within this genus which occur in the region where banding is done. Large-scale experiments would be desirable. We understood others have experimented with this method recently, and we would welcome comments on the results.

RECENT LITERATURE

BANDING

(See also Numbers 51, 62, 75)

1. Report for 1958 of the Camargue Banding Station. (Station de Baguage de Camargue, Compte rendu pour l'année 1958). L. Hoffmann. 1960. Fifth Report of Activities, Station Biologique de la Tour du Valat, pp. 7-108. Reports the banding in 1958 of 20,968 birds of 138 species, a station record, and bringing the 9-year total bandings to 60,585 birds, from which 3,546 recoveries have been received, a tremendously high over-all percentage indeed. The 1957-58 season was an exceptionally good one for waterfowl, and of the total 18,000 caught, 11,369 were banded and released. Large numbers of passerines were banded with mist nets. A selected list of recoveries and returns for 49 species is given with short comments on their significance. Tables show the monthly recaptures by locality of the flamingo, mallard, and Green-winged Teal. A series of 14 maps of teal recoveries at fortnightly intervals from January through May shows graphically the winter distribution and northward movement of this species.—O. L. Austin, Jr.

2. Bird ringing in the Netherlands. (Ringverslag van het Vogeltrekstation nr. 44, 1957-1959). A. C. Perdeck and J. Taapken. 1961. *Limosa,* **34**(1-2): 33-156. (English summary.) The totals for the three years reported here show banding activities in the Netherlands have taken a healthy upswing: 48,472 in 1957, 57,217 in 1958, and a tremendous jump to 95,693 in 1959. All recoveries in foreign countries are listed, but "those from within the Netherlands are highly selective." The extensive list is once again dominated by waterfowl banded in the large duck decoys along the Netherlands coast. Some 650 recoveries are given for the Mallard alone, and 1579 more were omitted for lack of space and interest. A welcome addition is the mapping of all the foreign recoveries received for several species.—O. L. Austin, Jr.

3. Recoveries of birds banded abroad, 31. (Terugvondsten van in het buitenland geringde vogels, 29). C. G. B. Ten Kate and J. Taapken. 1960. *Limosa,* **33**(3-4): 180-201. Raw data for some 700 birds of 78 species, most of them waterbirds, banded abroad and recovered in the Netherlands since the last report of 1959, and a bibliography of the 15 foreign reports from which these were culled.—O. L. Austin, Jr.

4. 10th Annual Report of the Banding Committee Ornithological Society of New Zealand, Inc. for the Year Ending 31st March 1960. F. C. Kinsky. 1960. Published by the Dominion Museum, Wellington, 42 pp. Banding activities are increasing gratifyingly in New Zealand. The 12,782 birds banded this year show a more than 50 percent increase over previous year's totals, and bring New Zealand's grand total up to 53,000. The number of species banded this year is 52, including 6 species new to the banding list, which now totals 81 species. The activities of most of the 40 active cooperators centered on waterbirds, primarily albatrosses, shearwaters, petrels, gannets, skuas, and gulls. Largest quantities were the Southern Black-backed Gull (1943), Red-billed Gull (2900), and Black-billed Gull (841). New Zealanders used nets this year for the first time, and as their use increases we may look for more significant bandings and recoveries of various passerines. A selected list in conventional form presents the more significant of the 722 recoveries received during the year, also of the 1240 "repeats" as the New Zealanders insist on terming what other banding schemes usually call "returns." Data are also given for the 8 Giant Petrels and 2 Grey Teal banded elsewhere and recovered in New Zealand. Short comments on the significance of the recoveries listed for each species would be a worthwhile addition to a report of this nature.—O. L. Austin, Jr.

5. Seventh ringing report. G. R. McLachlan. 1961. *The Ostrich,* **32**(1): 36-47. The "Organizer of Ringing" for the South African Ornithological Society reports the banding activities from 1 July 1956 to 30 July 1957. Some 28,000 birds were banded, a record year, 6,000 more than the average of the previous several years. Of the 204 species banded, heading the list in numbers are Red-billed Quelea (11,023), Cattle Egret (3,594), Yellow-billed Duck (2,086), Cliff Swallow (1,433), and Sacred Ibis (1,102). Details are given for about 150 recoveries selected from those received during the year, omitting returns, repeats, and records of birds recovered near the banding locality. Among the more spectacular recoveries are a Cattle Egret recovered in 14 months in northern Rhodesia, 1300 miles north-northeast, and two more banded as juveniles and recovered 6 years later, one within 10 miles of the place of banding, the other 420 miles away.—O. L. Austin, Jr.

6. Bird banding in 1957 and 1958. (Prstenovanje ptica god. 1957. I. 1958.) Renata Kroneisl-Rucner. 1960. *Larus,* **12-13:** 7-36. (English summary.) This report of the banding activities carried out by the Ornithological Institute, a department of the Zoological Museum of Zagreb, Yugoslavia, is in two parts. The first lists the individual banding totals of the 97 cooperators, the totals by species, and the recoveries received during the period. In 1957 11,995 birds of 107 species were banded, 3,848 as juveniles, and a hundred recoveries were received. In 1958 bandings totaled 12,677 (6,509 of them juveniles) of 124 species, and 132 recoveries were received. The "recoveries" contain a large number of returns to the place of banding. The second part of the report lists the 120 Yugoslavia recoveries of birds banded in 13 other countries.—O. L. Austin, Jr.

7. Bird banding in Finland in 1958. (Die Vogelberingung in Finnland im Jahre. 1958.) Göran Nordström. 1960. *Memoranda Societates pro Fauna et Flora Finnica,* **35:** 1-63. In 1958 Finnish operators banded 4,421 birds of 179 species. Heading the list in numbers are 4,048 Black-headed Gulls, 2,334 Starlings. Raw data are given for 932 recoveries of 89 species.—O. L. Austin, Jr.

8. Bird banding in Norway 1959, Report No. 10. Ringmerkingsoversikt 1959.) Holger Holgersen. 1961. *Sterna,* **4**(5): 177-228. The 30,020 birds banded in 1959 bring the grand total of Norwegian bandings to more than 355,000. Outstanding in the long list of selected recoveries are 4 Kittiwakes reported from Newfoundland and 8 from Greenland.—O. L. Austin, Jr.

9. Results of bird banding in Belgium in 1959. (Resultats du Baguage des Oiseaux en Belguique. Exercice 1959). R. Verheyen. 1960. *Le Gerfaut,* **50**(3): 337-382. This is the usual Belgian report—45 pages of undigested and unselected raw data for some 800 recoveries, returns, and repeats reported for 80 species of birds. Largest numbers are for waterfowl, with some 200 recoveries of mallards alone. As usual nothing is mentioned of the numbers banded, and no comment is given on the significance of the records.—O. L. Austin, Jr.

10. Herring Gulls and Caspian Terns—1960 Recoveries. C. C. and F. E. Ludwig. 1961. *Inland Bird Banding News,* **33:** 28-29. Raw data on recoveries of birds banded by the Ludwigs on the Great Lakes and reported through the Fish and Wildlife Service during 1960. Herring Gulls totalled 47, not including young found dead within 3 months of the time of banding (120); 10 Caspian Tern recoveries are listed.—E. Alexander Bergstrom.

11. Operation Recovery at Monhegan Isand, Maine, 1960. Albert Schnitzer. 1961. *EBBA News,* **24:** 37-46. Data on a netting station operated from September 1 to October 10, 1960, on Monhegan Island, 10 miles off the coast of Maine near Port Clyde. Monhegan has long been famous as a concentration point for fall passerine migrants, though observation has been sporadic. Two previous attempts had been made to set up a temporary banding station there, unsuccessfully; it would well repay regular work in the late summer and early fall.

The paper includes a table listing the 1161 birds banded, broken down by species and date. Judging by sudden peaks and lulls, the bulk of those taken appear to have been migrants—even though the species may nest in the heavy spruce woods on the island ". . . the birds which have landed on Monhegan make their way, as they feed, toward the west side of the island . . . When they take off it is toward the west; not necessarily due west, but westerly. Those that arrive come from an easterly or northeasterly direction." Do they come in from Nova Scotia, some 180 miles to the east, or are they making their way back to land after being drifted out from the Maine coast on a northwesterly wind?—E. Alexander Bergstrom.

12. Banding in Europe: Bat Fowling. M. J. Thomas. 1961. *EBBA News,* **24**: 48-49. Description of the way in which Starlings *(Sturnus vulgaris)* are taken at night in England, in winter roosts, in bushes and low trees. The birds are taken in bat fowling nets: "a pair of bamboo poles, twelve feet high, which are joined at the top" and hinged at the top. When the birds fly into it, the poles are brought together with a circular motion, forming a pocket in which the birds are trapped. The netting is similar to fish nets, *not* mist nets. The team described by Thomas would total about 20, divided into netters, those banding the birds, and others beating the thickets to drive roosting birds towards the netters.

This technique seems to have had little or no use in this country, but has been used quite widely in Europe. See, for example, the description in *Trapping Methods for Bird Ringers* (P. A. D. Hollom, 1950, pp. 33-36). The minimum effective party seems to be two people with one net; a strong light on a dark night seems to help. The technique would in all probability be the best one for icterid or starling roosts in low evergreens, such as one I reconnoitered near Hartford in early 1961, with perhaps a quarter of a million birds; a short-handled net was not effective.—E. Alexander Bergstrom.

13. Banding Sharpshins at Point Pelee. Leslie Gray. 1961. *EBBA News,* **24**: 25-26. On the morning of September 18, 1960, at Point Pelee, Ontario, three members of the Ontario Bird Banding Association banded 177 Sharp-shinned Hawks *(Accipiter velox)* by 11 a.m., and 192 in all that day. "The birds were overhead, in the trees, at eye level, and were literally flying between our knees."

"We believe that the reason for the large numbers was the strong and steady southwest wind blowing all day . . . . the birds must have been filtering down the point some days and, because of this strong wind, would not migrate further. None of the birds migrated this day, instead they gradually turned back up the point as the day progressed."

On the 19th, the wind blew strongly from the northeast. "There were now many small birds at the tip . . . and there was considerable kill by the Sharpies. By 8:00 a.m. they began rising and soon were migrating southeast off the point in flocks of 15-25 birds. By 9:00 a.m. we had stopped taking birds complete. And the flocks migrating overhead increased in number."

