REFERENCES

BROUN, MAURICE. 1941. Migration of Blue Jays. *Auk,* **58:** 262-263.

DEXTER, RALPH W. 1945. Three and five-year Returns of the Blue Jay. *Bird-Banding,* **26:** 64-65.

GILL, GEOFFREY. 1941. Notes on the Migration of Blue Jays. *Bird-Banding,* **12:** 109-112.

LEWIS, HARRISON F. 1942. Instances of the Spring Migration of the Blue Jay. *Bird-Banding,* **13:** 79-80.

NICHOLS, J. T. 1955. A Criterion for Young-of-the-Year in the Blue Jay. *Bird-Banding,* **27:** 27.

PITELKA, FRANK A. 1946. Age in relation to migration in the Blue Jay. *Auk,* **63:** 82-84.

TYLER, WINSOR MARRETT. 1946. Northern Blue Jay, in Life Histories of North American Jays, Crows and Titmice, by A. C. Bent, et al., pp. 32-52. Washington, Smithsonian Institution.

E. Alexander Bergstrom, 37 Old Brook Road, West Hartford 7, Conn.

RECENT LITERATURE

BANDING

(See also Numbers 6, 11, 12, 22, 51, 53, 54, 74)

1. About the Ringing-Activity of the Czechoslovak Ornithological Society. Otto Kadlec. 1956. *Sbornik Prednasek* (Report of the First Czechoslovakian Ornithological Conference in Praha, October 1956), Praha, Czechoslovakia, pp. 104-111. This history of banding in Czechoslovakia is highly reminiscent of the one their neighboring Hungarians published in 1955 (see *B.-B.* **27**(4) : 186). The Czechs also started from scratch and developed slowly, overcoming such difficulties as lack of funds and no source of bands. At the start in 1934 they chose the band legend that is still successfully in use today, N. MUSEUM PRAHA CSR, "because it includes the whole address . . . and suggests to the finder that it does deal with scientific action." (F&WS, Wash DC please note!)

During the German occupation they had to make their own bands and, having no workshop, for 2 years "worked during summer and winter in the open air." Nevertheless they managed to band more than 20,000 birds annually. Since 1946 their totals have risen markedly, and in 1952 they banded 53,000 birds, mostly nestlings. In their first 20 years, 1934-1954, their grand total was just short of half a million birds. They band more Blackheaded Gulls *(Larus ridibundus)* than anything else, about 4,000 per year ever since 1939. Next in numbers are Starlings, thrushes of the genus *Turdus,* and Great Tits.

Accounts of this sort are most heartening, for they assure us, reading between the lines, that regardless of wars (hot and cold), enemy occupations, political and economic upsets, and in the center of a world threatened with atomic upheaval, men still find time and opportunity to study birds—and birds to band!—O. L. Austin, Jr.

2. IX. Ringing Report of the Czechoslovakian Ornithological Society for the years 1943-1946. (IX. Krouzkovaci Zprava CS. Ornithologicke Spolecnost: Za Rok 1943-1945.) O. Kadlec and D. Basova. 1957. Krajske Museum of Jihlave, Czechoslovakia, pp. 1-72. Raw data for the Czech banding during the last 4 years of the occupation and revolution, when the 170-odd cooperators managed somehow to band almost 100,000 birds of 174 species (see No. 1 above). From these bandings they received some 800 returns and recoveries from 95 species through 1946. Leading the list are those species which were banded in the greatest quantity—Black-headed Gulls, Starlings, and thrushes. The number of distant foreign recoveries is gratifying.—O. L. Austin, Jr.

3. Results from the Belgian Banding Scheme for 1955. (Résultats du baguage des oiseaux en Belgique (Excercice 1955).) R. Verheyen. 1956. *Le Gerfaut*, **46**(3): 199-213. Included in this report are about 300 recoveries and returns recorded during 1955. Among the recoveries is that of a Ringed Plover, *Charadrius hiaticula* banded at Zoute-Knokke as an adult 2 June 1951 and recovered on Lake Ladoga, U.S.S.R. 24 August 1954. There are also two interesting recoveries of Garganeys, *Anas querquedula*. One banded in Belgium 1 April 1955 was recovered in Senegal, East Africa, 10 November 1955; the other, banded 29 March 1955, was recovered on 15 May 1955 at Novosibirsk, Siberia.—D. S. Farner.

4. Results of the ringing investigation instituted by the Royal Museum of Natural History, Leiden, 52 (1955), 1. (Resulten van het ringonderzoek betreffende de vogeltrek, ingesteld door het Rijksmuseum van Natuurlijke Historie te Leiden, XLII (1955), 1.) J. Taapken, 1957. *Limosa*, **30**(2-3): 127-154. Lists the raw data for the 1955 recoveries up through the hawks. Noteworthy are the many foreign waterfowl records—45 for the Teal, 117 for the Mallard, some 60 more of 6 other ducks, most of them from Germany and the British Isles, a surprising number from the U.S.S.R.—O. L. Austin, Jr.

MIGRATION

(See also Numbers 51, 53, 60, 61)

5. The Relative Magnitude of the Trans-Gulf and Circum-Gulf Spring Migrations. Henry M. Stevenson. 1957. *The Wilson Bulletin*, **69**(1): 39-77. This reapplication by a leading contemporary Gulf-States ornithologist of analytic methods developed at the turn of the century by W. W. Cooke was an immense undertaking. It involved a 10-year investigation of the status of 200 migratory species in 20 or more separate areas. Field lists representing 2721 hours of observation were assembled; the number of birds per hour per area was computed for each species; other data were compiled from the literature; and the results were plotted on individual maps. The objective was to determine, species by species, the extent to which northbound migrants fly directly across the Gulf of Mexico and the extent to which they detour around it—matters already extensively treated by Cooke but not always with clear-cut distinctions between spring and fall movement. As in the earlier work, decisions were based mainly on the distribution of grounded migrants around the Gulf and the pattern of their arrival dates. These criteria were supplemented wherever possible by records of birds identified during the act of migrating.

Results for the some 170 species that could be analyzed are given in both a systematic account and a tabular summary of evidence, and the maps showing numerical data are reproduced in 30 cases. Though for the most part the conclusions agree rather well with those of the original study, there are several surprises. Cooke thought that almost all the wading birds, hawks, terns, and swallows travel around the Gulf. Stevenson judges the Green Heron, the Broad-winged Hawk, six of the sandpipers, the Black-necked Stilt, the Black Tern, and three of the swallows to be predominantly trans-Gulf migrants. Conversely, he switches several of Cooke's over-water species, such as the Parula, Mourning, Canada, and Wilson's Warblers to the predominantly circum-Gulf category. All in all, he seems to accept a somewhat larger number of species than Cooke as chiefly trans-Gulf and a far greater number as partially so. Yet he would probably not endorse Cooke's description of the marine route as "the main traveled highway." He appears to believe that almost as many species are primarily circum-Gulf as primarily trans-Gulf and that even more are circum-Gulf in part than are trans-Gulf in part.

The paper itself does not attempt to say which type of migration is more important in the aggregate. The foregoing efforts at summary are based on this reviewer's own interpretation of conclusions presented for each species individually —conclusions that are often equivocal or confusing. In the table summing up the evidence, the letter "x" (or more doubtfully "?") is supposed to signify the *bulk* of the migration. Yet in no less than 62 instances these symbols appear both in trans-Gulf and circum-Gulf columns, seeming to imply that the greater part of the migration of the species concerned goes both ways at once. Perhaps the symbols are intended to mean only a *significant portion* of the migration, but this explanation gives rise to new contradictions. Sometimes the main account asserts that a significant portion of the species moves along a certain route, though the table of evidence gives no indication whatever that it does so *(e. g.,* in the references to the Black-billed Cuckoo and Catbird); and just as frequently evidence in the table for a particular route is ignored in the commentary *(e. g.,* with respect to the Ruby-throated Hummingbird and Scarlet Tanager). All in all, there are at least 40 places at which table and text become in some measure inconsistent. As one extreme example, the remark is made that data for the Barn and Cliff Swallows are similar, although their tabular ratings for both dates and abundance are the exact opposite!

Much if not most of the failure to reach clear-cut and decisive conclusions is not, however, the fault of the author. It stems rather from inherent limitations of the criteria employed and of the data available to implement them. Space permits mention of only a few of the many difficulties. To begin with, the student of routes must assume that localities where the most grounded migrants have been found lie along the main migration path of the species, while localities where few or none have been recorded lie off the main path. This seemingly plausible premise generally leads somewhere along the line to patent fallacy. In the present case, the maps for species returning from South and Central America repeatedly show numerical indices for the Gulf coast of the United States several times as high as for *any* of the tropical land approaches that all these migrants, trans-Gulf and circum-Gulf alike, must first traverse. Since the actual amount of passing migration for any species must be essentially the same at all latitudes between the summer and the winter range, these indices cannot be entirely reliable.

Dates pose a different problem. The arrival times of spring migrants traveling around the Gulf should tend to form a progression from south to north, but birds that span the Gulf in nonstop flight may reach northern points on the coast as early as southern points. If one knew the true bulk arrival date of a species from year to year at several localities, one might thereby trace the main route followed. Because such information is not obtainable, Stevenson substituted the *earliest* (or second earliest) date ever known. At worst such a statistic, usually provided by the activity of a single bird, can be the result of a mere inadvertent crossing of the Gulf. At best it would seem capable of yielding no real evidence concerning the *magnitude* of migration along a particular route. Selecting the extreme date from the largest possible pool of records, as has here been done, merely aggravates this shortcoming. The problems of analyzing the dates or distribution of species that have populations breeding or wintering near the northern Gulf coast are even more formidable. Neither the method of dealing with such birds nor the logic underlying the method is satisfactorily explained.

The net effect of such difficulties is not that any of Stevenson's judgments are necessarily incorrect but only that, like most other ideas concerning Gulf migration, most of them are lacking in conclusive proof. His paper is the most thorough treatment of its subject yet written and perhaps the best that will be written for a long time to come. In several respects, it constitutes an advance over the studies by Cooke, and it is certainly superior to the well-known work of Williams, who used similar criteria in an attempt to prove that *no* spring migrant crosses the Gulf in appreciable numbers. Lowery had already suggested the flaws in Williams' analysis: The omission of critical species, the grouping of unlike parts of the coast in the same geographic section, the unwarranted assumption that the presence of migrants in Texas is in itself good evidence of their circum-Gulf movement, and the comparison of firsthand data from Texas with the more meager information for other states obtainable from standard reference works. By avoiding these pitfalls and by obtaining very different results in the process, Stevenson has actually demonstrated the invalidity of Williams' evidence. Another solid accomplishment of the present paper is its use of special data from Tallahassee, Florida and nearby counties to contrast the observability of transients in spring and fall, inland and on the coast. In terms of birds per 100 hours of observation, totals for 22 species are as follows: spring inland, 38; spring on coast, 118; fall inland, 371; fall on coast, 517. These figures show, and are meant to show, that counts of migrants are systematically biased by circumstances in the area where they are made; but, by illustrating this point, they again remind us how uncertain the quantitative study of migration routes unavoidably is.—R. J. Newman.

6. Autumnal Migration of Ducks Banded in Eastern Wisconsin. Joseph J. Hickey. 1956. Wisconsin Academy of Sciences, Arts and Letters, **45**: 59-76. This distributional analysis of recoveries of waterfowl banded mainly at two Wisconsin stations deals primarily with Mallard, Black Duck, Green- and Blue-winged Teals, and Wood Duck. The data are evaluated carefully and presented graphically on a series of outline maps. The author finds nothing new or startling in them. His analysis shows they bear out the findings of others who have worked with larger samples, and whose work he reviews.—O. L. Austin, Jr.

7. The Migration of the Blackcap, Garden Warbler, Whitethroat and lesser Whitethroat as seen from Banding Returns. (Über den Zug der europäischen Grasmücken *Sylvia a. atricapilla, borin, c. communis* und *c. curruca* nach Beringungsergebnissen.) C. Brickenstein-Stockhammer und R. Drost. 1956. *Die Vogelwarte,* **18**(4): 197-209. Discusses the distribution of these species during summer, winter, and migrations. The banding returns are listed and nicely presented on a series of maps.—Helmut C. Mueller.

