron (*Ardea purpurea*). The slaughter of storks and falcons by hunters is vigorously deplored, because these birds seem to be on the brink of extinction in Europe.—Louise de K. Lawrence.

28. Pine Bunting Trapped in Liege Province. (Capture d'un bruant à calotte blanche, *Emberiza leucocephalus*, Gmelin, dans la province de Liège.) J. Neuville. 1963. *De Giervalk*, **53:** 553-559. The calls of a captive bird of this species attracted a wild one and the author caught it in a mist net. The bird was photographed and full description and measurements are given. This is a second record for Belgium and comes 50 years after the first one was obtained.—Louise de K. Lawrence.

POPULATION DYNAMICS

(See also 4, 7, 40, 61)

29. The influx of the Boreal (Tengmalm's) Owl into central Sweden 1958, and some aspects of its distribution in Sweden. (Invasionen av pärlugglan (*Aegolius funereus*) i Mellansverige 1958 samt något om artens förekomst i Sverige.) Hans Källander. 1964. *Vår Fågelvärld*, **23:** 119-135. (English summary). The difficulties in distinguishing a true influx of a species that is sparsely distributed throughout most of its range are discussed. Among the factors influencing the picture are the great recent increase in field observers, the connection with the population dynamics of the small rodents upon which the owl preys and of which a great deal still remains to be discovered, and fluctuations in the population density of the owl due to varying breeding success. From the gathered material the author concludes that an increase occurred in the species in 1958, especially in central Sweden. This increase was related to a peak in the small rodent population. As to the owl's habitat requirements, the investigation fails to support earlier suggestions of its need for uninterrupted forest. Rather, the owl shows strong preference for the openings in the forest created by lakes, muskegs, lumbering, and cultivation.—Louise de K. Lawrence.

30. The distribution of the Southern Dunlin (*Calidris alpina schinzii*) **in Finland.** Martti Soikkeli. 1964. *Ornis Fennica*, **41:** 13-21. The species breeds along the southwest and western coasts of Finland. The present population is estimated at about 150-200 pairs. This constitutes an expansion of the range which has taken place mainly since 1940. Among the most interesting reasons for this expansion are: (1) a decrease of winter mortality due to the amelioration of climatic conditions of the first part of the century; (2) population pressure owing to the encroachment of cultivation upon the coastal meadows which are an important habitat requirement of the species; and (3) prolonged migration mostly by first-year birds encouraged by the warming of the climate and the discovery of suitable habitats in the north. The most recent expansions are thought to be secondary, stemming from the earlier breeding centers in Finland. The reader is cautioned not to take the word hibernation literally, used here in connection with the wintering grounds.—Louise de K. Lawrence.

31. An examination of the Blackcap movements of autumn 1960. K. Williamson and Penelope Whitehead. 1963. *Bird Migration*, **2** (4): 265-271. Record numbers of Blackcaps appeared at British Bird Observatories in late September and October, 1960. The arrivals are attributed to Scandinavian and/or east European populations which normally migrate southeast in autumn, but which are thought to have been carried W and NW by east and southeast winds. Two banding recoveries quoted in the paper support these conclusions, but a third one from Norway suggests that the SSW-migrating populations of western Europe were also involved in the abnormal movements. The authors suggest that "the great majority were not strictly migrants, but birds (probably mainly young) engaged in random post-breeding dispersion . . ." and they attribute the large numbers to high population. They do not offer any independent evidence for high population, however. Furthermore they do not explain why post-breeding dispersion should occur in October, and they do not discuss alternative explanations, such as reversed migration.—I. C. T. Nisbet.

32. Movements as an Indicator of Population Changes. K. Williamson. 1963. *Bird Migration*, **2** (4): 207-222. A new classification of the different types of "movement" (mainly arrivals of grounded migrants) observed at British Bird Observatories. The movements are discussed under three traditional headings: (a) regular migration, (b) eruptive and dispersive movements, and (c) extralimital vagrancy. Williamson argues that many arrivals formerly grouped under (a) and (c), hard to explain in terms of normal migration, actually represent eruptive dispersal, latent even in long-distance migrants. Such arrivals usually take place in anticyclonic weather, and Williamson argues (with progressively weaker evidence) that they represent dispersal movements of juvenal birds, that they are oriented downwind, and that they occur in response to population pressure. There are several objections to Williamson's arguments which he does not anticipate: (a) the supposed post-breeding dispersals do not occur particularly early in the autumn (see last review); (b) downwind dispersal of long-distance migrants would be hard to assimilate into any theory of orientation; and (c) the way in which nongregarious species could respond to population pressure needs clarification. Moreover Williamson uses falls of migrants at coastal stations as his sole criterion of irregularity in numbers, without discussing Lack's evidence that the falls bear little relation to overhead passage.—I. C. T. Nisbet.

33. The Summer and Autumn Crossbill Irruptions of 1962. Kenneth Williamson. 1963. *Bird Migration*, **2** (4): 252-260; (5): 329-340. An invasion of the British Isles in late June and July came northwest from central Europe. Movements in Scandinavia occurred later. A second invasion in late September and October came from Scandinavia and included many Parrot Crossbills *Loxia pytyopsittacus* (described in a separate paper by Peter Davis on pp. 260-265 of the same journal). As usual, the birds reached Britain in anticyclonic weather with easterly winds.—I. C. T. Nisbet.

34. Movements of Tits in Europe in 1959 and After. S. Cramp. 1963. *British Birds*, **56** (7): 237-263. This detailed study of observed movements and banding recoveries of three species of tits (*Parus* spp.) forms an interesting sequel to the author's joint paper on the eruptive movement in 1957 (*British Birds*, **53**: 49, 99, 176. 1960). It is now possible to distinguish three regions of Europe, whose populations of tits differ significantly in their behavior on eruptive dispersal. There are differences, for example, in their dates of movement, relative numbers of different species, wintering areas and tendencies to cross mountain ranges and stretches of water.