This makes an interesting comparison with the major Sharpshinned flights at Cape May, N. J., which occur in autumn on a strong NW wind with falling temperatures, and where the birds appear to cross Delaware Bay with a *head* wind.—E. Alexander Bergstrom.

MIGRATION

(See also Numbers 11, 13, 68)

14. "Nonsense" orientation in Mallard *Anas platyrhynchos* and its relation to experiments on bird navigation. G. V. T. Matthews. 1961. *Ibis,* **103**(1): 211-230. "Blockbuster!" That is what some ornithologists are calling this report. To understand why, one must briefly review recent work on homing.

Matthews' admirably written little book *Bird Navigation* (1955) expounded his conviction that birds navigate by extrapolating the arc of the sun to the noonday point and comparing the result at their present position with the remembered situation at the place where they want to be. The height of the sun at the estimated noon point reveals comparative latitude, while the angle between its location at a given time and the noon point is a clue to comparative longitude.

Though the theory won a wide following, William Allen promptly pointed out *(Bird-Banding,* **27**(1): 48-50) that the method would require almost fantastic discrimination. German investigators methodically continued field research with homing pigeons in Germany, in England, and (with American collaboration) in the United States. Their findings cast threefold additional doubt on the hypothesis: (1) take-off bearings in approximately the right direction too frequently occurred too rapidly to permit estimation of the sun arc; (2) the pigeons homed better from some directions than from others; (3) attempts to duplicate a sun-occlusion experiment that was a major support of Matthews' theory failed (see *Bird-Banding,* **30**(3): Review 7). The German school concluded that, while the sun plays a part in the diurnal orientation of birds, unidentified factors must be involved in any complete system of navigation.

Now Matthews offers a long-delayed rerebuttal—one with a considerable element of surprise. He has turned from pigeons to observe the actions of nonmigratory Mallards *(Anas platyrhynchos)* set free in unfamiliar surroundings. He has discovered that the ducks tend strongly to fly northwestward regardless of sex or age, of topography at the release point, of time of day, of season, of wind direction, or of distance and direction from home. The particulars are statistically impressive, and the observed reaction has seeming parallels. Matthews mentions northward post-fledging movements of birds and the experience of Bellrose *(Bird-Banding,* **29**(2): 75-90) with Mallards carrying lights at night. The reader will recall in addition the tendency of displaced passerines in New England to fly northwestward in fall *(Bird-Banding,* **31**(4): Reviews 1 and 2). Matthews infers that homing pigeons share this proclivity. When he applies this assumption to the German case against the sun-arc hypothesis, the laboriously accumulated counter evidence *seems* to disintegrate.

Does it really? An answer to that question should be deferred until the active opposition has had a chance to comment, for the evidence is too voluminous to sift hurriedly. But certainly there are points with which to take issue. Those who insist that migratory habits and homing abilities as well have developed along many independent lines will doubtless look askance at an attempt to transfer lessons learned with ducks that do not home to pigeons that do. They will probably raise eyebrows at Matthews' attempt to explain results from the release at the same place of pigeons from two homes on the grounds that "the two stocks may have different direction tendencies," in spite of the fact that his whole case seems based on the idea that birds as different as pigeons and Mallards have the same tendencies. Banders may question whether the cited "northward post-fledging movements of many birds" are anything more than a radial dispersion whose results are most detectable north of the regular range. Although pigeons have most often homed most successfully from south to north, as they would do with a Mallard-like urge to fly north, exceptions have been so many that the "directional effect" has been renamed "local effect." As already noted in a previous review *(Bird-Banding,* **30**(4): 230): "Though a consistent superiority on the part of birds homing from the south might conceivably be explainable in terms of Matthews' sun-arc speculations, the contrast between releases from the east and releases from the west is very difficult to rationalize in such terms." Finally, Matthews believes that the northward orientation of Mallards "breaks down, probably quite quickly." If it collapses in pigeons with equal rapidity, it would seem to be of little ultimate aid to those released far to the south of the home loft. Yet such pigeons have often performed best not only at take-off but also in terms of speed of return.

In short, while Matthews has presented his opponents with a stimulating challenge, he seems still a long way from demolishing them. Meanwhile the sun-arc hypothesis is under fire on other fronts.—R. J. Newman.

15. The physical basis of astronavigation in birds: theoretical considerations. C. J. Pennycuick. 1960. *Journal of Experimental Biology.* **37**(3): 573-593. Pennycuick's hypothesis is essentially a renovation and simplification of the sun-navigation theory of Matthews. Pennycuick proposes a system based on perception of the altitude of the sun and the rate of change of its altitude. If the positions from which these quantities respectively appear to be equal at a given time are plotted on a globe, they produce a grid in which the lines of equal altitude resemble the parallels of latitude and the lines of equal change of altitude resemble meridians—except that the position of the sun and its antipodal point constitute the poles. A displaced bird does not need to ascertain direction in terms of our compass. It could home simply by flying toward the sun when the sun is lower than at home, away from the sun when the sun is higher than at home, to the left of the sun's azimuth if the altitude is changing faster than expected, to the right if the change is slower.

The visual discriminations required in using this system with reasonable precision are fine but seemingly not quite so fine as in the original version of the sun-navigation theory. Pennycuick discusses possible adaptations of the avian eye that may increase the exactitude of the method and undertakes mathematical analysis of the effects of errors of measurement. He concludes that the sensory performance required for adequately accurate homing is reasonable. He develops circumstantial support for his views by using them to explain anomalies in the results of experiments already carried out. To measure altitude accurately a bird must locate the horizon. In surroundings where the horizon is artificially or topographically tilted, predictable errors should result. He suggests that these errors may be the basis for such observed phenomena as the greater success of pigeons in homing from some release points than from others and the lack of homing ability among individuals reared behind palisades without a view of the horizon. In conclusion, he describes two experiments that might be carried out to test sun-navigation hypotheses.—R. J. Newman.

16. Sun navigation by birds. R. J. Pumphrey; C. J. Pennycuick. 1960. *Nature*, ***188***(4756): 1127-1128. The paper just discussed (Review 15) points out that measurements of azimuth require a fixed reference point and that migrants find their way at sea, where such reference points are lacking. It reasons, therefore, that the facts disprove the navigation theory of Matthews, which allegedly relies on the azimuth of the sun as a coordinate.

In an exchange of views on the subject, Prof. Pumphrey objects to the assumption that birds at sea cannot measure the sun's azimuth. He calls attention to the possibility that they can use the pattern of the waves as a frame of reference. Pennycuick replies that this method might be used by pelagic birds in the trade wind zones but attempts to demonstrate mathematically that the probable accuracy would be insufficient elsewhere.

Though Matthews' defender and critic both argue in terms of azimuth, the reviewer has the impression that Matthews avoided implicating the azimuth of the sun as such, that instead he envisioned the bird as perceiving the path of the sun along the ecliptic and identifying south as the high point of the extrapolated arc, independent of terrestrial reference. That is not to say that such an ability is truly plausible even on the part of a stationary bird, let alone one in flight.—R. J. Newman.

17. Recent experiments on bird orientation. Gustav Kramer. 1959. *Ibis*, **101**(3-4): 399-416. This review article bids for remembrance as the valedictory of one of the greatest investigators in the history of orientation study. In official chronology, the late Gustav Kramer's bibliography concludes with his posthumous chapter on long-distance orientation in *Biology and Comparative Physiology of Birds* (1961); but content suggests that the present synopsis, though published earlier, may have been written later.

Most of the material treated here has been recently summarized in *Bird-Banding*: findings relating to annual fluctuations in the homing ability of pigeons, the role of weather conditions, effects produced by variations in the location of the release point, and correlations between homing performance and interdiurnal barometric change. Kramer also reviews timely experiments in which pigeons were raised in outdoor aviaries with an open view of most of the sky but with the 3 degrees nearest the horizon hidden by a surrounding palisade. Such birds neither homed after transport and release nor showed any significant tendency to home except possibly by their initial orientation while still in sight. Others confined at Wilhelmshaven within a partial palisade permitting them to see the northern horizon only did no better. In contrast, 17 percent of the pigeons from aviaries with no unnatural visual obstructions came back after displacement.

As Pennycuick has pointed out, his sun-altitude theory of navigation offers an explanation of the lack of homing ability of pigeons reared behind palisades.

During confinement their horizon is the palisade rim, which, because of effects of parallax, tilts back and forth as they move about in the enclosure and prevents them from becoming acquainted with the altitudinal movement of the sun in relation to the real horizon. Whether the conditions would similarly distort their view of the sun arc is not so clear. On the other hand, Kramer has set forth reasons for believing that the altitude of the sun has little bearing on orientation: birds tested with a controlled artificial sun seemed to pay no attention to its height, and displaced pigeons turned loose at a moment when the altitude of the sun at the release point was the same as at the home loft almost immediately flew in the right direction. Matthews has explained the latter performance as "nonsense" orientation (see Review 14) and in so doing may have done greater service to Pennycuick's version of sun navigation than to his own.—R. J. Newman.

18. The sun azimuth compass: one factor in the orientation of homing pigeons. Klaus Schmidt-Koenig. 1960. *Science,* **131**(3403): 826-827. Manipulation of the light-dark cycle of captive birds is a familiar device. Its use in the study of the orientation of homing pigeons has become Schmidt-Koenig's specialty. Here he reports on 55 pigeons subjected to 4 different artificial states of the light-dark cycle: (1) a shift 6 hours clockwise; (2) a shift 6 hours counterclockwise; (3) a change of 12 hours; (4) a duplication of the natural schedule outdoors (controls). When released singly at various points in northern Germany and North Carolina, in various directions and at distances of 5.5 to 100 miles, the experimentals behaved predictably. In the mean bearings of their vanishing points the first three groups differed from the controls as follows: (1) 72 degrees counterclockwise; (2) 93 degrees clockwise; (3) 168 degrees clockwise.—R. J. Newman.

19. Internal clocks and homing. Klaus Schmidt-Koenig. 1960. *Cold Spring Harbor Symposia on Quantitative Biology,* **25**: 389-393. The author again presents the material summarized in the preceding review and combines it with earlier results in which clock-shifted pigeons, directionally tested in circular training cages, reacted in the anticipated manner with even greater exactitude. He holds that the evidence demonstrates the use of the sun as a compass but "includes a disproof of genuine sun navigation." His failure to state his reasoning in the latter regard explicitly is inconvenient. The conclusion is not immediately obvious, for the accurate operation of a complete sun-navigation system might also depend upon a correctly set internal clock.