8. Concerning the Return, Occupation of Territory and Passage of the White-spotted Blue-throat *(Luscinia svecica cyanecula)* in Spring. (Über Rückehr, Revierbesetzung und Durchzug des Weisssternigen Blaukelchens im Frühjahr.) K. Schmidt-Koenig. 1956. *Die Vogelwarte,* **18**(4): 185-196. In a study area of ø.8 km.^{2}, 42 male and 23 female Bluethroats were banded in the years 1953-1955. Each male had a small area which it favored; the intervening areas were freely visited by various individuals and no definite territorial boundaries were established. There were a few non-breeding, non-displaying males in the area each year. Song, displays, and other behavior are described. A map of band recoveries shows that this species migrates to Spain in the autumn and that German-banded individuals can appear as far east as Poland. The migration from the wintering areas in North Africa is discussed. Of 15 color-banded birds that were known to breed in 1953 or 1954, 5 returned the following year and 2 of these returned for 2 consecutive years. The population on the area seemed to vary greatly: minimum estimates of males occupying territories ranged from 6 in 1953 to 19 in 1955.—Helmut C. Mueller.

9. Concerning the Spring Passage of the Yellow Wagtail *(Motacilla flava)* on the South Coast of the Caspian Sea. (Vom Frühjahrs-Durchzug der Wiesenstelze an der Südküste das Kapischen Meeres.) E. Schüz. 1956. *Die Vogelwarte,* **18**(4):169-177. Reviews briefly the systematics and geography of the Yellow Wagtail complex as an introduction to the observations of its various forms on the Caspian Coast. As many as 80,000 wagtails were seen passing in one day. Of the forms that occur in migration on the Caspian *lutea* is the most common, *flava* and *thunbergi* next, then *feldegg,* and lastly, *beema,* although this subspecies is often difficult to differentiate from *flava.* The migration is stratified as to time: *feldegg* begins moving in late March, followed by *flava, beema* and *lutea* in early April, and later in the month by *thunbergi.* The winter range of these migrants is probably in East Africa. The composition of the breeding population on the Caspian has not been closely studied. Biological and behavioral differences in the various races are discussed briefly.—Helmut C. Mueller.

10. The Dispersion of Siskins Banded or Recovered in Belgium. (La dispersion des Tarins, *Carduelis spinus* (L.), visitant la Belgique.) R. Verheyen. 1956. *Le Gerfaut,* **46**(1): 1-15. The author has analyzed returns and recoveries of 609 Siskins banded in Belgium or banded by foreign stations and recovered in Belgium. Although the first Siskins may arrive as early as the first part of August, they more generally do not arrive until the latter part of September, with the majority of arrivals in October and November. Departure begins in February, occurring principally in March and April. Although there are some records of Siskins banded in Belgium and subsequently recovered during the same winter in the Netherlands, England, France, Spain, and even Italy, it appears that most of those that come to Belgium do not migrate further. The Siskins that winter in Belgium come from Scandinavia, Finland, U.S.S.R., Netherlands, Germany, Czechoslovakia, and possibly from the Caucasus. The migration is in general rather similar to that of the Brambling, *Fringilla montifringilla.*—D. S. Farner.

11. Late winter movements of Pink-footed Geese in February 1956. (Kortnebbgjess *(Anser arvensis brachyrhynchus)* i den Kalde Ettervinteren 1956.) Holger Holgersen. 1956. *Stavanger Museums Arbok,* 1956: 151-159. (From the English Summary.) Banding recoveries show the Pink-footed Geese that breed in Spitsbergen normally winter on the south coast of the North Sea from the Jutland Peninsula westward to the Belgian coast. In February 1956 extremely bad weather with frost and snow in Holland and north Germany forced the birds southwestward into France where French hunters took a heavy toll of them, as the 18 recoveries reported from France that February and March show. The author uses this incident to warn of the "great caution" that should be used in plotting wintering grounds from band recoveries. Such data should be correlated with the numbers of birds known to winter in each area, and with the local hunting regulations, "which may cause an uneven distribution of recoveries at least in the latter half of the season."—O. L. Austin, Jr.

12. Annual Report for 1956 of the Foundation "Vogeltrekstation Texe." (Stitchting Vogeltrekstation Texe Jaarverslag over 1956.) A. C. Perdeck and others. 1957. *Limosa,* **39**(2-3): 59-83. (From the English Summary.) The first section of this 3-part report announces that in 1958 the Netherlands ringing scheme will be placed under the Vogeltrekstation. The second summarizes the results of large-scale displacement experiments with migrating Starlings in which almost 10,000 birds caught near the Hague were banded and released in Switzerland, "(full English paper in preparation)" and gives the preliminary findings of orientation experiments being conducted on caged Starlings, as yet somewhat inconclusive. The third section tells of a statistical analysis being made of 6 years of observation records of the autumn Chaffinch and Starling migrations on the Ijssel Sea. These indicate a correlation between the angle of change of flight direction and the wind direction, and a decreasing accuracy of orientation with increasing overcast skies.—O. L. Austin, Jr.

13. The Arrival of Continental Migrants in Western Japan. H. Elliott McClure and Masashi Yoskii. 1957. *Auk,* **74**(3): 359-370. The authors studied the daily catches of two commercial netters in the coastal foothills of Toyama Prefecture where the fall migrations reach Japan from Siberia after crossing the Japan Sea. The two netting stands were about 2 miles apart; one operated 36 mist nets, the other 53; each used light-conditioned live decoys. In the 11-day period (28 Oct.-Nov. 1955), the two stands netted 4,715 birds of 31 species.

Japanese netters have long been aware of the effect of weather on the migrating passerines, and the authors found their observations sound. Correlating the daily catches with the local weather, they were able to conclude: "Weather at dawn affected the take, especially wind or rain which reduced it; migration took place in waves related to the weather of the Siberian coast; rain or storms from the south held the birds on the mainland; and a break in weather at sundown over Toyama indicated a flight during the night of the following day and a large catch on the second morning, even though weather conditions might have become adverse again."—O. L. Austin, Jr.

14. Wader Migration at Cambridge Sewage Farm. I.C.T. Nisbet. 1957. *Bird Study,* **4**(3): 131-148. The author analyses statistically the daily counts of 24 species made over the past 30 years at this famous haunt of migrating waders. By summarizing the records in 4- and 5-day periods, he presents a series of frequency tables that show the patterns of each species' movements each year. In six species for which the data are particularly ample, the spring migration varies annually "with a standard deviation of between 2 and 5 days. The duration of the spring migration is correlated with the extent of the breeding range both in latitude and longitude. The date of peak migration in spring is correlated with the latitude (longitude in arctic birds) of the breeding-range, and negatively correlated with size (wing length)." He concludes that the timing of the breeding cycle largely determines the timing of the autumn flight, for the length of the summer interval between spring and fall flights (88 to 125 days) varies proportionately with both latitude of the breeding grounds and size of the bird. An interesting analysis, showing what can be done by applying statistical methods to a mass of observational data.—O. L. Austin, Jr.

15. A Study of the Movements of the Sheld-Duck. (En undersøgelse af Gravandens *(Tadorna tadorna* (L.)) traekforhold.) Hans Lind. 1957. *Dansk Ornithologisk Forenings Tidsskrift,* **51** (3) : 85-114. (From the English summary.) Lind traces the annual movements of the species in Denmark as shown by the records kept at the Tipperne sanctuary from 1929 to 1956, supplemented by his own observations. The carefully-recorded counts show the resident population at Tipperne has increased slowly but regularly since the establishment of the sanctuary in 1929. An interesting graph (figure 9) of the annual counts in late April-early May (breeding population) and again in September (reflecting the yearly production of young) shows the peaks in production to be reflected by peaks in the breeding population 4 years later.—O. L. Austin, Jr.

16. The "Invasion" Type of Bird Migration. Gunnar Svärdson. 1957. *British Birds,* **50** (8) : 314-343. A very important paper, documented with maps, charts, and tables, as well as 3½ pages of references. Invasions start annually, like ordinary migrations, but are halted by the finding of a rich food supply. "Invasion" species are dependent on the fruiting of certain trees or shrubs. Records on the fruiting of spruce for 60 years show that in southern Sweden a "*rich cone-winter comes every third* or fourth year . . . the better the crop of cones is in one winter, the worse it must be the following winter." This rhythm is the result of two factors: "High temperature during a sensitive period of the summer (June, early July) causes many buds to become flower-buds, instead of purely vegetation buds, giving rise to shoots. This results in rich flowering in the following spring, and many cones in the autumn. Secondly, after coning the trees become 'tired,' which means that they need an interval of some few years to be able to react again to the temperature." Birch, oak and beech are found to have rhythms synchronous with the spruce, but not with the pine, whose cones take 2 years to mature.

After finding an abundant food supply, the birds may often stay to nest. Redpolls *(Carduelis flammea)* have been found nesting in March when the ground was covered with deep snow and the temperature was —20° C; these broods were raised on spruce seeds. "The second brood is raised on insects and there is probably only this one brood in a year when the spruce has few seeds."

The author suggests that the "ultimate factor" in the rhythm of the perennial plants "could be an adaptation, by means of which the plants minimize the damage done to them by the specialized seed-eaters. In the off-year, these seed-eaters are driven to emigration (some mammals and birds) or death (most rodents). As the plants have a longer span of life, the total number of seeds that result in seedlings might be higher if the fructification is concentrated in certain peaks, coming at intervals of some years. . . . It is suggested that the rhythm of fructification of some perennial plants, animal cycles and the invasion type of bird migration form one great ecological complex of mutual adaptation."—M. M. Nice.

17. Orientation by the Stars of Warblers Migrating by Night. (Die Sternenorientierung nächtlich ziehender Grasmücken *(Sylvia atricapilla, borin und curruca)*). Franz Sauer. 1957. *Zeitschrift für Tierpsychologie,* **14** (1) : 29-70. (With English summary.) Some birds and many invertebrates have been found to orient by the sun, one amphipod orienting both by sun and moon (p. 65). Now Dr. Sauer, experimenting with 20 Blackcaps, Garden Warblers, and Lesser Whitethroats, finds that these night migrants steer by the stars! The majority of his subjects had been raised indoors from the age of 9 days and had never before seen the sky. During their spring and fall periods of "migration restlessness," they were put, one at a time, "into a circular rotatable cage covered on all sides and only permitting an upward outlook of about 68°, thus preventing all orientation based on landmarks. Nevertheless, the fluttering birds chose their natural migration direction. Blackcaps and Garden Warblers tended in clear starlit nights during autumn migration period to SSW-SW." "Confronted with an artificial autumn sky during autumn migration period, Lesser Whitethroats chose their seasonable migrating direction of SSE-SE. . . . A Lesser Whitethroat, presented with the starry skies of different latitudes, but of identical longitude, changed the direction of its autumn migration in accordance to the declination of the stars between 35° N and 20° N from SE to S. This result . . . corresponds exactly to the way in which wild Lesser Whitethroats are known to change their course when reaching the eastern end of the Mediterranean Sea."

If presented with the artificial starry skies of the contrary migration, the birds alternated between the directions of spring and fall migration. Given the winter or summer sky in fall, the Lesser Whitethroat was completely disoriented. On moonlit nights the birds tended to fly towards the moon. On completely overcast nights they ceased all migratory activity.

The author concludes this notable paper by stating: "Garden Warblers, Blackcaps and Lesser Whitethroats possess a mechanism of migration orientation which enables them, independently of local topography and of their individual experience, to determine, with the help of their ability to assess time, their specific course of migration while steering by the starlit sky. For the functioning of the mechanism, it is sufficient that the bird is able to see sections of the starry sky. Azimuth and the declination of the star pattern are important for the functioning of the migration orientation by astronavigation."—M. M. Nice.

18. The autumn migration at Falsterbo 1952. Report No. 9 of the Falsterbo Bird Station. (Fågelsträcket vid Falsterbo 1952. Meddelande från Falsterbo fågelstation 9.) Sven Mathiasson. 1957. *Vår Fågelvärld,* **16:** 90-104. (English summary.) This report is based on continuous observations from 20 July to 31 October with about 5 to 6 hours average time spent in the field daily. The list of birds comprises 135 species, of which the Chaffinch *(Fringilla coelebs)*, the Starling *(Sturnus vulgaris)*, and the Wood Pigeon *(Columba palumbus)* are most numerous.

The distinctive feature of this fall migration was the comparatively low totals of many species. The analysis of the data suggests changes in the migration routes taken by these birds as the chief contributing factor to this. A comparison between the concurrent observations made at Ottenby and Falsterbo and of the weather conditions at the time of the three peak dates in July, August, and September revealed among other things the following: 1) the advance of cold air in the fall is a migration releaser, and when this air spread over an extensive area it gave rise to heavy migratory movement over a wide front; 2) for more than 10 days strong easterly to northeasterly as well as strong westerly winds inhibited the southward movement of great numbers of migrants, but immediately these conditions changed, they moved forth as if in an avalanche. On 24 September, the peak date of the season, 75,000 Chaffinches left the coast of Sweden from the peninsula of Falsterbo. Diagrams show interesting details in the migration of eight species. An analysis of the movement of loons, *Colymbus arcticus* and *C. stellatus*, seeks to relate direction of flight to species. As shown, *arcticus* winters on the coasts of the Black Sea and *stellatus* along the west coasts of Europe.—Louise de K. Lawrence.