The movement in 1959 was especially noticeable in Fenno-Scandia and in central Europe, but only slightly affected the British Isles. The movement in 1959, like that of 1957, appears to have been due to above-average temperatures in the preceding winter, leading to well-documented population peaks in the breeding season. In 1961, however, breeding populations in England and the Netherlands reached levels higher than in 1957 or in 1959, yet there was no autumnal eruption. This is perhaps because breeding success was low in 1961, but evidence from Sweden suggests that good supplies of food in autumn may have a role in stopping eruptions soon after they start.—I. C. T. Nisbet.

35. The daily rhythm of the Starlings' Roosting Activities. (Rhythm quotidient des activités de l'Etourneau, *Sturnus vulgaris* L., au dortoir.) W. Delvingt. 1961. *De Giervalk*, **53**: 489-507. (English summary.) This paper seeks to prove that two main factors serve as releasers for the departure from the roosts in the morning: 1) a threshold of light intensity no less than about 270 foot candles, 2) an internal "clock" which induces departure 24 hours (or more precisely expressed "one period of the physiological cycle") after the last departure on the previous day. All departures from September to May take place during the period of civil twilight, whereas from May to September it generally occurs at or after sunrise.

A difference exists in the light sensitivity of the British and the Belgian starlings. This difference is thought to be correlated with a difference in the speed of gonadal development in the two populations.

Departure from the feeding areas to the night roosts occurs along "lines of flight" with stops at points of assembly. There are preliminary, intermediate, and preroost areas of assembly before the arrival at the roost. The visual and auditory stimuli of flocks of calling starlings provide the primary incentive to congregate at these points. If at any given point no such noisy congregation is in evidence, the birds fly over it to the next meeting place. The order in which the birds congregate in the rural areas is much less intricate than it is in the urban localities. Six diagrams illustrate the paper. This is a well documented and clearly presented paper of much interest.—Louise de K. Lawrence.

36. Some aspects of the Woodpigeon population in the Netherlands. W. J. Doude Van Troostwijk. 1964. *Ardea*, **52** (1-2): 15-29. Damage to agricultural and horticultural crops by *Columba palumbus* "had become so serious in the Netherlands that the Minister of Agriculture and Fisheries decided in 1954 to put a premium on the shooting of these birds." About 142,000 Woodpigeons were shot annually up to 1961, yet no distinct decrease of the population could be noted. Hence the Institute for Biological Research (Itbon) was requested in 1960 to study the ecology of this species. The author found that 260 recoveries of 2,600 banded Woodpigeons had been recorded between 1911 and 1960. Of these 113 were usable from 1911-1953 and 66 from 1954-1962. "Only 40 pigeons (i.e. 25%) were recovered outside the Netherlands," so the population is predominately nonmigratory. The average age of both groups—before and after payment of the bounty—was found to be 18.4 months. Seven tables and 4 figures are presented in the paper.

The author concludes that the shooting of perhaps 15 to 20 per cent of the population has not influenced its size and that "the amount of food and the weather conditions during the winter are probably the most important" factors.—M. M. Nice.

37. The Biology and Population Dynamics of the Common Buzzard (Buteo buteo). Zur Biologie und Populationsdynamik des Mäusebussards (*Buteo buteo*)). Th. Mebs. 1964. *Jour. f. Ornith.*, **105** (3): 247-306. (English summary.) In carrying out this extensive study the author conducted field work for five years on the hawk and investigated population dynamics of the vole, *Microtus arvalis*, for three years. Relevant data for the buteo on territory size, population density, food, egg-laying, incubation period, clutch size, mortality rate, life expectancy, and average reproduction rate are presented.

One interesting result of the study was that "comparison with the results of other studies elucidated the dependency of density from the available amount of food, which can roughly be estimated from the quality of soil, degree of forestation and altitude of a special locality." In 1958 the local vole population was relatively low, increasing to a peak and breakdown in late 1959 ,and a low level in 1960. The buteo population was similarly high in 1959, exceeding that in 1958 by about one-fifth. The availability of food appears to affect breeding density of the birds and correlates with reproduction and mortality rates.

It is certainly discouraging to realize that persecution by man may account for 50-80 per cent of all deaths of these hawks.—David W. Johnston.

NIDIFICATION AND REPRODUCTION

(See also 61)

38. A preliminary study of the breeding biology of Ross's Goose. John P. Ryder. 1964. *The Wildfowl Trust 15th Annual Report*, 1962-3: 127-137. During the last 20 years *Anser rossii* has apparently increased in numbers. A breeding colony of some 1500 of these birds was studied in the Perry River region in Northwest Territory. from June to August, 1963. "Nesting territories, which were fiercely defended, may be as small as 150 sq. ft." Clutches ranged from 1-6 eggs, the average of 769 being 3.67. The female incubates from 22-24 days. Ninety of 93 nests (96.7 per cent) were successful, and 328 of 351 eggs (93.5 per cent) hatched. This is nearly the same as the 96 percent success of 260 nests observed in 1949. "1963 was mild but in some years bad weather may be a serious mortality factor."—M. M. Nice.

39. Breeding Biology of the Southern Black-backed Gull, I: pre-egg and egg stage. R. A. Fordham. *Notornis*, **11** (1): 3-34. This is a detailed account of nesting activities in *Larus dominicanus*. Among the topics discussed are pair formation, defense of territories, nest construction, dates of egg-laying, clutch size, and renesting. Several tables present valuable information on nesting density, commencement of laying in different colonies, weights of eggs, egg colors, and renesting occurrences. There is a seasonal change in clutch size such that later nests tend to have smaller clutches. This is an important contribution to knowledge of breeding biology in gulls.—David W. Johnston.

40. The breeding of the Common Tern at Hjälmaren, central Sweden. (Fisktärnans (*Sterna hirundo*) häckning vid Hjälmaren.) Ragnar Edberg. 1964. *Vår Fågelvärld*, **23**: 97-102. (English summary.) This lake of 483 square km, with its optimum conditions of habitats and food supply, probably harbors Sweden's densest Common Tern population. A census taken in July 1961 showed that 886 pairs occurred in 51 colonies. This figure represents a considerable increase over the past two decades. From year to year drastic changes in the size and location of the colonies sometimes occur, due mainly to changes in the habitats and to predation. Preferred nesting sites include smooth flat rock formations, low gravel bars, and small rocky islands with or without vegetation. During the past 15 years 2,048 downy young have been banded. Of these 15 were recovered along their migration route from France to South Africa.—Louise de K. Lawrence.

