RECENT LITERATURE

Edited by JACK P. HAILMAN

MIGRATION, ORIENTATION, AND HOMING

(See also 15, 22, 27, 28, 29)

1. Temporal variations in the ability of individual radars in detecting birds. W. J. Richardson. 1972. Associate Committee on Bird Hazards to Aircraft (National Research Countil, Ottawa), *Field Note*, **61:** 69 pp.—This is a very thorough survey of the technical characteristics of various types of radar used for studying bird migration, with theoretical and experimental studies of the effects of varying different technical parameters of the equipment on the number of birds detected. It should be read in detail by anyone intending to use radar for quantitative studies, or to evaluate published results. Richardson's concluding comment is: "In general, one should recognize that surveillance radars are not carefully calibrated precision instruments. While these radars can provide excellent qualitative information about migration, even with careful use they can provide only moderately accurate quantitative data. Fortunately, temporal variations in the amount of migration and in migratory behavior are so marked that the data which such radars can provide are sufficiently accurate for many types of analysis."—I. C. T. Nisbet.

2. Sun navigation in homing pigeons—attempts to shift sun coordinates. C. Walcott and M. C. Michener. 1971. *J. Exp. Biol.* **54:** 291-316.—This paper reports a complicated series of experiments designed to test the hypothesis that homing pigeons use the sun for bi-coordinate navigation. Trained pigeons were subjected to various experimental treatments, equipped with radio transmitters, released at unfamiliar points 25-100 miles from the home loft, and tracked by aircraft until they returned home. Untreated birds (controls) were well oriented toward home within 10 miles of the release point. Other birds had their internal clocks shifted by small amounts (5-20 minutes) by means of artificial light-dark cycles: on the sun-navigation hypothesis this should have corresponded to a displacement of the home loft by 1.25 to 6 degrees of longitude, and should have caused corresponding east-west shifts in orientation. Other birds were kept in cages equipped with mirrors so that the apparent altitude of the sun could be changed by up to 1.2 degrees: this should have caused north-south shifts in orientation. A third group of birds was exposed to irregular light-dark cycles and given 30% D_2O in their drinking water: this is known to slow down the internal clocks of pigeons and should have resulted in east-west shifts. However, none of the experimental birds shifted their orientation in the predicted manner; collectively their orientation toward home was nearly as good as that of the controls. Birds with larger time-shifts (2 hours) shifted their orientation as though they were using the sun as a compass only. Although the number of pigeons used in these tests was comparatively small (a necessary consequence of the expensive tracking technique), they seem rather conclusive in ruling out sun-navigation as the sole or principal means of homing, at least in the circumstances described.—I. C. T. Nisbet.

3. Radar observations of spring migration in central Switzerland: a contribution to the study of the influence of weather on bird migration. (Radarbeobachtungen über den Frühlingszug im Schweizerischen Mittelland.) B. Bruderer. 1971. *Orn. Beob.* **68:** 89-158. (In German, with French and English summaries.)—This paper raises the study of bird migration to a new technical plane. Previous studies (mostly with surveillance radars) have tended to lump different species, birds flying at different heights, or birds flying in different directions, into groups for analysis. In this study, densities, flight-directions, and flight-speeds were evaluated separately for each hour and for various flight levels; size, wing-beat frequency, and flocking tendency were used to divide radar echoes into categories corresponding to groups of similar species. Winds at each level were determined three times nightly by tracked balloons. The resulting increase

in precision allows the author to resolve some previous ambiguities in interpretation and to report new phenomena.

Important conclusions in the paper include the following. By day, most birds fly in flocks; at night, most fly singly, but there are also loose groups with distances between individuals ranging from 100 to 300 m. The height of flight varies with the wind and weather conditions. The speed of flight increases with height, at a greater rate than would be expected on the basis of differences in air pressure alone. Peak flight densities are reached around midnight, but heights of flight peak around 22:00, declining thereafter. The median height was about 700 m at night and 400 m by day. Highest densities of migration occur on the west sides of Highs and on the east sides of Lows, but not close ahead of fronts. The author reaches the general conclusion that "the behaviour of European birds does not show a basic difference from that of North American birds, but, merely, that the same basic patterns are less obvious in Europe due to the faster passage of weather systems, and that differences in methods and formulations led to partly divergent interpretations."—I. C. T. Nisbet.