Schmidt-Koenig's diagrams do not identify the home direction but merely contrast the mean directions of the experimentals with the mean direction of the controls, which varied from place to place. This method of charting is not illogical, but it permits Matthews in his latest paper (see Review 14) to remark: "It appears that Schmidt-Koenig was also dealing with a simple compass orientation, the northward tendency on release." If the data were published in full detail, they might or might not support this charge.—R. J. Newman.

20. Sun navigation in birds? Klaus Schmidt-Koenig; C. J. Pennycuick. 1961. *Nature,* **190**(4780): 1025-1026. Now the specialist on clock-shifted orientation takes direct issue with the exponent of sun-altitude navigation. The gist of Schmidt-Koenig's criticism is simply that, after a resetting of their chronometers 6 hours clockwise, pigeons do not react as Pennycuick's assumptions require.

Pennycuick maintains that experiments in which a bird does not see the sun during the training period can shed no light on the postulated role of altitudes in navigation and that the time-shifts tested were unreasonably large. He reasons that if the pigeons merely supposed they had been taken for a few days to a place where the light-dark rhythm was advanced 6 hours and then had been brought back and released near home, no specific effects could be foreseen, though one might expect the increased scatter and reduced homing success that Schmidt-Koenig did in fact observe.—R. J. Newman.

21. The sun-orientation of directionally trained pigeons in their physiological night. Die Sonnenorienterung richtungsdressierter Tauben in ihrer physiologischen Nacht. Klaus Schmidt-Koenig. 1961. *Die Naturwissenschaften,* **48**(4): 110. In cages with eight feeding receptacles equally spaced around the rim, two homing pigeons learned that the eastward feeder was the only one with food. Presumably they located the direction of this receptacle by referring to the position of the sun and by *increasing* their angle to the sun to compensate for its movement westward. Next Schmidt-Koenig reset the internal clocks of the pigeons 6 hours by means of an artificial light-dark cycle and then retested them under the real sun, this time with all feeders empty. During the testing periods corresponding to the dark phase of their artificial regimen (their "physiological night"), the pigeons behaved much as if the sun were moving backwards—from west to east instead of east to west. They tended progressively to *decrease* their angle with the sun. In this respect, the behavior of the pigeons was more similar to that of the amphipod *Talitrus* and the pond skater *Velia* than to the behavior of bees, fish, and Starlings.—R. J. Newman.

22. Experimental manipulation of the orientational clock in birds. Klaus Hoffmann. 1960. *Cold Spring Harbor Symposia on Quantitative Biology*, **25**: 379-387. Hoffmann's resumé is broader than that of Schmidt-Koenig (see Review 19). It places its major emphasis on work with caged Starlings *(Sturnus vulgaris)* rather than pigeons and begins with the breakthrough by which Kramer originally demonstrated the use of a sun compass by birds. It ends by describing the rather fallible orientation of a Starling during the permanent day of the arctic summer. In between, it recalls evidence that the directional choices of Starlings can be shifted predictably by exposure to an artificial light-dark rhythm, that the shift may persist as long as 4 weeks when the bird is kept in constant light, that resynchronization with local time is restored after 8 to 17 days under natural conditions, that the clock is only gradually reset under experimental manipulation, that the rhythm of locomotor activity and the change of angle to the sun are different functions of one basic clock, and that individuals reared under sun occlusion differ from one another in their compensation for the movement of the sun.

Diagrams demonstrate that neither the altitude of the sun nor its change of altitude had noticeable influence on the orientation of the treated Starlings. "A bird which could notice the motion of the sun, and make full use of this observation," says Hoffmann, "would be able to find the right compass direction even if its clock were grossly wrong." Thus he looks upon the deviations of phase-shifted birds as a point against the hypotheses of Matthews and Pennycuick.—R. J. Newman.

23. Does celestial navigation exist in animals? Hans G. Wallraff. 1960. *Cold Spring Harbor Symposia on Quantitative Biology*, **25**: 451-461. In summing up the case against sun navigation, Wallraff discusses several considerations already mentioned in reviews in this issue of *Bird-Banding*. He also stresses that landmark-independent goal finding occurs at distances down to a few miles, where position finding by a strictly solar grid seems impossible. Matthews' attempt to discredit the evidence against the sun-arc hypothesis as examples of northerly "nonsense" orientation had not yet appeared. But Wallraff does cite some examples of deviation not easy to reconcile with sun navigation even on the premise that homing pigeons react like Mallards.

The critique of Sauer's star navigation hypothesis largely repeats in English what Wallraff has already said in German (see *Bird-Banding*, **31**(4): Review 9). The contention is not that birds are incapable of true navigation, not that they make no use of sun and stars, but simply that celestial elements alone do not supply adequate bases for the abilities migrants display. Latitude of interpretation of the type of data obtainable in a planetarium leaves doubt "whether the bird in these experiments actually 'homes' to a specific goal, or whether it is systematically misled in its determination of compass direction by the displaced star positions."—R. J. Newman.

24. Star navigation of nocturnal migrating birds: the 1958 planetarium experiments. E. G. Franz Sauer and Eleanor M. Sauer. 1960. *Cold Spring Harbor Symposia on Quantitative Biology*, **25**: 463-473. These previously unreported tests introduce several improvements in apparatus and method: a new cage permitting a view of more of the sky; reduction of the parallax caused by cage placement; more frequent adjustments of the planetarium sky to conform with the shifts of a real sky; the objective determination of a subject's main direction by vector analysis; and more compact organization of the results. Planetarium north was at 41 degrees of the natural compass, 65 degrees from the former position. The subjects were two Garden Warblers *(Sylvia borin)* and three Blackcaps *(Sylvia atricapilla)*.

In control experiments under a starless, diffusely illuminated dome, two of the birds remained motionless and two circled disorientedly. With the planetarium stars adjusted to local latitude and time, three of the birds displayed mean directions that differed by only a single degree. One series of tests investigated the effect of 25 progressive shifts of the constellations ahead of local time, amounting at the end to a full 24-hour advance. During the series the bird displayed these successive reactions: over-compensated orientation, under-compensation, random movement, mixed northerly and southerly tendencies in the same test (when the star shift was in the neighborhood of 180°), random movement once more, and southeasterly and random choices alternating between tests. When the star shift had completed the 24-hour circuit and again reached the local time, the bird resumed its normal seasonal direction. A series of shifts of the constellations in the opposite direction tested with a different bird produced little reaction, presumably because the migratory unrest of the subject was not well enough developed. A third type of experiment confronted a Garden Warbler and a Blackcap in successive trials with skies of the opposite migration season varied only according to latitude. The object was to find out whether a sky rotated 180° would stimulate the birds to reversed migration. The final results pointed to continued conflict between spring and fall tendencies, not obviously affected by changes in latitude.

Whether the modified arrangements actually reduced scatter is a question not easy to answer by inspection of the diagrams, nor does the text discuss the matter. In this connection, use of a form of vector analysis in which the resultant expresses not only the average direction but also the amount of directionality would have been a great convenience. Another interesting question is whether the 65-degree shift of planetarium north at all modified the headings of the birds in planetarium terms, as it should have done if the birds were not depending wholly on the stars. Clear indications that it did so are lacking, though the paper makes no capital of its seemingly important evidence in support of its thesis.

While the work helps a great deal to clarify the role of the stars in orientation, it does not seem to refute Wallraff's contention that a complete inherent system of stellar navigation is yet undemonstrated. But the present paper is only the opening step in an attempt to re-establish the original hypothesis in all its first persuasiveness.—R. J. Newman.

25. Oriented spring migration of pinioned Canada Geese. William J. Hamilton III and Merrill C. Hammond. *Wilson Bulletin*, **73**(4): 385-391. Occasional sightings showed that, after escape or release, adults on refuges tended to walk or swim toward more northerly nesting grounds. Progress averaged only 1/3 mile to 3/4 mile per day, and the longest recorded seasonal advance was less than 25 miles. The most informative feature of the movement was its continuance in the right direction into June, after all free-flying Canada Geese had passed and even long after the free fliers had presumably reached the nesting grounds.

These results have a parallel in the persistence of migratory restlessness in caged birds beyond the date when the normal migration of the species is at an end. They imply that factors other than sheer passage of time tell a migrant when to stop migrating. At the same time they seem to bear out the belief of the authors that by observing the behavior of unconfined flightless individuals, we can learn things not so clearly indicated by the study either of caged birds or of their free-flying kindred that remain so briefly within our range of perception.—R. J. Newman.

26. Migrants at station "Juliett" in September 1959. Ivor McLean and Kenneth Williamson. 1960. *British Birds*, **53**(5): 215-219. In the period of 15 to 29 September, two Ruddy Turnstones *(Arenaria interpres)* and 18 land birds of 9 species appeared on or near a weather vessel anchored in the open Atlantic, 400 miles off Ireland and 800 miles south of Iceland. All the land birds were passerines except two Kestrels *(Falco tinninculus)*, one of which remained for 3 days and ate at least five of the small migrants. Only two of the passerine species were represented by more than one individual—the Wheatear *(Oenanthe oenanthe)* with 3 and the Meadow Pipit *(Anthus pratensis)* with 7. The authors attribute the presence of most of the birds to downwind drift from southwestern Britain or northwestern France in an anticyclonic air circulation during the first week of the period.

Also listed are a number of phalaropes and terns. Since phalaropes are normally pelagic and since the one completely identified tern belonged to a species *(Sterna paradisea)* with a great reputation for regular transoceanic migrations, these records do not seem to belong in the same category as the others. The report does not state who made the observations.—R. J. Newman.

27. Migrants between South Greenland and Iceland. (Traekfugle mellem Sydgrønland og Island.) Ivor McLean and Kenneth Williamson. 1960. *Dansk Ornithologisk Forenings Tidsskrift,* **54**(2): 69-76. Reports observations on migrants made from an ocean weather ship stationed in Denmark Strait between South Greenland and Iceland. During the spring migration period from April to mid-May, 12 species were observed, 7 of them passerines. Twenty-five birds of several species landed aboard the vessel. Much of the movement in anticyclonic weather seemed to be from South Greenland to Iceland. During the autumn flight, from mid-October to mid-November, only four non-passerine species were observed, two Eiders, a Purple Sandpiper, a Dunlin, and a Gray Heron that was apparently way off its usual course.—O. L. Austin, Jr.

