what one might find in the field. Temperature data for this location are not available, but the mean daily temperature of about 27° C. with a daily range of 21° C - 32° C, which is found at the same latitude in Panama City, is probably correct. Indeed these temperature conditions are monotonously similar throughout coastal areas of the lower half of Central America.—David T. Rogers, Jr., Dept. of Biology, Univ. of Alabama, P. O. Box 1927, University, Ala. 35486.

Apparent Homing in the Red-tailed Hawk.—While banding Red-tailed Hawks (Buteo jamaicencis) with the aid of a balchatri trap described by Berger and Mueller (1958, *Ring*, **17**: 86-88), I trapped an adult male which was kept as a prospective bird for breeding experiments. The bird was trapped three miles south of Lawrence, Douglas County, Kansas, and transported inside the city limits. The bird was tethered using the system of jesses or leg straps adopted by falconers. On 16 February 1967, five days after trapping, the bird broke loose with leg straps still attached. A thorough search was made but the bird was not relocated.

On 21 February 1967 I was trapping in the area where I originally captured the male. I attempted to capture a Red-tailed Hawk there, but it did not seem to pay any attention to my trap and bait (hamster). The bird flushed at the approach of my car and, with the aid of binoculars, I identified the bird as the original missing red-tail by means of the leg straps. The straps did not appear to hinder the bird.

Several things are worthy of note in this report. The bird returned to its original territory over an air distance of 4.25 miles after an absence of five days. The red-tail was "still-hunting" from the same perch when relocated as when first spotted and trapped. The bird's reluctance to respond to the same trap twice may indicate a retention of past experiences. Similar reactions have been noted on other red-tails exposed to the same trap a number of times.—Bruce R. Wolhuter, Museum of Natural History, University of Kansas, Lawrence, Kansas

RECENT LITERATURE

BANDING

(See also 8, 29)

1. The Wandering Albatross (Diomedea exulans): Results of Banding and Observations in New South Wales Coastal Waters and the Tasman Sea. J. D. Gibson. *Notornis*, **14**(2): 47-57. This paper includes several noteworthy features—measurements of live birds, recoveries of banded birds, and plumage patterns.

For 108 birds, not segregated to sex or age, the mean weight was 8.3 kg (5.9 to 11.3, although a single bird from another area weighed 12.2 kg or 27 lb.). The wingspans of 119 birds ranged between 272 and 323 cm (that is, 9-10.5 ft).

About 50 birds banded at New South Wales have been recorded 90 times at South Georgia, 7000 miles away, and 12 are known to have made the trip both ways. At the breeding grounds on South Georgia, some 6000 Wandering Albatrosses have been banded, and since 1959 thirteen of these have been caught off New South Wales. Other recoveries of New South Wales birds have been from New Zealand, Kerguelen Is., and Auckland Is. From these and other records, the author concludes that the large number of wintering Wandering Albatrosses off New South Wales includes birds from all the nesting colonies.

Plumage patterns in this and other species of albatrosses have been a source of perplexity for some time, chiefly because a given pattern could not always be associated with a specific sex or age. Whereas these problems are still not entirely solved in the present paper, the handling of 600 birds has permitted at least a categorization of plumage types, figures for which are presented to show the order of gradual changes. Unfortunately, the patterns are not adequately related to sex or age.—David W. Johnston.

2. Bird Ringing in the Netherlands (Ringverslag van het Vogeltrekstation Nr. 50 (1965)). A. C. Perdeck and B. J. Speek. *Limosa*, **40:** 59-112. In this report one finds the usual tables of species and individuals (114, 363) banded during 1965 and recoveries. Recoveries of interest included a turnstone from Greenland, a Long-eared Owl from Norway, a Hooded Crow from Finland, and a goldfinch from Spain.—David W. Johnston.

3. Durability of Bands on Dominican Gulls. 1967. R. A. Fordham. *Notornis*, **14:** 28-30. In this short paper the author calls attention to the annual rate of band-wear, and suggests that "bands may start to fall off in the sixth year and there may be marked loss of bands by about the tenth year." These observations should caution banders that recovery data on such birds might be accurate for only part of the bird's potential life.—David W. Johnston.

MIGRATION

(See also 29)

4. The Avifauna of Haparanda Sandskär. (Fågelfauna på Haparanda Sändskar.) Jens Wahlstedt. 1967. *Vår Fågelvärld*, **26:** 131-151. (English summary.) On this interesting islet located about 25 miles from the nearest mainland in the midst of the most northerly part of the Gulf of Bothnia, a total of 146 species of birds have been recorded. The island offers a variety of habitats suitable for stop-overs during migration as well as for breeding—beaches, sandbars, inland pools, shrub vegetation, stands of pine, birch and a rare virgin aspen forest. Studies of migration yield much of interest, particularly the prolonged migration of some southern species not encountered on the mainland and the directions of migratory movement. A full annotated list concludes the paper.—Louise de K. Lawrence.

POPULATION DYNAMICS

(See also 7)

5. On Mortality of Avian Clutches and Young in a Desert. (O gibeli kladok ptits i ptentsov v pustine). 1967. O. V. Sopyev. *Izvestiya Akad. Nauk Turkmenskoi SSR, Seriya Biol.*, No. 2: 82-84. Data on mortality suffered by 512 eggs and 363 young were recorded in the Kara-Kums desert in the summers of 1958-1963. Per cent of losses in open-nesting species (427 eggs, 322 young) was 47.4 per cent: *Aquila chrysaetos*, 40.0; *Corvus ruficollis*, 43.7; *Podoces panderi*, 49.5; *Rhodospiza obsoleta*, 50.0; *Passer simplex*, 43.0; *Agrobates galactoides*, 44.2; *Hippolais caligata*, 42.1; *Scotocerca inquieta*, 56.9. Losses in closed or cavity nesters (85 eggs, 41 young) were 20.5 per cent: *Dendrocopos leucopterus*, 24.2; *Passer ammodendri*, 28.1; *Parus* sp. 25.0. Main causes of mortality were spring freezes, sand storms, and hot spells. Sand-stormy days per year number 70 or more. Infertile eggs, trampling of weak by stronger young, infertile eggs, bird, reptile and mammal predators, and thirst, each effected an appreciable loss in the desert.—Leon Kelso.

