SUMMARY

During the period 1945-1960, 126 Brown Thrashers were banded at Arcadia Wildlife Sanctuary in Northampton and Easthampton, Massachusetts. An examination of the return records showed that only 34 birds of the 126 banded returned, or 27 percent. One bird returned seven times, reaching an age of eight. A red plastic band on this bird lasted five years. From a group of returns with definite determinations, a sex ratio of 13 males and 9 females was found. Eleven of the returning birds, or 10 percent, were adults when banded. Two birds, or 2 percent, were immatures when banded. — Edwin A. Mason, Arcadia Wildlife Sanctuary. Northampton, Massachusetts.

RECENT LITERATURE

MIGRATION

1. Problems of Mediterranean-Saharan migration. R. E. Moreau. 1961. *Ibis,* **103a**(3): 373-427; **103a**(4): 580-623. Two vast and largely land-locked seas, the Gulf of Mexico and the Mediterranean, pose problems for birds migrating back and forth between holarctic and tropical regions. Many European ornithologists have felt that such birds tend to detour around the widest parts of the Mediterranean. The most commanding voice of dissent for more than two decades has been that of R. E. Moreau. Now in a 99-page synthesis, he reviews the reasons for his deepening conviction that the smaller migrants usually cross the Mediterranean on a broad front.

The Gulf of Mexico exceeds the Mediterranean in north-south expanse but is far inferior in east-west dimension. At first glance the average trans-Gulf migrant would seem to risk more to gain less than the average trans-Mediterranean migrant. Moreau demolishes this notion. Most crossings of the Mediterranean are closely linked with at least a 900-mile traverse of the Sahara, where to land without shade is to court death and where the oases are like "a few dozen teacups" scattered in a football field. Worse still, spring migrants must expect head winds everywhere over the desert unless they fly northeastward, at high altitude. Moreau believes that most adopt the diagonal course, which though much longer in mileage should average much shorter in time. He rates the journey from central African latitudes to Europe "potentially the morst arduous to be performed regularly by a mass of land-birds anywhere in the world." In spite of the greater distances involved in migration across the Banda Sea, he may be right. Certainly his conclusion that trans-Saharan migrants must be able to continue for 2 to 2½ days without refueling well exceeds the most pessimistic estimates for trans-Gulf passage.

A belt of vegetation varying in width from more than 200 miles to only a few miles intervenes between the Mediterranean and the northern edge of the desert. Here spring migrants from south of the Sahara can pause before launching out again on another nonstop flight, this time over the sea. Observations of grounded migrants all along this belt of vegetation in spring are the core of the evidence that most small bird traffic between Europe and Africa is on a broad front. Moreau assembles the data from 8 sectors of the southern Mediterranean coast for 57 species of non-soaring land birds, nearly all the birds of this sort that breed wholly or partly within the same longitudes as North Africa and winter wholly or almost wholly south of the Sahara. He presents these data both in a series of species accounts and in a semigraphic table somewhat reminiscent of the table of relative abundance once provided for the Gulf of Mexico (see *Bird-Banding,* **29** (1): Review 5).

Though migrants are obviously much more numerous in fall than in spring, the volume of migration usually appears much greater at the latter season to field observers along the northern shores of the Gulf of Mexico. Such too has been the case in Moreau's central sectors — Algeria, Tunisia, Tripoli, and Cyrenaica. But both to the east and to the west of these sectors, the seasonal disparity is not so great. The general situation suggests that most migrants with adaptations for the difficult spring flight across the Sahara have ample reserves for a nonstop passage from Europe to their wintering grounds in autumn, when the air flows are more favorable. This assumption provides an alternative explanation of much of the evidence for such phenomena as "loop migration" and the European migratory divide.

Moreau is keenly aware how delusive counts of grounded migrants are. Repeatedly the reader senses loopholes in reasoning and just as repeatedly finds them anticipated. The process has a disarming quality, but it does not remove the difficulty

that ambiguous data are almost the only materials available for the construction of hypotheses regarding the immense subject to which Moreau has here devoted so much labor, skill, and insight. He does not pretend otherwise. He frankly states that most of the views he expresses are entirely provisional.

The thought may arise that the birds seen along the central sectors of the south shores of the Mediterranean could be the ecologically concentrated product of drift from routes lying well to the east or west. Moreau's reasons for rejecting such an explanation are not conclusive, but they are extremely interesting. He cites 51 records of small transients recovered in subsequent seasons at the locality in Tunisia where they were banded. Such precise adherence to individual routes suggests to him a system of navigation accurate enough to place rather rigid limits on drift. — R. J. Newman.

2. Movements at sea between southwest Iberia and northwest Africa. C. H. Fry. 1961. *Ibis,* **103a**(2): 291-293. A review of current papers and published notes offers a means of making a vicarious trip from west to east through the Mediterranean region, a journey that Moreau's latest analysis renders extremely opportune. The tour begins on 21-22 September 1959 in the Atlantic with Fry's observations aboard a ship sailing straight from the Canary Islands to Cadiz.

While east winds were blowing, the vessel transected a bird movement that appeared "sufficiently vigorous and directed" to be an extensive broad-front migration. Fry identified approximately 140 land birds of 16 species. Half the species were Old-World warblers, but more than half the individuals were Turtle Doves (*Streptopelia turtur*). Some birds that came aboard stayed long enough to be carried back 100 miles northward. A few permitted capture. Yet Fry considered none unduly exhausted. The data add to the proof that, on occasion at least, numbers of migrants pass from Iberia to Africa over oceanic courses west of the entrance to the Mediterranean. — R. J. Newman.

3. Further observations on migration in southwest Iberia. C. J. Henty. 1961. *Ibis* **103a**(1): 28-36. Henty momentarily takes us backward from Cadiz to Cape St. Vincent, Portugal, the westernmost extremity of the coast of southern Europe, well east of the Canaries and even more to the east of the farthest bulge of Africa into the Atlantic. Mist-netting operations on the Cape in the autumn of 1957 (*Bird-Banding,* **30**(3): Review 2) had revealed the presence of many small nocturnally migrating transients. Now in the following fall, Henty and six helpers tried to determine whether similar concentrations occur all along the southwest coast of the Iberian Peninsula.

The results are difficult to evaluate. Mist-netting at the Cape in 1958 yielded 448 birds, far fewer than in 1957, and revealed no pronounced migration waves. At other points on the coast the nets were ineffective. The only simultaneously studied stations were the Cape and Quarteira, about 50 miles away. Since the data are mist-netting results in the one case and counts of grounded migrants in the other, no direct comparison is possible. Subsequently the party moved systematically eastward along the coast, with stops of several days at three other well-spaced localities, the last of these being Tarifa at the Straits of Gibraltar. A table shows that the number of grounded night migrants of eight species recorded at Quarteira and Isla Christina, about 45 miles to the east, were very similar. The other localities seem to have been less productive. Grounded night migrants were particularly scarce at the Straits. Henty's own conclusion is that "these observations . . . indicate that autumn migration through S. W. Iberia is on a broad front."

Little raptor movement occurred in south Portugal or on the Coto Donaña, north west of the Straits), but concentration at Tarifa was marked. Small easterly movements of swallows were visible along part of the southwest coast of the Peninsula, but these did not lead to a stream along the length of that coast. The inference is that the birds were going out to sea somewhere along the line. Much larger flights near Tarifa seemed to originate from inland. — R. J. Newman.

4. On the birds of the south of Spain with special reference to migration (spring 1959). Sobre aves del sur de España con especial referencia a migración (primavera 1959). P. P. Feeny. 1960. *Ardeola,* **6**(1): 125-150. (With English summary). A change of season finds our review tour still stalled in western Spain. Feeny and the other members of his expedition, in the field from 26 March to 19

April 1959, concentrated attention on the stretch of coast between Cadiz and Gibraltar. There they did not meet with the large number of nocturnal migrants anticipated, and no "waves" developed. Feeny attributes the paucity of observations to generally good weather, which encouraged birds to continue on inland before alighting. As in autumn, the observations of raptors were almost exclusively confined to the Straits. Prominent among diurnal migrants were swallows (*Hirundo rustica*), which usually flew low, and Bee-eaters (*Meriops apiaster*), which usually flew higher. The large numbers of shore birds in the Guadalquivir Valley suggested that this valley may be the principal migratory route for such birds in southwest Spain. A systematic section gives brief accounts for 74 species. — R. J. Newman and F. J. Rolle.

5. Migration from Morocco into southwest Spain in relation to weather. I. C. T. Nisbet, P. R. Evans, and P. P. Feeny, 1961. *Ibis*, **103a**(3): 349-372. "Under these circumstances [clear, moonlit nights], the reviewer finds it hard to understand why, after journeying all the way to Portugal expressly to study migration, the party made no effort to secure direct information on nocturnal migration by watching the moon — information without which the other data remain ambiguous." The quotation is from a 1959 issue of *Bird-Banding* (**30** (3): 187). Now, members of another party *have* used moon-watching data as the foundation of a study of spring immigration from Africa into the Iberian Peninsula.

Interest centered on the number of migrants using the shortest crossing over the Straits of Gibraltar in comparison with the number flying over the greater stretch of ocean just west of the Straits. During approximately 21 station-hours of simultaneous lunar observation spread over 5 nights, computed migration traffic at Tarifa (terminus for the minimal crossing) exceeded that at San Lucar de la Barameda (terminus for a longer, more westerly crossing) in the overwhelming ratio of 33 to 1. The calculated nightly heading of nocturnal migrants crossing before the moon at the Straits was usually between north and north-northeast, but was northwest on a night when clouds hid the stars. As in radar studies, where no other method is possible, these headings were derived on the still debatable premise that night migrants never compensate for drift. By frequently permitting judgments regarding both track and heading, moon watching provides a possible observational test of this assumption, but no one has yet made such a test.