19. Birds killed at lighthouses in southern Sweden 1951-1956. (Fågelfynd vid sydsvenska fyrar 1951-1956.) Anders Enemar. 1957. *Fauna och Flora,* **1-2:** 49-60. This report on the research on birds killed against lighthouses conducted by the Zoological Institute of Lund (two earlier reports were published in the same journal in 1945 and 1951) concerns 564 birds of 65 species. Remarkably few birds meet death at these Swedish lighthouses, the total list for the 13 years being only 912 birds of 78 species, as compared to the Danish lighthouses where over a thousand birds a year are collected for the Copenhagen Museum. An interesting sidelight of this informative discussion is the flight habit of the Hedge Sparrow *(Prunella modularis)*. As it reaches the coast-line, it rises steeply to the considerable altitude at which it flies across the sea, thus escaping the dangers of the lighthouses.—Louise de K. Lawrence.

20. Fair Isle Bird Observatory Annual Reports for 1955 & 1956 [combined]. 1957. K. Williamson *et al.* 39 pp. We note with regret that lack of funds has forced the Fair Isle Bird Observatory Trust to reduce its activities, and to terminate the employment of Kenneth Williamson, who had been director of the Observatory since its inception in 1948. He had demonstrated how many branches of field ornithology such an observatory can contribute to, and set a high standard for other observatories. Mr. Williamson spent the summer of 1957 on St. Kilda (off the west coast of Scotland), representing the Nature Conservancy. —E. Alexander Bergstrom.

POPULATION DYNAMICS

(See also Numbers 15, 29, 64)

21. Age and mortality for the Tawny Owl *(Strix aluco)* and the Barn Owl *(Tyto alba)* in Switzerland. (Alter und Sterblichkeit bei Waldkauz und Schleiereule.) Alfred Schifferli. 1957. *Der Ornithologische Beobachter,* **54**: 50-56. Recoveries obtained from 124 young Tawny Owls and 233 young Barn Owls banded in the nest reported to Sempach Observatory prior to March 1957 provided material for a study of mortalities and life expectancies in these species. The author counts the first year of life as from 1 April of the banding year to the following 31 March. The basic data:

NUMBER OF RECOVERIES

Month:	*Apr.*	*May*	*June*	*July*	*Aug.*	*Sept.*	*Oct.*	*Nov.*	*Dec.*	*Jan.*	*Feb.*	*Mar.*
Tawny Owl												
1st year	—	3	11	6	7	6	5	2	4	1	5	11
Older	12	10	5	6	1	2	3	6	3	5	6	4
Barn Owl												
1st year	—	1	—	2	7	15	15	17	18	18	37	19
Older	8	1	7	4	3	4	2	4	3	8	30	10

For the Tawny Owl the table shows the greatest losses of young birds occur in June and March. The June peak is associated with immediate post-nesting independence of the young, and the March peak with increased activity in territorial fighting and rivalry. For the adults the greatest mortality occurs in April and May during the increased activity and risks of the nesting period.

The high mortality of young Barn Owls extends over a longer period, as might be expected from their lengthier nesting season. Highest adult losses occur in winter, particularly in February. This owl, a bird of the open fields, is more susceptible to losses from heavy snow concealing its prey than is the woods-inhabiting Tawny Owl. The author also considers the latter to be a more "robust" bird.

He also reworks the data to show the following:

	Tawny Owl	*Barn Owl*
Mortality in 1st year	47%	64%
Mortality in 2nd year	45%	54%
Average Mortality after 3rd year	24%	39%
Life Expectancy after 1st year	2.2 years	1.3 years
Life Expectancy after 2nd year	2.7 years	1.7 years
Life Expectancy after 3rd year	3.7 years	2.1 years

A study of clutch size and nesting success shows that the Tawny Owl has an average clutch of 3.2 (based on 82 reported clutches) and raises 2.1 young, while the Barn Owl has an average clutch of 5.3 (based on 38 reported clutches) and raises 4.4 young. These reproductive figures agree well with the demands their relative mortality rates make on each species to maintain the populations. An excellent paper.—R. O. Bender.

22. Mortality Rates of the Shag Estimated by Two Independent Methods. J. C. Coulston and E. White. 1957. *Bird Study,* 4(3): 166-171. Estimated by the conventional Lack method from reported band recoveries, the authors found the average annual mortality in the Shag to be 44 percent. They consider this manifestly too high, far higher than could be compensated for by the observed recruitment of 2.27 chicks per nest. They attribute the bias to loss and destruction of bands, which results in too few recoveries of old birds. Shag bands are highly subject to wear, as the clip on the bands used in England "acts as a guide, always bringing the same part of the band into contact with the abrading rock surface." A rough estimate of the progressive illegibility of bands based on the conditions of bands taken from Farne Island Shags in 1955 and 1956, when applied to the recovery figures "reduced the apparent adult mortality to 26% per annum."

They also calculated the adult mortality from the 63 live recaptures taken in 1956 on Farne Island where 146 adult Shags had been banded on 73 reachable nests during the preceding 5 seasons. These data, calculated by Bailey's formulas, yielded an average annual adult mortality of 14 ± 9%. The authors consider this estimate to be the more reliable, and recommend that this "negative" method be used instead of the "dead recapture method" in species where loss or illegibility of rings may occur.—O. L. Austin, Jr.

23. Statistical Data on 20,000 English Sparrows. (Statistische Feststellungen an 20,000 Sperlingen, *Passer d. domesticus.)* Rudolf Piechocki. 1954. *Journal für Ornithologie*, **95**(3/4): 297-305. The sex ratio for a sample of 20,931 birds was 113.6 males per 100 females. The change in bill color of the males begins in December or January. The relationship between degree of testicular development and bill color is confirmed.—D. S. Farner.

24. An Investigation of the Kentish Plover, *Charadrius alexandrinus* L., on the Island Oldeoog. (Untersuchungen am Seeregenpfeifer *(Charadrius alexandrinus* L.) auf der Insel Oldeoog.) Hans Rittinghaus. 1956. *Journal für Ornithologie*, **97**(2): 117-155. Described in this interesting paper are the results of a 10-year study of banded Kentish Plovers. During this period the population fluctuated between 100 and 200 individuals; 433 adults and 1,305 young were banded. The first birds arrive in the latter part of March with most arriving by mid-April. Records of 28 birds breeding during the first summer suggest that first-year breeding is not uncommon in this species. Choice of territory is effected by the male. The normal clutch size is three. Both sexes incubate; the mean incubation period was 26.3 days for 43 cases. The young begin to fly at the age of 6 weeks. Normally there is only a single nest per pair. However, renesting may follow the destruction of a nest, eggs, or young. Banded birds from Oldeoog have been recovered in autumn and winter on the Atlantic coast of France and the Iberian Peninsula. A case of *Brutortstreue* for 9 years was recorded. One pair was maintained through 6 breeding seasons. The oldest bird recorded was at least 11 years of age. The author estimates that the mean age of the breeding population must be at least 3 years and quite possibly more than 4 years.—D. S. Farner.

25. Longevity in Local Passerines. Kenneth Williamson. 1957. *Fair Isle Bird Observatory Bulletin*, **3**(3): 133-134. Longevity of several Wheatears, Starlings and Rock Pipits is recorded. In addition, recaptures showed seasonal variations in measurements. A 5-year-old Water Pipit *(Anthus spinoletta)* had been measured on 17 different days. "The wing-length ranges from a maximum of 95 mm. after completion of the autumn moult, maintained until the following spring, to a minimum of 83-85 mm. at the height of the nesting season. Similarly the variation in tail-length shows the effect of abrasion . . . 70 mm. on September 28th, October 26th and November 15th in three different years, but 67-68 mm. in May 1954 diminishing to 65 mm. in July. . . . The 30 weight-records vary between 22.8 gm. and 30.5 gm. the latter being for November 15th, a time of year when the body-weight of locally resident . . . Pipits has begun its climb towards the winter peak."—E. Alexander Bergstrom.

NIDIFICATION AND REPRODUCTION

(See also Numbers 24, 41, 42, 55, 56, 64, 65, 72)

26. Comparative Breeding Behavior of *Ammospiza caudacuta* and *A. maritima*. Glen E. Woolfenden. 1956. *University of Kansas Publications. Museum of Natural History*, **10**(2): 45-75. An excellent study made during 1955 of these two sparrows nesting in the marshes of New Jersey. Through use of a Japanese bird net, 40 Seaside Sparrows *(A. maritima)* and 85 Sharp-tailed Sparrows *(A. caudacuta)* were caught and banded with aluminum and colored bands. All nestlings and many adults were dyed, the males red, the females blue, sex being determined by cloacal examination. Nests were discovered through observation from blinds.

Seaside Sparrows are territorial, defending both an area around the nest and a feeding area on the shore. They sing loudly and frequently from conspicuous perches, one male delivering 395 songs in an hour, an average of 6.6 per minute. They are monogamous and the males help feed the young; both parents feed them for about 20 days after they leave the nest at 9-10 days of age. One male raised 3 out of 4 young after the disappearance of his mate 4 days before fledging. But a female whose mate was killed just as she was starting incubation deserted 2 days after the eggs hatched.

Sharp-tailed Sparrows are semi-colonial and non-territorial; their songs are weak and apparently used only in courtship. They are promiscuous and the males take no interest in the nests or young.

Location of nest differed in the 2 species, but black grass *(Juncus gerardi)* was the main material used by both. The natal down of both species is described and daily weights and measurements of 12 nestlings reported. Seaside Sparrows feed in areas of open mud and smooth cord-grass *(Spartina alterniflora)*; they molt once a year. Sharp-tailed Sparrows feed mostly in dense and matted black grass and undergo 2 complete molts a year, prenuptial and postnuptial.—M. M. Nice.

27. Goldfinches on the Hastings Natural History Reservation. Jean M. Linsdale. 1957. *American Midland Naturalist,* **57**(1): 1-119. Observations on the Green-backed Goldfinch *(Spinus psaltria)* and Lawrence Goldfinch *(S. lawrencei)* by the author and 35 coworkers, with ample quotations from the literature. Building and incubation rhythms are illustrated by numerous charts, and care of young by tables as well as detailed notes. Intra- and interspecific relationships are described, and also responses to the environment. "Pairing occurs when the birds are in flocks." The Green-back nests from March to July, the Lawrence from May to July. Females build and incubate and are fed about once an hour by their mates. Both parents feed the young. A great deal of data is given on feeding habits of the two species. Considering the length of the paper and the wealth of observations presented, a fuller summary would have been welcome.—M. M. Nice.

28. The Yellow-bellied Flycatcher nesting in Michigan. Lawrence H. Walkinshaw and C. J. Henry. 1957. *Auk,* **74**(3): 293-304. The authors present detailed notes concerning their observations of a single nest of *Empidonax flaviventris.* They supply information on habitat, incubation period, percentage of time spent in incubation, voice, etc., but do not compare their observations with previously published data.—J. C. Dickinson, Jr.

29. Nesting Success in Altricial Birds. Margaret Morse Nice. 1957. *Auk,* **74**(3): 305-321. This exhaustive summary tabulates, compares, and evaluates some 70 previously published efforts. Mrs. Nice concludes that "open nesters" average 49 percent successful. Fledgling success of this same group is 46 percent. "Hole nesters" are, on the average, more successful—fledgling success averages 66 percent. Various favorable and unfavorable factors for nesting success are discussed. —J. C. Dickinson, Jr.

30. The beginning of laying and second broods of the Starling *(Sturnus vulgaris)* in Switzerland. (Über Legebeginn und Zweitbruten beim Star in der Schweiz.) Alfred Schifferli. 1957. *Der Ornithologische Beobachter,* **54**: 1-8. This paper is drawn from "nest charts" prepared by many Swiss field observers and banders and is presented to arouse interest on the part of additional ornithologists as well as to set forth information about the nesting of the Starling. The author had 605 nest charts available dating from 1949. Of these 177, or 29% of the charts used, either recorded the date for the first laying or contained sufficient information to calculate that date. With the others, approximate dates had to be calculated. When only the number of eggs was noted on at least two observations, it was assumed that the clutch had been incubated for 6 days. When only the number of young was hatched, an additional 10 days was added to give the first laying date. With this method of computation, an error of ± 5 days for the first value and ± 6 to 7 days for the second must be allowed for. When comparing first laying dates for various areas, these errors tend to cancel out. The accurate and estimated dates are shown separately on the charts in the paper.