6. The Strip Survey as a Complement to Study Area Investigations in Bird Census Work. Anders Enemar and Bengt Sjöstrand. 1967. *Vår Fågelvärld*, **26:** 111-130. This study was conducted at Ammarnäs, Lapland, and shows clearly the limitations of the strip survey method. Variations in the composition of the bird community while the census is in progress, the dependence on auditory observations subject to many influencing factors (such as weather conditions), the time of day or in the breeding cycle—these represent some problems to be considered. Hence the results must be handled with utmost discrimination. According to this study, the method is subject to six conditions. Among them are the use of the material for calculations of dominance values only and as part of study area surveys to establish related abundance and fluctuations of the less numerous species. Even though the use of English in this paper is at times some-

what involved and confusing, the discussions based on so thorough an investigation should prove useful to many interested in population studies.—Louise de K. Lawrence.

NIDIFICATION AND REPRODUCTION

(See also 5, 31)

7. Breeding Cycle and Population Dynamics in the Dunlin (Calidris alpina). 1967. Martti Soikkeli. *Ann. Zool. Fenn.*, **4**: 158-198. Between 1962 and 1966 the author studied nesting Dunlins in southern Finland where emphasis was given to the several features of the breeding cycle—arrival, egg-laying, incubation, fledging of young, and migration. In this paper, discussions are devoted to timing of the breeding season ("the most important proximate factor . . . is temperature. . . ."), territoriality, mortality rate, and the broad area of population dynamics.—David W. Johnston.

8. Territory, Behaviour, and Breeding of the Dipper in Banffshire. Raymond Hewson. 1967. *Brit. Birds*, **60** (6): 244-252. Between September 1959 and December 1964, 27 adult and 38 nestling *Cinclus cinclus* were color-banded on the River Isla. Notes are given on displays of adults and growth of young. Mr. Hewson refers to the papers on nesting of this species in Ireland (Rankin, 1940), in England (Robson, 1956), and in Czechoslovakia (Balát, 1962, 1964), but missed the detailed and fascinating account of the nesting of two pairs in Germany (Eggebrecht, 1937), reviewed in *Bird-Banding*, **9**: 59-60, 1938.—Margaret M. Nice.

9. Observations on the Breeding Biology and Development of the Young of the Great Spotted Cuckoo. (Beobachtungen zur Brutbiologie und Jugendentwicklung des Häherkuckucks (*Clamator glandarius*).) Otto and Heide v. Frisch. 1967. *Z. Tierpsychol.*, **24**(2): 129-136. (Summary in English.) Great Spotted Cuckoos in the Crau area in southern France parasitize Magpies (*Pica pica*) exclusively. The young cuckoo does not actively harm the host's chicks, but by hatching earlier and growing faster it has an advantage over the latter. Four young cuckoos were taken from the nest; the first two throve on grasshoppers and other insects and one fledged at 22 days; the other two could not adapt to artificial food and died. The growth curves of the young birds are shown and their general behavior described. Six excellent photographs illustrate the article.—Margaret M. Nice.

LIFE HISTORY

10. A Study of the Colies of Southern Africa. M. K. Rowan. 1967. *Ostrich*, **38**: 63-115. Rowan's paper is by far the most comprehensive study yet published on these unusual African birds, and is one that should be consulted as *the* definitive work on Colies. He draws together unpublished notes from manuscripts and field notebooks of many ornithologists, scattered life history accounts in the literature, results of his own detailed studies on three species over the past 15 years, and observations of captive birds. A list of the contents reveals the important nature of this work—distribution and habitats, physical characteristics, perching and locomotion, calls, social behavior, play, food and feeding patterns, water requirements, parasites and predators, breeding, and molt.

Several "curious misstatements made about the Colies in the past" are brought to light by Rowan. For example, contrary to a belief going back to an idle speculation by Thomas Ayers in the 1860's, Colies apparently do not sleep hanging upside down; at least none of Rowan's aviary birds did. Colies show no special preference for salty foods, and probably should not be considered as good examples of salt-eating birds. On the subject of torpor, Rowan suggests: ". . . the evidence from captive birds indicates that torpor readily results, not from cold *per se*, but from loss of insulation if the plumage is drenched with rain." A lengthy and provocative discussion is devoted to geographic and ecologic overlap of three

species, the absence of competition for food, and overlap in breeding seasons between two species, all these observations pointing to a case where Gause's hypothesis might not apply. The latter point merits further analysis.—David W. Johnston.

BEHAVIOR

(See also 22)

11. Imprinting and Species-specific Fixed Action Patterns. (Researches on Mallards and Red-crested Pochards.) (Zur Prägung von Instinkhandlung (Untersuchungen an Stockenten *Anas platyrhynchos* L. und Kolbenenten *Netta rufina* Pallas).) Jacques de Lannoy. *Z. Tierpsychol.*, **24**(2): 162-200. At Konrad Lorenz' *Institut für Verhaltensphysiologie Seewiesen* ducklings of two species were reared under five different conditions ranging from "with conspecifics" through "with other species" to "in isolation." In a richly illustrated and documented article the author reports his findings, summarizing them in part as follows:

"1. The fixed action patterns concerned remain the same both with regard to their ontogeny and to the conditions of appearance, whether the ducks direct them towards conspecifics or towards members of other species.

2. Imprinting determines the taxis-component of the fixed action pattern."

Finally, "The imprinting characters are discussed both in terms of the following response and in the context of sexual imprinting. The concept 'imprinting' is re-defined, since it is apparently only the 'primacy' of experience which distinguishes imprinting from other forms of learning."—Margaret M. Nice.

12. Imitation and Transposition of Human Whistles by Blackbirds. (Imitation und Transposition menschlicher Pfiffe durch Amseln (*Turdus m. merula L.*)). Erwin Tretzel. 1967. *Z. Tierpsychol.*, **24**(2): 137-161. (Summary in English.) Another carefully documented and analysed example of imitation of a human whistle by wild birds in Europe; (see review of Dr. Tretzel's study of Crested Lark's (*Galerida cristata*) and shepherds' whistles in *Bird-Banding*, **37**(3): 221, 1966.) The author recorded a strange whistle from a Blackbird and versions of the same from several neighboring Blackbirds. After considerable search he came upon the original whistler—a man who had been calling his cat for years by whistling to it; the further the Blackbirds lived from this man's house, the less exact became their imitations. "The whistle of the model varied considerably in pitch and rhythm . . The Blackbirds transposed the whole motif upwards by approximately a fifth and ornamented it: along with a short grace-note before the first note, they provided the second note with a long, steeply rising slur which stresses the transposition. The ornamentation is interpreted as an expression of playfulness and is equated with that customary in classical music." Seven illustrations are given of sonograms of the model's whistles and those of his imitators, as well as four long tables on frequency, rhythm and other features of the various whistles.—Margaret M. Nice.