A feature of Moreau's paper not mentioned in Review 1 is his calculation, based on population density, that the number of trans-Mediterranean migrants should average roughly 2,000 per mile of front per day during a 2-month spring season. The stated figure for the period of moonwatching at the Straits is several thousand per *hour*. The actual hourly mean, calculable from the data given, barely exceeds 2,000; but even the disproportion between 2,000 birds per day and 2,000 birds per hour, sustained for 6 hours, remains immense. The ways of explaining the difference are several. The simplest is to assume that many birds detour around the Mediterranean after all. Another is to doubt that five nights of experience at any locality at an optimal time can lead to a reasonably close approximation of the local mean for an entire spring.

Misbet, Evans, and Feeny favor neither of these extremes. They suggest instead that drift and topographic lines of influence may combine to concentrate migration that began on a broad front. The African shoreline slants northeastward as it approaches the Straits. If night migrants can distinguish between land and sea, as seems probable on moonlit nights at least, reluctance to launch out over the ocean might divert many of them toward the Straits. The radar data of Lack from Britain discourage such an idea; but these data, obtained in a special insular situation, do not necessarily represent the reactions of nocturnal migrants in general in other parts of the world. The possible role of drift is in delicate balance. It must have been strong enough to nudge trans-Mediterranean migrants toward the Straits, yet too weak to carry them beyond. Really powerful east winds seem to be able to push migrants to the Atlantic crossing, west of the Straits. As evidence of the latter effect, the authors point out that grounded migrants in numbers were found west of Trafalgar only during east winds. They also cite instances of drift on the part of small diurnal migrants and probable instances involving raptors.

Tables compare the varying amounts of grounded migration on the Spanish coast with weather variables in Morocco. When statistically analyzed, the migration quantities showed correlation with dry weather and rising night temperature in Morocco but not with high temperature *per se*. — R. J. Newman.

6. Notes on the migration of swallows in southeast Spain. Nota sobre migracion de hirundinidos en el SE de España. José J. Tato Cumming. 1960. *Ardeola,* **6**(2): 364-366. The observations, dating from August 1959 through the first days of October, mostly concern movements of *Hirundo rustica* near the shores of the small embayment of the Mediterranean known as the Mar Menor. The author pictures the movements as being most strongly influenced by topography — by mountains and seas that channel low-level flight. He considers convergence of topographically determined flight lines to be the reason why great numbers of swallows congregate at certain favored resting points in southeast Spain.

Though deemphasized, meteorological factors were involved in some of the events described. Almost without exception, Barn Swallows followed the trend of the coast of the Mar Menor as long as it remained southwesterly. Where the shoreline swerves suddenly eastward, they usually retained their original direction and cut across the base of the Cabo (Cape) de Palos; yet on one occasion, when a brisk warm breeze was blowing from the southeast, they turned into the wind and skimmed over the water in the direction of the Cape. Once when a storm front had crossed their path farther to the west, the birds could be observed returning. And the irregular presence of *Delichon urbica, Riparia riparia,* and *Apus apus* in the flights of *Hirundo rustica* coincided with bad weather.

The author visualizes a funneling of small migrants in general toward the short crossing at the Straits of Gibraltar. But he speaks of a tendency of the larger birds seen from his vantage point to head south or southwestward, directions that if maintained would carry them out over a much wider expanse of sea.—R.J. Newman.

7. Notes concerning migrants observed during a trip to Spain in the spring of 1959. Nota sobre migradores observados durante un viaje por España (primavera 1959). R. Lévêque. 1960. *Ardeola,* **6**(2): 348-351. These notes, frankly a byproduct of a more general exploration, understandably contribute little to the solution of migration problems, though they cover a period of more than 5 weeks, and a wide range of territory extending all the way to France. Seven of the 14 species accounts deal with water birds. Most of the nocturnally migrating species encountered are merely listed, without data. — R. J. Newman.

8. Observations concerning migration at Beauduc, Camargue, in the springs of 1959 and 1960. Observations sur la migration à Beauduc, Camargue, aux printemps 1959 et 1960. (With English summary.) Peter Hope Jones. 1961. *Alauda,* **29**(2): 118-133. At last this series of reviews leaves Spain behind and reaches the Camargue. Though this "island" in the Rhone Delta is ornithologically the most celebrated region in France, few previous data exist concerning the migration there. Jones devoted a total of 3 months to his investigations, which were concentrated in a small area near the Mediterranean shoreline. Most of his discussion concerns diurnal migrants, even though their numbers were usually so light that much watching was required to produce even modest dividends. Two of the three heaviest visible flights began immediately after the passage of storms. Though strong southeast and east-southeast winds were involved, Jones suspects that the bad weather moved in from the sea toward the coast more slowly than migrants normally fly and that the birds tended to accumulate behind the storm line. On the third occasion a strong head wind induced many normally high-flying birds, particularly swifts, to descend low enough to be seen. Most day migrants flew over the area on a north-northeast bearing, perhaps in response to a diversion line running in this direction. Their track indicates that these birds came in from the sea, and a table gives records for 20 species actually seen arriving from over the water. A rather surprising inclusion is the House Sparrow (*Passer domesticus*).

The paper implies that considerable time was devoted to the mist-netting of night migrants and to the banding, weighing, and measuring of the birds caught. The data from this phase of the work are reported in less detail. In calm weather, most of the catches of nocturnal migrants took place early in the morning; but when massive influxes of new arrivals were under way, results remained good all day long. Such influxes most commonly occurred 1 or 2 days after strong north or northwest winds had died away. On the northern coast of the Gulf of Mexico, in contrast, the big landfalls of night migrants are most likely to take place while northerly winds are blowing. — R. J. Newman.

9. Autumn migration in Greece. P. P. G. Bateson and I. C. T. Nisbet. 1961. *Ibis,* **103a**(4): 503-516. Recent regional reports on Mediterranean migration skip over Italy to Greece, where two parties worked from 18 August to 11 September 1960 and obtained the first lunar counts of birds ever made in that country. Most of Greece is a peninsula surrounded by wide expanses of sea. The observation there of numbers of transients, particularly in the southern part, would be unlikely unless these migrants were about to undertake transmarine passage. In this connection, the 23 hours of nearly simultaneous moon-watching in northern and southern Greece, representing 5 nights, provide considerable insight. Though the data are objective, they can be expressed in various ways. For convenience, the ways employed on this review will not always be exactly the same as those of the authors.

In both sections of Greece, the main flight direction was very close to south. In other words, most of the birds were heading toward a direct crossing of the Mediterranean. In the northern section, the flight had a small eastward component that could be regarded as part of a circum-marine movement toward Turkey; but it also had a stronger westward component difficult to explain in terms of routes. The amount of migration according to lunar criteria was abut 78 percent as large in southern Greece as in northern Greece. If only the southward-moving portions of the flights are compared, the percentage remains appreciably inferior. But the total computed migration for the southern stations exceeds the southerly migration at the northern stations by a wide margin. A north-northeast component at the southern stations accounts for part of the discrepancy. A total of 42 hours devoted to a search for resting night migrants produced hourly means of 20.3 for northern Greece and 15.7 for southern Greece. The 77 percent relation between these figures is remarkably close to the percentage derived from the lunar counts. The sum of the hourly means for the 10 hours of the night when lunar watches were made is 10,170 birds, 2½ times Moreau's estimate of the average number of trans-Mediterranean migrants that should cross a mile of front in a 24-hour period in fall. Even if one deducts a liberal allowance for the birds that were not flying in southerly directions, the 10-hour figure still remains double Moreau's 24-hour estimate. Thus the statement by Bateson and Nisbet that their average migration density "is of the same order as the average density calculated by Moreau" should perhaps not be construed too literally.

A feature of the paper by Nisbet, Evans, and Feeny not mentioned in Review 5 is that moon-watching at Tarifa revealed no major variations in the density of migration with the time of the night. The present paper makes a similar claim with regard to the results between 8 p.m. and 2 a.m. Actually, except for an aberrantly high density in the hour following midnight, the figures for the whole 10-hour period closely fit the smoothly ascending-descending pattern of hour-to-hour change exhibited by fall migration in America. In fact, 26½ hours of observation have seldom before reproduced the pattern with such fidelity. — R. J. Newman.

10. Notes on autumn migration at the Bosphorus and in the Aegean. D. K. Ballance and S. L. B. Lee. 1961. *Ibis,* **103a**(2):195-204. The Aegean is a broad northward extension of the Mediterranean interposed between most of Turkey and most of Greece. It connects eventually with the Black Sea by way of the Dardanelles, the lake-sized Sea of Marmora, and the straits called the Bosporus. In August and early September 1959, four observers in two parties visited all these places to look for concentrations of night migrants and to gather the first systematic notes on southward daytime migration in the area so early in the season.