A comparison of first laying dates was made for three zones in Switzerland: Genfersee region, Mittellands including Basel, and the Voralpen and Jura above 800 m. altitude. Both first and second nestings began on the average a week earlier in the Genfersee region than at altitudes above 800 ft. The first and second layings were sharply differentiated in the Genfersee area but ran together in the other two areas. The average interval between first and second layings is 40 days. Year to year variations for the first laying date in the same area have been found to be as much as 2 weeks.

Second broods have been observed throughout Switzerland, but the number of second nestings is much smaller than the number of first nestings. Actual proof of regular layings obtained from banding data had been lacking in Switzerland, but detailed data are reported from Sempach in this paper. Instances of changing mates between nesting and one of polygamy are reported.—R. O. Bender.

31. The Breeding of the Storm Petrel. Peter Davis. 1957. *British Birds,* **50**(3): 85-101; (9): 371-384. A 3-year study of *Hydrobates pelagicus* on the island of Skokholm, Wales, based on banding adults and young and daily examination of burrows by means of observation shafts. Forty-two out of 45 successful breeders, and 18 out of 29 unsuccessful ones "were recaptured in the following year, and only two, both failed birds, had changed their burrows." The birds arrive in April and May, but do not lay the single egg till more than a month later, the average duration of the pre-egg stage in 25 cases being 46.8 ± 9.1 days. The average incubation period in 36 cases lasted 40.6 ± 2 days. Eggs have hatched after 2 to 3 successive days of chilling, and one even hatched in 50 days despite chillings for 5, 2, and 2 days, 11 days in all (he doesn't mention the other 2 days—probably single days). Parents shared incubation rather equally, each usually staying on the nest for 2 to 3 days at a time. The fledging period of 32 chicks ranged from 56 to 73 days, averaging 62.8 ± 3-5 days. Much information is given on how often the chicks were fed and how much they received. Most Storm Petrels are efficient parents, but two pairs consistently underfed their chicks both in 1955 and 1956; these were retarded in development, and three departed at low weights. There is an amazing amount of valuable information both on adults and young in this thorough and detailed study. It is illustrated with 9 photographs, mostly of chicks at different ages.—M. M. Nice.

32. Nest-Hole Excavation by the Bee-Eater. Guy Mountfort. 1957. *British Birds,* **50**(6): 263-267. Detailed descriptions of nest excavation technique of *Merops apiaster* in a gravel bank in the Camargue, France, and in level sandy ground in Spain. In France the birds had to swoop at the vertical, sun-baked surface, striking it with partly opened bills. "After 15-18 attempts the bird retired exhausted to a perch nearby, where it sat panting while the work was continued by its mate. Sometimes several quick strikes were made from one approach flight, by a series of 10-12 inch backwards and forwards flights at the site. . . . As soon as a foothold was gained the process of digging became much more rapid," and after the hole was 4-5 inches deep the feet could be used for kicking out loosened soil.

"On level-ground sites the Bee-eater makes the initial scrapes with its feet. lying on its breast and working the feet alternately extremely rapidly, as though running on the spot." The waiting bird often shows great impatience for its turn. "As soon as the digging bird's tail appears, its mate's excitement redoubles and it moves up close to the entrance, where it stands right in the path of the stream of ejected sand, shaking its head and blinking under the onslaught." Courtship feeding by the male is frequent and is often followed by copulation. Four photographs by Eric Hosking illustrate this excellent paper.—M. M. Nice.

33. Notes on Nesting Nightjars. David Lack. 1957. *British Birds,* **50**(7): 273-277. Information on dates of first and second broods of *Caprimulgus europaeus* in Suffolk and Norfolk, but no correlation attempted either with earliness or lateness of the season, or with phases of the moon (see Wynne-Edwards, 1930, *Journal of Experimental Biology,* **7**: 241-247.) Incubation lasts 17 days and is performed chiefly by the female. but the male usually relieves his mate about 13 minutes after sunset on fine nights and markedly earlier on cloudy and stormy nights. Males stayed on the nests from 7 to 40 minutes. "In a dawn watch on 2nd July at one nest with eggs, the female left at 2.28 a.m. G.M.T.; the male came on at 2.33 but left after four minutes and sang." Beginning at 12 and 13 days the chicks exercised their wings at dusk and gradually attained strong flight by the age of 2 weeks. "They fly chiefly up and down, or up, round and down, because the nest is typically in a small open space amid vegetation in which they might be caught up if they landed in it." Figures are given on the weights of eggs and young.—M. M. Nice.

34. Early Sexual Maturity of a Female Mallard. Hugh Boyd. 1957. *British Birds,* **50**(7): 302-303. A female *Anas platyrhynchos* banded Sept. 4, 1956 by Peter Scott as a bird of the year was captured Nov. 6 accompanied by four ducklings 4 or 5 days old; these flew in early January. This hen must have started laying when less than 5 months old. Other females with November broods could not be captured, but it is suggested "that late autumn broods, which occur quite frequently in this species, are produced by early-maturing females rather than by females that had bred or attempted to breed earlier in the year."—M. M. Nice.

35. Nest building manner of House Sparrows — a nesting colony in palms. (Nestbauweise der Haussperlinge einer Brutkolonie auf Palmen.) Hans Münch. 1957. *Ornithologische Mitteilungen,* **9**: 145. This paper reports on a nesting colony of House Sparrows *(Passer domesticus italiae)* in palm trees *(Trachycarpus excelsus)* in the village of Cureglia near Lugano in southern Switzerland. The colony builds its nests in the upper part of the palm trees where they are invisible from the ground. They are constructed from grass stems and palm fibers and resemble those of the Weaver Birds *(Ploceidae).* G. Mächler, who first reported the colony, intends to use color banding to determine whether this is a distinct population with a special hereditary method of nest building. —R. O. Bender.

36. Observations on the Black Kite in Switzerland. (Beobachtungen am Schwarzmilan in der Schweiz.) Hans Münch. 1957. *Ornithologische Mitteilungen,* **9**: 146-147. The author reports observations on the fish-catching techniques of the Black Kite *(Milvus m. migrans)* on Brienzer See in Switzerland. Whereas the species nests in trees throughout almost its entire nesting range, this population is entirely cliff-nesting, perhaps owing to the absence of suitably large trees. He states that banding records have shown that the young return to the immediate area to nest but gives no details. He suggests that probably this nesting manner has become a strong habit in the course of time.—R. O. Bender.

37. Contributions to the Breeding Biology of the Black-headed Gull *(Larus ridibundus L.)* in Norway. Nests, Eggs and Incubation. Nils-Jarle Ytreberg. 1956. *Nytt Magasin for Zoologi,* **4**: 5-106. A detailed report on a 5-year study in 6 colonies. This species was first reported as breeding in Norway in 1865, and since then has become more and more numerous. Nest building is a major activity throughout the breeding season, much of the material being stolen from the nests of other Black-headed Gulls; on occasion so much is brought that eggs and even new-hatched chicks are covered up and perish. New nests are often built for the chicks, perhaps because the old nest has become trampled and water-logged. Most eggs are laid during the morning and early afternoon, the average interval between the 3 eggs being 1¾ days. Much information is given on incubation, which is shared fairly equally by both parents. The shifts usually ranged between 1 and 2½ hours, becoming longer near the end of the 22-24-day incubation period. Of 872 eggs laid in one colony in 1952 and 1953, 75.3% and 78.3% hatched.—M. M. Nice.

38. Breeding of the Senegal Combassou *(Hypochera chalybeata* Müll.) in Captivity. Holger Poulsen. 1956. *Avicultural Magazine,* **62**: 177-181. The Combassou (one of the Wydahs) is believed usually to be parasitic on the Fire Finch *(Lagonisticia senegala),* but occasionally in captivity it has incubated its own eggs. Recently two pairs have bred in Danish aviaries. The first laid their eggs in a nest of a Fire Finch, which raised two of the parasites. The other pair had no nest to parasitize. The male collected material, and a "loosely-constructed domed nest of the waxbill type" was built. Both birds spent the night on the nest and both fed the young, but after the latter were fledged only the male fed them. No nest of the Combassou has been found in the wild. "The problem still remains to be solved whether it regularly has two methods of breeding or only occasionally builds its own nest, e.g. under the abnormal conditions of captivity.—M. M. Nice.

39. The King Penguin of South Georgia. Bernard Stonehouse. 1956. *Nature,* **178:** 1424-1426. From daily observation of banded birds for 15 months in a colony of 5,000 individuals, it was found that the breeding cycle of *Aptenodytes patagonica* occupies 15 months. Hence this species raises two chicks in three years. "By comparison, the emperor penguin *(A. forsteri)* rears a single chick in 8-9 months, while gentoos *(Pygoscelis papua)* and adelies *(P. adeliae),* like most other species of penguin, rear two young in less than six months." Incubation lasts 54-55 days, but "chicks are fed by their parents through the summer and well into the following spring." At 5-6 weeks they join crèches. "Studies with banded birds showed that parents feed their own chicks exclusively, recognizing them primarily by sound and calling them out of the crèche with distinctive 'call-signs,' to which only their own chick responds." A full account of this notable study is to be published in the series of Falkland Islands Dependencies Scientific Reports.—M. M. Nice.

40. Nest of Crested Lark parasitized by Cuckoo. (Nid de Cochevis huppé *Galerida c. cristata* (L.) parasité par le Coucou gris *Cuculus c. canorus* (L.).) Louis Briche. 1956. *Alauda,* **26:** 310-311. A description of how the Cuckoo "searched" for the nest of the Crested Lark, ate the first egg laid by the lark, and then replaced it with one of its own eggs. The lark continued laying the second egg, but soon after abandoned the nest.—Louise de K. Lawrence.

LIFE HISTORY

(See also Number 64)

41. The Biology of the Tinamou, *Nothocercus bonapartei.* (Zur Biologie des Steisshuhnes *Nothocercus bonapartei.)* Ernst Schäfer 1954. *Journal für Ornithologie,* **95**(3/4): 219-232. This interesting tinamou occurs in the coastal mountains of Venezuela in subtropical and tropical forests at elevations between 700 and 2000 meters. The males occupy a fixed territory throughout the year in a humid locality with dense ground vegetation. Within the territory are the trees used for sleeping. Food is primarily fallen fruit. The breeding season can begin in February and extend to June; it begins ordinarily at the end of the dry season. Many males have several display sights. The sex ratio appears to be about 1:1. Young males pair with a single female; older males may have several females. All of the females of a single male lay eggs in a single nest cavity. Incubation is performed by the male.—D. S. Farner.

42. The Biology of the Umbrella Bird. (Zur Biologie des amazonischen Schirmvogels, *Cephalopterus ornatus.)* Helmut Sick. 1954. *Journal für Ornithologie,* **95**(3/4): 233-244. Observations were made on the upper Rio Xingú, Mato Grosso, central Brasil. The Umbrella Bird occurs on the edges of the forest. The food consists of insects and fruit. In courtship the male produces a deep roaring or grumbling sound associated with a distinctive display. A tracheal enlargement and an inflated oesophageal sac appear to serve as resonating chambers. The clutch consists of a single egg. Breeding may occur in both the dry and rainy seasons.—D. S. Farner.

BEHAVIOR

(See also Numbers 26, 27, 42, 59)

43. Development of Vocal Expressions and Behavior in the Blackbird under Natural Conditions and When Raised Singly in Sound-proof Rooms. (Die Entwicklung der Lautäusserungen und einiger Verhaltensweisen der Amsel *(Turdus merula merula* L.) unter natürlichen Bedingungen und nach Einzelaufzucht in schalldichten Räumen.) Egon Messmer and Ingeborg Messmer. 1956. *Zeitschrift für Tierpsychologie,* **13**(3): 341-441. With 4½-page summary in English.) Another admirable paper from Dr. Otto Koehler's laboratory in Freiburg. Six Blackbirds were raised in isolation in sound-proof chambers—"Kaspar Hausers." Twenty-nine others were hand-raised in the laboratory or flying cage and these could hear each other's songs as well as songs of wild Blackbirds. Four birds had their hearing organs excised.

Careful studies were made of all vocalizations by means of tape recordings. Juvenile song starts at about 19 days of age and is fully innate. "Between Kaspar Hausers, wild caught birds and deaf birds, differences of song only were observed regarding the duration and pitch of certain notes." There is considerable imitation of motifs of adults by young cocks, even in their first spring.

"Male blackbirds either look for a territory first and then choose a female or the pairs are formed already in winter quarters and then go in search for a territory together." The males look for nesting sites and show them to their mates; the females do the building and the incubating, while the males help feed the young. Photographs are given of the hatching process, and details furnished of the care provided the Kaspar Hausers and of their development, including observations and experiments on gaping.