41. Parental care in the Shelduck. John Hori. 1964. *The Wildfowl Trust 15th Annual Report*, 1962-3: 100-103. With *Tadorna tadorna* many broods of ducklings are cared for by one pair of adults, the so-called crêche system. This allows the parents to prepare adequately for their molt migration. The author believes the foster parents to be "failed breeders." He describes a pair attacking their own 3- to 6-day-old ducklings. The female "flew across the water, grabbed a duckling in her bill and 'ducked' it five times in rapid succession. In another case while she was 'ducking' one the male 'stabbed' at it viciously. The female always tried to hold the ducklings in the same way, by grabbing both wings behind their backs."—M. M. Nice.

42. Productivity and egg predation in the Woodpigeon. R. K. Murton and A. J. Isaacson. 1964. *Ardea*, **52** (1-2): 30-47. Studies on *Columba palumbus* in two localities in Britain. In one—Carlton wood—Jays (*Garrulus glandarius*) and Magpies (*Pica pica*) were undisturbed; in the other—Spikehall—these predators had been eliminated by the game keeper. At Carlton 40 per cent of the eggs were "predated" but only 23 per cent at Spikehall. Yet the percentage of young fledged from the eggs laid was about the same: 53 per cent of 530 eggs at Carlton and 59 per cent of 497 eggs at Spikehall. "Woodpigeons need 18 days to incubate their eggs and 20 days to rear nestlings." Juvenile losses were high; "an average of 52% of the young vanished in their first month of life." The paper contains 5 tables and 5 figures. Mortality between breeding seasons was more important in determining population size than was success in the nesting season.—M. M. Nice.

LIFE HISTORY

(See 37, 42, 60, 61)

BEHAVIOR

43. Behavior characters of the genera Parus (Tits), Aegithalos (Long-tailed Tits), Sitta (Nuthatches), Tichodroma (Wall Creeper) and Certhia (Tree Creepers). (Verhaltensmerkmale der Gattungen *Parus* (Meisen), *Aegithalos* (Schwanzmeisen), *Sitta* (Kleiber), *Tichodroma* (Mäuerlaufer) und *Certhia* (Baumläufer). Hans Löhrl. 1964. *Jour. f. Ornith.*, **105** (2): 153-181. (English Summary). A very interesting discussion of these five genera. The species of *Parus* are territorial; nest in cavities; only the female builds; both sexes possess a special display for nest-defence; young and adults respect individual distance; are slightly social towards conspecifics; social towards other tits; and hold food with the foot. In contrast, the Long-tailed Tit is non-territorial; nests in the open; both sexes build; has no specialized nest-defence; young and adults sleep in contact with one another; are very social towards conspecifics but not towards other species; and never hold food with the foot. Our bush-tits (*Psaltriparus*) behave much like *Aegithalos caudatus*.

All nuthatches "known to date break up food items by putting them into crevices and hammering on them with the head hanging downwards." Differing habits of nuthatches, the Wall Creeper, and tree creepers are described.

Dr. Löhrl concludes: "It is suggested that the Long-tailed Tits and Bush Tits be separated from the other tits, and placed in a family by themselves. The nuthatches deserve familial status. The Wall Creeper is by no means closely related to *Certhia*, and ought to be designated a subfamily of the nuthatches, in so much as it does not represent a separate family."—M. M. Nice.

44. Observations on the Dark Firefinch, with some comparisons with Jameson's Firefinch. Derek Goodwin. 1964. *Avicultural Magazine*, **70:** 80-105. A detailed account of the behavior of some captive *Lagonosticta rubricata haematocephala* as well as a few observations on a pair of *L. rhodopareia*. Both sexes of the Dark Firefinches incubate and brood. Descriptions are given of the rich repertoire of vocalizations and of behavior, illustrated by seven sketches. An interesting narrative on these African Estrildids.—M. M. Nice.

45. Notes on the behavior of the Bulbuls, Pygnonotus cafer (Linnaeus) and P. leucogenys (Gray) in captivity. Lester L. Short, Jr. 1964. *Pavo*, **2** (1): 26-36. Observations were made on two White-cheeked (*P. leucogenys*) and four Red-vented Bulbuls (*P. cafer*) at Cornell University. Both species are widespread in southeastern Asia and they hybridize in northern Pakistan. Most of the agonistic displays are similar in both species and, except for a difference in quality, the same is true for vocalizations. "Every colour marking in the plumage of the two species seems to play a role in agonistic display."—M. M. Nice.

46. Laboratory observations on the reproductive behavior of the Pigeon (Columba livia) during the pre-incubation phase of the breeding cycle. Eric Fabricius and Ann-Mari Jansson. 1963. *Animal Behaviour*, **11** (4): 534-547. Members of mated pairs of pigeons were separated except for 34 minutes each day when they were under close observation. Three fairly distinct groups in the courtship patterns were distinguished: primarily aggressive behavior—bowing, driving, attack intention, and attacking; sexual behavior proper—displacement preening, begging, billing, squatting, mounting, and copulation; and nest demonstration—pushing, collection of nest material, and nest-building. Bowing "seems to have the double function of intimidating strange males intruding into the territory, and of activating the sexual instinct of the female." "Driving seems to be ambivalent behaviour, during which the male is both aggressively and sexually motivated." Details of this impressive study are presented in three tables, three photographs, and eleven graphs.—M. M. Nice.

ECOLOGY

(See also 64)

47. Ecological Successions and Wildfowl Concentrations. (Oecologische successie en waterwildconcentraties.) T. Lebret. 1964. *Ardea*, **52** (1-2): 48-92. The status and development of wildfowl areas in the Netherlands is of concern especially because of ecological successions related to dike constructions. Waterfowl generally require a sufficient accessible food supply, shallow waters, cover, and lack of disturbance. These factors are interrelated in various ways: for example, food plants depend upon shallow waters where, in turn, they are accessible to the birds.