They found only moderate numbers of either nocturnally or diurnally migrating passerines. Among their highest counts were: 40 Spotted Flycatchers (*Musicapa striata*), Bosporus, 28 August; 80 Willow Warblers (*Phylloscopus trochilus*), Bosporus, 2 September; and a flock of 200 Yellow Wagtails (*Motacilla flava*), Küçük, Cekmece, 1 September. Prominent among small nonpasserines were *Meriops apiaster,* and the inevitable *Streptopelia turtur.* Observations of soaring birds were more numerous. Tables give counts for 14 species of storks and raptors seen "migrating East or S.E. in the Bosphorus area," on 20 dates. How many birds of these species were observed migrating in other directions is not clear. The figures favor the conclusion that the autumn movement of such birds is inhibited by strong northeasterly winds. White Storks (*Ciconia ciconia*) outnumbered the next most abundantly observed species (*Pernis apivorus*) more than 3 to 1. This result is surprising, since two long-time observers at the Bosporus writing 90 years ago had

never witnessed an autumn passage of White Storks there. Other highlights in the water bird category were the arrival of seven herons (*Ardea cinerea, Egretta garzetta*) flying wrong way into a strong northeast wind, the unprecedentedly large number of Little Gulls (*Larus minutus*) noted on the Bosporus, and the first Eastern Mediterranean records of the Arctic Tern (*Sterna paradisaea*). — R. J. Newman.

11. Spring migration of raptors in Bulgaria. Anthony Lambert. 1961. *Ibis,* **103a**(1):130-131. Bulgaria borders the Black Sea. It is separated from the Bosporus only by a relatively narrow strip of Turkish territory. So these spring notes provide a timely comparison with the report summarized in the preceding review.

Observations in late March 1960 of large flights of hawks along with Rooks, cranes, storks, and herons in the Burgas region of eastern Bulgaria suggest to Lambert that large birds of prey migrating across the Bosporus follow the coast of the Black Sea as far as its westernmost point and pass into Europe through the east-west valleys of the "Balkan Corridor," which lies along the south side of the Balkan Range. Additional observations indicate that terns, bee-eaters, doves, and shrikes may also use the same route. Such marked responsiveness of the smaller birds to details of topography seems at variance with the concepts of Moreau. — Stuart L. Warter.

12. Migration through Cyprus. W. R. P. Bourne. 1960. *Proceedings XII Ornithological Congress*: 127-132. This synopsis of the findings of the reactivated Cyprus Ornithological Society deals with the most easterly island of the Mediterranean, situated "where there is a local concentration of the great migration between the Palearctic and Ethiopian regions as birds fly around the eastern extremity" of that sea. The species treated are many and diverse, and the sources of evidence are several — banding recoveries, observer networks, moon watching, and radar.

Large numbers of migrants visit Cyprus annually. They occur in greatest numbers in spring, probably because conditions then are most conducive to lingering. The banded birds recovered there come from places as far apart as Britain and Moscow, but the bulk of the passage migrants are from the northwest rather than the northeast — a circumstance suggesting that transients from the latter source tend to travel overland. Radar returns have created the impression of immense flights of small birds, moving over the area too high to be seen, mainly during the first half of the night just as in the case of lunar silhouettes in America. But maximal counts of birds passing before the moon at Cyprus were only six per hour in fall, three in 80 minutes in spring — poor by United States standards yet sustaining almost exactly in their modest way the New-World moon-watchers' experience that twice as many birds go south in autumn as return in spring. Whether radar has exaggerated the volume of migration over Cyprus or lunar observation has unduly minimized it are questions that still remain to be decided. From the ordinary field observer's viewpoint, Barn Swallows (*Hirundo rustica*) have made up a large part of the transmarine migration visible by ordinary means, just as in many other places on many other occasions. In line with previous findings, their "biggest coastal passage occurred with relatively unfavourable weather conditions, and the smallest coastal passage occurred when birds were going out to sea in greatest numbers high overhead . . ."

On the basis of his general summary, Bourne ventures the following conclusions: that "under the stable weather conditions which prevail in the Mediterranean area the majority of small birds seem to fly higher, and pay less attention to topography than they do in northern Europe"; that "many birds must make a definite detour around the Mediterranean, avoiding the central Mediterranean-Sahara crossing to Africa by passing through the Middle East"; and yet that "different species seem to respond to the necessity to cross the Mediterranean and desert zone in different ways." Presumed differential behavior in the last regard is not taxonomically separated. He illustrates it by contrasts among closely related Old-World warblers, as well as by contrasts among large "soaring" birds — herons and cranes, harriers and falcons. — R. J. Newman.

13. Some land birds noted at sea between Mombasa and the English Channel. R. Charles Long. 1961. *Ibis,* **103a**(1): 131-133. Fittingly, our review tour, which began with an ocean voyage, ends with an ocean voyage. Long's terse ornithological

log of the latter journey, 27 April - 17 May, lists 34 nonpasserine land birds of 7 species and 113 passerines of 6 species. No land birds at all appeared while the ship was in the Indian Ocean, off the east coast of Africa, and only a very few were noted during the passage through the Gulf of Aden and the Red Sea. In contrast, 80 Yellow Wagtails (*Motacilla flava*), including examples of 3 subspecies, landed on the vessel on May 8 in the mid-Mediterranean, southwest of Greece, and 24 European Redstarts (*Phoenicurus phoenicurus*) came on board on May 10, off the coast of Italy. Eight Turtle Doves (*Streptopelia turtur*), 2 Barn Swallows (*Hirundo rustica*), and 2 Yellow Wagtails were the only birds noted beyond the Straits of Gibraltar. All in all, the present results are not as impressive as those of Fry from west of the entrance to the Mediterranean (Review 2).

Considered in retrospect, the material summarized in the preceding reviews appears to be as chaotic a mixture as the jumble of land and water from which it came. One can understand why Moreau placed such emphasis on events along the more regular southern shore of the Mediterranean. — R. J. Newman.

14. Studying migration by moon-watching. I. C. T. Nisbet. 1961. *Bird Migration,* **2**(1): 38-42, with figure facing p. 44. Replicated moon-watching is one of the main means Moreau has suggested for the eventual solution of the immense migration problems associated with the Mediterranean and the Sahara. Dr. Nisbet has been a major force in initiating such investigations (see Reviews 5 and 9). Here he promotes this line of research in another way by making readily available to the European reader a discussion of the principles of migration study by moon watching, its field procedures, processing phase, advantages, disadvantages, and applications. As a stringently brief résumé of a complex subject, the treatment is in general excellent. But the many American migration students already familiar with the subject will be most interested in details regarding which Nisbet expresses views that differ from the previous consensus.

For example, Nisbet says that high-powered binoculars are better for moon-watching than telescopes, since they cause less eyestrain. Yet repeated experience has shown that a single observer using a 20-x spotting scope can watch the moon 40 minutes out of every hour (20 minutes with each eye) from dusk to dawn without undue visual fatigue. The use of a polaroid filter to reduce the glare of the full moon and of an eyepatch to rest the unemployed eye has been helpful in this regard. But one may doubt seriously that under any circumstances, an observer could stare with both eyes at the moon for 40 minutes out of every hour for 12 hours as comfortably. Direct comparison tests between 20-x scopes and 10-x binoculars, which Nisbet calls not too small, have indicated that the larger instrument is at least 40 percent more effective. His own preference for instruments of less than 20-x magnification is perhaps one of the factors that has convinced him that "small birds cannot be seen at ranges of much over a mile." In actual trials in Louisiana, a mounted Parula Warbler viewed against the daytime sky remained clearly visible at a distance of a mile through the 20-x scope and was still discernible at a mile and a half. A warbler of the same small size thrown into sharp relief against the moon and passing far above the layer of greatest atmospheric interference, should remain visible at even greater distances. Such common migrants as thrushes, tanagers, and the like — much larger but still classifiable as "small" migrants — should be perceptible nearly twice as far away as the Parula.

The counsel that "it is wise to avoid places where birds might perhaps be channelled by topographical features" needs modification. One of the greatest opportunities of moonwatchers working in cooperation with other moon-watchers is their chance to compare results at such places with results at adjacent localities where no channelling effect is to be anticipated.

As an experienced practitioner of both the moon-watching and radar methods of migration study, Nisbet is eminently qualified to compare the two. As comparative drawbacks of lunar study, he lists the small area covered, the limitation to clear weather and to only a few nights each month, and the mathematical labor required to obtain statistically valuable results. As comparative advantages, he points out that the moon-counts can be conducted anywhere by anyone and that they provide a direct and accurate estimate of the number of birds in the air, whereas radar can at best measure only the number of flocks. The veteran moon-watcher might take some exception, but he still would certainly agree that both methods, judiciously applied, can work well together toward a solution of migration problems. —R. J. Newman.

15. Flight speeds of some small birds. Oliver P. Pearson. 1961. *Condor,* **63**(6): 506-507. Moreau's forthright conclusion that a migrant embarking on a flight across the Sahara must be prepared to remain aloft for 50 to 60 hours raises crucial physiological questions. All the provisional answers that can be given to these questions at present go back for their ultimate basis to measurements Pearson made a decade ago of the metabolic rate of hummingbirds hovering in a belt jar.

By making several assumptions — that the energy requirements of straightaway flight approximate those of hovering, that hummingbirds migrate at an air speed of 50 mph, and that their fuel reserves do not exceed 1 gram of fat — Pearson himself calculated the maximum range of nonstop travel as 385 miles, considerably less than the distance across the Gulf of Mexico. Later Odum and Connell (*Science,* **123:** 892) found Ruby-throated Hummingbirds with 2.1 grams of fat, seemingly more than enough for a direct Gulf crossing.

Recently Pearson released Allen's Hummingbirds in a large culvert. As they emerged, a motion-picture camera photographed them against a 1-inch grid and, by means of a mirror arrangement, recorded their distance from the grid. The flight speeds shown by the film were only 23.8 and 18.2 mph, less than half the speed originally assumed. This drastic reduction in velocity neatly cancels the gain in estimated cruising range conferred by the doubling of the assumed fat reserves. So once again experimental evidence seems to discredit the ability of hummingbirds to cross the Gulf.