13. Behavior Patterns of the Wall Creeper in Relation to Adaptation to its Environment. (Bewegungsweisen des Mauerlaüfers *Tichodroma muraria* im Hinblick auf die Anpassung an seinen Biotop.) Hans Löhrl. 1967. *J. f. Ornith.*, **108**(2): 165-168. (Summary in English.) This paper is based on observations of 23 pairs of Wall Creepers on their nesting territories, as well as on a male and female kept in a flight cage. Its expert ability to climb up cliffs and its butterfly-like flight are described. Its instinctive habit of wing-flicking, thus displaying its white spots, is "obviously" a means of social contact with conspecifics . . . . When aerial predators appear wing-flicking is completely suppressed." At a distance the Wall Creeper "threatens with dropped wings and strongly elevated tail . . . . Intensive threat is especially displayed by spreading the shoulder and elbow joints. The white spots remain concealed."

Wall Creepers take both sand and water baths. "Head-scratching is indirect." Twenty-four photographs of the behavior patterns of the tame birds illustrate this valuable study.—Margaret M. Nice.

ECOLOGY

14. On the Interrelationships of the Arctic Fox and some Species of Tundra Birds. (O vzaimootnosheniyakh pestsa i nekotorykh vidov tundrovykh ptits.) F. B. Chernyavskii. 1967. *Zool. Zhurn.*, **46**(6): 937-940. (In Russian.) Following a review of previous work (12 titles) the author's observations of the Arctic Fox (*Alopex lagopus* L.) on Wrangel Island in 1964 are presented. The fox was the chief predator of the Snow Goose, whose main colony there has been reduced to 300,000. Predation pressure was especially severe in years of lemming scarcity. On the island as a whole there were about 100 occupied fox burrows, their greatest density (2 burrows / 1000 ha) being near Snow Goose colonies. The main opponent of the fox was the Snowy Owl, whose prowess in repelling it caused small nesting colonies of Snow Geese, Black Brant, and Common Eiders to be formed around the owls' nest sites, a situation that the author calls "a classic example of the tundra nesting community."—Leon Kelso.

15. Ecology of the Common Eider in the Non-nesting Period (Ekologiya obykhnovennoi gagi vo vnegnezdovoi period). V. V. Bianki, V. N. Karpovich, V. V. Makarov, and I. P. Tatarinkova. 1967. *Trudy Kandalakshskogo Gosudarstvennogo Zapovednika*, **5**: 5-39. (In Russian). On the major Russian reserve set aside for research on the eider, many details of its post-nesting life have been worked out, including molt migrations, and winter survival on the patches of open water in the arctic ice, for the various northeast European eider populations, and for the different sex and age groups within those populations, (a quite complicated pattern). It is illustrated by 8 maps and 9 tables, with a bibliography of 22 items. For this paper and also for the rare "Eiders of the Novosibirski Islands," by G. L. Rutilevskii, 1957, English translations are being prepared.—Leon Kelso.

CONSERVATION

(See 25, 33)

MORPHOLOGY AND ANATOMY

(See 22)

PHYSIOLOGY

16. Photoresponses of the Woodpigeon Columba palumbus in Relation to the Breeding Season. 1967. B. Lofts, R. K. Murton, and N. J. Westwood. *Ibis*, **109**: 338-351. The present paper describes experimental work designed to relate the breeding cycle of *Columba palumbus* to photostimulation. This species was chosen because it has a protracted breeding season extending over both sides of the summer solstice.

Seven different photoperiod experiments were set up, the results of these ". . . demonstrating that the Woodpigeon either has no characteristic period of post-nuptial refractoriness, or a refractory period that is at most of extremely short duration." At the end of the normal breeding season in September, birds retained on long photoperiods were maintained in full reproductive condition until December. Also, controls placed on short photoperiods regressed within one month, but soon showed gonadal recrudescence when exposed to long photoperiods.

In contrast to A. J. Marshall's insistence that the refractory period functions chiefly in gonadal reorganization, the present authors submit a different function, namely that the refractory period functions as a safety mechanism to prevent out-of-season reproduction.—David W. Johnston.

PLUMAGES AND MOLTS

(See also 1)

17. On Signal Patches of Avian Plumage and the Structural Features of Woodcock Tail Feathers. (O signalnykh pyatnakh opereniya ptits i osobennostyakh stroeniya rulevykh perev waldschnepa.) T. L. Borodulina and A. N. Formozov. 1967. *Byull. Moskovskogo obschh. isp. prirody, otdel. biol.*, **72**(3): 27-31. (In Russian, with English summary.) The distinctive "shine" of a white band on the tail of the Woodcock (*Scolopax rusticola*) in deep twilight is produced by peculiar macro- and microstructures on the barbs and barbules. The light band consists of a system of microscopic concave, complex mirrors, gathering and focusing the light, i. e. a system of reflectors. The glow is further enhanced by numerous alveoles lined by very fine thin-walled air spaces. This mode of light reflection is similar to that of a pearl screen. It amplifies the visibility of the white band even in deep dusk when the tail is held erect. This effect is present also in *Capello gallinago, C. stenura, C. megala,* and *C. solitaria.*—Leon Kelso.

18. On the Problem of the Mechanism of Avian Plumage Abrasion. (K voprosy o mekhanisme obnashivaniya opereniya ptits.) V. I. Kroshkin, 1966. In collage, *Voprosy fiziol., zool., i helmintol.*: **81-92**. Chelyabinsk. (In Russian) Wear of contour feathers was investigated in 27 birds in 11 orders. The general nature of abrasion of radii and barbules is described; wear of barbicels was not even observed once. The location of breakoff of fragments was determined mainly by arrangement of pigments and their structural features. With uneven deposition of pigments the break always occurs between areas of pigment concentration. The abrasion of barbules is determined by disposal of pigments and air cells. Separation of fragments is preceded by oxidation of melanin and subsequent breakdown of air cells. In the abrasion of barbules pigmented by lipochromes there are no variations. White feathers wear to the same extent as pigmented ones, but in case of strongly developed dichromatism breakoff occurs at the border between the pigmented and non-pigmented sections; therefore white or pale feather borders wear off with greater rapidity. The rate of this process is influenced by various external factors, including intensity of solar radiation and humidity.—Leon Kelso.