4. Use of landmarks in orientation by Bank Swallows. J. F. Downhower and D. Windsor. 1971. *Bio Science*, **21**: 570-572.—Bank Swallows (*Riparia riparia*) nesting near Lake Cayuga in the Finger Lake region of New York were the subjects of homing experiments designed to determine the distance from home at which landmarks are used for orientation. The authors hypothesized that Lakes Seneca and Cayuga were sufficiently similar to cause the swallows to mistake the former for the latter and, if they use the nearest lake as a navigation aid, to orient accordingly. The data show that when released on the shores of Lake Seneca, swallows nesting between 0.4 and 5 km from Lake Cayuga do use the nearest lake as a navigation aid and do mistake Lake Seneca for Lake Cayuga, 25 km away. Bank Swallows nesting more than 5 km from the shore of Lake Cayuga generally flew in the direction of their home colony, showing no tendency to use the lake for orientation.

Bank Swallows appear to use landmarks when navigating within 5 km of their home colony, but some other system when further away. The location of the experimental colonies around Lake Cayuga admits no other simple explanation of the data.—Edward H. Burtt, Jr.

POPULATION DYNAMICS

(See also 35, 42)

5. On zoocenotic group structure of forest songbirds in the nesting season. (O struktre zootsenoticheskikh gruppirovok pevchikh ptits v sezon gnezdovaniya.) N. Birulya. 1971. *Byull. mosk. obschch. isp. prirody, otdel biol.*, **76**(6): 5-21. (In Russian, English summary.) Bibliography of 50 titles.—A probing study, embodying personal research and available literature, was undertaken to determine the simplest one-species group that can persist as a viable community or colony. The latter is defined as a superorganic system of functionally and structurally interrelated elements. It was decided that two resident males and their families would be sufficient, these being located in nearest mutually tolerable proximity. Such a group, it is presumed, may expand, depending on local conditions and events, into a larger simple or mixed colony.—Leon Kelso.

6. Populations of higher vertebrates and duration of their existence. (Populyatsii vyshikh pozvonochnykh i dlitelnost ikh cushchestvovaniya.) S. V. Kirikov. 1971. *Z. zhurn.*, **50**(11): 1761-1763. (In Russian, English summary.)—It would seem that large definite populations should survive indefinitely under conditions adequate for self-maintenance, but actually they are potentially mortal. If the situation as a whole worsens, a large population may constrict into smaller isolated groups (micropopulations) whose persistence varies. Under further environmental deterioration some may disappear; under improvement of the former they may be renewed and merged into the former large population. Survival of the simplest and smallest populations is least likely. Persistence is closely correlated to less isolation and interpopulation exchange.—Leon Kelso.

NESTING AND REPRODUCTION

(**See also 12**)

7. Social facilitation in weaverbirds: importance of colony size. N. E. Collias, J. K. Victoria, and R. J. Shallenberger. 1971. *Ecology*, **52**(5): 823-828.—Since F. Fraser Darling's book ("Bird flocks and the breeding cycle") appeared over three decades ago, evidence bearing on his thesis of social stimulation as an important factor in synchronizing breeding cycles of gregarious birds has been slow to appear. Here Collias and his co-workers report experimental analyses on this alleged phenomenon, using the nest-building of African Village Weaverbirds (*Ploceus cucullatus*) as a measure. Males of this gregarious and polygynous species build nests and then attempt to attract females to them. If she accepts a nest, the female lines it and subsequently takes on most of the care of eggs and young.

In these studies the investigators have manipulated a number of potentially relevant parameters, in this case, colony size. Within the aviary confines "large" colonies (8♂, 8♀) began nesting earlier than smaller colonies (2♂, 2♂ and 4♀, 4♀). When all groups were combined at the end of the season (14 pairs) nest-building activity again increased, suggesting that the increase in colony size resulted in stimulation. No significant differences occurred in different-sized colonies through the height of the breeding season; the authors suggest simply that nest-building activity was proceeding at a maximal rate at that time in colonies of all sizes. Increased crowding was associated with an increase in territorial singing. It seems possible that this singing could act as the facilitating element in the colonies, although the authors do not specifically make this statement. (see Review **8**).—Douglass H. Morse.