But the new data by no means substitute certainty for uncertainty. That birds fly at full cruising speed near the ground is open to question. That they would reach such speed after flying only 30 feet in the semidarkness of a pipe is even more so. Instructive in this connection are five species of fringillids that Pearson tested in the same manner. He rated them at a mean of less than 17 mph, not much more than half the mean for small migrating passerines indicated by radar. — R. J. Newman.

16. Lipid deposition in nocturnal migrant birds. Eugene P. Odum. 1960. *Proceedings XII International Ornithological Congress*: 563-575." . . . the ratio between energy required for everyday life [existence energy] and that required for sustained strenuous work is of the same order of magnitude in horses and hummingbirds," says Odum. This conclusion provides a starting point for estimating the nonstop flight capacity of an individual bird at a given time from its fat store of energy. In doing so, Odum assumes that the requirements for sustained flight are between two and three times existence energy and that migrants of the 10 species on which he is reporting tend to fly at an air speed of 30 mph. In the present study he carefully extracted and measured the fat content of 308 birds of the 10 species, all killed in Florida in autumn, while actually migrating, by collision with the famous Leon County Florida TV tower (see *Bird-Banding,* **32**(4): Review 35).

The ratings show variation from species to species. Presumably, the leanest Scarlet Tanager (*Piranga olivacea*) carried enough fuel for at least 700 miles more of travel, while the fattest White-throated Sparrow (*Zonotrichia albicollis*) had reserves for only another 400 miles. These findings fit prediction. The sparrow was near its destination; the tanager was bound for South America. Less expected is the great intraspecific variation among some birds that winter in the United States sparingly or not at all, such as Red-eyed Vireos (*Vireo olivaceus*) and Indigo Buntings (*Passerina cyanea*). In both species, the calculated distance equivalent of the fat reserve ranges from 50 miles to more than 1200 miles. But a majority of the buntings are in the lower half of the range, and a majority of the vireos are in the upper half. Two immature Scarlet Tanagers and an adult Bobolink (*Dolichonyx oryzivorus*), with 50 percent of the body weight fat, are the fattest birds yet recorded. They should have been able to fly more than 1700 miles without alighting.

No adequate information is available regarding the extent to which palaearctic migrants put on fat. Therefore Moreau in his discussion of the physiological problems of a Saharan crossing has had to hypothesize on the basis of Odum's fat determinations for American long-distance migrants. But he frankly points out reasons why the conclusions about the possible lengths of nonstop flight must be regarded as very doubtful. First, the foundation provided by Pearson is untrustworthy, since it is based on the average of readings that "varied from 165/cc./g./hr. to 23". Second, Odum has overestimated distances by failing to make allowance for the effect of the different loads of fat the birds are carrying. The reviewer might add that the time of collision introduces another unknown variable. Birds that strike

the tower after migrating most of the night have obviously already used up a much larger part of their capacity for sustained flight than birds that are killed soon after taking wing. — R. J. Newman.

17. Premigratory hyperphagia in birds. Eugene P. Odum. 1960. *American Journal of Clinical Nutrition,* **8**(5): 621-629. Savannah Sparrows begin migration *before,* and White-throated Sparrows usually *after,* their fat reaches a peak. Scarlet Tanagers become extremely obese just prior to long flights. Odum uses these species to exemplify three patterns of lipid deposition. The distinction between the first two patterns is temporal and clear-cut. The third differs from the other two in the vastly greater quantity of fat involved, but Odum does not sharply define its qualitative relationships. Does the Scarlet Tanager start out with moderate fat and later build up a maximal supply in some staging area? If so, its pattern as a pattern strongly resembles that of the Savannah Sparrow. Or does this tanager load itself to capacity before ever starting to migrate? If so, its pattern is a larger-scale repetition of the sequence in the White-throated Sparrow. Whatever the case, Odum believes that the Ruby-throated Hummingbird exhibits pattern 3. Individuals have now been found with as much as 2.6 grams of fat, which was 78 percent of the total dry weight, the highest percentage recorded in any species.

The recognition of different patterns of fat deposition emphasizes the need for experimental laboratory research on birds typical of all three. Work with the Bobolink, an outstanding long-distance migrant, has already begun at several laboratories. —R. J. Newman.

18. Fat-free weights of birds. C. E. Connell, E. P. Odum, and H. Kale. 1960. *Auk,* 77(1): 1-9. This paper expands upon a finding mentioned in the preceding one. Weight minus fat is rather constant for all members of a species. Some variation does occur with differences in basic body size due to sex, age, or race, and in the postmigratory phase fat-free weight seems to drop somewhat below the year-around mean. Still, a bander can closely approximate the true fat content of a migrant by simply subtracting the average fat-free weight for the species from the total weight of the bird. An actual trial has shown that he can do so much more accurately than by the external criteria heretofore most commonly employed.

Through analysis of four subspecies of the Savannah Sparrow, the authors demonstrate an almost exact correlation between variations in wing-length (usually a good indicator of basic body size) and variations in fat-free weight. They state that generally the fat-free weight increases 0.30 grams for each mm. of wing length in birds of small and medium size. But they could not incorporate these refinements in their table giving fat-free weights for 13 additional species.

Odum and his colleagues have performed a great service to migration study by opening a brand new field of investigation with a vast potential. Yet it is one that field workers cannot exploit fully until ornithological laboratories provide more data. Though we can count on Odum to be in the forefront of future progress, his determinations will probably always be tinged with admitted geographic bias. A pressing need is for physiologists in other parts of the United States to venture down the path he has pioneered. — R. J. Newman.

19. Flight energy and estimated flight ranges of some migratory birds. E. P. Odum, C. E. Connell, and H. L. Stoddard. 1961. *Auk,* **78**(4): 515-527. Repetition of the material in the three reports just reviewed makes up much of the content of the present one. A graph provides a handy means of reading the estimated flight range of a small migratory bird directly from its amount of body fat as a percentage of total live weight. Two curves are included. One represents the previous assumption that the energy required for migratory flight is three times existence energy. The other takes into special account the energy needed to sustain in the air the ever-diminishing cargo of the extra fat itself. Its premise is that "flight energy of a lean bird is two times existence energy . . . and increases proportional to the average weight of the bird during the trip." Whereas the corrections for fat loading cited by Moreau (see Review 16) shorten the previously estimated flight ranges, the new method of Odum and his colleagues produces increases of as much as 400 miles in the case of birds with a fat weight less than half the total weight.

Comparison of Summer Tanagers (*Piranga rubra*) and Hooded Warblers (*Wilsonia citrina*) taken in spring with individuals taken in fall indicates that the flight estimates are of the right order of magnitude. The great variation in the

lipid content of fall Red-eyed Vireos (*Vireo olivaceus*) has influenced the authors to make the following suggestion: "Since Red-eyed Vireos presumably follow both the Florida-West Indian route and the trans-Gulf route, it may be that the fat birds would have gone by sea and the lean birds by land!" The difficulty is how to envision the journey via Florida and the Caribbean as a trip overland. The infrequency with which Red-eyed Vireos have been recorded in the West Indies seems to permit only two alternatives: either very few of these vireos use Caribbean routes or else the majority tend to fly nonstop. And the direct distance across the Caribbean, from the tip of Florida to South America, far exceeds the distance across the Gulf. — R. J. Newman.

20. Lipase activity in the heart muscle of a migratory and a nonmigratory bird. J. C. George and P. Thomas Iype. 1961. *Auk,* **78**(4): 633-634. Comparison of the migratory Rosy Pastor (*Pastor roseus*) and the nonmigratory Common Myna (*Acridotheres tristis*), birds similar in size, revealed 31 percent higher lipase activity in the cardiac muscles of the latter. The result suggests that *Pastor roseus* may have a lower heart rate, adapted to prolonged and sustained flight. — R. J. Newman.

21. *Zugunruhe* activity in castrated Bramblings *Fringilla montifringilla*. B. Lofts and A. J. Marshall. 1961. *Ibis,* **103a**(2): 189-190. Migrations by liberated castrates and the arrival of some normal birds at their breeding grounds with apparently inactive gonads have cast doubt on once general belief that gonadal hormones strongly influence the spring flights of migrants. But these evidences are inconclusive. Flocking inclinations might have induced castrates to travel along with their intact fellows, and gonads can become active without perceptible enlargement.

Lofts and Marshall have attacked the problem by carefully removing the testes of adult Bramblings, photo-stimulating the birds, and then testing their migratory restlessness in activity cages. The controls exhibited *Zugunruhe* somewhat before the castrates, but both groups reached similar seasonal peaks of intensity at the same time. On a nightly hour-to-hour basis, the activity curve for the controls began much higher, but ended much lower, than that of the castrates. The authors conclude that the seasonal phenomena of migratory unrest and gonad development occur independently. — R. J. Newman.

22. Some aspects on the directing and releasing influence of wind conditions on visible bird migration. Staffan Ulfstrand. 1960. *Proceedings XII International Ornithological Congress*: 730-736. Opinions about the factors releasing bird migration and the general effects of wind on migration have been diverse. Concentrating attention on diurnal migrants, Ulfstrand suggests that this diversity may in large part be due to the geographic position of the observation localities and to their surrounding topography. To demonstrate, he sets up a model situation, contrasting impressions of the same migratory movement as seen from the southwest corner of a land mass, a locality in the central part of the mass, and an oceanic island offshore.