All the young birds showed precocious breeding behavior in their first fall. From the 21st day they chose little territories in the room and defended them for days or weeks from their companions. Of 2 Kaspar Hausers put into the same chamber, "the dominant bird always showed male courtship behaviour, even when the bird in question was a female." Most of the Kaspar Hausers courted the authors. "When a Kaspar Hauser male was brought together with a Kaspar Hauser female, the males preferred the observer as an object for their courting activities. The female only threatened the conspecific male." One male, raised by wild parents and brought into the laboratory at 15 days of age, courted both a wild female and his caretaker. "Kaspar Hausers began to show courtship behaviour in their isolation chambers at approximately the same time as wild birds." A paper to be carefully studied by anyone making a serious study of the development of song and behavior in a passerine species.—M. M. Nice.

44. Influence of Hunger on Aggressive Behavior in Certain Buntings of the Genus Emberiza. R. J. Andrew. 1957. *Physiological Zoölogy,* **30**(2): 177-185. Based on observation of wild and hand-raised buntings and on experiments on the latter. In the Yellowhammer *(Emberiza citrinella)* the aggressive encounters of flocks increase under conditions of hunger because of intensified activity. With birds crowded together at feeding dishes, the preferred individual distance cannot be maintained without threats or pecks. The author concludes, however, that "hunger has no direct effect on the threshold of aggressive responses." He compares aggression with other behavioral drives.—M. M. Nice.

45. The Dipper's Winking. James Alder. 1957. *British Birds,* **50**(6): 267-269. The author has been able to tame individuals of *Cinclus cinclus* and has studied and photographed their eyes when "winking." He concludes that the bird shows 2 movements:

"(a) A quick blinking of the whitish upper eyelid, which may or may not accompany bobbing, and is the movement seen by observers at the usual distances.

(b) A high speed flick of the nictitating membrane across the eye, perceivable normally only at close quarters. This membrane is bluish-white and semi-transparent."—M. M. Nice.

46. The Aggressive and Courtship Behaviour of Certain Emberizines. R. J. Andrew. 1957. *Behaviour,* **10**(3-4): 255-308. Very interesting, detailed study of the components of aggressive and courtship behavior of nine species of buntings with comparisons with other passerines from the literature, numerous sketches of different postures of buntings, and sound spectrograms of various calls. A paper that should be carefully studied by everyone engaged with problems of behavior of passerines.—M. M. Nice.

47. Observations on a Blind Short-eared Owl. (Beobachtungen an einer blinden Schleiereule *(Strix flammea).*) Otto v. Frisch. *Anzeiger der Ornithologischen Gesellschaft in Bayern,* **4**(7): 572-574. 1957. A completely blind adult Short-eared Owl was kept for 2 years. It investigated new quarters thoroughly and quickly learned to orient itself perfectly. It customarily flew straight up and let itself drop straight down. Always before it moved it turned its head back and forth as if carefully observing its surroundings. When it took prey in its claws it always "looked" backwards before eating. It was never seen to drink or bathe.—M. M. Nice.

48. Sociability of Ravens (Corvus corax), especially in Schleswig-Holstein. (Geselligkeit beim Kolkraben, insbesondere in Schleswig-Holstein.) G. A. J. Schmidt. 1957. *Ornithologische Mitteilungen,* **9**: 121-126. This paper on the factors affecting flock formation of ravens is a review supported by new observations. The author believes that the flocks, which are seen throughout the year, are composed mostly of first-, second-, and possibly third-year birds. He points out that first-year birds can be differentiated in the field, principally by the brown color of the neck and of the small feathers on the wings. As additional evidence, he shows that the members of these flocks appear to be unpaired, whereas paired birds are so closely bound to their territories they seldom leave them throughout the year. As courtship flights observed within the flocks during the fall and early winter presumably involve the second- and third-year birds, flocking of subadults thus contributes to pair formation. In addition to these social aspects, such ecological factors as favorable feeding and roosting places also contribute to flock formation. In severe weather some breeding adults join the flocks at the feeding places.

The author estimates that about two-thirds of Schleswig-Holstein is favorable nesting territory for ravens. In 1953 the population was estimated at 200 nesting pairs occupying 15,644 sq. kilometers. In 1954 through 1956 hunters reduced the population to about 25 percent of this. The subadult flocks wander about a great deal and enter regions where ravens have not nested for years. This wandering is believed to have contributed to the recent settlement of areas near Hamburg and Steinburg.—R. O. Bender.

49. The Response of Chicks of the Franklin's Gull to Parental Bill-color. Elsie C. Collias and Nicholas E. Collias. 1957. *Auk.* **74**(3): 371-375. An objective test of chicks of *Larus pipixcan* demonstrates that the red color of the bill of the adult is, in part, an adaptation to stimulate and direct the initial feeding responses of downy young.—J. C. Dickinson, Jr.

ECOLOGY
(See also Number 80)

50. The Forest Habitat of the University of Kansas Natural History Reservation. Henry S. Fitch and Ronald L. McGregor. 1956. University of Kansas Publications, Museum of Natural History, **10** (8): 77-127. An excellent study of the ecology, past and present, of this Natural History Reservation in Douglas County in northeastern Kansas. Each species of tree on the reservation is discussed in detail—its history, its present status, and its role in furnishing look-outs, shelter, nesting sites, and food to the birds and mammals.—M. M. Nice.

WILDLIFE MANAGEMENT
(See also Numbers 6, 60, 80)

51. Waterfowl Banding in the Canadian Prairie Provinces. Seth H. Low. 1957. Special Scientific Report—Wildlife No. 36. U. S. Fish and Wildlife Service, Washington, D. C. pp. 1-30. photo-offset. This interim assessment of the results of waterfowl banding in the continent's most productive duck breeding grounds is noteworthy chiefly for being the first Fish and Wildlife Service publication to my knowledge at least to imply that their sacrosanct "flyway" concept is not sound distributionally. It admits: "Unfortunately, breeding areas for each flyway are not separate and distinct. Rather, many areas supply birds to two or three flyways, and some to all four." It also shows that the percentages of birds from particular breeding grounds taken in each flyway fluctuate from year to year, which makes forecasting the fall flights in each flyway (a major concern to the F&WS for setting open seasons and bag limits) extremely unreliable, if not impossible. The author points out some of the difficulties encountered in the banding researches and the steps being taken to overcome them, but he is unable to reach any sound conclusions. The best he can do is plead "that banding data from 4 or 5 years should be obtained from each of the important breeding areas before the data can be considered satisfactory."

The main source of trouble in this, as in every analysis of their waterfowl banding data the F&WS has attempted, lies not in uneven distribution of the banding effort, inconsistencies in sexing, poor standardization of terms, inadequate sampling, and other minor difficulties as claimed. While such faults in the data are real and annoying, with the mass of recoveries available for analysis, any knowledgeable analyst should be able to explain and allow for them. No, the tables, maps, and grids accompanying this report show the actual stumbling block to be the political necessity of fitting the banding results into the artificial confines of the "flyway" boundaries. This, as I have suggested before, just can't be done. As waterfowl can't read the regulations, they simply "haven't gotten the word" about the flyways, and they aren't about to either! Low's excellent grids 4 and 5 are particularly revealing. They show at a glance how the boundary separating the F&WS's Central and Mississippi "flyways" neatly bisects the actual migration path and wintering range of the Mallards (by far the most numerous and important species hunted) produced by the most fruitful Saskatchewan breeding ground!

If the F&WS must have their "flyways" for administrative purposes, why not base the flyway boundaries on what the banding data show? Geographical analysis of the mass of waterfowl banding data *without* reference to the current artificial "flyway" boundaries would not only remove the main handicap hampering their analysts and statisticians, but would lay a firm and sound foundation for practical and efficient management of our waterfowl resources.—O. L. Austin, Jr.

52. Blackbirds and the Arkansas Rice Crop. Johnson A. Neff and Brooke Meanley. 1957. Agricultural Experiment Station, University of Arkansas, Fayetteville, Bulletin 584: 1-89. An 8-year study of this economic problem, involving banding of over 48,000 birds and examination of 2,208 stomachs. The natural history of three most important species—the Redwing *(Agelaius phoeniceus)*, Cowbird *(Molothrus ater)* and Bronzed Grackle *(Quiscalus quiscalus aeneus)*—is described. Populations reach their peak in Arkansas during late February or early March, with the next highest numbers late in November or early in December. Great communal roosts exist approximately every 50 miles from Louisiana to Missouri; in these the 3 major species segregate "to an amazing degree," the Redwings even segregating according to sex. "Few of the true mid-winter central roosts contain fewer than 1,000,000 birds, while one "was estimated to contain more than 15,000,000 birds at its peak." Maps are given showing the dispersal of the 643 banded birds recovered.

It is only the birds that nest in the vicinity that damage the rice crop, so protective measures are effective only from March to October; in winter the millions of blackbirds assist the farmer by gleaning weed seeds. Besides, the Redwing "is the principal natural enemy of the rice water weevil, and feeds extensively upon other insect pests of rice." Exhaustive studies were made of the food of the blackbirds. It was estimated that the "average annual loss of rice to blackbirds, state-wide, 1950-1954, did not exceed one-half bushel per acre." Detailed instructions are given on methods of reducing this loss through repellents, frightening devices, and killing.—M. M. Nice.

53. Investigations of Woodcock, Snipe, and Rails in 1956. Special Scientific Report: Wildlife No. 34, U. S. Fish and Wildlife Service and Canadian Wildlife Service, January 1957, 85 pp., photo-offset. This is the sixth annual report of its kind (for previous ones, see *Bird-Banding*, **26**: 170-171 and **27**: 194-195). It contains: "Perspective of Woodcock, Snipe and Rail Investigations—1956" by John W. Aldrich, "The Wintering Woodcock Population on Nocturnal Feeding Sites in Louisiana in 1955-56" by Leslie L. Glasgow, "Wintering Woodcock Observations in West-Central Louisiana" by Vincent H. Reid and Phil Goodrum, "Woodcock Singing Ground Counts in Canada—1956" by V. E. F. Solman, "Woodcock Census Studies in Northeastern United States—1956" by Howard L. Mendall, "Woodcock Singing Ground Counts for the Middle Atlantic States for 1956" by Ward Sharp, "Woodcock Breeding Ground Counts in the Central-Northern United States 1956" by John W. Aldrich, "Massachusetts Woodcock Studies" by William G. Sheldon. "Preliminary Analysis of Woodcock Band Returns" by Leslie L. Glasgow, "Wilson's Snipe Wintering Ground Studies, 1955-56" by Chandler S. Robbins, "On the Breeding of Wilson's Snipe in Newfoundland" by Leslie M. Tuck, and "Clapper Rail Study" by Fred Ferrigno.

Sheldon continued to use mist nets to take woodcock. The nets were particularly effective with summer concentrations of woodcock feeding on insects (other than angleworms) in short grass or clear ground. Further progress was made in estimating age and sex of the banded bird before release.

Glasgow plotted on a map all recoveries of woodcock outside the state of banding, and outlines probable migration routes. The data are somewhat fragmentary as yet. Tuck reported in some detail (13 pp.) on his life history studies of snipe on the breeding ground.—E. Alexander Bergstrom.

54. Partridges *(Perdix perdix)* ringed during 1950-54. (Ringmaerkning af Agerhøns 1950-54.) Knud Paludan. 1957. *Danske Vildtundersgelser,* **7:** 5-27 (From the English summary.) Analyzes the 230 recoveries (2.8%) obtained before 31 March 1956 from 8225 banded Partridges released from 1950 to 1954. Disregarding recoveries obtained the year of release, the recoveries show a mean annual mortality of 83.9 ± 3.8%. Birds that survived to the first April have a mean expectation of further life of 0.693 ± 0.015 years; for those that survive to their second April, the expectation rises to 0.753 ± 0.035. Survival until the first breeding season was five times as high among adults and sub-adults released in November as among the birds (mostly chicks) released in July-August. Most of the Partridges remained within 2 kilometers of the release point; a single bird was reported 17 kilometers distant. The author concludes: "The considerable chick mortality in conjunction with the short span of life of fully grown birds must be taken into consideration when the importance of release for the breeding population is assessed."—O. L. Austin, Jr.

55. Artificial Nests for the Great Horned Owl in Wisconsin. (Kunsthorste für den Uhu *(Bubo virginianus)* in Wisconsin.) D. D. Berger (Translated by F. Hammerstrom and E. Zebe). 1956. *Die Vogelwarte,* **18**(4): 183-185. Great Horned Owls occupied 3 of the 5 nests built of sticks for them, and fledged 6 young. The appearance of this paper in a German journal emphasizes the interest of belatedly wise Europeans in restoring even predators in areas where they have been extirpated. In our country they are still shooting owls.—Helmut C. Mueller.