28. Spring migrants between South Greenland and Iceland. (Forårstraek mellem Sydgrønland og Island.) Ivor McLean and Kenneth Williamson. 1961. *Dansk Ornithologisk Forenings Tidsskrift,* **54**(4): 189-193. Observations from the same weather ship during May 1960 as reported in number 27 above. Details are given for the actions of 84 individuals of 15 species of ducks, waders, and passerines observed and are correlated with weather data. The commonest passerine, the Snow Bunting, a number of which landed on the ship and ate seeds put out for them, were apparently moving from Iceland to East Greenland. —O. L. Austin, Jr.

29. Nearctic birds in Great Britain and Ireland in autumn 1958. Kenneth Williamson and I. J. Ferguson-Lees. 1960. *British Birds,* **53**(9): 369-378. From our point of view, here in the Western Hemisphere, no movements of birds across the sea have quite such dramatic appeal as the transatlantic ones. In the interchange, our continent seems more often to give than it receives, and it was especially bountiful in the autumn of 1958. During that period 14 species almost certainly of Nearctic origin appeared in Britain or Ireland. The following list gives the number of records with the number of individuals in parentheses when the latter differs. Green-winged Teal, 2; American Widgeon, 1; Surf Scoter, 1; Snow Goose, 6(11); Purple Gallinule, 1; Killdeer, 1; Dowitcher sp., 3; Lesser Yellowlegs, 3; White-rumped Sandpiper, 4; Pectoral Sandpiper, 6(5); Buff-breasted Sandpiper, 1; Gray-cheeked Thrush, 1; Northern Waterthrush, 1; Baltimore Oriole, 1. Thus the total number of records is 32.

The grouping of main occurrences into more or less well-defined phases, from mid-September onward, has encouraged the authors to attempt correlations with specific patterns of air flow. They succeed in rationalizing the results as products of cyclonic circulation in various parts of the Atlantic, but to do so they sometimes have to resort to a sliding scale that makes assumptions regarding the point of departure of the bird from the American continent and a lag in the detection of the bird at the locality of ultimate record. Certainly no one can deny the oddity of a bird's winding up at a place far to the northward during a season when normally it should be moving southward. In this regard the Purple Gallinule, a bird of southern distribution and one with a heavy body and a wing-shape that seems ill-adapted to long-distance flying, is an especially astonishing inclusion, even though previous data have indicated that it is a trans-Gulf migrant.

According to the hypothesis of Williamson and Ferguson-Lees, birds are carried out over the Atlantic by the westerly winds that prevail in the lower part of the counterclockwise circulation around a low. When they reach the eastern side of the center, the air flow swerves to bear them northward. Hence they are eventually deposited somewhere in Europe. The sometimes very local grouping of the arrivals, in that part of the country exposed to the westerly airstreams, is strong indication of flight directed down wind.—R. J. Newman.

30. Birds crossing the Atlantic on ships. Louis J. Halle. 1960. *British Birds*, **53**(1): 39-41. The interpretation of bird occurrences such as those just reviewed is complicated by the possibility of artificially assisted passage. Halle's repeated personal experience leads him to believe that "every ship that sails from the east coast ports of the United States while a migration is under way carries with it an assorted cargo of migrants, usually Passerines." Most of these passengers disappear within two days, but some succeed in sustaining themselves indefinitely on board. Halle has seen such birds leave the ship at the first landfall and wing their way ashore.—R. J. Newman.

31. The Cattle Egret in Australia. J. M. Hewitt. 1960. *Emu*, **60**(2): 99-102. This inquiry into the origin of the present large population of *Bubulcus ibis* in Australia takes issue with the theory that the birds are descended from the 18 imports liberated there in 1933. Hewitt gives reasons for believing that the Cattle Egret reached that continent by natural immigration from across the sea—the method generally considered most likely with respect to its invasion of the Western Hemisphere.—R. J. Newman.

32. Movements of Cattle Egrets. J. L. McKean. 1960. *Emu*, **60**(3): 202. In support of transmarine emigration as the true means of the world-wide spread of the Cattle Egret, this note cites a nestling banded in Spain and recovered a year later in Trinidad.—R. J. Newman.

33. Cattle Egrets on the Dry Tortugas. I. J. Abramson. 1960. *Auk*, **77**(4): 475. On 7-8 May 1960, while a cold front was grounding many migrants of various species on Garden Key, the number of Cattle Egrets present rose from 9 to 19. Abramson concludes that the extra egrets were part of a migratory wave from Cuba, the Yucatan Peninsula, or points south but adds that "it has not been determined whether the Florida breeding population is migratory." He does not discuss the significance of the Cattle Egret banded in Florida as a nestling in June 1956 and recovered in Quintana Roo in the following December (*Auk*, **76**(3): 360).—R. J. Newman.

34. Evaluation of an aural record of nocturnal migration. Richard R. Graber and William W. Cochran. 1960. *Wilson Bulletin*, **72**(3): 253-273. Recording apparatus recently developed by the authors (see *Bird-Banding*, **31**(2): Review 4) and put to work in Illinois has provided flight-call samples for 175 nights representing three migration seasons.

The data encourage a number of inferences. The greater part of the migration (67-88 percent) passed on only 23-42 percent of the nights of record. Most mass movements were associated with warm fronts in spring, cold fronts in fall. Birds did not take wing until a front had passed. Migrants should have overtaken the front only once during four big flights in spring but on five out of six similar occasions in fall. The peak of the calling correlated with the closing of the gap between birds and fronts. At times migrants passed beyond the front, but the vast majority always trailed it. In fall the volume of movement seemed to be greatest when the interval between cold fronts was greatest. In spring, no such time-volume relationship was evident.

The factors most consistently associated with an initial wave of birds were: in fall, shift of wind from southwest to northwest, relatively *high* night temperature with falling trend, and rising barometric pressure; in spring, wind shift from southwest to north to southeast to south, rising temperature, and falling pressure. The wind exerted the dominant influence in initiating and halting a mass flight. Migration was not particularly reduced on nights of opaque overcast.

The number of types of calls correlated well with the number of species killed during the three major kills at local TV towers (all in fall), though more species were heard calling than were killed. But the amounts of migration indicated by the two criteria did not agree. The kill extrapolation exceeded the call extrapolation in each case, though the smallest kill occurred with the highest call density. The collisions were associated with mass migration overtaking cold fronts from the northwest and with 10/10 cloud cover. "As long as migrants are flying with favorable winds behind a front, no kill will occur even if skies are completely overcast." Correlation between peaks of migration as determined by nocturnal auditing and by diurnal field observations was poor. April through June migration came earlier for most species in 1959 than in 1958.

A few of the foregoing statements reiterate nearly unanimous opinions. Most of them are in conflict with one or more other lines of evidence. And some of them seem to agree with none—i.e., the idea that warmth stimulates fall migration. But the authors do not want us to accept all the statements literally; they make clear at the outset that for convenience they are equating the amount of migration with the number of flight calls, though they themselves do not assume that the two are the same. They point out, for instance, that warmth may stimulate the amount of calling per bird and thereby give a false impression of the amount of migration that occurs with rising temperatures in fall.

An inconvenient omission is the failure to explain how flight-call densities are computed. In the previous paper, these quantities exceeded the "densities" derived from moon-watching. Here they appear inferior in a ratio of not better than 1 to 10. Whether the change is actual or merely represents a different type of calculation is not entirely clear.—R. J. Newman.

35. Tall Timbers reports 1959 progress. Herbert L. Stoddard, Sr. 1960. *Florida Naturalist,* **33** (2) : 89-90. Most of the report deals with the Leon County (Fla.) TV tower, made famous by Mr. Stoddard's migration studies. In 1959, he and his assistant made approximately 450 visits to the site. They are now staking out "test birds" to determine how many of the migrants killed there are removed during the night by predators. After causing some 17,000 known casualties, the old 671-foot tower is being replaced by a 1,000-foot giant. Stoddard is enlarging the carefully sodded and mowed surrounding area to 20 acres to take care of the increased scatter of corpses expected. These activities are examples of the matchless care being devoted to the Leon Co. research. More than 140 species or well-marked subspecies have now appeared among the casualties. Newcomers in 1959 were the Common Egret, Yellow-crowned Night Heron, Wood Duck, Black Vulture, King Rail, Solitary Sandpiper, Red-cockaded Woodpecker, and Fox Sparrow.—R. J. Newman.

36. Bird migration casualties and weather conditions, autumns 1958-1959-1960. Amelia R. Laskey. 1960. *Migrant,* **31** (4) : 62-65. Each autumn since 1956, Mrs. Laskey or her helpers have searched daily for dead migrants around the towers of the WSIX TV station in Nashville, Tenn. Her present report summarizes findings for the years 1958 through 1960 and includes data from a new installation about 7 miles away (WSM), checked only on dates of sizable kills. The recorded casualties in 1960 were the highest ever for the city—1553 at WSIX plus 2130 at WSM, with 77 species represented all told. Mrs. Laskey gives reasons for two disputed opinions: that most of the birds are killed by striking the guy wires and that nocturnally traveling "birds of a species may migrate in groups or in a flight line." Among the pick-ups was one of the few marked individuals ever so recovered, a Catbird banded in Illinois in the previous spring. Also unusual were two ducks, a Mallard and a Blue-winged Teal.

Many accounts of the death of migrants at television towers have appeared in print. Among these, the reports of Mrs. Laskey and Mr. Stoddard have two special distinctions. First, they provide a full listing, not just a potentially arbitrary sample, of the kinds of birds destroyed. Second, by day-to-day surveillance, they give meaning to negative evidence. For example, they enable Mrs. Laskey to observe: "On some foggy mornings when one would expect to find casualties, there were none although tower and cables were shrouded in mist. This seems to indicate that migrations were light during these intervals or the possibility that birds may fly above the clouds."—R. J. Newman.

37. Night migration at 4,200 meters in Venezuela. William H. Phelps. 1961. *Auk,* **78** (1) : 93-94. In late October 1959, two Yellow-billed Cuckoos and a Connecticut Warbler, all very fat, were found dead at a cable railway station in the Andes, which is lighted at night. The altitude (more than 13,000 feet) is unique for records of this kind, though radar has indicated scattered night migration at similar elevations.—R. J. Newman.