Lebret recognizes four major groups of wildfowl "according to their specialisation in habitat selection and their capacity to adapt themselves to agricultural land use." These groups are: (1) *food specialists*—associated with specific marshes or vegetation types; (2) *specialists* which are vulnerable to rapid ecological succession or drainage; (3) *diving ducks*—more independent of shallow waters; and (4) *non-specialists* which are more adaptable to different ecological situations. The areas inhabited by the wildfowl come under several headings: practically stable, pioneer vegetation developing slowly, or succession at a rapid rate.

Wildfowl populations generally thrive where there is pioneer vegetation, but "in the Netherlands there is not much room left where new pioneer vegetations can start afresh, when the existing ones will be worn out." A plea is made to the government to pay special attention to those regions of the country where large dike construction is underway, for the continued existence of pioneer vegetation types is necessary.—David W. Johnston.

48. Ecological Research on the Birds of Pointe Geologie Archipelago. (Recherches ecologiques sur les oiseaux de l'Archipel de Pointe Geologie.) Patrick Arnaud, Robert Guillard, Jean Prevost, and Jean Sapine—Jaloustre. 1964. *L'Oiseau et la Revue Francaise d' Ornithologie*, **34** (special number): 1-112. (Summaries in English). This is a collection of four papers on various ecological aspects of some birds on the antarctic continent. The first article, by Arnaud, is a report on the annual cycle in 1962 of the Emperor Penguin Colony. Principal events in the cycle are discussed—arrival at the colony, egg-laying, population dynamics, departure of immatures, and mortality. Chick mortality is largely due to inclement weather and inanition.

Observations in the colony in 1963 comprise the second article, written by Guillard and Prevost. Herein they discuss microclimate, egg dimensions, monthly mortality, and penguin movements. A conclusion reached was that "the sojourn on the continental ice at the end of the cycle is conditioned by the need for fresh snow; it also prevents the chicks from being carried out to sea by an early breaking up of the sea-ice."

Long needed have been detailed data on temperature regulation of penguins, and in the third article, by Prevost and Sapin-Jaloustre, this subject is investigated. Emperor and Adelie penguins both require special and effective means to regulate heat loss; these are provided by featherless "radiators," social behavior, and huddles. Although rectal body temperature was 37°-40° C in adults, surface temperatures of their toes was as low as 3° and of their flippers, 5°. The effect of grouping on body temperatures was shown by the fact that isolated adult males had a rectal temperature of 37.9°C, those "in groups" 36.9°C, and those in huddles 35.7°C. A discussion of these temperatures as they relate to behavior and metabolism is included.

Prevost terminates the volume by an article on other antarctic species—Snow Petrel, Cape Pigeon, and Antarctic Fulmar. Features of life history (egg-laying, incubation, body temperatures, and mortality) for these species are presented. Some comparisons are made with studies of the same species at other stations in Antarctica.—David W. Johnston.

PARASITES AND DISEASES

(See 17)

CONSERVATION

(See also 36)

49. The development of the Biocide Problem. (Biocidfrågans utveckling.) Gunnar Otterlind. 1964. *Vår Fågelvärld*, **23**: 143-150. This is a thoughtful review summarizing the findings recently brought out on the dangerous side-effects of biocides, utilized by agriculture in particular. In the fall of 1963 conferences were held on the subject by the Swedish Society for Nature Conservation and by the State Conservation Authority involving all government departments, institutions, and organizations concerned. Debates continued throughout the following winter and spring in the press and on radio and television. In conjunction with this, Sweden's Ornithological Society conducted separate studies which furnished 160 authentic instances of direct poisoning of birds as well as proof of the catastrophic decline of at least five especially exposed species. Parallel with this work, experiments were carried out at Upsala to find a coloring of the so-called "baited grain" that would keep the birds from devouring it when carelessly or accidentally spilled. Victoria blue was found to be the most effective, although the possibility of individuals learning to eat the blue-colored grain is not excluded.

While it has put into effect the prohibition of aldrin and dieldrin in baited grain as well as a total prohibition of the use of phosphorus, the newly established Poison Committee received its baptism of fire in these debates—many shortcomings were brought out, especially with reference to the earlier, all-too-loose application of licensing. It was also found, among other things, that in its research work the biocide industry by no means strives to discover the *minimum* effective dose of mercury necessary to obtain desired results with treated grain. Instead the industry concentrates on finding the *maximum* tolerance of the grain. As a result the Swedish farmers, to no useful purpose for their own agricultural needs but to great detriment for the avifauna, are "fertilizing" their fields with overdoses of mercury poisons at a cost of one to two million kronor a year.

"To sum up, it can be said that nowadays the biocide problem manifests itself as a dismal brew of too far-reaching progress optimism, mighty commercialism—not seldom involving world-wide concerns—ignorance, and irresponsibility. It is an international phenomenon whose extreme development is made possible by the lack of adequate financial resources possessed by the non-commercial institutions and governmental agencies enabling them follow and to control progress along these lines. When the negative effects of biocides pertain not only to nature around us but also to man himself, his health, and his future, it is indeed high time to institute counter-measures—and effective ones at that."—Louise de K. Lawrence.

50. Extinction and the Anatidae of New Zealand. G. R. Willlams. 1964. *The Wildfowl Trust 15th Annual Report*, 1962-3: 140-146. Five species of Anatidae became extinct in New Zealand before European settlement, probably due to utilization by the Maoris, and one since then—the Aukland Island Merganser (*Mergus australis*). Of the seven surviving native species most have been reduced in numbers and range. Seven "stragglers and temporary self-introduced invaders" have vanished. The Grey Duck (*Anas s. superciliosa*) is "the most common and most widespread of all New Zealand waterfowl," the "main game species among waterfowl."

Only four of the many introduced species survive. The Black Swan (*Cygnus atrata*) was brought from Australia a hundred years ago; now it is abundant throughout New Zealand. Many thousands of its eggs are taken in a season without any detriment to the species. The Mute Swan (*Cygnus olor*) is widespread throughout the country but nowhere abundant except on Lake Ellesmere in Canterbury. The Canada Goose (*Branta canadensis*) is numerous in South Island "When most common in agricultural areas they "are considered a pest by many farmers. . . . Because of their wariness Canada Geese are not exploited to anything like the extent their populations would allow." Mallards (*Anas p. platyrhynchos*) are well established in both North and South Islands. They "do best in the improved agricultural districts where they tend to replace Grey Ducks or hybridize with them."