56. The Eagle Owl back in Kilsbergen, Province of Närike, Sweden. (Uven tillbaka i Kilsbergen.) Mauritz Magnusson. 1957. *Sveriges Natur,* **3:** 86-92. The growing realization of the important role played by the raptors in the balance of nature induced the reintroduction of the Eagle Owl *(Bubo b. bubo)* into a suitable habitat in the northwestern corner of the province, where in the past irresponsible hunters and game wardens had extirpated it. The lively account shows the careful planning and execution with which the experiment was carried out by the experts, assisted by many interested volunteers, to a conclusion deemed successful after the second nesting of the introduced birds. The male Eagle Owl chooses the hollow in which the hen then lays the eggs. The incubation period is 35 days.—Louise de K. Lawrence.

57. Distinguishing juvenile from adult Bobwhite Quail. Arnold O. Haugen. 1957. *Journal of Wildlife Management,* **21**(1): 29-32. Where standard methods fail to separate adult from juvenile Bobwhite Quail, characteristics of greater upper primary covert No. 7 can be used for distinguishing these age groups. In the adult this feather is darker, not uniformly brownish as in the juvenile. It is sleeker, with barbs holding together better than in the juvenile feather, which is usually tipped with buff.—Oliver H. Hewitt.

58. A summer whistling cock count of Bobwhite Quail as an index to wintering populations. Walter Rosene, Jr. 1957. *Journal of Wildlife Management.* **21**(2): 153-158. This careful study, in Alabama and South Carolina, revealed a very close correlation between numbers of male Bobwhites heard whistling during the peak of nesting activity (from June 20 to July 10) and the numbers of coveys found in the census areas in subsequent hunting seasons. Data from 4 years of study are presented, comprising more than 900 cocks and more than 900 coveys in an area of approximately 12,000 acres. Increases or decreases in numbers of whistling cocks from year to year were followed by corresponding changes in coveys found. The status of the whistling cock, *i.e.,* whether he is unmated or the mate of a nesting female, was not determined.—Oliver H. Hewitt.

59. Social and range dominance in gallinaceous birds—pheasants and prairie grouse. Ward M. Sharp. 1957. *Journal of Wildlife Management.* **21**(2): 242-244. In Nebraska from 1937 to 1943, interspecific conflicts between cock Pheasants, Prairie Chickens and Sharp-tailed Grouse were observed. Twelve involved Pheasants and Prairie Chickens, eighteen were between Pheasants and Sharptails. Occasional encounters between Prairie Chickens and Sharptails did not include fighting of cocks. Sharp-tailed Grouse dominated both of the other species, and Pheasants always defeated Prairie Chickens. Competition between Pheasants and Prairie Chickens is sufficiently severe to cause the elimination of isolated colonies of the latter.—Oliver H. Hewitt.

CONSERVATION
(See also Numbers 19, 78, 80)

60. Nissum Fjord and the Brent Geese. (Nissum Fjord og Knortegaessene *Branta bernicla* (L.).) Finn Salomonsen. 1957. *Dansk Ornithologisk Forenings Tidsskrift,* **51**(3): 119-131. Nissum Fjord in western Jutland is on the migration route of the Spitsbergen and Franz Josef Land populations of Brant that move southward along the coast of Norway to winter in the southern parts of the North Sea. As *Zostera marina* grows there profusely, the Brant visit the fjord commonly in passage "and winter in some number when the fjord is not icebound." Some 2,000 are present at peak periods in April when the birds are moving northward. The author decries tentative plans to dike in and reclaim large parts of the fjord, which will ruin it "from a natural history point of view." (And what sounder points of view are there?) He also pleads for giving the Brant full protection in Denmark "owing to its fatal decline in number in recent years."—O. L. Austin, Jr.

PHYSIOLOGY AND PSYCHOLOGY
(See also Numbers 34, 49)

61. Comparative Investigations of the Energy Economy of Bramblings and House Sparrows. (Vergleichende Untersuchungen über den Energiehaushalt des Bergfinken *(Fringilla montifringilla* L.) und des Haussperlings *(Passer domesticus* L.).) Werner Rautenberg. 1957. *Journal für Ornithologie.* **98**(1): 36-64. This investigation contributes to a definition of the energetic and regulatory basis for the premigratory accumulation of large amounts of depot fat in *Fringilla montifringilla* and, secondarily, the reasons for the absence of a similar biennial accumulation in the nonmigratory *Passer domesticus.* Premigratory fat deposition and the ability to mobilize these reserves rapidly are regarded as major characteristics of the physiologic preparation for migration *(Zugdisposition).*

Five males and five females of each species (only one of each sex in the case of the Brambling from July to December, 1954) were confined individually for a period of 1.5 years in small (62 x 28 x 24 cm) cages which were fitted with special accessories for quantitative feeding and collection of waste food and excreta. The birds were exposed to normal annual variation in daylength and *quasi*-normal air temperature (mean min. in February = —1.9°C.; mean max. in July = 30.2°C.) in an unheated room. The minimum light intensity in the cages was 175 lux (=16.3 foot-candles). The birds were weighed every 2 days before dawn: gaseous metabolism was measured under standard resting conditions (postabsorption, nocturnal, 18°C.) every 14 days; metabolizable energy income was determined over consecutive 10-day periods. The latter datum is computed from the difference between gross energy intake and excretory energy output, and includes energy available to the bird for maintenance, work, and storage, minus a variable fraction potentially lost in the calorigenic effect (S.D.A.) of the ration and in bacterial utilization and fermentation in the gut.

The data are also given in terms of "work metabolism" *(Arbeitsumsatz),* which is the difference between resting metabolic rate and metabolizable energy income, and as the *Energiebilanz,* which is defined (p. 51) as ". . . Ruheumsatzkalorien geteilt durch Arbeitskalorien. . . ." However, it obviously has been computed (Table 9) as the inverse of the ratio, *i.e.,* as "work metabolism"/ resting metabolism. It should be clearly understood that this version of the energy balance does not denote the ratio of input to output. Both terms of the *Energiebilanz* represent energy expenditure; hence variation in the ratio reflects changes in the partition of energy output. When the caloric income is equally divided between "work metabolism" and resting metabolism the ratio will be equal to unity.

Values above unity indicate that more energy is being expended in "work metabolism" than in resting (maintenance) metabolism. As a numerical device for comparing seasonal changes in energy expenditure the *Energiebilanz* has a certain utility. Its interpretation is complicated, however, by the fact that both terms of the ratio include energy fractions which are spent in thermoregulation. In the case of the "work metabolism" this fraction will vary annually in correlation with the ambient temperature; accordingly, the percent contribution of the upper term of the ratio to the total thermoregulatory expenditure also varies annually. This situation makes it rather difficult to decide what value should be regarded, at different times of the year, as a "favorable" or an "unfavorable" balance.

The metabolism data, without exception, have been expressed on the basis of unit total weight of the birds, *i.e.*, as kcal/kg/day, or kcal/kg/hr. of daylight. Although this basis of comparison is clearly advantageous in many types of investigations, it is my opinion that here it is an unfortunate choice. In studying animals in which there is a considerable temporal variation in the fat content of the body we deal largely with variation in metabolically inactive triglycerides and water, which constitute roughly 75% of the weight of adipose tissue. A simple example will illustrate the effect on metabolism data of body weight change resulting from fat deposition. An average female Brambling in August consumes 20.6 kcal/day in metabolizable energy and weighs 22.4 gm. In October, her weight increases to 27.4 gm. and she consumes on the average, 22.6 kcal/day, for an increase of about 10% in energy income. On the basis of total body weight, however, the data are 922 and 825 kcal/kg/day, or a *decrease* of about 10%! The energy intake of the bird *as an individual* has thus increased, while there has been an apparent decline on the basis of unit total weight. This situation is well known in investigations of the energetics of obesity (von Döbeln, *Acta Physiol. Scand.*, **37**(Suppl. 126): 1-78, 1956) and is circumvented by expressing data on the basis of unit fat-free weight. This datum is not frequently known in investigations of wild animals, but data can be given on a "per individual" basis to obviate the effect of fattening. Dr. Rautenberg has recognized this problem, but has dismissed it by reference to evidence on the high turnover rate of labeled fatty acids in depot fat. This high turnover is equated with high respiratory rate, but such an assumption cannot be made safely. It is well established that the metabolic rate of ordinary adipose tissue (as distinguished from brown fat), even on a fat-free dry-weight basis, is much lower than that of other tissues (Shapiro & Wertheimer, *Metabolism*, **5**:79-86, 1956). It is apparent that Dr. Rautenberg's data are open to alternative interpretations, which will now be discussed in relation to his own.

The mean body weight of the Bramblings showed two annual peaks (resulting from deposition of fat) which corresponded to the vernal and autumnal periods of migration. The increase in the vernal phase amounted to 11.3 percent of the minimum attained during the prenuptial molt; it began in the last half of March and continued through April. Body weight declined slowly in May and very rapidly in June to a midsummer (postnuptial molt) low. The autumnal increase attained a maximum in October which was about 23 percent greater than the summer minimum. The mean body weight of the House Sparrow showed only minor variation, slowly increasing from a vernal minimum of about 24.4 gm. to an October maximum of about 26.5 gm.

As the data on the metabolism of the Brambling are expressed, it appears that there is a high peak of metabolizable energy income in March, and that the metabolizable energy remains relatively stable during the remainder of the year. Resting metabolism appears to exhibit a slight increase in July and August, during the molt, and to fall considerably below normal levels in September. Autumnal adiposity, according to this analysis of the data, develops during a period of (apparently) unaltered energy intake and (apparently) decreased resting metabolism. It is suggested that the decline in resting metabolism, which is presumed to result from a decrease in the catabolic influence of the thyroid and gonads, permits a more economical utilization of energy and a consequent sparing of energy for storage as fat.

It is at this point, however, that the data are especially open to a different interpretation. A recalculation of data, insofar as possible on a "per bird" basis to abolish the influence of changes in body composition, indicates that there was an autumnal *increase* in mean energy intake per individual and an over-all *increase* in resting metabolism per individual. For male Bramblings in 1954, the mean body weight in August, September, and October was, respectively, 22.9, 26.0, and 28.5 gm.; metabolizable energy, in the same order, was 19.2, 22.5, and 23.2 kcal/bird/day (Rautenberg's data: 838, 864, and 815 kcal/kg/day); the resting metabolism, in the same order, was: 11.6, 11.2, and 12.3 kcal/bird/day (Rautenberg's data: 508, 430, 433 kcal/kg/day). The data for female Bramblings followed essentially the same pattern. Although it is possible that a different picture would emerge if the data could be plotted as individual points rather than as monthly means, the recalculated values clearly suggest that autumnal fat deposition is at least in part the result of hyperphagia, *i.e.*, simple over-eating.

With respect to the energetic basis of vernal fattening in the Brambling, it is stated (p. 51) that a comparison of the data ". . . lässt vermuten, dass der Gewichtsanstieg des Bergfinken im April durch die günstige Energiebilanz im März verursacht ist . . . (Diagr. 3) zeigt, dass der Gewichtsanstieg bzw. Fettablagerung von der Grösse der Gesamtumsatzes abhängt." However, because of the temporal discrepancy, it seems doubtful that this statement was meant to be accepted literally. The suspicion arises that the discrepancy may be the result of the effect of fattening on the expression of the data, but a rough recalculation of the individual plots given in Fig. 3 does not justify this suspicion. These data are shown below. They must be regarded as only approximate, since the figure cannot be read with close accuracy.

Date	Mean Body Wt.	Metabolizable Energy	
		kcal/bird/day	kcal/kg/day
10 March	21.9 gm.	21.9	1000
17 March	21.9	26.7	1220
25 March	21.9	25.0	1140
10 April	23.0	20.1	875
22 April	24.7	22.2	900
27 April	25.5	21.9	860

Because of the fact that the increase in energy income occurred during a period of constant weight, the original values show about the same relationships as do the recalculated values. On either basis it is difficult to rationalize the data with the hypothesis that vernal fattening in the Brambling results directly from increased food intake. The period of high vernal intake, as far as these data show, is associated with constant mean body weight. The additional suggestion is made that increasing daylength, rapidly increasing ambient temperature, and a lag in the adjustment on energy income to these altered conditions may facilitate the development of a favorable energy balance. This is reasonable enough, but it must be noted that the major increase in temperature occurred between February (mean = —0.2°C.) and March (mean = 6°C.). The mean April temperature increased to only 8.6°C. Likewise, energy intake per hour of daylight was highest in March and declined in April. It should be noted also that the Bramblings were weighed before dawn, and hence after a night of fasting, often at low ambient temperatures.