38. Warbler kill in the Palm Beaches. H. P. Langridge. 1960. *Florida Naturalist,* **33**(4): 226-227. During the week of 9-14 May 1960, large numbers of migrants met death at shopping centers, apparently by colliding with plate glass windows and other obstructions. The Weather Bureau reported visibility good in the disaster period, though acres of brush and trees were burning a few miles south of the Palm Beaches. Similar fires occurred in 1945, when a previous tragedy of this rare low-level type was reported at the same locality.—R. J. Newman.

39. The 1958 fall migration at Whitefish Point. George J. Wallace. 1960. *Jack-Pine Warbler,* **38**(4): 140-144. Counts of presumed migrants on five dates, 12-17 September, on the Michigan side of the shortest crossing of Lake Superior from Canada ranged from 497 to 376 birds. Wallace gives 8 a.m. temperatures and wind directions but refrains from general conclusions—wisely so, for no clear correlations are evident. Rather surprisingly he obtained his best results with the second highest temperature and an ESE wind.—R. J. Newman.

40. Fall shore bird migration at Nashville. John Ogden. 1961. *Migrant,* **32**(1): 18-19. Around Nashville, Tenn., migrant shore birds are particularly scarce and hard to find in the fall. Observers there have learned that success is most likely during or immediately after the passage of a cold front. In the autumn of 1960, the fronts of 10 and 17 September provided the best results.—R. J. Newman.

41. The long journey. Roger Peterson. 1961. *Audubon Magazine,* **63**(2): 72-75. Newly returned from firsthand experience in Tierra del Fuego, the southernmost extension of South America, the author points out that examples of American long-distance migrants most often used in bird books have become too stereotyped. He cites the White-rumped and Baird's Sandpipers as superiors of the more publicized American Golden Plover and the Barn Swallow as a greater performer than the more publicized Bobolink. Actually, the fame of the plover rests as much on its switch from a mid-continental route in spring to a flight southward over the western Atlantic in fall as upon the sheer mileage it covers. But, as Peterson reminds us, the White-rumped Sandpiper apparently makes a similar shift and travels even farther.—R. J. Newman.

42. Bird Mortality at the WENH-TV Tower in Deerfield, New Hampshire. Philip J. Sawyer. 1961. *New Hampshire Audubon Quarterly,* **14**(2): 46-49. April, 1961. This tower rises 436 feet, from an elevation of 1100 feet on Saddleback Mountain. A table includes spring and fall mortality by species for 1959 and 1960, not broken down by dates. ". . . the spring casualties were distributed more or less at random around the tower. No directional pattern was evident. The fall data did show a definite migratory pattern. Approximately ninety percent of the dead birds were found on the southeast side of the tower. The birds appeared to be heading directly toward the coastline."—E. Alexander Bergstrom.

43. The Contamination of Birds with Pollen and Other Substances. J. S. Ash, P. Hope Jones and R. Melville. 1961. *British Birds,* **54**(3): 93-100. Banding in the Camargue (France), Jersey, Ireland, and in two English counties has brought to light a small proportion of European warblers (Sylviidae) with pollen on them. *Citrus* pollen was most common on the Blackcap *(Sylvia atricapilla)* and Willow Warbler *(Phylloscopus trochilus),* but Chiffchaffs *(Ph. collybita)* were carrying pollen of *Myrica* (sweetgale). Sometimes pollen may be taken as food, but at other times the bird may have been attracted by nectar or insects. The kinds of pollen throw some light on the migration routes of the birds involved.

Tiny snails and ticks have occasionally been found adhering to migrating birds. American banders should look for pollen and other foreign objects adhering to the birds they capture and any such specimens should be sent to specialists for identification.—M. M. Nice.

44. A study of night migration in Blekinge, southeastern Sweden. (Undersökning av nattsträcket i östra Blekinge.) Gunnar Strömberg. 1961. *Vår Fågelvärld,* **20**: 30-42. (English summary.) Lunar observations were carried out for a total time of 783 minutes, during August and September 1958 at two places about 15 miles apart, the coastal town of Karlskrona and a promonotory jutting out into the Baltic Sea. Methods and mathematical formulae are described and the data summarized in diagrams and tables.—Louise de K. Lawrence.

45. Migration through the Sound of Kalmar 1960. Report No. 29 from Ottenby Bird Station. (Fågelsträcket genom Kalmarsund 1960.) Ragnar Edberg. 1961. *Vår Fågelvärld,* **20:** 47-57. (English summary.) This is a comprehensive summary of continuous observations carried on from the middle of March to the end of November of birds migrating through this narrow stretch of water between the island of Öland and the Swedish mainland. In all 142 species were recorded, including 9 not before seen at this locality. Of the 710,170 individuals counted, 35 percent flew north, 60 percent south, slightly over 4 percent east, and about 1/3 percent westwards. The waterfowl, shore-birds, and gulls, most consistently migrated north and southwards, whereas the great majority of the hawks and passerines flew eastwards. Comparison with two previous years of observation here gave the following general result: the greatest number of species were seen during April (84) and October (89); a steady rise occurred in the number of Eiders *(Somateria mollissima),* a maximum daily count of 41,900 was obtained 13 April 1960; the daily counts as well as the total numbers of southbound migrants declined.—Louise de K. Lawrence.

46. The migration of Danish Sparrow Hawks. (Danske Sturvehøges. *Accipiter nisus* (L.), traekforhold.) *Dansk Ornithologisk Forenings Tidsskrift,* **54**(2): 88-102. (English summary.) This study of the movements and the population dynamics of Sparrow Hawks is based on the analysis of the 151 recoveries received from more than a thousand birds banded previous to 1959. The Jutland population is 87 percent nonmigratory. Of the 39 recoveries of birds banded in Jutland and reported from October through February, 87 percent were taken locally within Denmark, while 13 percent had moved to northern Germany, Belgium, and northern France to winter. The 41 winter recoveries of birds banded in eastern Denmark showed 51 percent remained in the country, 49 percent wintering in Holland, Belgium, France, and Spain, most of them in central and southern France. Migratory movement is most marked in younger birds, which move farther southward than do adults. The first-year mortality of 63 percent drops to about 40 percent at the end of the first year: the oldest bird recovered was 11 years of age. Mortality is primarily due to shooting; 71 percent of the recoveries were shot, 24 percent were "found dead," 5 percent "other causes." As an average of 2.8 to 2.9 young are fledged in each clutch, the author shows the species is not producing enough young to balance the demonstrated mortality. As the manifest decline of the species in Denmark of recent years is due primarily to shooting, the author urges year-round protection for the Sparrow Hawk, which "generally speaking is quite a harmless bird."—O. L. Austin, Jr.

Some behavioral observations on migrating terns. (Nogle iagttagelser over traekkende terners opførsel.) Arne Nørrevang. 1960. *Dansk Ornithologisk Forenings Tidsskrift,* **54**(3): 125-127. (English summary.) Nørrevang watched Common, Sandwich, and Arctic Terns moving southward along the west coast of Jutland in mid-August. The birds move leisurely southward during the daytime, seldom more than 200 meters offshore. They dive for food as they travel and "obviously" (?) roost along the beach at night. Of particular interest is his observation of young birds being fed by old ones during migration. "In three cases the young were seen to alight on the water, where it assumed begging posture. The fish was handed over by the adult which alighted or hovered in front of the young." This confirms what we have long suspected, that much of the high mortality our banding recoveries demonstrate in young terns on their way southward results from starvation when the young become separated from their parents before mastering fishing techniques adequately for themselves.—O. L. Austin, Jr.

POPULATION DYNAMICS

(See Numbers 46, 61)

NIDIFICATION AND REPRODUCTION
(See also Numbers 52, 53, 75)

48. The Tameness of Some Scandinavian Waders. Edvard K. Barth. 1961. *British Birds*, **54**(4): 133-136. In the Dotterel *(Charadrius morinellus)* and Red-necked (Northern) Phalarope *(Phalaropus lobatus)* the males incubate the eggs and care for the chicks with no help from their mates; the male Wood Sandpiper *(Tringa glareola)* does likewise, but his mate remains nearby. The first two species are usually fearless, while the third species is customarily shy. Delightful photographs are given of males of all three species brooding chicks held in Mrs. Barth's hand.—M. M. Nice.

49. The European Bee-eater in the Camargue. (Le Guetier d'europe *Merops spiaster* L. en Camargue.) J. J. Swift. 1959. *Alauda*, **27**(2): 7-143. (English summary.) A detailed description of the nesting habits of this interesting species, which has recently been expanding its range northward. The Camargue colonies have been increasing steadily since the bird first appeared there in 1940. The species is a hole nester, boring its chambers in banks in colonies. Good data are given on the courtship, nest building, incubation, rearing of the young, fledging, post-breeding behavior, and food habits. The species' predation on honeybees is discussed for its economic aspects.—O. L. Austin, Jr.

50. The nesting of flamingos in 1958. (La nidification des Flamants en 1958.) Luc Hoffmann. 1960. Fifth Report of the Activities of Station Biologique de la Tourduvalat, pp. 118-119. Though the 1957 season was highly successful, the 1958 nesting of the flamingos was a complete failure. The birds started nesting late and in relatively small numbers. Of the 5,000 birds on the famous reserve, only about 2,000 to 3,000 attempted to nest. Two storms in May flooded part of the breeding grounds, destroying many nests, and a general breaking up of the colony soon followed, accompanied by severe predation by Herring Gulls.—O. L. Austin, Jr.

51. Density of nests and territoriality in the Camargue flamingos. (Densite des nids et notion de territoire chez le flamant de Camargue.) J. J. Swift. 1960. *Alauda*, **23**(1): 1-14. (English summary.) (See No. 50 above.) The Camargue flamingo colony had a more successful year in 1959, and 585 young birds were banded early in July. The author describes the colony in detail and comments on reasons for the species' colonial behavior. The 2,900 square meters of the colony contained 3,645 nests, or about 1.3 nests per square meter, which is comparable to the density in the Kutch colonies (the Kenya and Mauritania colonies reach 2½ to 3 nests per square meter, those in Anagua and Andros from 0.6 to 1.05 nests per square meter). Swift shows that at these densities the nesting birds do not have room enough to take flight among other incubating birds, and have to move out of the colony to take wing. Under normal conditions in remote colonies that are seldom disturbed this causes no untoward difficulties, but it increases the attendant destruction when the colony is frightened into mass flight, as by low-flying airplanes. Lack of suitable nesting space and mutual protection from predators he dismisses as inadequate to explain their densely colonial nesting, for the groups of nests occupy only a small part of the suitable territory available, and the adults make no attempt to defend their eggs or young against intruders. As colonies of fewer than several hundred pairs are rarely successful, he considers their colonialism "points perhaps to the need for a higher level of social stimulation in flamingos than in other birds. This coupled with the lack of need for sudden takeoff may have resulted in the extreme compact nesting colonies of flamingos."—O. L. Austin, Jr.