19. On the Adherent Colors of Birds: Rusty Coloration by Iron Oxide in the Bearded Vulture and in Other Species. (Über Haftfarben bei Vögeln: Rostfärbung durch Eisenoxid beim Bartgeier (*Gypäetus barbatus*) und bei anderen Arten.) Peter Berthold. 1967. *Zool. Jb. Syst. Bd.*, **93**, S: 507-595. (English summary.) Rust coloration, which is not due to feather pigments, is studied in detail. The rusty coloration on *Gypäetus barbatus* is caused by amorphous iron oxide and a trace of *a* quartz, not within the feather but adherent to the surface. The iron oxide is not derived from the bird itself but originates from the iron-oxide-stained subsoils of the bird's biotope. At least 1g of iron oxide has been found on the plumage of densely rust-colored specimens. A variety of factors enter into this situation: the density of iron oxide in the biotope, the bird's habits, features of feather structure, and the abrasion process on the feather. The considerable variation in the rufescence of older Bearded Vultures depends not on age but on prevalence of iron oxide in the biotope. The biological significance of this phenomenon is discussed.

Rusty coloration of similar origin has been established in 120 additional birds and in 2 species of mammals. In 42 species of Anatidae the iron oxide is not adherent to the feather surface but is in microscopic hollow spaces of the barbs, barbules, and barbicels. These spaces form an intercommunicating network of unknown function. The peculiar adhesive strength of iron oxide is credited for most of the rust colors on feathers. Species of most of the bird families may acquire rusty coloration if brought into contact with iron oxide. It is suggested that colors developed from external factors (i.e. oxides, preen gland oils, soot ("industrial discoloration") and others) be called "adherent colors."

Incidentally this paper describes and supports with microphotographs two feather features described 70 years ago by A. P. Chadbourne (*Auk*, **14:** 147, 148 1897), namely surface pores, and some exudant substance forming caps on barbs

and radii where broken off or abraded. These and other features requiring further study are discussed in this detailed and important paper. There is a bibliography of 217 titles.—Leon Kelso.

20. Transport of water by Adult Sandgrouse to Their Young. Tom J. Cade and Gordon L. Maclean. 1967., *Condor*, **69**(4): 323-343. Another disputed detail on sandgrouse behavior is now clarified. Seventy years ago Meade-Waldo (1897) reported that in 61 broods of three species of sandgrouse hatched in his aviaries, the male parent soaked up water in his belly feathers, then went to his chicks and they stripped the water from his feathers. Although this observation was soon confirmed by another aviculturist (St. Quintin, 1905), it was met with scepticism by many ornithologists. The present paper, based on intensive field work on two species of sandgrouse in the Kalahari Gemsbok Park, followed by laboratory and museum work in this country, convincingly supports the early observations.

Four times Mr. Maclean watched wild males leave their young broods and later return with soaked bellies from which the water was stripped by their chicks. The soaking behavior of these parent sandgrouse is carefully described and an exhaustive analysis made of the specialized water-carrying belly feathers of the male, as well as comparisons made with feathers of other species.

The authors are to be congratulated on their creative, scholarly research on the remarkable family Pteroclididae.—Margaret M. Nice.

ZOOGEOGRAPHY

(See 4, 26, 32, 35)

SYSTEMATICS

21. The Systematic Position of the Sandgrouse. (Die systematische Stellung der Flughühner (*Pteroclididie*).). G. L. Maclean. 1967. *J. f. Ornith.*, **108**(2): 203-217. (Summary in English.) Confusion has existed among ornithologists as to the systematic position of the Pteroclididae since 1758 when Linnaeus placed them in the genus *Tetrao*. In the 19th century they were at times classified with the Galliformes, more often with the Columbiformes. It was D. G. Elliot who in 1878 made the unsupported statement that sandgrouse drink like doves and not like all other birds; this "information" was accepted unquestioningly by many ornithologists and appears to be the chief criterion by which the two families are still placed together in the Columbiformes.

Mr. Maclean studied two species of sandgrouse in the Kalahari Gemsbok Park in South Africa; he found them invariably drinking like fowls. Their chicks are very precocial, those of doves typically altricial. He concludes after marshalling all the evidence:

"Recent behaviour studies and egg-albumin analyses indicate that the sandgrouse are not at all closely related to the gallinaceous birds, nor to the doves, but rather to the Charadriiformes. They bear the greatest resemblance to the suborder Charadrii. It is therefore suggested that the sandgrouse (Pteroclididae) be included in the order Charadriiformes, in their own suborder Pterocli close to the Charadrii." A fine study.—Margaret M. Nice.

FOOD

22. Some Complex forms of Feeding Behavior in the Nutcracker (Nucifraga caryocatactes) after Removal of Its Archeocortex. (Nekotorye slozhyne pishchevye formy povedeniya kedrovok posle udaleniya u nikh staroi kory). N. L. Krushinskaya. 1966. *Zhurnal Evolyutsionnoi Biokhimii i Fiziologii*, **2**: 563-568. (In Russian.) In light of the belief in the highly developed visual memory of birds, postulated by Edinger (*J. Comp. Neurol.*, **5**: 206, 1895) and others, and the remarkable ability of the nutcracker to rediscover stored food, experiments were conducted on four experimental and four control individuals

in an aviary. Destruction of the archeocortex in the brain tissue of the experimental birds led to a decided loss of capacity to find food items (cedar-pine nuts) stored by themselves a day previously or even just a few hours before. They could find caches hidden by themselves not over 15 minutes previously, and also those caches wherein they had stored seeds on several occasions before. The control nutcrackers and some others with neostriatum caudatum and hyperstriatum accessorium removed, found their caches quickly and accurately. In 50 per cent of the experimental trials those with archeocortex removed could not find even one of their caches, and their successful attempts at finding caches required an average of 1 hour and 35 minutes Control birds required not over 10 minutes It is concluded that the archeocortex has an essential role in the visual memory involved in the relocation of caches by the nutcracker.—Leon Kelso.