The author of this interesting paper concludes that destruction of habitat is the most serious threat to the survival of the Anatidae, especially of the native species.—M. M. Nice.

WILDLIFE MANAGEMENT

(See 47, 50)

MORPHOLOGY AND ANATOMY

(See 13, 59)

PHYSIOLOGY

(See also 48)

51. The fat reserves of Yellow Wagtails Motacilla flava wintering in Southwest Nigeria. P. Ward. 1964. *Ibis*, **106** (3): 370-375. From October through March the average fat content of wintering wagtails was about five per cent of the total weight. Prior to northward migration in April there was a rapid increase to as much as 30.6 per cent. Six out of 11 birds in mid-April had over 20 per cent. It was therefore shown that this wintering population amasses much premigratory fat, though the first 800 km of its migratory flight is over land where food and water are plentiful. Whether or not the birds stop to feed and replenish fat reserves enroute is unknown, but at least they *could* fly nonstop over hospitable country before continuing on across the Sahara Desert and Mediterranean Sea. —David W. Johnston.

PLUMAGES AND MOLTS

52. John James Audubon and juvenile Evening Grosbeaks. Benjamin M. Shaub. 1964. *Wilson Bull.*, **76:** 174-178. The gist of this paper is that in the Evening Grosbeak, contrary to Audubon's contention, "the sexes are clearly and definitely distinguishable while the birds are in juvenal plumage, and that the first winter plumage of both sexes is like the adult. The change from the juvenal to the first winter or adult plumage occurs between the middle of September and the latter part of October . . . ." A description of the juvenal plumage for both sexes plus clear photographs will assist banders who obtain these birds.—David W. Johnston.

ZOOGEOGRAPHY

(See also 60, 62)

53. Plant and animal associations in the interior of the Ungava Peninsula. Francis Harper. 1964. *Univ. Kans. Mus. Nat. Hist., Misc. Publ.* **38:** 1-58. The present work, the latest in Harper's important contributions dealing with biota of the Ungava region, contains "a few simple data on the ecological relationships of plants and vertebrate animals . . . ." Eighteen localities are discussed, all of them lying within the general confines of the Hudsonian Life-zone, although four of them above tree-line are Arctic-Alpine. Dr. Harper gives a brief overall description of each locality and lists characteristic trees, shrubs, ground plants, birds, and mammals. A previous paper ("Birds of the Ungava Peninsula," *Univ. Kans. Mus. Nat. Hist., Misc. Publ.* **17:** 3-171. 1958) presented a more detailed account of the avifauna occupying this interesting biological region.—David W. Johnston.

54. Observations on geese in the polders of Antwerp during the winter 1962-1963. (Ganzen in de Antwerpse Polder tijdens de winter 1962-1963.) J. de Ridder, G. Huyskens, P. Maes, H. Van Der Vloet, H. Voet. 1963. *De Giervalk*,

53: 485-488. (From French summary.) Due to the extremely cold weather with heavy snowfalls, the geese deserted their usual winter grounds along the seaboard of Flanders and took refuge in the polders of Antwerp. Canada Geese (*Branta canadensis*) were present from February 26 to March 10, and it is suggested that this species should now be included on the official list of Belgian birds. First wintering records were obtained for the Pink-footed (*Anser brachyrhynchos*) and the Barnacle Geese (*A. leucopsis*), and the very rare Red-breasted Goose (*Anser ruficollis*) was observed during three days in February. Attention is drawn to the preference for certain feeding places shown by each species.—Louise de K. Lawrence.

SYSTEMATICS

55. On the possibilities of encountering the Icelandic Black-tailed Godwit in Belgium. (Over hot mogelijk voorkomen van de Ijslandse Grutto, *Limosa limosa islandica*, in België.) P. Herroelen. 1963. *De Giervalk*, **53:** 560-564. (From French summary.) In view of the mention in Vernon's recent study (1963) of several Icelandic Godwits among birds collected in England, measurements were taken of all the Black-tailed Godwits in the collections of the Brussels Institute of Natural Sciences. Six specimens were distinguished from the others by the length of the bill. Among these was a juvenal female (No. 22) collected at Nieuport, which may be designated as *islandica* by reason of its having been taken in the winter (December 21, 1946) and the length of its bill (89 mm.).—Louise de K. Lawrence.

56. Identification for ringers. The Genus Sylvia. Kenneth Williamson. 1964. Brit. Trust for Ornithol., Identification Guide No. 3, 71 pp. Although this publication, like its predecessors dealing with other genera of Palearctic warblers, is primarily designed for banders so that the birds can be identified in the hand, the booklet contains a wealth of data on migration, distribution, molt, habitat preferences, and the like. Seventeen species of *Sylvia* are included, for each of which Williamson devotes a paragraph to a description of the bird, vocalizations, age differences, colors of soft parts, measurements (wing, tail, bill, tarsus), weights, and wing-formula. Insofar as measurements are concerned, the reader will be pleased to find two tables which give means, standard deviations, and ranges for the species and subspecies of *Sylvia*. There is, finally, a dichotomous key to this genus; the author suggests that "the key . . . should be treated only as a guide indicating the likely identity of the bird under examination . . . ." This key is apparently workable for individuals irrespective of sex and age.

An identification manual of this sort, comparing confusing birds in problem groups such as fall warblers and vireos or *Empidonax* flycatchers, would be of considerable use to North American bird-banders.—David W. Johnston.