BEHAVIOR
(See also Number 49)

52. On the Biology and Ethology of Australian Honeyeaters. (Beiträge zur Biologie und Ethologie australischer Honigfresser *(Meliphagidae)*). Klaus Immelmann. 1961. *Journal für Ornithologie*, **102**(2): 164-207. (With 1½ page summary in English.) During an 11-month stay in Australia the author observed 29 species of Honeyeaters, 9 of which were breeding. "Honeyeaters are very pugnacious. Most controversies are carried out by real fighting." In most of the species both sexes sing. "A continuous succession of higher-development is present from the mutual answering of the partners through increasing synchronization to the highly developed duet singing." In most species the female builds the nest alone and incubates the eggs, but the male helps in feeding the young. Incubation lasts 13 to 16 days, fledging 10 to 16 days.

Young are fed by their parents for a long time after they leave the nest. Sometimes they assist in rearing their younger brothers and sisters. Sexual maturity comes early in young Honeyeaters, pair formation often taking place before the end of the juvenal molt. A female Rufous-throated Honeyeater *(Conopophila rufogularis)* started nest building two weeks before the end of this molt and raised her brood successfully. This early maturity is characteristic of many bird species in central and northern Australia. A very interesting article.—M. M. Nice.

53. Observations on Some Breeding Water Birds on Bylot Island. William H. Drury, Jr. 1961. *Canadian Field-Naturalist,* **75**(2): 84-101. Very interesting series of sketches of displays of Red-throated Loons *(Gavia stellata),* Greater Snow Geese *(Chen hyperborea atlantica)* and Oldsquaws *(Clangula hyemalis).* The behavior of these species and also of King Eiders *(Somateria spectabilis)* is described and comparisons made with observations of other authors. Spring was late, lemmings were scarce and nesting birds suffered greatly from foxes and jaegers during Dr. Drury's stay from 12 June to 29 July, 1954 on Bylot Island, Northwest Territories, Canada.—M. M. Nice.

54. The Development and Ethology of the Black-winged Stilt and Pratincole. (Zur Jugendentwicklung und Ethologie der Stelzenläufers *(Himantopus himantopus)* und der Brachschwalbe *(Glareola pratincola).*) Otto v. Frisch. 1961. *Zeitschrift für Tierpsychologie,* **18**(1): 67-70. An interesting paper illustrated with sketches of the birds and curves of their growth. Chicks were reared by hand in the Camargue. The stilts kept close together for the first 14 days. At 5 days they took their first baths; on the seventh day marked growth of the legs started. On the 29th day they were able to fly.

Parent Pratincoles, like those of the Stone Curley *(Burhinus oedicnemus)* at first hold food before the chicks which at times spring high to get it. At 6 days the chicks started to search for their own food. The young Pratincoles were always peaceable with the other shorebirds kept by the author and were the tamest of all the species towards people. In the spring their courting behavior resembled that of Stone Curlews.—M. M. Nice.

ECOLOGY
(See also Number 72)

55. A Study of Certain Plant and Animal Interrelations on a Native Prairie in Northwestern Minnesota. John R. Tester and William H. Marshall. 1961. Occasional Papers: Number 8, Minnesota Museum of Natural History. viii—51 pp. Copies available upon request to: Minnesota Museum of Natural History, University of Minnesota, Minneapolis 14, Minn. "A field study to determine the nature of the relations between specific vegetational characteristics of the dominant grasses and litter found on a native prairie and changes in distributions and abundance of certain birds, mammals, and insects was carried on at the Waubun Prairie Research Area in Mahnomen County, Minnesota during the growing seasons of 1957, 1958, and 1959. . . . A total of 70 acres of relatively undisturbed native prairie was selected within the 640-acre tract. On five 10-acre plots mowing, grazing, or burning was carried out. Two plots were left untreated and held as controls."

For Bobolinks plots with very deep litter or very little litter appeared less desirable. For Savannah Sparrows the plots with less litter appeared the least desirable; more than 2 years of recovery after a fire appeared necessary to make a plot once more desirable. Results with LeConte's Sparrows were less conclusive, but they "appear to need a moderate amount of litter combined with much new grass rising 30 centimeters or more above the litter."—E. Alexander Bergstrom.

CONSERVATION
(See also Numbers 42, 46, 63, 65, 67, 77)

56. The Protection of Fauna in the U.S.S.R. G. P. Dementiev. 1960. Smithsonian Report for 1959, pp. 483-493. Separate available on request from the Editorial and Publications Division, Smithsonian Institution, Washington 25, D. C. This paper originally appeared in the *Atlantic Naturalist*, **14**(1), January-March, 1959. It is a free translation, by John Covert Boyd, III, of a talk given by Prof. Dementiev in June, 1956, at Edinburgh, Scotland, in a meeting of the International Union for the Conservation of Nature and Natural Resources (and published in French in 1957 in the proceedings of that meeting).

Brief mention is made of early natural reserves, such as one established in the 17th century on the Seven Isles (to the north of the Murmansk coast), to protect the eyries of gyrfalcons.

The paper deals primarily with conditions since 1917, under a number of headings—ecological studies as a basis for active protection, reduction of pollution, habitat improvement, and partial or complete protection. Introduction or reintroduction of birds appears to have been confirmed to a few game birds, except for "several attempts to import the eggs and young of insectivorous species to new tree farms." As an example of the need for international cooperation: "As far as we know, the birds using the great Caspian flyway, protected in the U.S.S.R. by three special refuges—Astrakhan, Kyzyl-Agatch, and Hassan-kuli—should definitely be protected along the southern coastal areas of the Caspian Sea."—E. Alexander Bergstrom.

57. Bird mortality in the Dutch elm disease program. George J. Wallace, Walter P. Nickell, and Richard F. Bernard. 1961. Bulletin 41, Cranbrook Institute of Science, Bloomfield Hills, Michigan, 44 pp. The wholesale broadcasting of highly lethal and non-selective insecticides is the latest and one of the most serious threats to wildlife our ingenious and expanding civilization has yet devised. Though the marked die-off of birds, mammals, and fishes following large-scale spraying and dusting operations has thoroughly alarmed and aroused conservationists, bird lovers, and sportsmen to the peril, all too few accurate assessments of the effects of insect-control programs on wildlife have been made. Hence this detailed report, sad reading though it makes, of the drastic effects to bird life of DDT spraying in Michigan provides valuable ammunition for the campaign against such mass use of insecticides. A bibliography of 17 titles lists other recent papers on the subject.

The report details the history of the elm disease in Michigan and the measures used to control its spread—heavy sprayings of DDT to kill the bark beetles believed to spread the fungus that causes the disease. A careful check of the Michigan State University campus during the spraying of 1960 showed a mid-April population of about 18 pairs of Robins. These died off rapidly as spraying operations were conducted until only 3 were known left by 22 May. Analysis of 22 robins picked up dead or dying showed high levels of DDT in all tissues examined; the substance was also found "in fully developed eggs in the oviducts, in unhatched eggs in deserted nests, in developing embryos, and in one newly hatched nestling." The breeding bird population on the Cranbrook campus has declined more than 90 percent since the spraying program started. Surveys of other Michigan communities show similar mortalities and decreases of bird populations wherever spraying programs have been conducted.

The authors suggest a number of refinements in spraying techniques that might alleviate some of their harmful effects to wildlife, but admit these will not eliminate the destruction. Despite their reluctance "to criticize or evaluate the earnest efforts of operators [the word is well chosen] and administrations to try to save valuable elm trees," the authors are nevertheless "inclined to question the whole [Dutch elm disease control] program, as currently conducted, on ecological grounds. Any program which destroys 80 or more species of birds and unknown numbers of beneficial predatory and parasitic insects needs further study."

Personally I have been strongly opposed to all such programs since my first experience with one 11 years ago. In a countywide effort to control gypsy and browntail moth depredations, large areas of Cape Cod were dusted with DDT by aircraft in 1950. One afternoon a plane dusted the 300 acres of our Research

Station, where our thriving colony of 150 pairs of Tree Swallows had just finished building their nests and were laying their first eggs. By the next day our swallows had vanished, and no more were seen in the entire township until the following spring, when the birds returned in greatly reduced numbers. The colony has not yet recovered, 11 years later, but the gypsies and browntails are still going strong.

The only hope I can see to abate the wildlife mortality incident to insect control is the development of selective toxins or other killing methods that will destroy insects without affecting other forms of animal life. In the public mind economic and health considerations (to say nothing of comfort) far outweigh the value of the birds destroyed by insect-control operations. It is not going to be easy to convince administrators otherwise before it's too late.—O. L. Austin, Jr.

58. The economic importance of birds in forests. Herbert Bruns. 1960. *Bird Study*, **7**(4): 193-208. This review of recent researches on methods of increasing bird populations in managed forests and their effectiveness in controlling forest insect pests summarizes the work done on the subject in the last several decades. It is accompanied by a useful bibliography of 68 titles, largely from the German and other central European literature. From the strictly economic viewpoint Bruns comments "Birds generally are not able to break down an insect plague, but their function lies in *preventing* insect plagues." For this, as well as for aesthetic reasons, he emphasizes the importance of maintaining balanced biota in the forests "to conserve or create a rich and diverse community," which offers the best possible protection to forests against epidemic outbreaks of insects.—O. L. Austin, Jr.

59. On the damage by birds to power and communication lines. F. J. Turcek. 1960. *Bird Study*, **7**(4): 231-236. This short discussion is based largely on the author's observations on power lines in Czechoslovakia for two years and a cursory review of the literature on the subject in other countries. The bibliography lists only seven titles, all of them dealing with woodpecker damage. The paper deals mainly with their borings in power line poles, which has at some times and places been extensive enough to be of economic importance. The only remedy suggested is replacing the usual wooden poles with poles of concrete and steel. The author reports damage to power lines by Goldfinches tearing off long threads of insulation for nest material, which allows the wires to be short-circuited by wind action. This unusual phenomenon is of little economic importance, and easily prevented by using a different type of insulation or by stretching the wires taut enough so that they cannot rub together. No mention is made of the frequent short-circuiting of power lines by osprey nests, which has been remedied successfully by erecting platforms for the birds above the poles.—O. L. Austin, Jr.