23. Some Ecological Aspects of the Feeding Behaviour of the Oystercatcher Haematopus ostralegus on the Edible Mussel Mytilus edulis. 1967. M. Norton-Griffiths. *Ibis*, **109:** 412-424. Observations reported in this paper suggest that Oystercatchers have two methods for opening small mussels. To open them under water, the bird cuts through the posterior adductor muscle. Mussels exposed by the tide are opened by the bird's hammering a hole in the shell. Larger mussels must be opened by stabbing and not hammering. Interestingly, a given Oystercatcher will either hammer or stab the mussels, not both. Obviously, then, individual birds must select the mussel bed suitable to their own particular feeding method. The results reported here have interesting genetic and ecologic implications.—David W. Johnston.

24. Evening and Morning movements of Ducks on the Falsterbo Peninsula. Falsterbo Bird Station's Report No. 35. (Om kväll soch morgonförflyttningar hos änder på Falsterbohalvön.) Frantisek Balàt. 1967. *Vår Fågelvärld*, **26:** 97-110. (German summary.) This investigation took place in August and September 1963. In the daytime the ducks stayed around the sandbars at the northern end where they were undisturbed but food was scarce. The evening flights to the inland pools rich in food, particularly the seeds of *Bolschoenus* (*Scirpus*) *maritimus*, began about 30 to 40 minutes after sunset, reached a peak within the next 20 minutes and ended abruptly about an hour later. The morning flights began after sunrise when the arrival of people on the golf course and on the beaches disturbed the ducks. The birds flew most often in singles or in pairs, seldom in flocks.—Louise de K. Lawrence.

SONG

(See 12)

BOOKS AND MONOGRAPHS

25. Nature in Lapland. (Natur i Lappland.) Edited by Kai Curry-Lindahl. 1963. *Svensk Natur*, Vol. I, II, 1046 pp., illustrated. What is the true meaning of a tract of land? What is it worth? What role does it play in our lives and what role do we play in its existence? Within a broad framework and in penetrating detail 23 volumes on nature in Sweden's 22 provinces endeavor to answer these questions. These two are the last of the series.

This land lies landlocked under the Arctic Circle, wedged against the keel of the Swedish-Norwegian border mountains and sloping southeast toward the lowlands along the Sea of Bothnia. Long and narrow lakes and a vast river system of cascading falls and steaming white water fed by the glaciers and the melting snows, cold crystal clear water, drain from the Lapland "fjäll" and highland plateaus through muskeg, moraine, and immense forests. Peculiar to many of these "fjäll" is the nature of their southern slopes whose microclimate in the midst of the starkly alpine environment provides suitable habitats for animal and plant-life of distinctly temperate character.

Some 3000 years ago the land was first settled by the Sameh, a people renowned for their ability to run down wild animals by sliding on "strange magic wooden slabs," and who came from the east over a narrow landbridge spanning

the primordial sea. Its later colonization by peoples from the south did not become significant until the 18th and 19th centuries. The decline of the forests during the 20th century was not due to wasteful devastation as in so many other places, but to a miscalculation of the regrowth upon carefully managed tracts. In certain forest preserves pines seeded by a widespread forest fire around the year 1400 still stand at an age of 550 years. Hydro-electric power dams and the manipulation of waterlevels now cause grave changes in the environment, and relentless hunting pressure, mainly by non-resident tourists, threatens the survival of many species of Lapland's wildlife. Here as well as elsewhere the conflicting interests caused by mankind's free-wheeling proliferation prevent adequate measures of meaningful preservation.

In the description of this unique land 47 authors contribute their different viewpoints and sciences, creating a picture of unusual authenticity. How the land came to be, events that shaped its past, the abuses and the benefits brought upon it by those who drew their support from it and, finally, the inexorable changes that are now casting its future—all these ideas form the material contained in these volumes, written with deep-rooted reverence and insight.—Louise de K. Lawrence.

26. The Bird Faunas of Africa and its Islands. R. E. Moreau. 1966. Academic Press, London and New York. 6 1/2″ x 10″, 424 pp., 65 figs. 100 shillings or $18.00! ! [Have your friends in London buy it for you; the postage is only 42 cents.]. The present volume is the culmination of Reg Moreau's study of the bird life of Africa over a period of more than forty years, beginning with his interest in migration when he was stationed in Egypt and accelerating during his years at Amani in the montane forest of the East Usambaras. As Moreau states in his foreword, if space had been offered, he would have subtitled his book, "an eco-geographical discussion with its roots in the past." This is an apt description, for he defines and compares faunas both on a regional and vegetational basis, and discusses their present status in relation to the drastic climatic changes in Africa in the recent past.

Unlike most "African" authors, Moreau does not confine himself to the Ethiopian Region south of the Sahara but includes Mediterranean Africa where the birds at least are of Palaearctic affinities. Some idea of the scope of his volume may be gleaned from a rough summary of his chapters. The first three give a background of the present day climate and vegetation of Africa, and of the immense changes that have taken place in the late Pleistocene. A chapter on North Africa covers this region that is essentially outside the main stream of the discussion. The Ethiopian fauna is next analyzed as a whole, its primary dichotomy into forest and non-forest, and lowland and montane elements is emphasized, and its relations with other Regional faunas are discussed. Then follow comparisons between the geographical faunas within each of the main categories, and between the lowland and montane elements of each. The ecological aspect is stressed in a section in which the faunas of sample localities in the main vegetation types are compared. Migration, both inter- and intracontinental, is next discussed, and finally the faunas of the African islands, including Madagascar, are compared both with each other and with those of the adjoining mainland. A final chapter provides most useful summaries, chapter by chapter, and conclusions. A list of references, and taxonomic and subject indices complete the book.

Three basic assumptions underly Moreau's discussion. The first is that a profound dichotomy exists between the forest and non-forest faunas, and that they must be treated separately. The figures that he gives in his analysis of the Ethiopian fauna as a whole, that only 3 per cent of the species (42 of 1481) cannot be certainly allocated to either forest or non-forest faunas, certainly seem to bear this out. The second assumption is that the majority of species in each of these categories can be considered either typically lowland or montane. This division is more evident among the forest birds than among the non-forest. Of the 158 species of birds breeding in montane forest, 120 (76 per cent) are confined to that zone, whereas among non-forest birds, only 66 (51 per cent) of 130 species breeding in the montane zone are restricted to it. Moreau's third assumption is that the faunas cannot be treated as blocks, but must be divided into several categories based on taxonomic and ecological considerations. The classes that he uses are 1) families typically dependent on water, 2) predatory and scavenging birds, 3) ground birds, 4) other non-passeres, and 5) passeres. The use of these

groupings gives greater flexibility in comparisons between faunas, for they vary in ways that are frequently significantly different.