FOOD

57. An investigation into the prey preferences of the Boreal (Tengmalm's) Owl in central Sweden. (En undersökning av pärlugglans (*Aegolius funereus*) bytesval i Mellansverige.) Karl Fredga. 1964. *Vår Fågelvärld*, **23:** 103-118. (English summary.) This is a report on 1281 prey animals based mainly on skeletal and other fragments collected during the years 1953-1962 from eight nesting cavities after the young fledged. A discussion on methods is followed by a detailed account of the breeding and collecting data pertaining to each nest. The results of the work are summarized in two tables and two diagrams. Small mammals, including shrews (Soricidae), voles (Microtidae), and mice (Muridae), account for a little less than 98 per cent of the total identified materials. Of these the Field Vole (*Microtus agrestis*) is the most frequent prey animal (38 per cent). When small mammals are scarce the owls prey upon birds to a greater extent and some of them may become specialized in feeding on birds. The owl is able to carry its own weight, since they regularly take the Vole Rat (*Arvicola terrestris*) in small numbers. The paper represents a carefully executed investigation.—Louise de K. Lawrence.

58. Otoliths in pellets of Caspian Terns (Otolithen in Gewöllen der Raubseeschwalbe). Erlend Martini. 1964. *Bonner Zoologische Beiträge*, **15:** 59-71. (English summary.) This is an interesting method of learning the precise foods of a tern. Pellets of Caspian Terns were collected at breeding colonies near San Diego Bay, California, and from these pellets otoliths of 14 species of fish were identified. Five additional species were described from mummies found in the colony. Shiner perch (*Cymatogaster aggregata* Gibbons) comprised 76 per cent of the food, and Topsmelt (*Aterinops affinis* (Ayers)), 12 per cent. 18 species were marine fish and one was from a freshwater tributary nearby.—David W. Johnston.

59. The role of olfaction in food location in the Turkey Vulture (Cathartes aura). Kenneth E. Stager. 1964. *Los Angeles County Museum Contributions in Science*, No. 81:1-63. A definitive report on the vexed question of the sense of smell in vultures. By a series of well planned and carefully executed experiments it was found that: "Odors from fresh and decomposed animal tissue baits, placed on predetermined air currents by means of a forced air unit, elicited positive olfactory responses from turkey vultures. Turkey vultures were also able to detect the presence of concealed animal baits placed in bait chambers at various sites." "The dispensing of ethyl mercaptan on predetermined air currents elicited strong olfactory responses from large numbers of turkey vultures at test sites in Mexico and California."

The Turkey Vulture utilizes a low-level searching flight in quest of olfactory cues, while the Black Vulture (*Coragyps atrata*), California Condor (*Gymnogyps californianus*), and Andean Condor (*Vultur gryphus*) customarily soar at great heights. It may be that the fifth genus of New World Cathartidae—the forest dwelling King Vulture (*Sarcoramphus papa*) depends on olfaction in finding its food. In India Dr. Stager was able to prove that the three species of Old World vultures present at his camp paid no attention to overpowering odors of hidden carcasses.

Anatomical studies of the olfactory apparatus in New and Old World vultures corroborated the field experiments.

The author is to be congratulated on a masterly demonstration with his historical review of the subject, his ingenious experiments, and his anatomical investigations.—M. M. Nice.

BOOKS AND MONOGRAPHS

60. The Living Bird. Third Annual. Edited by Olin Sewall Pettingill, Jr. 1964. Laboratory of Ornithology, Ithaca, New York. 201 pp. Price $4.25. In my opinion this is by far the best of the three volumes yet published in this series. With few exceptions the authors of the 11 articles are well known American ornithologists whose writings, for the most part, are clear and concise. Crisp black-and white photographs, line drawings by Dilger and Eckelberry, and the colored illustrations of Mengel, Sutton, and others add greatly to the attractiveness of the book.

Readers are given a fairly wide range of topics—species formation, radar studies of migration, song analyses, breeding behavior, life history, and even "Birds in English Poetry." Not meaning to imply that any of the articles are necessarily more important than the others, this reviewer would nonetheless like to indicate two impressive papers. Bob Mengel's discussion of species formation in some northern wood warblers merits special consideration and careful perusal by those especially interested in this subject. Though necessarily largely conjectural, the hypothesis developed and defended by Mengel attempts to relate certain Pleistocene features with speciation in groups of wood warblers. Another fine contribution is the paper by George Clark entitled, "Life histories and the evolution of Megapodes." Territoriality and temperature regulation of the eggs are but two of the interesting topics considered therein.

Dr. Pettingill and his staff are to be complimented on the steady improvement and growth of these volumes.—David W. Johnston

61. The Terns of the Dry Tortugas. William B. Robertson, Jr. 1964. *Bull. Florida State Mus.*, **8** (1): 1-94. The tern colonies on the Dry Tortugas have been visited by ornithologists for more than a hundred years. There has been so

much confusion, however, over the names of the various islands and there are so many imprecise statements and misquotations in the literature, that the value of the information obtained has been largely obscured. Dr. Robertson's meticulous history of the islands and their bird colonies is therefore most welcome. His accounts of the biology of the terns represent the most important contributions to knowledge of these populations since the classic work of Watson and Lashley early in the century.

The interest of the author (and the reviewer) centers on the Sooty Terns (*Sterna fuscata*). Their numbers have fluctuated during the last fifty years between about 30,000 and 191,000 breeding adults, after building up from the low total of about 5,000 in 1903, when protection became effective. Unfortunately the meaning of the fluctuations in the size of the Tortugas breeding population will not be clear until we have an answer to the question, discussed by Robertson, of whether there is significant interchange of young or adult birds with other colonies in the West Indies.

The author gives some preliminary results of the large-scale banding of Sooty Terns carried out on the Tortugas in recent years. Of particular interest is the information on the age at which young birds first reappear at their natal colony: a few do so when three years old and many more when four years old. In each case, though, the young birds appear only late in the breeding season and may not breed.

Perhaps the most startling fact mentioned (but unfortunately not fully documented) is that the date in each season on which the first Sooty Tern eggs are laid has become "consistently earlier" over the past twenty years. A gradual change in breeding season over a long period seems to have been recorded for few, if any, bird populations. I hope that future study of this case may include an attempt to detect changes in the environment which might be proximate or ultimate causes of the change in breeding season.