60. A survey of vertebrate road mortality, 1959. M. L. Hodson. 1960. *Bird Study*, **7**(4): 223-231. The author assesses road mortality on the basis of counts of vertebrates killed on a 2-mile stretch of "arterial" roadway in rural Northhamptonshire. In his daily checking the stretch of through highway, he collected and identified the remains of 288 birds of 26 species and of 295 other vertebrates of 16 species, mostly small mammals, killed by speeding cars. His analysis shows great specific variations seasonally. Mortality is highest during periods of good weather during the breeding and post-breeding seasons in spring and summer when birds are moving most actively across the roads between feeding grounds, and when the density and speed of traffic are also at a peak. Though he gives figures for traffic density (the average 101 vehicles per hour rises to 180 on normal weekends and to 244 on "Bank Holidays"), he does not estimate speeds. He considers traffic density and speed the most important factors in road kills, which confirms casual observations of the road-kill phenomenon in this country. Far more bird carcasses are to be found on high-speed roads than in districts where cars must operate at lower speeds. Studies such as this suggest the terrific toll of wildlife that cars now take on our major highways. The subject is well worthy of further statistical study.—O. L. Austin, Jr.

PARASITES AND DISEASES
(See also Number 57)

61. Analysis of 1,000 deaths in wild birds. A. R. Jennings. 1961. *Bird Study*, **8**(1): 25-31. Postmortem examinations of a thousand birds found dead in the wild show the cause of death in all but approximately 17 percent. The chief causes of death in descending order were: injury (trauma), infectious disease, poisons, parasitic disease, and organic disease. Peak mortalities seem to occur in May and June. An analysis of the causes of death by families shows small land birds, mostly passerines, are more subject to injury than others. Similarly vulnerability to various diseases and types of injury varies by family according to habitat and behavior.—O. L. Austin, Jr.

PLUMAGES AND MOLTS

62. The Moult Gatherings and Moult Migrations of Shelduck in Northwest Germany. Friedrich Goethe. 1961. *British Birds,* **54**(4) : 145-161. Graphs are given showing the numbers of resting and moulting Shelduck in different places in Germany. A map depicts the recoveries of these birds that have been banded at Knechtsand. Suggestions are given as to further lines of investigation on these mass gatherings.—M. M. Nice.

63. A Survey of Moulting Shelduck on Knechtsand. Friedrich Goethe. 1961. *British Birds,* **54**(3) : 106-115. Grosser Knechtsand is an extensive maze of channels and sand banks 8.1 nautical miles from the German mainland between Bremerhaven and Cuxhaven. This is the most important molting area for *Tadorna tadorna* in Europe. Aerial photographs taken in August 1955 and 1956 show enormous numbers of these birds—from 75,000 to 100,000. In 1952 an agreement was reached by the German Federal and British governments to use this area for a bombing range. In 1954 over 12,000 Shelduck were killed there, but steps have been taken to restrict the bombing to times when the birds are absent.—M. M. Nice.

ZOOGEOGRAPHY

64. The breeding distribution of thirty bird species in 1952. C. A. Norris. 1960. *Bird Study,* **7**(3) : 129-184. A series of maps and tables presents the data compiled by an organized survey of volunteer cooperators for the British Trust for Ornithology during the summer of 1952. The observers censused areas of 25 square kilometers and reported the estimated numbers of pairs present of each of the 30 selected species breeding in five categories: A, not recorded for the area, B, recorded but probably not breeding, C, probably under 10 pairs breeding, D, probably between 10 and 100 pairs, E, probably over 100 pairs. With distinctive symbols ranging from pure white for category A to solid black for category E, the combined results were plotted on basic national grid squares of 25 square kilometers. Despite obvious difficulties in inequalities of reporting and in translating or transcribing the combined results, the resulting maps reveal significant trends and outlines in the distribution of the various species. Further refinements in the collecting and the presenting of the data are desirable, but the method has good potentialities for showing graphically the distribution density of species. It should be most useful in determining trends and changes over say 10-year periods if it is possible to repeat these surveys at stated intervals.—O. L. Austin, Jr.

65. Warbler Fluctuations in Oak Woodland in the Severn Valley. M. Philips Price. 1961. *British Birds,* **54**(3) : 100-106. Population statistics on breeding Nightingales *(Luscinia megarhynchos)*, Willow Warblers *(Phylloscopus trochilus)*, and Chiffchaffs *(Ph. collybita)* from 1927-1960 on a 200-acre tract of oak woodland and grass orchards. All of these have declined in numbers, the Chiffchaff in the last 2 years, the Nightingale in the last 4 years and the Willow Warbler in the last 8 years. The disappearance of rabbits through myxomatosis in 1954 was followed by an increase in brambles which largely destroyed the preferred habitat of this warbler. The brambles, however, offered better nesting facilities for the other two species. The decline of the Nightingale appears to be general in the Severn Valley and elsewhere. It is possible that contributing factors may be the increase in spraying of agricultural crops, as well as the anti-locust spraying in Africa. "Mr. J. G. Williams of the Coryndon Museum, Nairobi, says that the numbers of insectivorous birds passing along the Kenya coast have been growing less in recent years."—M. M. Nice.

66. Directory to the Bird-life of Kansas. Richard F. Johnston. 1960. *Museum of Natural History, University of Kansas, Miscellaneous Publication,* No. 23:1-69. Dr. Johnston has had a rich amount of data—published and unpublished—on which to base this painstaking annotated list of the 379 species (461 species and subspecies) that have been taken in Kansas. Under each species the following topics are covered: occurrence in the state, habitat, dates when present, and sub-species taken in Kansas. For the breeding species further information is given: dates of egg-laying, number of broods, number of eggs, and site of nest. In some cases a reference to a life-history study of the species is appended—a very helpful feature.

A map shows the names of the counties; it would have been useful if maps showing the physiographic and vegetational regions could have been included. This well-planned Directory should give a great impetus to the study of birds in Kansas. It will be sent free by application to the Museum at Lawrence, Kansas. —M. M. Nice.

67. Notes on the Peregrine in Cornwall. R. B. Treleaven. 1961. *British Birds,* **54**(4): 136-142. Before the last world war there were at least 20 eyries of *Falco peregrinus* in Cornwall and their breeding success was good. During the war the government destroyed the eggs and adults so thoroughly that none of these birds bred in Cornwall from 1941 to 1945. The next year one pair bred and by 1955 17 eyries were in use. Since then, however, the number of pairs have fallen rapidly and few young have been raised. By 1960 seven pairs were present early in the season, but only three were left by June 1, and these raised only three young. An excess of females in the population is a disruptive factor. Other conditions apparently contributing to the lack of success may well be the great increase of human visitors to the cliffs in recent years, as well as increase in foxes, due to the luxuriant growth of grass and bramble since the disappearance of rabbits. The food of the Peregrines consists mainly of feral pigeons *(Columba livia)*.—M. M. Nice.

68. The sea-bird population at Stockholm during the winter 1956-57. (Sjöfågelbeståndet i Stockholm under vintern 1956-57.) Kjell Engström. 1961. *Vår Fågelvärld,* **20**: 1-12. (English summary.) This is the second census taken of birds wintering in the waters in and around Stockholm. The weather was milder than during the first census in 1955-56 and accordingly the ice formation around the Baltic coasts was less heavy. However, the author does not emphasize the divergencies of the two counts due to weather conditions, but looks rather to the features found in common. On these he bases his conclusions of the normal population fluctuations and analyses their causes. Thus three main trends emerged: 1) a gradual increase with a peak in March of the diving ducks, denoting the period of most severe ice conditions; 2) a sharp and early increase occurring before the peak of severest winter weather, followed by a decrease in species such as the Herring Gull *(Larus argentatus)*, the Coot *(Fulica atra)*, and the Mute Swan *(Cygnus olor)*, explicable as a delayed or inhibited migration due to artificial feeding; 3) a decline in species represented here by the Black-headed *(Larus fuscus)* and the Common Gulls *(L. canus)*, reflecting a definite southward migration. The data are presented in several diagrams and one table. —Louise de K. Lawrence.

FOOD
(See also Numbers 47, 49, 72)

69. Honey Bee Larvae *(Apis mellifera,* L.) for Bird Food. Norman E. Gary, Robert W. Ficken and Robert C. Stein. 1961. *Avicultural Magazine,* **67**(1): 27-32. Clear description of a simple and efficient method of raising and harvesting bee larvae. These larvae are exceedingly nutritious and would seem to form an ideal food for raising young insectivorous birds.—M. M. Nice.

70. Insects and Food Mixtures for Insectivorous Birds. Robert W. Ficken and William C. Dilger. 1961. *Avicultural Magazine,* **67**(2): 46-55. A detailed discussion on insect culture techniques, insect capture, 'meating off', automatic feeding of live insects, and food mixtures and some nutritional considerations. A vast amount of information is supplied and 15 references given. This should prove very helpful to people studying behavior of captive birds.—M. M. Nice.

SONG
(See Number 71)

BOOKS

71. Animal Sounds and Communication. Ed. W. E. Lanyon and W. N. Tavolga. 1961. Publication No. 7, American Institute of Biological Sciences. 2000 P St., N.W., Washington 6, D. C. Book of xiii + 443 pp. plus 12" long playing record. $9.50 ($8.50 to AIBS members). "Two diverse fields of biological research are currently enjoying rapid development and broadening coverage. These are: studies in general animal behavior and investigations into biological acoustics. A distinct need has appeared for improved communication between the workers in these two fields." This was carried out in a symposium held in August, 1958, at the annual meeting of the AIBS. The present book and record are basically the proceedings of that meeting, with some additions.

The contents are: Introduction, by J. T. Emlen, Jr.; Considerations and Techniques in Recording Sound for Bio-Acoustics Studies, by P. P. Kellogg (25 pp.); The Analysis of Animal Sounds, by D. J. Borror (12 pp.); Sound Communication in Orthoptera and Cicadidae, by R. D. Alexander (50 pp.); Sound Production and Underwater Communication in Fishes, by W. N. Tavolga (44 pp.); The Influence of Sound on the Behavior of Amphibians and Reptiles, by C. M. Bogert (184 pp.); The Ontogeny of Vocalizations in Birds, by W. E. Lanyon (27 pp.); Bird Songs and Mate Selection, by P. Marler (20 pp.); An Ecological and Functional Classification of Animal Sounds, by N. E. Collias (24 pp.); and Logical Considerations in the Study of Animal Communication, by C. F. Hockett (39 pp.). Each paper has a bibliography, and the volume as a whole is indexed.