There is one constant theme underlying all of Moreau's discussions. That is the extreme mutability of the African climate and vegetation during the late Pleistocene. It is usual to think of tropical climates and habitats as extremely stable, with the main blocs of vegetation remaining virtually unchanged throughout the Pleistocene. This has not been the case in Africa, where the present patterns of habitat are no more than 10,000 years old, and in some areas considerably less. For example, 70,000 years ago and again only 12,000 years ago the southern Congo basin, now part of the main bloc of tropical forest, experienced great aridity with semi-desert conditions and drifting sand. The potential area in which forest could have survived was greatly reduced and fragmented. Sometime after the first period of aridity in the Congo, there was a similar period in West Africa, with Saharan conditions extending 300 miles south of their present limits. However, there was a post-glacial mitigation of desert conditions in the western Sahara, and as recently as 6000 years ago Mediterranean vegetation extended south to the latitude of Lake Chad so that in the west at least, the Sahara was not a barrier to migration. In contrast to the periods of aridity, during the height of the last glaciation, 18,000 years ago, montane forest was continuous from Abyssinia to the Cape, and west around both sides of the Congo forest to Cameroon and Angola. This not only greatly reduced the area of lowland forest, but fragmented the vast area of savanna and steppe that now is continuous around the Congo basin.

Against this background of change, Moreau compares the faunas of various geographical regions in relation to the variety of habitats involved. Within the framework of the five groups of families outlined above, his faunas are defined purely numerically, that is, by the number of species present. In his comparisons of the non-forest fauna of, for example, Malawi with that of West Africa or Somalia, his concern is with the numbers of species that each supports, not with the degree of relationship between them. In his ecological discussions the same numerical approach is used in the comparisons of faunas from various vegetation types. Because of his concern with geographical areas comprising a wide range of habitats, the faunal districts of Chapin are not applicable to Moreau's work and he does not use them. However, in his discussion of endemism among non-forest birds, several of Chapin's districts emerge as centers of endemism.

It is not possible in a short review to summarize the myriad comparisons, correlations, and conclusions that Moreau presents. Certain ones seem of particular interest, however. One is the remarkable poverty of non-forest birds in West Africa, despite its wide range of habitats from humid savanna and extensive flood plains to subdesert steppe. Even Malawi, with an area of only 37,000 square miles, has more non-forest species than West Africa west of the Cameroon highlands with an area of 1,000,000 square miles. From the ecological point of view, the problem of the richness of the acacia steppe fauna inhabiting sparse woodland with a prolonged and severe dry season, compared to the poverty of the montane forest fauna, living in lush vegetation with an equable year-round climate, is most interesting. A census taken in the acacia steppe of the Kalahari desert during the dry season, when a number of migrant species were absent, totaled 71 species, whereas the montane fauna of Ruwenzori, the richest recorded, has only 51. The ability of the dryer woodlands in general to support bird life is closely tied in with the problem faced by palaearctic migrants wintering in the northern tropics. When the migrants arrive, the woodlands are at their best at the end of the rains, but during the winter there is a gradual degeneration until by March and April the habitat appears too degraded to support more than a bare minimum of birds. Yet during this period, the migrants not only survive alongside the resident fauna, but in spring in the worst times they are able to deposit sufficient fat to make the trans-Saharan migration. As Moreau says, "we know altogether too little that is significant about the ecology of our material."

The strength of Moreau's book lies in the wealth of detail that he presents, not only from his own extensive experience but from a thorough knowledge of the literature and a copious correspondence with his friends. Primarily the book is descriptive, and far more problems are raised than are solved. This is not said in criticism, for the author is better aware of this deficiency than anyone else, but to point up our woeful ignorance of the factors controlling geographical and ecological distribution of African birds. His numerical approach is strictly his own, and although it makes difficult comparison with other faunal works such as Chapin's

introduction to his *Birds of the Belgian Congo* or Chapman's *Distribution of Bird Life in Ecuador*, it has the obvious merit of illuminating many of the unsolved problems of the distribution of African birds.

I join Moreau in hoping that by revealing our ignorance, he will challenge future students to overcome it. One such study is already being made, for the B. O. U has recently sent an expedition to Lake Chad to investigate the problems of survival of the palaearctic migrants in that area.—Melvin A. Traylor.

27. The 1826 Journal of John James Audubon. Alice Ford. 1967. University of Oklahoma Press, Norman. 409 pp., 37 illus. $6.95. This is the art critic's fifth book based on the life and activities of the woodsman-artist Audubon. In her *Bird Biographies of John James Audubon* Miss Ford transposed paragraphs and sentences and omitted much of the original text that she used. She may have done the same thing with this journal, but at least she retained more of the lusty robust outdoorsman than did his prim victorian granddaughter, Maria Audubon, who edited it for the 1897 publication.

In Miss Ford's biography of Audubon published in 1964 she discredited all Audubon's romantic lies about his birth, his parents, and his education. In this book she discredits his granddaughter. If Maria Audubon expurgated the 1826 journals as drastically as Miss Ford's interpretation indicates, one wonders how much she deleted from the later European, Labrador, and Missouri River journals. Because many of these journals have been destroyed, we will probably never know.

Miss Ford's edition of the 1826 journals is entertaining reading, particularly when it is compared word by word with Maria Audubon's, and it unquestionably gives the reader a truer picture of the man. But, even in this journal supposedly in Audubon's own words, he appears as he does in all of Miss Ford's books, primarily as an artist. Her only interest in natural science appears to be the way in which Audubon delineated it.

Audubon's journals and letters should be presented with as little editing as necessary because they are his only writings that posterity can be sure were done by him. The texts accompanying his pictures were prepared by many people. Yet if Miss Ford had asked an ornithologist to check the partridge-pheasant confusion on page 156, it might have been resolved.—Elizabeth S. Austin.

28. The Birds of America. John James Audubon. Dover Publications, Inc. New York, N. Y. 7 vol., 500 black-and-white plates. $2.50 per vol. This is a reprint of Audubon's 100-part popular edition of 1840-44 which sold for $1.00 a part. The $100.00 that the original subscribers each paid for the whole edition had at least 20 times the purchasing power of the $17.50 that Dover customers will pay today, so this is indeed a bargain. The student who would like this basic work on his book shelves will get not only Audubon's delightful prose but an introduction by Dean Amadon which tells of the history of *The Birds of America*. and two annotated indexes by John Bull. The first index is an alphabetical list of Audubon's common names for the birds, each followed by its scientific name and (in brackets) today's nomenclature. The second index also lists the birds alphabetically but by the accepted common names of today with scientific and Audubon names following each entry.