A table compares the probable relative amounts of migration likely to be observed from the three vantage points under conditions of calm and seven different combinations of wind direction and velocity. In no instance are the predicted results uniform, and in four of the eight cases the viewpoints of all three stations disagree. The situation is hypothetical, but it has close real counterparts in Europe. The principles from which the imaginary station ratings are derived are unproved, but they are widely accepted. The most debatable assumption from the American viewpoint is that head winds have "a directly stimulating effect on the release of bird migration"; and later Ulfstrand himself concedes that "it might be that head-winds merely contribute to the concentration of flight-lines." But such an objection is minor. With any conceivable set of premises, migration as ordinarily observed from the three postulated watching posts should be modified by misleading local influences and therefore encourage geographically biased conclusions. Ulfstrand's central thesis "that it is very difficult, even impossible to make general decisions . . . from studies at one place only" seems well-sustained. The question remains how many currently accepted generalizations, when critically examined, can really meet the test of having been demonstrated at many times and at many diverse places. — R. J. Newman.

23. The influence of wind on the migration of swallows. Claes Ramel. 1960. *Proceedings XII International Ornithological Congress*: 626-630. Data from Swedish bird observatories in late summer and early fall show maximal numbers of swallows flying against the wind and minimal numbers moving downwind. Indeed, from 18 August to 4 September 1947, when the wind was almost constantly northerly, 10,000 swifts and swallows were recorded at the Ottenby station actually travelling northward, counter to the normal seasonal direction of migration as well as to the wind.

Ramel does not insist that migrants in general react to the wind as swallows seem to do. He points out that swallows feed on the wing while migrating. To do so they have to travel at the lower atmospheric levels where airborne insects are abundant but where higher turbulence makes gliding flight downwind both inefficient and dangerous. — R. J. Newman.

24. About wintering and migration of the Common Crane (*Grus grus*) in Spain. F. Bernis. 1960. *Proceedings XII Ornithological Congress*: 110-117. Results of extensive inquiries (presumably by mailed questionnaire) show that the wintering area of *Grus grus* in the Iberian Peninsula is much more extensive than once supposed and that the preferred habitat there is country where stretches of open ilex woods alternate with corn and legume fields and pastures. The migration range is pictured as a broad band extending northeast-southwest across the middle of the peninsula, with a central line of concentration that eventually swerves southward to cross the Straits of Gibraltar to Africa on a front no more than 30 miles wide. Some of the fringe movements point to the possibility of drift. — R. J. Newman.

25. Magnitude of crane migrations in eastern Washington, 1950-1951. Charles F. Yocom and Henry A. Hansen. 1961. *Murrelet,* **41**(3): 41. Sandhill Cranes (*Grus canadensis*) on spring migration congregated at two resting areas east of the Cascades, where as many as 1000 birds were seen in one day. Observations indicated that some of the departing flocks passed northward along river valleys. — R. J. Newman.

26. A spring migration of waterfowl in briefly favorable weather. J. W. Johnson, A. B. Pack, and G. Jonkel. 1961. *South Dakota Bird Notes,* **13**(3): 64-70. The editor of this publication of the South Dakota Ornithologists' Union, the United States Weather Bureau State Climatologist for South Dakota, and a biologist have contributed to a "symposium of events" concerning an April northward movement of waterfowl at Huron, South Dakota. An extensive movement of birds was correlated with a backing shift to southerly surface winds of 10 to 30 mph, which prevailed for more than 13 hours during the day and evening of 5 April 1960. This wind shift was occasioned by the passage of a high pressure cell and the approach of a warm front preceding a weak low pressure cell. It provided the tail winds usually associated with such "pressure-pattern flying." — Stuart L. Warter.

27. Mass migration. Dorothy Makin. 1961. *Emu,* **61**(2): 139-141. For a 3-hour period ending at 3 a.m. on 25 September 1960, a large flight of land birds passed over the Pine Islet Lightstation, located about 70 miles southeast of Mackay, Queensland, Australia. Many of these birds, flying in a light rain, were seen to be confused by the beams from the light itself, and by light reflected from the low cloud cover. A few birds were taken by hand during the night at the light, and several more were located in the sparse vegetation surrounding it after daylight. — Stuart L. Warter.

28. Migration at Falsterbo 1957. Report No. 18 from Falsterbo Bird Station. (Fagelstracket vid Falsterbo ar 1957.) Sven Mathiasson. 1961. *Var Fagelvarld,* **20**:226-240. (English summary.) This report contains several interesting items. The station was manned by at least two observers from 31 March to 30 November, the longest period in its history. The spring migration was, on the whole, sparse. Correlated with this was the apparently slow recovery of a number of species hard hit by disaster in 1956. A remarkable feature was the visible reverse migration, i.e. birds flying south instead of north. In the period 31 March to 31 May, it exceeded by 3,686 individuals the number of birds seen flying north.

The fall migration appeared more "normal," although here the "disaster" species

also failed to show signs of adequate recovery. The fluctuations from year to year of certain species are tabled and discussed. Among the birds of the Falsterbo region, the Carrion Crow (*Corvus c. corone*) occupies prominence by its spectacular increase in recent years. Although proof of nesting is still lacking, several hybrids, crosses between Carrion and Hooded Crows (*C. cornix*), were observed during the fall. — Louise de K. Lawrence.

POPULATION DYNAMICS

29. Nesting Success of Birds on a Farm in Southern Michigan. H. Lewis Batts, Jr. 1961. *Jack-Pine Warbler,* **39**(2):72-83. A report on the nesting success of birds (a total of 54 species) on a 64-acre tract of land from 1948-1950. The success of the 40 species which nested for 2 or 3 years is summarized in Table 2 according to site of nest. The results were: of 59 open nests in trees 41 percent succeeded, of 164 nests in undergrowth 45 percent, of 109 nests on the ground 57 percent, and of 85 nests in cavities 67 percent. The success of the 332 open nests averaged 47.7 percent. These figures agree well with the 49 percent success of 7,788 open nests of altricial birds reported in 24 studies and with the 66 percent of 94,400 eggs in 33 studies of hole-nesting altricial birds (Nice, M. M., 1957, *Auk,* **74**:305-321).

Cowbird parasitism was light — only 38-39 eggs in 34 nests; 14 of these (36-37 percent) fledged. The chief causes of nest loss were predation, destruction by the elements, and desertion. House Wrens were the chief predators of the eggs in cavity nests.

"Reproductive increase was measured in the percentage of adult breeding birds that was represented by the fledglings which they produced (average number of fledglings produced per breeding adult)." This was as follows: tree nesters, 81 percent, undergrowth nesters 114 percent, ground nesters 145 percent, and cavity nesters 200 percent. — M. M. Nice.

30. Nesting Success Calculated from Exposure. Harold Mayfield. 1961. *Wilson Bulletin,* **73**(3):255-261. Mayfield starts from the perfectly valid, but often overlooked, point that observed losses can be related only to the period of actual observation. Assuming that the rate of loss varies in some definable way (invariant in the present article) the actual loss per unit of exposure can be found and from this the total loss over the whole duration of a phenomenon, such as incubation or fledging. The author gives so clear an illustration of his procedure that even those who are gunshy of mathematics will be able to use it. The reviewer will only point out that a number is more quickly raised to a power by logarithms than by repeated multiplication by itself. If the lesson of the article is learned the credibility of nesting success figures will be greatly enhanced. — C. H. Blake.

31. Preliminary Method for Estimating Stability in Plankton. B. C. Patten. 1961. *Science,* **134**(3484):1010-1011. Although applied to plankton, the method given here might be applied to comparing the variability of a population of birds over a period of years to the variability of a set of environmental factors such as mean temperature, rainfall, food items, predator populations, etc. taken all together. The measure used is an empirical one which implies a linear effect of each variable upon the population. The article has one major defect: the calculation of "transition probabilities" is not explained and the reviewer cannot work it out with certainty from the example in Table 1. — C. H. Blake.

BEHAVIOR

32. On distraction displays and so called "play" behavior in birds. (Avledningsbeteenden och s. k. lekyttringar hos faglar.) Martin Markgren. 1961. *Var Fagelvarld,* **20**:214-224. (English summary.) All too often students of animal behavior fall into the habit of using accepted terms without making clear to themselves through careful analysis whether these expressions actually fit the behavior they wish to describe. In this paper the author discusses two kinds of behavior, distraction displays and "play" rituals. He disassociates himself from such terms as "injury feigning," "dance," and "play," suggesting that they are unrealistic. To illustrate his point he makes a clever analysis of the distraction display of a Dotterel (*Charadrius morinellus*), showing that its display is a "dynamically balanced" behavior pattern including aggressive, escape, and *brooding* drives, which alternate with the constantly changing situation.

As to the terms "play" and "dance," he suggests that they be eliminated from ethological parlance. They were brought into use primarily based on the anthropomorphic conceptions of casual observers who saw sexual and other displays of birds without realizing their intrinsic meaning and underlying tendencies. The author denies the probability of birds being within the level of organization that permits play as an acting performance and dance as rhythmic movement executed for the mere pleasure of motion. From my own experience with woodpeckers, I fully agree. The shortcoming, however, rests not with the birds but with the observer who lacks the penetration to see them as they really are, living and reacting in full accordance with their station within the organization of life.

My one criticism of this stimulating paper is that it is too short and incomplete. It is to be hoped that this talented observer will eventually publish a more extensive dissertation on a subject he apparently understands exceptionally well. — Louise de K. Lawrence.