Borror discusses the use of sound spectographs in recent years to study bird song in greater detail than previously possible. They reveal, for example, more variation in the song of individual birds than is apparent to the ear. This may be carried to the point of identification of the individual bird in successive seasons.

Lanyon sums up recent investigations into the development aspects of bird song: "(1) There appears to be a general pattern of the sequential development of song . . . which is at least partially controlled by endocrine factors. A gradual transition . . . occurs from early subsong to intermediate rehearsed song and finally to definitive primary song. The latter is fully developed by the first spring. . . . (2) The extent to which exposure to experienced birds is essential for the normal development of song is still the challenging question. . . . We know that certain song birds that have been reared from the egg in soundproof rooms are capable of developing original song motifs, but these are only suggestive of the song of their respective species. These birds normally refine and supplement their own original motifs by imitating the sounds that they hear from other individuals. This important role of learning in the normal development leads to distinct geographical dialects of bird song. (3) The period of receptivity during which learning may occur extends from the time of fledging through the first spring . . .. Most birds, except those that normally mimic others, show a preferential receptivity to the sounds of their own species. Once learned and incorporated into the vocal repertoire, these vocal patterns are remarkably stereotyped and fixed for life."

Marler's paper includes such topics as reproductive isolation and specific distinctiveness, geographical variation of song, song dialects, variation within a population, repertoires of individual birds, specific characters versus individual characters, the significance of song learning, some examples of specific "indistinctiveness" in songs, and other functions for song than mate selection. Examples are drawn from the Canary Islands and elsewhere.

The record includes sounds discussed in the various papers, and is incidental to the papers. It will have no appeal to the amateurs who buy other records of animal sounds. However, the book and record appear indispensable for all serious students in these fields.—E. Alexander Bergstrom.

72. Ecological Relationships Between Birds and Trees. (Oekologische Beziehungen der Vögel und Gehölze.) František J. Turček. 1961. Verlag der Slowakischen Akademie der Wissenschaften, Bratislava. 151 photos. 332pp. A truly remarkable volume based on the author's many years of research in Czechoslovakia and on a wide acquaintance with the European writings on the subject. The largest part of the book is devoted to trees furnishing food to birds.

This is followed by sections on planting of trees by birds, living quarters in trees for birds, and finally on the harm done to trees by birds. Table 1 (51 pages long) shows for 274 species of trees the number of birds known to feed on their seeds and fruits. The mountain ash proves to be the tree with the most patrons —63 species. Table 5 (66 pages long) lists under each of 156 species of European birds the kinds of seeds and fruits known to be taken. Numbers range from 1 to 112—the Hawfinch *(Coccothraustes coccothraustes)* being the champion.

Seeds of most of the conifers are rich in fat; those of oak, birch, and ash are rich in carbohydrates; those of locust, elm, and linden rich in protein. Birds appear to be immune to poisonous substances in seeds, except for alcohol and hydrocyanic acid. Figures are given on the amounts of seeds and fruits eaten and the speed of their digestion. The eating of buds, leaves and shoots; drinking of sap, and destruction of galls are discussed. This last activity is beneficial to the trees.

The dispersal of tree seeds by birds through pellets and droppings and by burying is treated in detail. The many ways in which trees are used for nesting, roosting, etc. are described. As to the harm done to trees by birds, it is usually localized—as in fruit orchards, or it is offset by the good done by the destruction of injurious insects, a subject which is to be dealt with in a later publication. A summary would have been helpful to the book.

The 10-page bibliography is followed by 151 photographs taken by Dr. Turček. The first 101 of these show seeds or fruits of a large variety of trees eaten by a diversity of birds. The next 23 show injuries to trees by birds and ringing of trees by woodpeckers for sap. There are ten pictures of galls opened by different birds, and views of trees and shrubs planted by birds.

This book will serve as a valuable source of information on this important subject It may be obtained for $4.00 from "Artia," Prague 2, Ve Smeckách 30, Czechoslovakia.

73. Penguin Summer. Eleanor Rice Pettingill. 1960. C. N. Potter, Inc., New York. 198 pp. ill. Price $5.00. Books by wives of ornithologists may vary greatly in intent and content, but all unconsciously tell the same story. No woman can remain happily married to and travel with an ornithologist without becoming one herself, or becoming a bird watcher, or at the very least a watcher of bird watchers. The first ornithologist's wife I knew was Mrs. Vernon Bailey, an outstanding example of a bird man's wife (and daughter) become an ornithophilite herself. Florence Merriam Bailey, Grace (Mrs. Robert C.) Murphy, and Elsa (Mrs. Arthur A.) Allen have all gained friends for conservation and recognition for their own work in their husbands' vocations. Eleanor Pettingill now joins this distinguished company. Her charming account of months spent birding and adventuring with cameras in the Falkland Islands is delightful reading and a most informative survey of the fauna, flora, weather, and peoples of the settlement. Unintentionally she has included a detailed and graphic description of all forms of summer transportation available on the islands in her tales of treks, flights, sails, and rides on wheels and horses to the scattered bird rookeries. Her descriptions of the birds are just as accurate and much pleasanter to read than technical accounts. She manages to tell a great deal about avian behavior without using any of the jargon that has crept into so many recent ornithological papers on this subject. I only wish she had correlated the hours of daylight from October through March with her activities for the benefit of the reader. Of more value to ornithologists than the appended list of scientific names of animals and plants mentioned in the text would have been an annotated list of the birds known to occur in the Falklands. I hope that Eleanor Rice Pettingill is preparing her Iceland adventure for publication.—Elizabeth S. Austin.

74. Audubon and his journals. Maria R. Audubon. With zoological and other notes by Elliott Coues. 1961. Dover Publications, Inc., New York, Vol. 1, 532 pp., Vol. 2, 566 pp. Price $2 each. This republication of the famous journals in sturdy paperback form puts them within reach of everyone. Though lengthy excerpts from them have been quoted and reprinted many times in subsequent biographies of Audubon and elsewhere in the ornithological literature, the complete journals, as edited by his granddaughter and published in 1897, have long been out of print and are now something of a collector's item.

Audubon's skill as an artist overshadowed his ability as a writer, but his prose gives us one of the most accurate and revealing contemporary pictures of frontier America of the first half of the 19th century. Equally entrancing is the picture that emerges from his own words of Audubon as a man and a naturalist. He is occasionally "debunked" and belittled today, by sentimental members of the organization named in his honor, as a cold-hearted bird-killer. Such critics only reveal their ignorance of the real Audubon, and of the contemporary attitude of humankind to wildlife. Make no mistake about it. Though Audubon killed his share of birds without compunction wherever he deemed it necessary—for art, for science, for food, or for sport, he was as sentimental and sensitive about them as only an artist of French descent could be. Let the doubters read this condemnation of the egging business in the Labrador, and this item from the same journal: "I watched the Ring Plover for some time; the parents were so intent on saving their young that they both lay on the rocks as if shot, quivering their wings and dragging their bodies as if quite disabled. We left them and their young to the care of the Creator. I would not have shot one of the old ones, or taken one of the young for any consideration, and I am glad my young men were as forbearing."

The zoological and other comments inserted as footnotes by the great Elliott Coues add an interesting commentary on the progress of ornithology in the half century from Audubon's to Coues's day, as well as in the past 70 years since Coues wrote them. It would not be amiss further to bring them up to date and to show how well Audubon's and Coues's contributions to ornithology have stood the test of time.—O. L. Austin, Jr.

75. **Dusky and Swallow-tailed Gulls of the Galapagos Islands.** Alfred M. Bailey. 1961. Museum Pictorial No. 15, Denver Museum of Natural History, 33 pp., illustrated. Price $1.00. This popular account of the author's experiences with two little-studied species during his 2-month stay in the Galapagos in 1960 is illustrated with superb photographs by the author. He presents clearly and entertainingly the essential data available on the habits, appearance, and life histories of the two species culled from a bibliography of 15 titles, to which he adds his own observations and comments. He describes the nest and eggs of the Dusky Gull, hitherto unknown. Of interest is his finding young Swallow-tailed Gulls banded a few weeks prior to his visit by Dr. Raymond Leveque, the UNESCO representative in the Galapagos Islands.—O. L. Austin, Jr.

76. **Binoculars & Scopes/How to Choose, Use, & Photograph Through Them.** Robert J. & Elsa Reichert. 1961. Chilton Company, Book Division, 56th and Chestnut Sts., Philadelphia 39. 128pp. $1.95 paper, $2.95 cloth. Modern Camera Guide series. The Reicherts, of Mirakel Optical Company, have lectured to many bird clubs and other interested groups on binoculars and spotting scopes. This book incorporates the substance of the lectures, plus details too technical for inclusion in most lectures. This is the best description I have seen of just how the various models and specifications differ; it gives an excellent basis for an intelligent choice. The Reicherts include 28pp. of practical advice on the use of binoculars or scopes with a camera, in lieu of a telephoto lens. About the only useful bit of information in this field that the book doesn't include is that the removable eyepiece of a spotting scope, reversed, makes a tolerably good field substitute for a hand lens, though with very shallow depth of focus.—E. Alexander Bergstrom.

77. **In the Arms of the Mountain. An Intimate Journal of the Great Smokies.** Elizabeth Seeman. 1961. Illustrated by Glen H. Hounds. Crown Publishers, Inc., N. Y. 251pp. $4.00. This is a story of high courage, of two people who, as Marcus Aurelius enjoined "chose the highest and held it fast," despite hardships, ill health and great difficulties. Deeply resolved to live in the beauty of forests by a rushing stream, surrounded by unspoiled nature, they left the city and built themselves a cabin in the Smoky Mountains. Mrs. Seeman writes vividly of their varied and moving experiences with their goats, ducks, chickens, bees and dogs, with their mountain neighbors, and with the wild birds and beasts. Poignant descriptions are given of the wilderness throughout the day and night and throughout the year. This is a beautiful and inspiring book.—M. M. Nice.