An important discussion is given to the factors which may determine maximum population size of Sooty Terns and Brown Noddies (*Anous stolidus*). Evidence is presented that the sooties find plenty of food close to the island and so are probably not limited by food shortage. Robertson believes that crowding in the center of the colony may prevent late arrivals from nesting there. The tendency of these birds to choose insecure nest sites near the colony, rather than starting new colonies on nearby islands, may provide a density-dependent control of the population. Using a similar argument for the Brown Noddy he points out that since suitable nest sites in bushes are limited in number, the use of low nest sites not typical for this colony increases when the population is high. These nests are "much more likely to fail than are those placed in live bay cedar bushes."

The reviewer agrees that in many sea-birds there is a strong tendency to attempt to breed in an established colony, even though this is overcrowded, and that this must delay the establishment of new colonies. However, the question of whether it ever provides a sufficient density-dependent check on population growth to prevent the eventual establishment of new colonies cannot yet be answered. The reviewer is doubtful whether the size of the Tortugas population of Sooty Terns is limited in this way at present, since it is apparently mainly late eggs which are laid in insecure peripheral sites. This suggests that the birds concerned may be either young and inexperienced, or individuals which have laid and lost eggs early in the season in more central locations. The latter possibility is supported by work on the Seychelles and Ascension Island. Since both young and re-nesting birds are likely to have low nesting success wherever they nest, their restriction to peripheral sites should not have a great effect on productivity of the colony, and so is unlikely to prevent population growth. However, if it could be shown that in years when numbers are high a substantial number of mature adults, arriving with the main body of birds, breed in insecure peripheral sites and are generally unsuccessful, the control mechanism suggested by Robertson would be a real possibility.

There are shorter accounts of the other species of terns found on the Dry Tortugas—Roseate, Least, Common, Royal, and Sandwich terns and Black Noddies. The discussion of the Common Tern includes the interesting suggestion, that the sporadic nesting of small groups of this species south of the normal breeding range may represent breeding attempts by individuals which have not yet reached normal breeding age, but which are stimulated to nest when they become associated with terneries of other species.

It seems certain that the continuing studies of Dr. Robertson and others on the populations and biology of the terns in the Tortugas colonies will yield results of basic importance to the understanding of the population dynamics of colonial sea-birds.—N. Philip Ashmole.

62. The Birds of Yakutia. (Ptitsy Yakutii). Konstantin A. Vorobev. Published by the Academy of Sciences USSR (Moskow) for the Yakutian affiliate of the Siberian Division of the USSR Academy of Sciences (Akademii Nauk). 1963. 336 pp. 26 color plates. Price 2 rubles, 67 kopecks (about $4.50). In one compact volume, which in quality of printing and binding compares favorably with the better American and British bird books, there is here summarized all previous ornithological knowledge of Yakutia (Yakutsk). Also included are the results of six expeditions led by the author from 1955 through 1961 for further exploration of that province which, in the author's words, has remained a "blank spot" in the faunistic map of USSR. The province extends about 2,000 km north to south, and 2,300 km east to west, with an area of over 3,000,000 square km or nearly 1/3 that of continental United States. It has a topography varying from steppe to forests, mountains, swamps, and seacoast. One of the largest rivers of the world, the Lena, is there plus 15 other rivers of notable size and innumerable smaller streams, lakes and ponds. Yet Yakutia has a small bird list of about 250 species. But it enfolds a great reservoir of waterfowl—shorebirds (42 species) and Anatidae (36 species); and it was most advantageously situated before the threat of atomic fallout.

Of the 250 species 232 are breeders, 7 are probable breeders, 11 are accidentals, and 32 are winter residents.

The book contains the following: a foreword, author's preface, a history of ornithological exploration in Yakutia, a systemetic review of the species, a brief physico-geographic description of the province, a general survey and zoogeographic analysis of its avifauna, a summary list of species and subspecies by their Latin names, lists of early arrivals for years 1956-1962, a list of native Yakut bird names, 63 distribution maps for 171 of the species, and a bibliography of (curiously) 250 titles.

There are 121 numbered text figures which break down into 38 black-and-white drawings, 36 photos, 26 color plates and 21 maps in addition to the 63 above-mentioned distribution maps. As for most of the better Russian bird books the color plates and drawings are by N. N. Kondakov.

The species accounts, from one paragraph to five pages, are confined to their ecology and distribution in Yakutia. Of interest to American ornithology is the first detailed account of nesting of the Sharp-tailed Sandpiper (*Calidris acuminata*) with color plate of chicks and eggs. The Dowitcher, (*Macrorhamphus griseus scolopaceus*) or what Russians call the "Amerikanskaya bekasovidnyi veretennik" (American Snipelike Godwit), which has turned up farther and farther westward in Siberia, is especially intriguing to their bird students. Thus there is a detailed account of its nesting reinforced by two color plates of adult, chicks, and eggs. The author and E. P. Spangenberg, by observations and collections, have fairly well established that the male dowitcher takes over care of the young immediately after hatching. The Wilson's Phalarope is credited to their fauna on the basis of the author's sight record. Yakutia is the site of the first discovery of the nest and the main nesting grounds of the rare Ross' Gull. There is a detailed account with two colored plates and four photographs of that species. Bringing out points of importance too numerous for a review, the zoogeographic analysis is a model of its kind.

Of especial interest to bird-banders are a few banding records for some of the species, and evidence of the apparent re-invasion of the Siberian mainland by the Snow Goose, for decades restricted to Wrangel Island.—Leon Kelso.

63. I Went to the Woods. The Adventures of a bird photographer. Ronald Austing. 1963. Coward-McCann, Inc. New York. 144 pp. 48 black-and-white photographs, 9 in color. Price $5.00. Here is a book to be read for enjoyment. Nature photographer Ronald Austing is able to impart, in writing and throufih the medium of the camera, his love for birds and especially for the raptores. Autobiographical, the book details the development of his interest in nature and eventually his desire to record its various facets by means of the camera.

There is, we must admit, little real meat, except for those who desire in-

struction in equipment and techniques of nature photography. For such I can highly recommend it. But the extremely chatty style, occasional lapse in grammar, and inclusion of too many rather trivial details detract somewhat from the book. However, the much-needed conservation message is there, and one is impressed by the obvious concern of Mr. Austing for the bird or other animal which is the subject of his photography. No amount of trouble is too great to insure the well-being of the subject—an attitude not always found in nature photographers.