33. On the Evolutionary History and Taxonomic Value of Some Motor Patterns of Birds. (Ueber die Stammesgeschichte und den taxonomischen Wert einiger Verhaltensweisen der Vögel.) Wolfgang Wickler. 1961. *Zeitschrift für Tierpsychologie,* **18**(3): 320-342. (With English summary.) Several pairs of motor patterns, each pair of which perform the same function, "are investigated with a view to their relative phylogenetic age." Tables are given showing which orders, families, genera and sometimes species walk or hop, which scratch over or under the wing, which do or do not retrieve eggs from out of their nests, and which (among the Sturnidae and Icteridae) do or do not use their bills for prying. In the light of the large amount of information gathered, the author points out the impossibility of deciding which is the ancestral pattern in these and several other behavior patterns. The manner in which doves and sandgrouse drink by sucking up the water has been considered an important indication of relationships, yet the author notes that one dove (*Didunculus*) — a primitive form — drinks like a goose and that certain Astrildine finches drink by sucking up the water. — M. M. Nice.

34. Attacking Behavior in Homosexual Groups of the Bengalee, Uroloncha striata, var. domestica Flower. Hiroyuki Masatomi. 1959. *Journal of the Faculty of Science, Hokkaido University,* Series VI, Zoology, **14**(2):234-251. Although the Bengalee is "famous for its mild temperament," the author found considerable hostility between the members of two homosexual groups of five birds each. Two homosexual pairs were formed within each group and aggression appeared primarily between these pairs in relationship to the one nest provided in each cage. The observations are summarized in three sets of sociograms. The author discusses many other studies in relation to social hierarchy, territory, homosexual relationship and frustration. — M. M. Nice.

35. Territorial Behaviour Between Two Pairs of the Bengalee in Two Different Cages. Hiroyuki Masatomi. 1960. *Journal of the Faculty of Science, Hokkaido University,* Series VI, Zoology, **14**(3): 387-409. The two pairs of the Bengalees were put first into a large elongate horizontal cage, then after a month transferred to a large vertical cage. Territories were established around each nest provided; eggs were laid and incubated, but they failed to hatch, due in part to interference between the pairs. Territorial behavior did not differ in the two types of cages. These birds had already raised young in other cages. The author suggests that "Pre-existence of the pair bond before the beginning of observation may be one of the most important factors in the formation of a definite territoriality." A wide selection of references is discussed. — M. M. Nice.

36. Communal Use of One and the Same Nest by Two Breeding Pairs of the Bengalee. Hiroyuki Masatomi. 1961. *Behaviour,* **17**(4): 261-274. Four sibling Bengalees were kept together continuously in a cage 100 cm. high, 70 cm. wide and 100 cm. long. The cage contained one artificial dome nest of straw. The birds paired and all four used the one nest without friction. All incubated, but the embryos died in the shell. A new-born white mouse was substituted for the eggs; one female brooded it, then regurgitated food, stood up and twice touched one of the mouse's forelegs with her bill, the mouse responding by twisting around.

A male Bengalee attacked the strange object, whereupon it was removed and a 10-day-old Bengalee put in its stead. It proved a trial and error process for one female to place food into the gaping mouth of the nestling, but the other three adults apparently fed with almost no trouble. The young bird was cared for by all members of the group.

The author remarks, "As a rule, the smaller the cage or the denser the population, the less aggressive may be the Bengalee." He concludes, "The availability of only one ready-made nest in the cage was considered one of the most important causes of the curious outcome, in combination with the gentle temperament of the species in general." — M. M. Nice.

37. **On the Use of Tools by the Woodpecker Finch.** (Ueber den Werkzeuggebrauch des Spechtfinken *Camarhynchus pallidus* (Sclater und Salvin). Irenäus Eibl-Eibesfeldt. 1961. *Zeitshrift für Tierpsychologie,* **18**(3):343-346. Observations and photographs of this Galapagos finch, one of the few birds known to use a tool. It knocks at branches, then leans its ear close to the surface. If it cannot get the prey with its beak it probes with a cactus spine or small twig. Thus it drives out or impales the insect. Ill fitting tools are worked over and adapted. — M. M. Nice.

38. **The Congo Peacock (Afropavo congenis (Chapin)).** F. J. Appelman. 1961. *Avicultural Magazine,* **67**(2): 41-42. In 1959 a pair of these rare birds was placed in the Rotterdam Zoo in an aviary planted to resemble a tropical forest and kept at high temperature and humidity. In 1960 they bred. The hen laid three eggs in a basket in a willow-tree and incubated them for a month. Soon after hatching one chick let itself fall down and "The cock at once ran to the chick . . . and behaved completely like a hen, warming the chick under his breast and wings and showing the little creature how to look for food." The chicks took food from their parents' bills. They were very vigorous and could fly a little in 2 or 3 days. Three photographs of the family are shown; one of these is in color. — M. M. Nice.

39. **Some Recent Records of Anting in Passerine Birds.** K. E. L. Simmons. 1961. *Avicultural Magazine,* **67**(4):124-132. A list is given of 96 passerine species seen anting by the author; 49 of these records are of previously unrecorded species. The ants used are specified. The majority of the birds were seen anting in the London Zoo. A list of passerine families is supplied, with the number of species in each that have been recorded as anting; these vary from zero to 23, Turdidae, Sturidae and Timaliidae having the largest numbers. Mr. Simmons concludes this valuable summary with a plea for further "records of true anting (with ants) by passerines," with a description of the kind of full and careful information needed. — M. M. Nice.

40. **The Smallest Parrots of the World.** Sten Bergman. 1960. *Avicultural Magazine,* **68**(6):209-215. In Dutch New Guinea the Woodpecker Parrot (*Micropsitta keiensis chloroxantha*) excavates a nesting hole in a tree termite nest. The author found three nests, in each of which both parents and two to four older young spent the night with the eggs or new chicks. One father was seen to feed two of these older young. Despite earnest efforts Dr. Bergman was not able to find food acceptable to the birds. Although they ate a few termites, it is believed their chief food must be some kind of a fungus. Several photographs are given of these tiny parrots, 3½ inches in length. — M. M. Nice.

41. **Observations on Breeding Behavior of Veeries in Michigan.** Ormsby Annan. 1961. *Jack-Pine Warbler,* **39**(2):62-71. Studies on seven nests of *Hylocichla fuscescens* at Douglas Lake, Michigan in 1956 and 1957. Five of the nests each contained 2 Veery eggs and 2 Cowbird (*Molothrus ater*) eggs; 2 contained 4 Veery eggs apiece. One of the former was deserted after its discovery: from the 6 others 10 Veeries and 6 Cowbirds fledged. The female at one nest incubated 77 percent of the daylight hours while watched; the average period on the nest lasted 53 minutes. The males sang much and called their mates off the nest when approaching with food for the young. During the 9th day of nest life at one nest a 30-inch garter snake seized the larger Cowbird but was unable to get it loose. The parents attacked the snake with feet and wings and drove it off on 9 different occasions during 2 hours. — M. M. Nice.

ZOOGEOGRAPHY

42. The avifauna of Lina bog 1947-1960. Lina myrs fagelliv aren 1947-1960.) Karin Jansson. 1961. *Var Fagelvarld,* **20**:193-211. (English summary.) This is a careful study of the bird-life at one of Sweden's most famous bird habitats located in the eastern part of the Baltic island of Gotland. During the study, the author, a school-teacher of the nearby village school, spent days and nights faithfully recording what she heard and saw to produce this swansong of a doomed area full of irretrievable nature treasures on the verge of its disappearance. Thus, despite its form of annotated list covering some 133 species and its terse English summary, this paper acquires a special interest and poignancy that cannot escape the conservationist reader. What man does to acquire more land for his plow and his beasts or to preserve the land he already possesses from floods or drought does not always turn out exactly as planned. So he digs deeper into the earth and drains more from nature's reservoirs to influence, most often unpredictably and disastrously, the lives of every plant and animal organism that through the ages throve in these particular blessed environs. Here, through the white nights of May and June, the Corn Crakes (*Crex crex*), 40 to 50 of them, are heard croaking their grinding notes all over the Lina bog, perhaps the only place on earth where this rail is still to be found in abundance, but soon to vanish together with Lapwings (*Vanellus vanellus*), Ruff's (*Philomachus pugnax*), and all the others that gave to the bog its entrancing character. The author's descriptions, precise and graphic as they often are, vividly accentuate the subtle interplay of the being and not being of all those supported by the bog now and in the past.

Many of us carry out similar investigations into the life belonging to one particular spot on the map and through the passing years acquire some comprehension of the ever changing trends of events. But often this is as far as we go, and our discoveries of nature's secreted history, like that of the Lina bog, remain buried in the dust of forgotten records. — Louise de K. Lawrence.

SYSTEMATICS

43. Distance as a Measure of Taxonomic Similarity. R. R. Sokal. 1961. *System. Zool.,* **10**(2):70-79. The author comments briefly on the recent history of "numerical taxonomy." The computation of taxonomic distance at present requires, *inter alia,* that only observed values (actual measurements or ranks) are used and all characters are given equal weight. The concept of taxonomic distance goes back more than 60 years and has had its most elaborate formulation by Rao in 1952. In essence, the problem is to reduce the set of n measured differences between the objects, which can only be presented initially in n-dimensional space, to three, or better two, differences which can be presented in real (Euclidean) space so that the distance may be directly measured. Obviously we avoid the geometrical difficulties of n-dimensional space by a resort to computation. The actual solution of the matrix is given by Sokal in an appendix.

The relation to Pearson's coefficient of racial likeness and Mahalanobis' generalized group distance is discussed. Sokal notes that these two procedures take account of the variances of the characters used.

The reviewer ventures some comments. (1) It appears gratuitous to state that discontinuously varying characters should be handled only by ranking rather than by their actual measurements when the latter can be obtained. (2) The method as here stated leaves it moot whether more than two taxa can be considered in such a way that all the distances between them are to the same scale. Mahalanobis' method allows this. Without attempting a calculation the reviewer is of opinion that Sokal's method also permits this provided all the taxa afford the same characters and each is measured or ranked on its own uniform scale. The definition of scale is left open. (3) An implied assumption by the author is that any individual may be recognized as a member of a particular taxon. (4) The reviewer would have welcomed a comparison with the discriminant function.