The original subscribers to *The Birds of America* received 500 hand-colored plates with the Audubon text. Dover customers receive 500 black-and-white plates. If they want color they will have to buy paints or crayons for a do-it-yourself project. This will be better coloring than Dover might produce if the 7 color plates on the 7 covers are any indication. All are bad, but the yellow-billed, green-winged Summer Tanager on Vol. 3 is astoundingly so. Such obvious color distortion was the last thing I expected to see on their books, because I have just seen the three beautiful color plates Dover Publications printed as frontispieces for the last three volumes of the Bent Life Histories.

The amateur or tyro reading this work of Audubon for the first time is warned that, although Audubon is quite accurate when he refers to his notes, his observations are untrustworthy when he writes from memory or repeats hearsay. Audubon's vivid language brings life to the birds, his writing, and that of contributing authors, and makes one disregard the inaccuracies. His description of the Sooty Terns of the Dry Tortugas is so vibrant and true that I forgive him for presuming he could tell male from female and also for increasing the clutch size to three for each female.—Elizabeth S. Austin.

29. Bird Casualties at a Leon County, Florida TV Tower: An Eleven-year Study. 1967. Herbert L. Stoddard, Sr. and Robert A. Norris. *Bull. Tall Timbers Res. Sta.*, No. 8, pp. 1-104. Since 1955 the senior author and his associates, especially Dr. Norris, have made daily visits to this north-Florida television tower, picking up, sorting, and studying birds that struck the tower or its guy-wires during the night. An earlier report (No. 1) appeared in 1962 and embraced seven years. Most of the present report concerns the 170 species and 29,451 individuals handled at the tower over the eleven-year span.

One must, of course, marvel at the persistence involved in this sutdy. Not only were the tower grounds carefully inspected daily at dawn, but also the grounds were kept closely mowed (". . . the grounds resembled a well-cared-for golf course . . ."), predators (mammals, owls, crows) were humanely removed from the scene, and insect pests (ants and earwigs) were kept under control. Detailed weather data were recorded and have been employed here in the analysis of seasonal migratory patterns.

On most nights small numbers of birds were found, but on two occasions the kill exceeded 1,000 birds, the big kills occurring on nights of full or large moon. "A rare combination of deep, low clouds with mist and murk and favoring winds, sets the stage for disaster. Sometimes lack of favoring winds for days or weeks apparently causes a build-up or reservoir of birds ready to migrate, whether they be in their home range or somewhere along the migration route. With the advent of favorable weather conditions, the flyways are flooded with migrants, and kills may be huge. Our lunar observations, however, show that at times vast numbers may be passing over but are so high that few or none hit installations. . . ."

Aside from the obvious contributions to migration, this report rather modestly contains a brief section on "Use of Specimens." As a matter of fact, dozens of museums and other educational institutions have received birds from this tower, the birds to be prepared as study skins, mounts, or skeletons. Mr. Stoddard has retained a selected group of study skins, some of these representing rare species or subspecies in Florida. Frozen birds from this tower have also been utilized elsewhere for fat investigations, statistical analyses of given species, and blood studies. The authors note: "We get much satisfaction in salvaging as many such feathered victims as possible and in having them put to the best possible scientific use."

Of the 29,451 birds examined by the authors, only *one* banded bird (a Veery) was found!

Note should be made of some rareties found in these tower casualties—Black-capped Petrel (*Pterodroma hasitata*), Black Rail (*Laterallus jamaicensis*), Warbling Vireo (*Vireo gilvus*), Nashville Warbler (*Vermivora ruficapilla*), Western Tanager (*Piranga ludoviciana*), and Clay-colored Sparrow (*Spizella pallida*). A number of other species found at the tower were surprizes because they are not usually considered as nocturnal migrants in northern Florida—Cattle Egret, Black Vulture, Mourning Dove, Chimney Swift, and Starling.

Yet, we must not fail to recognize the common, abundant species represented in the casualties, such as Catbirds, Red-eyed Vireos, Myrtle Warblers, Yellowthroats, and Indigo Buntings. These species, to mention only a few, were killed at the tower in sufficient number and with a degree of regularity that histograms of their occurrences and numbers reveal peak migration times in fall and/or spring. Actually these commoner species are probably more important in migration studies than are the rarer ones, although the latter ones provide the "frosting on the cake."

This paper not only summarizes a unique study and a wealth of data but also serves as a model for investigations at other tall television towers. The authors are to be commended for this fine report.—David W. Johnston.

30. Catalog of Fossil Birds: Part 3 (Ralliformes, Ichthyornithiformes, Charadriiformes. 1967. Pierce Brodkorb. *Bull. Fla. State Mus., Biol. Sci.*, **11**(3): 99-220. This, the third, installment of the *Catalog of Fossil Birds* treats 34 families and 366 species (215 paleospecies and 151 neospecies) in the three orders given in the title. Of interest is Dr. Brodkorb's reduction of the order Diatrymiformes to a suborder of the Ralliformes as well as other taxonomic changes. Five pages of addenda to the first two parts are included in this volume. —David W. Johnston.

31. Oologia Belgica. 1967. Rene K. Verheyen. Institut Royal des Sciences Naturelles de Belgique, Bruxelles. 331 pp. and a packet of 71 plates (mostly in color). $16.00. As the title suggests, this book (in French) is concerned chiefly with reproduction and eggs of birds nesting in Belgium. For each species the following information is presented—synonomy, identification, habitat, location of the nest, nest contents, nesting time, clutch-size, dimensions of eggs (length width, weight), incubation period, number of broods, and a handsome plate depicting the eggs. Tables of egg measurements include data not only from Belgium but also, when available, from additional European localities, all with appropriate references. Attractive black-and-white photographs of adults at a nest or eggs or young alone adorn the text material.—David W. Johnston.