The black-and-white photographs are excellent. The color reproduction leaves something to be desired, at least in my copy. For example, his famous shot of the Saw-whet Owl catching the mouse, is far better on the dust-jacket than it is in the book itself. Several of the other color shots are off-register and washed out. One hopes to see more of Mr. Austing's superb action shots in the future, but with a text comparable to the standard of the photography.—Sally F. Hoyt.

64. The Ecology of North America. Victor E. Shelford. 1963. University of Illinois Press, Urbana. *xxii* + 610 pp. Price $10.00. In 1913 the author visualized this publication, the purpose of which "is to describe North America from an ecological viewpoint as it appeared in the period A. D. 1500 to 1600 before European settlement." This aim, though a commendable one, was defeated before it got started, because so very little of scientific merit has ever been written about conditions at those times. On the other hand, the book does give descriptions of some biogeographical aspects in more recent times.

The book embraces an area larger than North America, for its coverage extends to Panama. Eighteen chapters are devoted to major communities or biomes and their subdivisions, such as "boreal coniferous forest" and "temperate deciduous forest biome." Each chapter is subdivided into plant associations and faciations. Many readers will be overwhelmed by community terminology: "live oak-yaupon-sweetbay-yellow-lipped snake subfaciation" or "hemlock-wapiti-deer-redcedar-Sitka spruce biome." Usually Shelford mentions for these communities dominant and influent organisms, but the available data are highly variable from one community to another.

Addressing myself principally to birds as important animal constituents in community analyses, I find that the book is quite weak. Although Shelford randomly includes distribution and populations of other organisms, his discussions of birds are largely limited to mere mention of a few indigenous or characteristic species. He ignores the vast amount of knowledge on breeding bird populations readily available in the Audubon Society's breeding bird censuses. He also omits, or simply overlooked, the significant basic papers on bird populations published by Odum (1950), Bond (1957), Warbach (1958), Beecher (1942), Johnston (1947), and many others.

Furthermore, some outstanding papers on plant succession and vegetational types in Florida are also missing. The early work by Harper (1915) and later analyses of Laessle (1958) are two cases in point.

In spite of these and other objections to the book, I feel that it is valuable as a compendium of some ecological data. Tying these data together is a more serious problem, for as Shelford himself realized (p. 494), a basic defect is "the lack of consideration of the interrelation of animals and the vegetation."—David W. Johnston.

65. The Birds of Costa Rica, Distribution and Ecology. Paul Slud. 1964. *Bull. Amer. Mus. Nat. Hist.*, **128:** 1-430. One figure and 2 plates. Price $10.00. This volume is the first major treatise on the avifauna of Coast Rica since Carriker's annotated list of 1910, and is the product of seven years of field research between 1950 and 1962. Costa Rica has an extremely rich avifauna (758 species, excluding Cocos Island), considering its small size, and is geographically important as a strategic connection between the North and South American continents. In the introduction the author lists the 79 new species added to Carriker's total, other species which are as yet unrecorded but may be expected, and the endemic species and races. He has determined that the native land birds are predominantly of South American origin but with a considerable element coming from northern Central America and Mexico. Costa Rica is physiographically divided into four avifaunal zones. A discussion of these zones and the species which are generally limited to them is presented.

Much of the introduction is devoted to a lucid explanation of a life-zone map

which utilizes the Holdridge system for plant formations, and a description of the native vegetation. Slud's ecological interpretations display an understanding of tropical plant associations rare among zoologists. Maps of the physiography, river systems, and life-zones are provided, the latter as a large fold-out with all known collecting localities indicated. The author states that this volume is an annotated check-list and is not intended as a taxonomic treatise. He has, however, offered opinions concerning the taxonomic status of many forms and brought the nomenclature up-to-date.

The bulk of the text is devoted to species' accounts. The range of each species and its contiguous races, the distribution of each form within the country, and habitat preferences are given. Pertinent comments on behavior and song are included for almost all species. These notes on the comparative ecology and ethology of wide-ranging species should be of value to workers in other geographical areas. Carriker's check-list included keys to the species of a number of neotropical families. It is disappointing to find that keys are totally lacking in the present volume. A rapid aid to identification would seem a valuable addition not only for the benefit of ornithologists with little neotropical experience but for biologists in other disciplines. This is especially applicable to a country such as Costa Rica which stands geographically and politically as one of the most accessible of Latin American nations. It is regrettable that Slud's exceptional knowledge of the taxonomic characters of this avifauna has not been passed to others less experienced.

With this treatise Slud, whose skill as a writer par excellence equals his talents as an ornithologist, has set a standard for future efforts of this nature. It will undoubtedly serve as a major reference to students of avian zoogeography and ecology for years to come.—Robert W. McFarlane.

A NORTH AMERICAN NEST-RECORD CARD PROGRAM

Beginning in January, 1965, the Laboratory of Ornithology at Cornell University will operate a nest-record card program on a continent-wide basis and would like the assistance of everyone.

Through the cooperation of Dr. David B. Peakall and the Onondaga Audubon Society, the Laboratory has carried on a nest-record card program on a local basis for two years. The aim of the program, which is similar to one used in Britain (see Mayer-Gross, 1962, *Bird Study* **9**: 252-258), is to collect specific data on bird reproduction in a form convenient for statistical analysis. The results of this two-year trial have been so gratifying that we are encouraged to make the program continent-wide.

For this to be a success we will need the cooperation of all bird observers in all parts of the continent, particularly the United States and Canada. We will also need—because we are certain that regional centers can handle the distribution of data cards and their return to the Laboratory better than individuals—the cooperation of all bird clubs and other societies whose members make field observations of birds.

The Laboratory will provide bird clubs or individuals with cards. The observers will record the contents of each nest found on a separate card and make dated notations on the same card for each subsequent visit to the nest. Each card will then contain all the data from a single nesting. While one observation of a nest will be valuable, additional observations over a period of days or weeks will increase the worth of the record. Our goal is to have hundreds, possibly thousands, of cards containing data on each species from all parts of its range.

We are well aware that there are other local nest-record card programs in this country and in Canada (see Peakall, 1964, *Audubon Field Notes*, **18** (1): 35-38)