8. Social facilitation in weaverbirds: effects of varying the sex ratio. N. E. Collias, M. Brandman, J. K. Victoria, L. F. Kiff, and C. E. Rischer. 1971. *Ecology*, **52**(5): 829-836.—In this companion study to the one discussed in Review **7**, Collias and his co-workers vary sex ratios in small experimental colonies of the African Village Weaverbird (*Ploceus cucullatus*). When additional males were added to a colony, the rate of nest-building by a resident did not increase, but the number of nests torn down did increase. The acceptance rate of nests by females went down dramatically when other males were introduced (more empty nests). However, more nests were accepted by females when more males were present, suggesting that there is a discreet limit to the number of nests that a male can provide for females, and that the sex ratio would limit the ultimate success of a colony. An increase in number of females resulted in an increased rate of weaving and tearing down of nests. When numbers of males were kept constant, changes in numbers of females did not result in marked behavioral changes of the females. Although there was a suggestion that the number of eggs decreased under crowded conditions, this difference was not significant. In short, under the ratios of males and females and test conditions used, addition of males will have a stimulatory effect upon the behavior of the females present but little effect upon the males already present. Conversely, addition of females will have a stimulatory effect upon the males present, but relatively little effect upon the females present. Thus, the effect of new individuals appears primarily to be upon the opposite sex.

One word of caution should be added about these studies. Colonies in the wild frequently are much larger than those studied here, and Collias and Collias (*Ecology*, **50**(3): 481-488, 1969) report that breeding colonies with fewer than 10 males had a smaller proportion of females than large colonies. Some of the test conditions may be of unusual occurrence in the field.—Douglass H. Morse.

9. Nesting activities in a Cliff Swallow colony. A. J. Erskine and S. M. Teeple. 1970. *Can. Field-Nat.*, **84:** 385-387.—Mean clutch-size was 3.74 eggs for a colony of Cliff Swallows (*Petrochelidon pyrrhonota*) nesting on a farm near Doaktown, New Brunswick, Canada. There was an apparent decline in clutch-size as the season progressed. Many of the clutch-sizes were counted only once, so that there is no assurance that laying was complete when counts were made. This lack of data also affects the estimated date of laying. When young were found in the nest, their age was estimated and the date of laying calculated by assuming an incubation period of 14 days and the rate of laying to be one egg each

day. With the clutch-size itself questionable, this method is subject to great inaccuracy. The authors admit that date of laying is accurate to only ± 7 days in some instances. In defense of their conclusions, the same trend has been observed for this species and other passerine species by many authors (*e.g.*, A. W. Boyd. *Brit. Birds*, **30:** 98-116, 1936). No dead young were found either in or below the nests, but because other species of swallows remove small, dead young, this feature alone is not proof of low mortality. No counts were made of nestlings. The authors conclude that more than five sporadic visits in mid- to late June and July are needed to document accurately nesting of Cliff Swallows. They suggest six visits at selected periods. The reports of Emlen (*Condor*, **54:** 177-199, 1952) and Myres (*Condor*, **59:** 311-316, 1957) give no reason to believe that regular visits will cause the Cliff Swallows undue distress. More frequent nest-checks are necessary in a nesting study of this sort.—Edward H. Burtt, Jr.

10. The role of environmental factors and nest situation in behavior of incubating birds. (Rol faktorov sredy i svoistv gnezda v povedenii nasizhivayushchikh ptits.) T. Ponomareva. 1971. *Z. zhurn.*, **50**(11): 1709-1718. (In Russian, English summary.)—Thirteen desert and semidesert species, including 11 passerines plus Red-footed Falcon (*Falco vespertinus*) and Laughing Dove (*Streptopelia senegalensis*), were observed through three summers in southeastern USSR. It was concluded that incubation behavior is both directly and indirectly affected by environmental factors, the latter including the structure and location of the nest, the internal state and physiological capacity of the adults themselves, and air temperature factors under four phases of intensity. At 24-26 °C, nest-ventilation determined incubation habits in the main. It showed a dual effect: at about 26 °C open nests enhanced energy balance, even in- and outflow, and relaxed closeness of incubation; at higher temperatures nest-shading or thermo-resistance was evoked. The lowest incubation persistence or closeness was in cavity-dwelling and covered-nest species, most of which were locally sedentary. Coefficients of nest-cooling and heating as calculated were found closely correlated to nest material, structure, and position, time spent in nest by young and adults, and climatic tolerance limits. Accommodative incubation behavior, *e.g.*, setting, brooding or sheltering eggs or young, was especially important when nest temperature approximated the upper limit of embryo endurance.—Leon Kelso.

11. Hatching-help behavior of the Barn Owl. (Schluphilfe-Verhalten bei der Schleiereule, *Tyto alba*.) P. Buhler. 1971 *Vogelwelt*, **91**(4): 121-130. (In German, English summary.)—Details and excellent pictures show that a captive-reared female parent, after the start of hatching, bit off shell fragments with bill, removing also egg membranes and allantois from hatching young. Most of these items were swallowed, or held in the foot and eaten piecemeal. This article reviews hatching-help behavior as previously recorded in the literature, for Accipitridae, Gruidae, Rallidae, Recurvirostridae, Burhinidae, Corvidae, and Mimidae.—Leon Kelso.