The methods of "numerical taxonomy" need experimental application to organisms offering a diversity of taxonomic problems. These methods should prove of real help without necessarily displacing traditional procedures. They will probably never be a substitute for sound taxonomic judgment. — C. H. Blake.

FOOD

44. Conservation and Predation Problems of Birds of Prey in Sweden. Kai Curry-Lindahl. 1961. *British Birds,* **54**(8):297-306. Contrary to general opinion, birds of prey need little food. In a large cage in a zoo the average food consumption per day per bird for five Buzzards (*Buteo buteo*), two Goshawks (*Accipiter gentilis*) and one Rough-legged Buzzard (*Buteo lagopus*) was 170 gm., about 6 ounces. Of two Goshawk pairs nesting a mile apart one specialized on Woodpigeons (*Columba palumbus*) and Black-headed Gulls (*Larus ridibundus*) and the other on Jays (*Garrulus glandarius*). Descriptions are given of birds of prey capturing injured and/or abnormally behaving victims. Most birds of prey in Sweden are territorial, but Ospreys (*Pandion haliaëtus*) sometimes nest in colonies; several pairs may fish without friction in a restricted portion of a lake. A very interesting paper. — M. M. Nice.

45. The Food of Birds of Prey and Owls in Fenno-Scandia. Göran Bergman. 1961. *British Birds,* **54**(8):307-320. This is a summary of the published information on the food of 17 diurnal birds of prey and 10 owls in Finland and Scandinavia. — M. M. Nice.

46. The Relationship Between Foot-movements and Feeding in Shore Birds. John H. Sparks. 1961. *British Birds,* **54**(9): 337-340. The author points out that foot-paddling movements on intertidal mud flats do not result in the emergence of marine worms, but rather of small amphipods and sand shrimps. He believes that foot-paddling of gulls on wet grassland is a carry-over from this behavior that is functional in the intertidal zone, "but the capture of earthworms near the surface and trampling movements are in no way related as cause and effect." — M. M. Nice.

BOOKS AND MONOGRAPHS

47. Locomotor Mechanisms of Birds. Frank A. Hartman. 1961. Smiths. Misc. Coll. **143**(1):1-91. (See also review No. 33, in this issue). This is a remarkable compilation of original measurements of "more than 360 species in 70 families" of New World birds. The real meat is contained in five tables which are much more significant than the general discussion. Table 1 gives body weight (gm.), heart (%), main muscles of wing and shoulder (%), main leg muscles (%), wings (cm^2/gm.); aspect ratio, pectoral and supracoracoid muscles (%), pectoral muscles (%), supracoracoid (%), "rest" of muscles of wing and shoulder (%), tail (cm^2/gm.), "glide" or total projected area of wings, body, and tail (cm^2/gm.), buoyancy index. These are for almost all species, with male and female recorded separately. The deviation measure given is the standard error of the mean. To convert to the more meaningful standard deviation multiply by the square root of the number of variates.

My particular interest in the aerodynamics of bird flight leads me to offer both general and specific criticisms of the table. The only real reason for finding such quantities as wing loading or aspect ratio is to use them ultimately in the calculation of aerodynamic characteristics such as the coefficients of lift and drag and finally power requirements. If it be admitted that the measured quantities are not ends in themselves, then they must be so stated that they will fit into the equations yielding the aerodynamic quantities. These equations, in the American and English aeronautical literature, are in English units. The calculations are not a whit more difficult than with metric units.

The item "wings" should be wing loading in lbs/ft^2. To convert to the latter take 2.05 times the reciprocal. The author calculates his aspect ratio by dividing the length of an extended wing by the "median chord." He tells me this latter was actually an estimate of the mean chord. The result obtained is shown by my own calculations for 39 of the species to be somewhat less than half the true aspect ratio. The correct mode of calculation is $span^2$/area of both wings. The span is twice the length of an extended wing measured from the edge of the body. The real mean chord is span/aspect ratio and is used to calculate a value of the Reynolds number.

The expression of the tail area as the reciprocal of a loading is rather misleading since it implies that the tail contributes to lift. The shape of the tail in longitudinal

section shows that this almost certainly is not so. The tail does contribute to drag, but this involves only the area and the skin friction. In established flight the chief function of the tail is to control pitching movements. It does, of course, have other functions during maneuvers. Dr. Hartman tells me the area of the spread tail was measured much as in the well-known book by Baldwin *et al.* In normal flight most, if not all, birds carry the tail rather tightly closed.

The author tells me he intended the term "glide" as a measure of the resistance to vertical fall of a bird with outspread wings and tail. The area as such would be the best figure from which to compute the resistance — which is a drag. I find a usable expression for low speeds given as: 1.28 x area x ½ density of air x velocity squared (all in the English system, see Dommasch *et al.* 1958, Airplane Aerodynamics, p. 177). This kind of vertical fall could last but briefly in the open air. Even very slight turbulence would throw the bird into a spin or side slip with a resulting change in drag. So far as is now known only the wings contribute to lift. By calculating back to the area used in "glide" and doubling, one may estimate the total wetted area approximately. This is a necessary quantity in the calculation of parasitic drag.

I am not yet able to see the revelance of the buoyancy index to flight. Buoyancy is rather a misnomer since the specific gravity of a bird is about four orders of magnitude greater than that of the air.

The remaining tables show, for selected species, seasonal variation in proportional heart weight, muscles of wings and of legs in more detail, and a comparison of the mean data of Table 1.

These criticisms really illustrate the need for time and patience in establishing communication between the biologist and the engineer. Each must learn something of the language and philosophy of the other. I suggest that ornithologists put on record the actual weights, areas, and lengths, letting the user calculate such ratios as he wants.

In spite of all that has been said above, Dr. Hartman's paper contains an immense amount of useful information. — C. H. Blake.

48. Der Flug der Tiere. Herta Schmidt, ed. 1960. W. Kramer, Frankfurt a/M., 164 pp., illus. $3.00. In 1959 the Senckenberg-Museum produced for the 50th anniversary of the International Aeronautical Organization an exhibition dealing with natural flight. The staff wrote an explanatory pamphlet of which the present volume by the editor and seven other authors is a revision and enlargement. The section on birds, pages 77 to 112, is by Joachim Steinbacher. The treatment may be called traditional. It is frankly addressed to the laity and is non-mathematical. Perhaps this is all we can ask for in a small book which summarizes the whole subject of animal flight. The author seems overcredulous in the matter of speed. His diagram must refer almost entirely to extreme speeds and in some cases is almost certainly over the mark.

The reviewer will not attempt a critique of the other sections of the book. In the section on aquatic flying animals attention should be called to the discussion of the flying characinid fishes of tropical America. These fishes may be capable of true powered flight. The reviewer, from personal observation, is still convinced that the more famous exocoetids are solely gliders. — C. H. Blake.

49. The Birds of Trinidad and Tobago. G. A. C. Herklots. 1961. Collins, London. 287 pp., 16 colored and 4 black and white plates, 13 line drawings. $10.00. The two islands of Trinidad and Tobago with an avifauna of about 400 species provide a comfortable introduction to the vast riches of continental tropical America. The present book is a field guide patterned after Bond's guide to the West Indian rather than after Peterson. Under each species there are paragraphs for: description, nidification, habitat, range, and field identification. Some of these paragraphs are omitted for vagrant or doubtful species, and voice is added where it is significant. Subspecies are treated more briefly, usually only a statement of difference from the main form and of range.

In general the scientific names agree with those used by the Phelpses for Venezuela and with the A.O.U. Checklist. The most peculiar departure is the use of *Ceophloeus*, with *Dryocopus* as a synonym, and the use of the latter in place of *Coccyzus*. The

English vernacular names of the more conspicuous species include those in actual local use as well as the familiar book names. For many species French names are also given. The common vernacular of Trinidad was French until quite recent times.

The color plates are the work of the author. With a few exceptions, mostly hummingbirds, only the head and shoulders are shown. The reviewer can say from personal experience in the islands that this restriction is no great disadvantage to the user of the book. Herklots is not a highly skilled ornithological artist, but the essential facts are adequately displayed. The four black and white plates and most of the line drawings are by Jackson Miles Abbott. His craftsmanship is very good.

This book will be indispensable to the bird-watching visitor to the islands and should serve as an introduction to the birds of all northeastern South America. We may also hope that it will stimulate local interest in birds. — C. H. Blake.

50. Birds of the World. Oliver L. Austin, Jr. 1961. Golden Press, New York. 316 pp., 300 colored illustrations by Arthur Singer. Size 10½ x 13½". Price $14.95. In ten years of reviewing ornithological publications, I have never approached my typewriter with such mixed feelings as I do in reviewing Dr. Austin's long-awaited book. My reactions can be compared to that of a lover of good apples, who picks up a beautifully polished, perfectly shaped apple, of a variety reputed to be especially flavorsome. After duly admiring the external appearance, our apple-lover takes his first bite. It is almost as delicious as expected, but within the apple, unfortunately, the eater encounters several rather messy worm tunnels. These in no way detract from the beauty of the apple, and the flavor of the flesh around the worm-holes is still delicious, but somehow the apple-lover can never feel quite the same about that particular piece of fruit. It is a large apple, and the worm tunnels small, but still their overall effect on the apple-eater outweighs their actual damage to the fruit.