One is led to wonder if the hyperphagia of early March did not indeed engender increased fat reserves, which were lost, however, in the energy expenditure of nocturnal thermoregulation and which were therefore not detected in pre-dawn weighings. It may be surmised that as nocturnal temperatures ameliorated in April there was a decreasing overnight loss of weight, giving the appearance, from pre-dawn weighings, that the rate of fat deposition was increasing. Unfortunately, this speculation cannot be tested by the data available, and in the reviewer's opinion the energetic basis for vernal fattening in the Brambling remains unknown.

It is of interest to note, however, that Dr. Rautenberg's observations apparently conform with those of Merkel *(Ber. Ver. schles. Ornith.*, **23**:1-72, 1938) on *Sylvia borin,* in which the period of high premigratory food intake was associated with only a slight increase in body weight, while during the period of rapid fat deposition immediately before migration *(Zugunruhe)* began there was no hyperphagia. Although there is good evidence that the energy for vernal fattening in several species of passerines is the result largely of hyperphagia *(vide* King & Farner, *Proc. Soc. Exp. Biol. Med.*, **93**:354-359, 1956), the observations of Rautenberg and Merkel clearly urge caution in generalizing these findings into an all-inclusive hypothesis. It is widely agreed that fat reserves are an important element in the migratory economy of small birds, but it is eminently possible that different species emphasize different mechanisms in establishing these reserves.

The metabolism data for the House Sparrow, because the body fat of this species did not vary greatly during the investigations, are not seriously affected by the original method of expression. Between January and April the metabolizable energy did not appear to differ significantly from that of the Brambling. It is suggested that the earlier onset of gonadal maturation with its attendant increase in catabolic functions prevents fat deposition in the House Sparrow; endocrinological evidence is cited in support of this viewpoint.

Not previously mentioned, but of considerable interest, are the data on the nocturnal cycle of resting metabolism. Measurements of the resting metabolic rate of both species were made at half-hour intervals throughout the night for several months. The cycle of resting metabolism in the Brambling showed a minimum value at 0300 in February; in March the minimum was attained at about 0100, and the metabolic rate remained at this level until about 0500; in April, the minimum rate was likewise reached at 0100, but began to increase significantly again at about 0230. The cycle thus exhibited a rough correlation with the duration of darkness. Since external time-clues were absent in the silent, darkened metabolism chamber, it is suggested that the metabolic activity of the bird was influenced by an "internal clock." The seasonal variation in the 24-hour cycle of resting metabolism ("rythm nycthéméral" of various French authors) should be of considerable interest to investigators seeking to determine the minimum resting metabolic rate. The time of the night at which the minimum rate is attained appears to vary annually in birds subjected to normal conditions of temperature and photoperiod.

In summarizing his conclusions, concerning the etiology of premigratory adiposity, Dr. Rautenberg says (reviewer's translation): "We therefore consider it possible that fat deposition in birds results not only from surplus energy, but also that a simultaneous hormonal stimulus is necessary. The following hypothesis may be conceived: in Bramblings, energy surplus and gonadotrophic stimulation occur simultaneously (in March), and result in fat deposition. In House Sparrows, the activity of the anterior lobe has already begun in February. It is limited to the gonads, however, because fat deposition is prevented by unfavorable energy conditions. In April, when the ecological conditions and therefore the energy balance of the birds are improved, it is too late for fat deposition. The counteraction of the mature gonads is so far advanced that the energy surplus can no longer be diverted by endocrine processes to fat reserves."

Dr. Rautenberg has undertaken a laborious and well-conceived investigation which has yielded very important data. Other students of avian migration could very profitably follow his lead with comparative studies. It is suggested, however, that careful consideration be given to the units in which metabolism data are expressed, especially in investigations involving species which exhibit great seasonal variation in fat reserves.—James R. King.

62. The Influence of Temperature and Experience on the Homing Ability of Homing Pigeons. (Einfluss von Temperatur und Erfahrung auf das Heimfindevermögen von Brieftauben.) Gustav Kramer. 1954. *Journal für Ornithologie*, **95**(3/4): 343-347. Homing performance was definitely poorer in cold weather.—D. S. Farner.

MORPHOLOGY AND ANATOMY
(See also Numbers 25, 42)

63. Biometric Observations on the Mid- and West German Populations of the English Sparrow. (Biometrische Bemerkungen über mitteldeutsche und westdeutsche Sperlingspopulationen.) Hans Grim. 1954. *Journal für Ornithologie*, **95**(3/4): 306-318. Analyses of the weights and measurements of large samples indicate statistically significant differences in weight and wing length among local populations. Compared with Nordrhein-Westfalen populations birds from central Germany have greater wing lengths and probably greater body weights. There is a strong positive correlation between body weight and wing length. There is a weak positive correlation between bill length and body weight. —D. S. Farner.

PLUMAGES AND MOLTS
(See Numbers 25, 57)

ZOOGEOGRAPHY
(See also Numbers 9, 10, 19, 42, 48, 56)

64. An Investigation of a Population of the Collared Turtle Dove. (Untersuchungen an einer Population der Türkentabue.) Fritz-Bernhard Hofstetter. 1954. *Journal für Ornithologie,* **95**(3/4): 348-410. This very extensive study of a local population of *Streptopelia decaocto* is of special interest because of the species' recent range expansion. Restrictions of space permit comment on only a few of the more salient results. The population contained 75 birds in December 1952 compared to about 35 the year before. By the spring of 1954 the entire city was well colonized. Food consists of fruit and seeds (especially chicken feed). A common area is used by the entire population during the non-breeding season primarily because of its greater availability of food. During the breeding season birds may come as far as 1 kilometer to feed. The common sleeping places were generally outside of this area and, in winter, were generally used by most of the population with spontaneous shifts from one site to another. Breeding territories varied between 1.5 and 10.6 hectares in area. Territories are obtained either by "marriage" or by occupation of previously unoccupied space by a young pair. Nest construction is effected by the female while the male brings the nesting material. With the exception of that of a single pair, all nests were built in trees. Old nests were frequently reused. Copulation occurs 9-10 days before egg laying. Nest construction for a subsequent brood begins a day before to a day after the departure of the preceding brood from the nest. If a nest is destroyed, preparation for a new nesting begins within 2 or 3 days. The breeding season extends from early March to late October. Normal clutch size is five. About 60% of the broods produced at least one fledgling. From 100 broods about 100 young left the nest. Each pair is reported to produce about five young per year. At the beginning of the breeding season of 1953 the population still included 60% of the young banded as fledglings in 1952 and 46% of those banded in 1951. —D. S. Farner.

65. Collared Doves in Norfolk: a Bird New to the British Isles. R. A. Richardson, M. J. Seago and A. C. Church. 1957. *British Birds,* **50**(6): 239-246, This species, *Streptopelia decaocto,* which has made such a spectacular invasion of western Europe in recent years, has bred since 1955 in Great Britain. Two or three pairs nested successfully in Norfolk in 1956, one pair being triple-brooded. Notes are given on song, display, and plumage, and a painting of parent and young reproduced in color as a frontipiece.—M. M. Nice.

66. The boundaries of distribution of the Serin in Northwestern Europe. (Vom Grenzraum der Verbreitung des Girlitzes im nordwestlichen Europa.) H. Kumerloeve. 1957. *Ornithologische Mitteilungen,* **9**: 130-132. In a short discussion of the northern distribution limits of the Serin *(Serinus canarius),* the author comments that this bird's preference for parks and the "English garden" biotopes results in a spotty distribution. New colonies appear in the cities and extend gradually into favorable surrounding areas. He thus refers to a boundary area rather than a boundary line.—R. O. Bender.

67. Birds of Stora Karlsö. (Från Stora Karlsö.) B. Flach. 1957. *Vår Fågelvärd,* **16**: 112-118. (English summary.) This is a continuation of the author's previous review *(Fauna och Flora,* 1953) of the avifauna of Stora Karlsö, a small island in the midst of the Baltic Sea. From 1952 to 1956, 11 new species were recorded, most of which were accidentals or migrants. Notable was the Red-breasted Flycatcher *(Muscicapa parva),* a rarity for Sweden, which nested on the island. Several species of ducks, especially Old Squaws *(Clangula hyemalis),* appeared in greater numbers than before, but the release of oil in late December 1956 claimed the lives of some 30,000 Old Squaws and of many Cormorants *(Phalacrocorax carbo).* An influx of woodpeckers was observed in August 1956 and a few Red Crossbills *(Loxia curvirostra)* were present every year from 1953 and bred on the island in 1954.—Louise de K. Lawrence.

68. Birds of the Torne region, Lapland. (Fågelnytt från Torne lappmark. Torneträsk-Paittasjärvi.) Jens Wahlstedt. 1957. *Fauna och Flora,* **1-2:** 19-33. An annotated list of 62 species resulted from a week's sojourn in late June 1956 in this northern area. The song of the Red-throated Pipit *(Anthus cervinus)* was the object of special study and is described in detail. Notable was the absence in general of raptors, including the Snowy Owl *(Nyctea scandiaca),* despite the existence of suitable habitats, because of the scarcity of lemmings, but a more plentiful population of voles induced Long-tailed Skuas *(Stercorarius longicaudus)* in fair numbers to breed in the area.—Louise de K. Lawrence.

69. Birds of a southward-sloping mountain in Lapland. (Fågellivet på Vakketjåkko, ett sydväxt berg norr om Torne Träsk.) Karl-Göran Bringer. 1957. *Fauna och Flora,* **1-2:** 34-48. The discussion of the birdlife and its intimate relationships to the specific alpine vegetation of this dolomitic escarpment appears especially timely in view of the mining operations that have been started there. The author concludes his account with these words: "The future of the mountain is shrouded in gloom. Extensive mining would ruin the unique vegetation on its southern slopes. What effect this would have on the birdlife is difficult to predict . . . . It is to be hoped that this account, in a few years' time, will not remain as a necrology over a now-living mountain that died."—Louise de K. Lawrence.

SYSTEMATICS

70. Variation in *Seiurus noveboracensis.* Stephen W. Eaton. 1957. Auk, **74**(2): 229-239. Eaton has utilized standard statistical methods of analysis in this examination of variation in the Northern Waterthrush. With no explanation as to rationale employed, the population is divided into 11 samples. Variation in color of venter, dorsum, superciliary stripe, wing length, bill length are analyzed. Eaton points out that white tipping of the inner vanes of one to four of the outer pairs of rectrices is a normal condition of the plumage following the first post-nuptial molt. This white tipping appears as an anomalous condition in a few birds in first winter plumage. With this character as a known Eaton is able to deduce that more birds in first winter plumage reach the northern areas of distribution in the spring than do older birds. The data on geographic variation are interpreted (and it appears rightly so) to indicate a lack of validity of the races *S. n. limnaeus* McCabe and Miller and *S. n. uliginosus* Burleigh and Peters.—J. C. Dickinson, Jr.

71. Notes on the Song Sparrows of the Mexican Plateau. Allan R. Phillips and Robert W. Dickerman. The Auk, **74**(3): 376-382. To the three previously named subspecies of *Melospiza melodia* from Mexico two more are suggested. With 4 males and 1 female at hand *M. m. yuriria* is proposed as the designation of a subspecies known only from Lago de Yuriria, Granajuato. Sixteen specimens from the Lake Pátzcuaro region of Michoacán provide the basis for the name *M. m. villai.*—J. C. Dickinson, Jr.

EVOLUTION
(See also Number 30)

72. An Embryological Comparison of the Domestic Fowl and the Red-winged Blackbird. Joseph Carl Daniel, Jr. 1957. *Auk,* **74**(3): 340-358. An interesting attack on the problem of the evolution of the altricial condition of hatching in birds is made by comparing the embryological development of the chicken *(Gallus domesticus)* and the Red-winged Blackbird *(Agelaius phoeniceus fortis).* The Blackbird required 12 days of incubation for hatching. Most of the conditions necessary for hatching are present in the chick embryo at the 12th to 13th day of incubation. Daniel concludes that the nidicolous forms could have evolved a 12- to 13-day incubation period because the ancestral nidifugous forms were in an essentially hatchable state at that age.—J. C. Dickinson, Jr.

FOOD
(See also Numbers 16, 27, 52, 75, 80)

73. Bird Foods and Feeding-Habits as Subjects for Amateur Research. John Gibb and P. H. T. Hartley. 1957. *British Birds,* **50**(7): 278-291. An exceedingly interesting paper, full of stimulating suggestions. The subjects are: methods of study, diets, feeding stations, feeding habits, feeding routines, food requirements, the experimental approach, the numbers of birds and the amount of their food. The two pages of references are mostly from British authors.—M. M. Nice.