32. Twelfth Supplement to the Check-list of Birds of the West Indies (1956). James Bond. 1967. Acad. Nat. Sci. Phil., 1-22. As found in earlier supplements to Bond's "Check-list," the present one contains new and interesting records from the West Indian region. An innovation is the inclusion of a section entitled, "On the Use of Subgenera in the Classification of the Antillean Avifauna," chiefly because the author feels ". . . that relationships of many birds can well be clarified by a broad use of subgenera." In some cases, however, it appears that a subgeneric name is no more expressive of kinship than an older usage of genus and species. For example, is a "true relationship" shown better by grouping *ravidus* and *plumbeus* in the very large genus *Turdus* in a subgenus Mimocichla rather than using *M. ravida* and *M. plumbea* and retaining other genera such as *Hyplocichla* and *Turdus*?—David W. Johnston.

33. Extinct and Vanishing Animals. Vinzenz Ziswiler. 1967. Heidelberg Science Library, Vol. 2. Springer-Verlag, New York. 133 pp. $3.40. When I think of extinct and vanishing birds I immediately turn to Greenway's book (*Extinct and Vanishing Birds of the World*, 1958) or the red and black lists published by Fisher and Peterson (*The World of Birds*, 1964). More recently, Secretary of the Interior Stewart L. Udall, has designated 36 birds as Endangered Species (see *Can. Field-Nat.*, **81**: 156-7, 1967). This small book by Ziswiler has two appendices, one containing extinct forms and one listing the most gravely threatened forms. In some cases these four references do not jibe; Udall alone, for example, designates *Haliaeetus l. leucocephalus* as an endangered species.

Ziswiler's book is different from these other references, because (1) he includes birds, mammals, and reptiles, and (2) he discusses the methods of direct and indirect extermination in a general fashion, only occasionally drawing on specific forms. Many readers will note his frank indictments of modern civilization for air pollution, radioactive products, and biocides. Further chapters are devoted to the biology of extinction and protecting nature.

The appendices in Ziswiler are helpful because they give recent population estimates for endangered species. I wish that he had not lumped species (for example, "11 forms" of thrushes and "3 forms" of Old World warblers) without mentioning them individually.—David W. Johnston.

34. The Psychology of Birds. 1967. Harold E. Burtt. Macmillan Co., New York. 242 pp. $5.95. Scarcely a week goes by that we don't see a new bird book, many with a "new twist." The present book, subtitled "An Interpretation of Bird Behavior," is no exception because its author, a Professor Emeritus of Psychology at Ohio State University, has in this book included subject matter from major drives and motives, migration, communications, and social behavior to personality and intelligence. In fact, "every psychological factor in the life of a bird is examined."

One must be cautious in accepting some of the author's statements, presumably authenticated in the scientific literature. For example, in the chapter on migration one finds the following questionable pronouncements and inconsistencies. "In the tropics most birds never leave home, *for life is easy in that climate.*" (italics mine). ". . . some of the warblers and vireos . . . who winter on the slopes of the Andes and in the pampas of Brazil." It would indeed be an extremely rare North American warbler or vireo that spent the winter on the pampas, a treeless plain! "The golden plover migrating from Labrador to its wintering grounds in

South America flies 2400 miles *each way.*" "The endocrines that help initiate the migration itself may *push* the bird along toward his objective at greater than usual speed." Hummingbirds have been clocked in ordinary flight "from 45 to 60" miles per hour; such high speeds have been corrected by Greenewalt (1960). Later we learn "that with two grams of fat as fuel the hummingbird at 250 miles an hour could do 650 miles . . . ." These and other inconsistencies, misstatements of facts, and extreme anthropomorphisms make me wonder if indeed the author's avowed objective (". . . that a lot more people will have a lot more fun with birds.") can be accomplished by a book of this nature.—David W. Johnston.

35. South American Bird Field Guide. Clarence F. Smith. 1965. Part I (Sphenisciformes through Procellariiformes), 32 pp.; Part III (Falconiformes and Strigiformes), pp. 65-95. Laurelwood Press, 1152 Laurel St., Berkeley, Calif. $2 each. For those who might be misled by the title, this publication will probably not be an answer to field identification of South American birds. The two parts so far published are small, privately printed (large offset type) pamphlets with no illustrations. They are disappointing in both content and cost. In part I, pages 15-18 are lacking but this is an error in numbering. Part II and other parts containing the orders following Strigiformes are in preparation.

There are no introductory remarks or references in either part, so it is left to the reader to guess the source of the author's information. It is difficult to believe that the author has had field experience with all the South American species, even only those treated thus far. It is apparent that he has handled few, if any, specimens because he describes penguins as having "*featherless*, flipperlike wings" and grebes with tails "inconspicuous, but *well developed*" (italics mine). The brief characteristics given for tinamou genera are completely confounded. Evidently these pamphlets represent, at least in part, a gleaning of descriptions from the literature.

Each order and family has an introductory statement concerning appearance and habits. These statements are over-generalized to the point of being incorrect in places. Statements imply that the necks of grebes are "always fully extended;" that all grebes have a "rasping call;" that "Downy, day old young are found with the older, pin-feathered babies in the same nest;" in all Falconiformes, and that there are "Plumage patterns in rufous, dark or light phases;" in all Falconiformes. "Anatomical features of little interest to field students . . ." cause the family Pandionidae to be erected, yet we are informed in other sections that falcons "have a bony tubercle on the edge of the nostril" and marsh hawks have the "rear of tarsus reticulate", which facts are certainly of no use in the field.

Species accounts begin with common and scientific names and a Spanish name of dubious value. A vernacular name that is used by the natives of a region would be useful, but usually no one name is going to be in use throughout the entire South American continent, especially since more languages than Spanish are spoken there. Spanish names that are *invented* for species not even recognized by the inhabitants of a region are virtually worthless. I doubt that there is a *campesino* in all of Latin America that would know an "Halcon de Mirandolle" by that name.

Opposite the Spanish name is a measurement of total length (undoubtedly in millimeters although this is never stated) followed by the same measurement in inches. A short description of each species with diagnostic characters usually underlined precedes a brief statement of range.

The accounts of several little known species are lacking, presumably either because the author considers them conspecific with other forms or has simply omitted them. The phylogeny, expecially in part III, is haphazard and it is left to one's imagination as to whose systematic treatment the author is following if other than his own.

This work when completed will have as one advantage the fact that it combines descriptions and ranges of most of the species in South America in one place and in a size practical for field use. What is still needed, however, is a guide on a par with the Peterson series depicting neotropical birds in a manner that will be truly useful for field identification.—Storrs L. Olson.