The book, of course, is not primarily intended for the ornithologist. The lay reader cannot help but exclaim at the beauty of "Birds of the World," for it is a magnificent piece of book-making with respect to layout, typography, paper, binding, color-printing, etc. The only worm-holes the non-ornithologist is likely to notice are the typographical errors in ordinary English words. These are but a symptom of the general sickness; for all its beauty, this is the most error-ridden bird book to have come to my attention in years. This is all the more unfortunate in view of its genuine merits, and high price. The errors are of several kinds, and the blame for them must be laid at several doorsteps. Most inexcusable are the myriads of typographical errors and misspelled words, both in English words and scientific names. It is impossible to tell whether some of the misspellings may have appeared in the original manuscript; in any case, these should have been caught before publication. Errors in the captions of illustrations are of several types. In an unfortunate number of instances, the species illustrated is not correctly identified in the caption. In a few cases, correct captions have been transposed between illustrations. Among the correctly identified birds, there are caption errors in size and distribution statements, these sometimes conflicting with statements in the text.

Blame for the errors listed above lies in part with the author and artist, for not having double-checked all identifications. The greatest burden of the blame, in my opinion, belongs to the publisher. This was a major publication project, with a tremendous production budget and a virtually unprecedented advertising campaign. The reviewer cannot know whether it was the desire to save a few dollars, (which seems ridiculous) or the haste to get the book into the stores well before Christmas (which seems probable) that caused the publishers to slight the proof-reading and other aspects of quality-control.

It is my understanding that this book appeared without having been thoroughly and critically read in advance of publication by a paid scientific reader. Whether attributable to economy or haste, this was as bad a lapse on the part of the publisher as the inadequate proof-reading. The publisher's proof-reader would understandably have missed the incorrectly spelled scientific names and technical terms. The scientific reader would be expected to catch these, as well as errors of fact in the text itself. Both Dr. Austin and this reviewer are well aware that nobody can know everything about birds; in the process of such a tremendous compilation of facts as "Birds of the World," any one author, if human, will err. But a thorough reading by another ornithologist might have caught such errors as the attributing to night-jars of "large yellow eyes" (p. 162) or the identification of the introduced British Columbia population as the Common Myna (*Acridotheres tristis*) rather than the Crested Myna (*A. cristatus*).

Enough discussion of the worm-holes. Those purchasers of the book who are interested in doing so may obtain from Dr. Austin a mimeographed list of *errata,* and the book will almost certainly sell well enough to warrant additional printings, permitting at least some of the errors to be corrected when this can be done without radical resetting of type. What of the text itself?

It is inevitable that Dr. Austin's book will be compared with E. T. Gilliard's "Living Birds of the World," which has, after all, the same basic cast of characters. It is quickly apparent that Austin writes more naturally and easily than does Gilliard, with a style better suited to the lay reader. Gilliard frequently identified by name the authorities responsible for various ornithological discoveries; Austin seldom does this. Gilliard made much more of an effort to assemble the most complete and up-to-date material available on all groups of birds; Austin's shortcomings on this score are a function, in large part, of the difference between library facilities available at the American Museum of Natural History and at the University of Florida. By using commissioned paintings for his illustrations, Austin was able to pick and choose his examples for each family (and illustrate *every* family and most major subfamilies), and adapt the grouping of birds to the page layout. Gilliard's use of photographs robbed him of these advantages, but brought a sense of authenticity often lacking in the painted illustration. Gilliard identified the species being discussed in the text by the use of scientific names. These were largely eschewed by Austin, and this I believe to have been a mistake. There is little or no problem in identifying North American or European birds by their English names, but there are few really standardized English names for the birds of most of the rest of the world. The species called Gray Drongo by Austin is called Ashy Drongo by Vaurie, monographer of the family. *Picathartes* is called Bald Crow in Austin's picture caption, Bareheaded Rock Fowl in his text. *Tangara nigro-cincta* is called Golden-masked Tanager by Austin, following Skutch; Hellmayr calls this the Black-banded Tanager. Eisenmann's authoritative list of Middle American birds uses Golden-masked Tanager only *if* the Central American population is considered a separate species, *T. larvata;* if conspecific with the South American *nigro-cincta,* Eisenmann advocates calling the species Masked Tanager, as is done on the caption to Austin's illustration!

Another strong argument in favor of the use of scientific names in the text lies in the future appearance of foreign language editions of Austin's book. In the absence of scientific names. translators are inevitably going to misidentify and mistranslate unfamiliar English bird names.

As mentioned earlier, Austin's *style* is eminently readable. The *content* of his text is somewhat uneven. Dr. Austin has had the advantage of field experience with birds in several parts of the world, and it is most refreshing to come across first-hand material in a compiled work such as this. His personal enthusiasms may occasionally run away with him, however; the amount of space devoted to the Common and Arctic Terns, while packed with significant information, is perhaps not commensurate with their status as 2/8,635 (using Austin's figures) of the species of birds of the world. Gilliard proved to have the same perfectly human bias in devoting eight pages of his book to birds of paradise and bower birds versus four pages for the Fringillidae. Austin's selection of examples for discussion in some widely-distributed families is admirably broad; in others (cf. Tyrannidae, Icteridae) there is a heavy emphasis on North American species, sometimes to the detriment of a real appreciation of the range of variation within these large families.

The classification used by Austin is basically that of Wetmore, modified to some extent to accord with recent revisions and Austin's own opinions. Here, too, the treatment is somewhat uneven. Austin has been perhaps over-quick to adopt *in toto* some recent rather radical revisions (cf. certain parts of Bock's revision of herons), but has missed others now more-or-less generally accepted (cf. Deignan's allocation of *Apalopteron* to the Meliphagidae rather than to the Timaliidae).

The illustrations by Arthur Singer form such an important segment of this book that they deserve virtually a full-scale review of their own. Mr. Singer was little-known to most ornithologists prior to the appearance of this book; his name will be a household word from now on. The illustrations were painted over a period of several years. Without dates it is impossible to know the sequence in which the paintings were done, but it is quite reasonable to suppose that the contrast between the atrocious waterfowl on pages 68-69 and many of the lively and lifelike oscines represents a maturing of Mr. Singer's abilities as a bird artist. He is not always

successful in translating the stiffness of a study skin into a convincing posture when painting birds of groups wholly unfamiliar to him in life (cf. the bee-eaters), but in other cases he has done remarkably well. His sense of design, his adaptation of poses to the demands of a page layout, are superb. He has made a few out-and-out errors. In some cases these are soft-part colors, whose difficulty of obtaining is the bane of conscientious bird artists everywhere. The cere of the Cape Barren Goose, for instance, is apple green rather than dull yellow as Singer has painted it, and the iris of the Barred Antshrike white or pale straw rather than deep yellow. There are occasional errors of structure or proportion; the Plush-capped "Tanager" (*Catamblyrhynchus*) must have been painted from a specimen with rectrices only partially emerged during molt. Singer unaccountably omitted one leg of the Gentoo Penguin on p. 28. Most of the paintings, however, even those that are not quite convincing to the eye of the ornithologist, are accurate in detail and attractive in design, and serve their purpose perfectly adequately.

To summarize, Dr. Austin's book is a highly admirable attempt at the almost impossible. Its general excellence is marred by a series of unfortunate errors, some understandable, some utterly inexcusable. I am especially sorry that it does have shortcomings that could have been avoided, because it will probably be a long time before anybody else attempts a book of this scope. Anybody who does try to surpass it (and the burgeoning of competing bird books suggests that other publishers will be wanting a world ornithology on their Christmas book lists in the future) will have a real job on his hands. — Kenneth C. Parkes.

NOTES AND NEWS

The 1962 winners of the American Motors Conservation Awards include Mr. Laurel Van Camp, of Genoa, Ohio, game protector for the Ohio Division of Wildlife in Ottawa County. His bird-banding includes no less than 9,634 Mourning Doves, as well as thousands of other birds.

Erratum: the 1960 review (**31:**234) of Andrew J. Meyerriecks' *Comparative Breeding of Four Species of North American Herons* inadvertently showed the price as $4.60. The correct price is $3.00 (hard cover) and $1.50 (paper), available from the Nuttall Ornithological Club, Museum of Comparative Zoology, Cambridge, Mass. The book was strongly recommended to students of bird behavior by the reviewer, Mrs. Margaret Morse Nice. Another recent publication of the Club, *The Comparative Biology of the Meadowlarks* (*Sturnella*) *in Wisconsin,* by Wesley E. Lanyon (1957) is still in print at $2.00 (hard cover) and $1.00 (paper); for a favorable review, see *Bird-Banding,* **28:**249, October, 1957.

The American Onithologists' Union has announced that a sum of $500 is available in 1962 for research grants from the Josselyn Van Tyne Memorial Fund. Any student of birds is invited to apply for part or all of this amount. Young men or women just starting their careers or others not eligible for grants from government or other agencies are especially invited to apply. Ten duplicate copies of applications should be submitted for distribution to members of the A.O.U.'s Research Committee, who will determine how the funds will be distributed. The applicant should give a full description of the proposed research, the type of help required, and amount of money desired, and the background and training of the applicant. A letter of support from one or more recognized ornithologists would be helpful. Applications should be submitted *not later than June 1, 1962* to S. C. Kendeigh, Chairman, Vivarium Bldg., University of Illinois, Wright and Healey Sts., Champaign, Illinois.

Copies of the index to *Bird-Banding* for 1941-50 may be obtained from Mrs. J. R. Downs, So. Londonderry, Vt., at $3.00 (paperbound) or $4.50 (hard covers) to present NEBBA members or *Bird-Banding* subscribers; or $4.00 (paperbound) or $5.50 (hard covers) to others. All prices include postage.