SONG
(See also Number 43)

74. Recorded calls of the Eastern Crow as attractants and repellents. Hubert Frings and Mable Frings. 1957. *Journal of Wildlife Management,* **21**(1): 91. Tape recorded assembly calls, such as those heard when crows discover an owl or a cat, are remarkably attractive to crows. When broadcast even where crows are neither seen nor heard, the calls usually attract crows within a few minutes. If observers remain hidden, crows will come practically to the speaker. Alarm calls are repellent.

Having observed the great attractiveness of recorded calls to Willow Ptarmigan and Wilson Snipe, this reviewer is led to speculate on the possible uses of recorded calls to attract certain species of birds to banding traps.—Oliver H. Hewitt.

PHOTOGRAPHY

75. Photographic Studies of Some Less Familiar Birds. LXXXII. Great Grey Shrike. I. J. Ferguson-Lees. 1957. *British Birds,* **50**(6): 250-253. *Lanius excubitor,* which we call the Northern Shrike, is the most widespread of the 22 species in the genus. "Its breeding range extends from well within the Arctic Circle almost to the Equator, and at about latitude 60°N. it goes right round the world." Photographs from Spain by Eric Hosking and Switzerland by F. Göttschi show nesting pairs. The nest in Spain was watched when the young were about 2-4 days old; during one period of 3 hours they were fed 43 times by both parents. Insects, spiders, and lizards were brought, while "at least two shrews were stuffed down the young whole." "Particularly in the more northerly parts of the bird's range, many more small birds are taken; yet some of the desert races are almost exclusively insectivorous."—M. M. Nice.

76. Counting Flocks of Roosting Birds by Photography. R. E. Drinnan and M. G. Ridpath. 1957. *Bird Study,* **4**(3): 149-159. Describes two techniques of counting accurately large flocks of birds in motion, one by means of a consecutive series of still photographs, the other from a continuous motion picture record of the passing flock. The authors used these methods to count Rooks flying to their roosts at dusk and Oyster-catchers flying between their feeding and nesting grounds between tides. The techniques are useful when it is impossible to photograph the entire flock at rest. Despite certain difficulties, which they discuss, the authors claim flocks can be counted this way with a maximum error of ± 5 percent.—O. L. Austin, Jr.

BOOKS AND MONOGRAPHS

77. Johann Friedrich Naumann. Father of German Ornithology. His Life and Works. (Johann Friedrich Naumann, der Altmeister der deutchen Vogelkunde, Sein Leben und seine Werke.) Peter Thomsen and Erwin Stresemann. 1957. Barth, Leipzig. pp., 212/12 plates.—Prof. Thomsen, as husband of a granddaughter of J. F. Naumann, came into possession of a forgotten store of letters to and from the famous ornithologist. He wrote a biography of his wife's grandfather, but, failing to find a publisher, asked Prof. Stresemann to collaborate with him. This little book is the happy result. The Naumanns had been farmers and wild-fowlers for generations—and there was an incredible number of birds in those days. We are given a vivid picture of J. A. Naumann (1744-1826) with his passion for watching and keeping birds, and of the help rendered him by his three young sons in trapping and collecting birds, and in the case of Johann Friedrich (1780-1857) in painting birds for J. A. Naumann's pioneer work on the birds of the region. Johann Friedrich's own volumes on "*Die Naturgeschichte der Vögel Deutschlands,*" published between 1820 and 1844, exerted a tremendous influence on German students of birds. In 1893 Alfred Newton wrote that it "is by far the best thing of the kind as yet produced in any country. The fulness and accuracy of the text, combined with the beauty of its colored plates, have gone far to promote the study of ornithology in Germany, and while essentially a popular work, since it is suited to the comprehension of all readers, it is throughout written with a simple dignity that commends it to the serious and scientific."

This excellent biography covers J. F. Naumann's travels, his family and friends, and his interest in plants, with a final chapter on his work in the judgment of later generations. There are 10 pages of notes, a bibliography of J. A. and J. F. Naumann, a list of sources for the biographies of both men, bibliographical notes on all persons mentioned in the text, and a subject index. All in all, a fitting tribute to a great ornithologist on the hundredth anniversary of his death.—M. M. Nice.

78. On the Trail of Vanishing Birds. Robert Porter Allen. 1957. McGraw-Hill Book Company, Inc., New York, 251 pp., ill. Price $4.50. The steady retreat of the world's birds as the human population expands and inexorably changes the landscape is all too familiar and disheartening. Strangely, however, few ornithologists do anything about it actively; most of us are content to glean what knowledge we can of the existing forms while they last and to leave the conservation fight to others. Here is a first-hand account of the difficulties encountered by an ornithologist who courageously refuses to admit that extinction is inevitable, and who has devoted his life not only to studying but to trying to save some of the most threatened—and most glamorous—elements of our avifauna. Allen's technical reports on the Whooping Crane, the Flamingo, and the Roseate Spoonbill have made him the unquestioned authority on these species. Here he tells the intriguing story behind his scientific work, his adventures afield, his trials, disappointments, and successes, culminating of course in his discovery of the Whooper's long-sought breeding ground. As one would expect, most of the book concerns his experiences with the Whooping Cranes which, thanks almost entirely to his efforts, now have at least a fighting chance to survive. The chapters on his work with the Spoonbills and Flamingos are no less fascinating, and just as significant despite the lesser amount of publicity these species have received. The book makes excellent reading. It is written simply, directly, and entertainingly, with a minimum of technical details to bog the layman down. We need more Bob Allens!—O. L. Austin, Jr.

79. Natural History of Birds. Leonard W. Wing. 1956. Ronald Press Co., New York. xi + 539 pp. Price $6.75. With the great need for an up-to-date, comprehensive textbook on ornithology for college use, it is a shame that this attempt at one should be so badly done. The book covers the field fairly well and gathers together a good deal of miscellaneous information, but in every other aspect it falls so far short of competence I don't see how any mere editor could be expected to correct its faults without re-researching the basic data and rewriting the text completely. The brief section on banding, for instance, which the author dismisses in 1½ pages of awkward prose (pp. 469-471) under the heading "Bird Bandings" (sic), tells the student little of possible significance or value. His account of this important aspect of modern ornithology is a mishmash of generalized and somewhat inaccurate information that fails to mention why or how birds are banded, how records are kept and processed, or what use can be and is being made of the resulting data. After T. R. Howell's long and detailed criticism of the book (*Auk*, **74**(2): 396-401), with which needless to say I agree completely, I see no need of wasting space to point out more of its shortcomings.—O. L. Austin, Jr.

80. Hawks, Owls and Wildlife. John J. Craighead and Frank C. Craighead, Jr. 1956. The Stackpole Company and Wildlife Management Institute. XIX + 443 pp. 1 colored plate, 67 photographs, 100 tables, 22 text maps, 12 text figures. $7.50. This is a study of predation by raptorial birds. It is, without question, an important book for every professional worker in the field of wildlife management, and in due course is likely to have a much wider impact. It materially extends the limits of factual information on predation, and its conclusions tend to take on the stature of natural laws.

Predation has long been a controversial subject, and on the whole but little progress has been made toward reducing the differences of opinion. The initial assumption of the Craighead study goes to the root of this difficulty: predation is so complex that it cannot be understood except in terms of entire populations. The direct and immediate effects of particular acts of predation are evident enough to the farmer, the sportsman, and the wildlife research man who see them taking place from day to day, and rarely agree upon their interpretation. The indirect effects, the wide-spreading repercussions of each particular act upon all the other acts which accompany and follow it, are very much less evident. Even the research man has not fully perceived them, nor does he find it easy to trace them. Yet these more remote effects, and the checks and balances which they provide, are what reconcile the surface contradictions of predation. To understand predation, it is necessary to measure the total effect of a composite predator population upon a composite prey population, and to do so over an extended period of time. The data must include the simultaneous quantitative determination of the numbers, movements, and food habits of the predator population, and the numbers, distributional densities, and vulnerability of the prey.

The Craigheads have gone about the collection of their required data upon a scale not previously attempted. The thoroughness of their field work can hardly be appreciated without reading the text, but an outline will be suggestive. To begin with, they chose a study area where hawks and owls made up the bulk of the predator population and thus concentrated their attention upon the raptors, with only enough supplementary work on mammals to indicate that what they learned of the birds was largely true of the animals as well. The area selected was a township (36 square miles) in southeastern Michigan. A census route laid out over 40 miles of dirt road, with observation for a quarter-mile strip on each side, gave coverage of approximately 18 square miles, or one-half the total area. In the fall, winter and spring of 1941-42 this route was driven by car 18 times, and all raptor observations recorded on cover-maps to determine total numbers and the nature and extent of hunting ranges. Owls were censused by a systematic search of all woodlots (11% of township). Food habits were determined by collection and analysis of more than 4000 pellets, supplemented by observation of actual kills. Prey densities were sampled in some detail on eight typical sections, and total numbers estimated by projection for the township. With the coming of spring, nests were located by the systematic and repeated search of every woodlot, and summer food habits determined by collection of prey brought to the young.

In the summer of 1947, for comparative purposes, a parallel study of a nesting population of raptors was made on an area of 12 square miles in northwestern Wyoming, where a deep cover of snow during the winter has the effect of transferring the heaviest pressure of predation on small prey species into the warmer months. In 1947-48 the Michigan area was re-worked, with 20 additional population counts and further collection of winter food pellets. In all, the two investigators spent 800 days each in the field, walked 2000 miles, climbed 1200 trees to examine nests and collect food samples, located 331 nests in use, and studied 40 of them intensively. And to round out this listing, between 1939 and 1942 they fed in captivity 29 birds of prey, of different species and for varying periods of time, to obtain quantitative data on food requirements.

The harvest of these years of field work is as much greater than anything previously gathered together as the scope of the effort indicates it should be. In general, it is of two sorts. The collected data alone include a wealth of new information about hawks and owls—numbers, daily and seasonal movements, daily routine, food habits, and reproduction—and anyone with more than a casual interest in these birds will wish to read the text. The more widely significant parts of the book, however, are the chapters in which the Craigheads apply their data to the synthesizing of the whole picture, the philosophy, of predation. Predation is a biological process which tends to prevent excessive increases of prey species. The pressure of a collective predator population on a collective prey population is roughly proportional to the relative densities of prey species. Collective predation on a collective prey tends to depress the various prey species toward their thresholds of security simultaneously, so that no one species can draw enough predation to endanger its existence. The pressure of predation is not only proportionate but steady, and thus tends to hold the increase of prey species below the point where less persistent but more drastic forces, such as intraspecific conflict, starvation and disease, come into play. Predation is a basic natural force; it must be understood by naturalist and sportsman alike before management can be fully effective. Predator control by man, except on a local, short-term basis for economic reasons, draws no justification from biological fact.

Hawks, Owls and Wildlife is by no means an easy book to read, but those who take the time to digest it will be well repaid by its stores of primary data on raptors, its reasoned conclusions on predation.—Joseph A. Hagar.

LETTERS TO THE EDITOR

October 30, 1957

Sir:

Probably no two netters will ever have precisely similar experiences. This leads me to suggest a few more footnotes to Mr. Low's splendid article in the July, 1957 number of *Bird-Banding.*

1. I agree in general with the comments about thrush nets on page 117, but under special conditions they have been very useful in taking mourning doves, grackles, and flickers.

2. It should be noted on the same page that the shelfstrings are subject to permanent stretch, which is best remedied by shortening them as close as possible to one end of the string.

3. There are some situations not mentioned at the top of page 119 which I have found particularly useful. Nets between two hedges work well and sometimes across a stream bed even if it is dry or nearly so. One may also improve take in forest by cutting flight paths. These are merely straight passageways about three feet wide and extending from the knees to the shoulders of the bander. They should be 40 to 60 feet long.

4. If one does roll up a net on a mailing tube or similar object (in Tropics I have used pieces of bamboo about 15 inches long with a septum in the middle) one should be sure to roll and not wind. If one does wind, the net receives a half-turn of torsion for each turn around the stick and this makes it difficult to set the net if one does the natural thing and unrolls it.

5. I find that bands on legs make almost no trouble if great care is taken to close them tight leaving no notch in which a thread can lodge.

6. I would add to the list of bad actors (pp. 125-126) bluebirds and the smaller woodpeckers.

Yours very truly,

Charles H. Blake

Box 613,
Hillsboro, N. C.

November 10, 1957

Sir:

In his review of Lanyon's *The Comparative Biology of the Meadowlarks* (*Bird-Banding*, **38:** 249, 1957) Austin suggests hybridization and cytological techniques in the final determination of speciation of meadowlarks. Another technique in species determination was suggested to me two years ago by Professor Linus C. Pauling of California Institute of Technology. He stated his belief that the hemoglobin molecule differs in structure as between every species, and that hemoglobin structure would be a reliable index of animal species.

Sincerely yours,

Oscar M. Root

Brooks School,
North Andover, Massachusetts