ETHOLOGY AND PSYCHOLOGY

(See also 5, 7, 8, 10, 13, 14, 29, 34, 41)

12. Nocturnal behavior of some gulls of the Kustanai region. (Nochnoe povedenie nekotorykh chaikovykh kustanaiskoi oblasti.) Yu. Samorodov. 1971. *Vestnik moskogo universiteta, biol. ser.*, **26**(6): 22-26. (In Russian.)—By infra-red nocturnal vision ("snooperscope") apparatus, daylong watch was kept on Herring (*Larus argentatus*), Short-billed (*L. canus*), Great Black-headed (*L. ichthyaetus*), and Black-headed (*L. ridibundus*) gulls, and Black Terns (*Chlidonias niger*) from 1966 to 1971, chiefly at Lake Zharkol, Kazakhstan, in the nesting seasons. All four gull species were active and awake all night, the ponderous *L. ichthyaetus* the more so. It colonizes with Herring and Short-billed gulls, leaving sentinel and defense duty to them. The Black Terns were inactive and even slept at night, some with head drawn back between shoulders, with eyes open, at least in the infra-red rays of the snooperscope; others had the head under the wing.

Several times each night eggs were turned by bill and feet, and the plumage was preened. Sexes took turns on the nest at 2-3 hour intervals. Hatching occurred daylong: first feeding about 1 hr, 45 min. afterward, but no regular feeding by night. Care of the young was a communal adult activity. Likewise, the young were unattached to any particular nest or parent, becoming independent of adults at about 16 days of age.—Leon Kelso.

ECOLOGY

(See also 5, 7, 8, 10, 23, 24, 31, 34, 35, 37, 38, 39, 40)

13. Differential niche utilization in a grassland sparrow J. D. Robins. 1971. *Ecology,* **52**(6): 1065-1070.—This useful contribution about the Henslow's Sparrow (*Passerherbulus henslowii*) documents a rather different type of sexual partitioning of territories than has previously been reported. Males tend to forage farther from nests than their females, a characteristic that has previously been reported for other species, but in this case the males and females tend to utilize different areas well inside the periphery of the territory. These areas do not vary in any measurable characteristics, and sexual differences simply involve the members of a pair foraging in opposite directions from the nest. The way in which direction is partitioned differs from nest to nest and thus does not seem to have any simple genetic basis. Given that the sexes are extremely similar and that there is little vertical relief in the fields frequented by this species, the technique described represents about the only feasible method of partitioning available in a relatively homogeneous habitat. There are definite advantages for the participants in such partitioning. Where males perform all of the territorial defense and females carry out most or all of the nesting activities, as in Henslow's Sparrows, it should be advantageous for the bird to concentrate foraging activities where the most time is spent.—Douglass H. Morse.

14. Time and energy budgets of territorial hummingbirds. L. L. Wolf and F. R. Hainsworth. 1971. *Ecology,* **52** (6): 980-988.—In this study the time and energy budgets of the Purple-throated Carib Hummingbird (*Eulampis jugularis*), a native of the Lesser Antilles, are calculated from field and laboratory studies. Males typically defend a territory at flower sources throughout the year, and a majority of their time is spent sitting motionless on this territory. Major energy expenditures involve gathering food (primarily nectar from a number of flowers) and chasing away intruders. Time budgets differed with the type of flower source that was being defended. Important variables appear to be the amount of nectar per flower, the distribution of the flowers in the territory (clumped or widely spaced), and the difficulty in obtaining nectar from a flower (more difficult in flowers with deep corollas judging from laboratory data).

As discussed by many others recently, animals may be expected either to optimize their time budgets or their energy budgets. The former would be expected in forms that spend much of their time foraging. The opposite is probably true for species such as the Purple-throated Carib, which apparently is able to obtain all its food within a relatively small proportion of the time available.—Douglass H. Morse.

WILDLIFE MANAGEMENT AND ECONOMIC ORNITHOLOGY

(See also 15, 25, 39)

15. Studies of bird hazards to aircraft. V. E. F. Solman and others. 1971. *Canadian Wildlife Service Report Series,* **14:** 104 pp.—This report contains five papers on radar studies of bird migration, grouped around the theme of bird hazards to aircraft, with an introduction to the general problem by V. E. F. Solman and a reprinted paper on a bird-warning system for aircraft by Solman and Gunn. In view of the bird-aircraft theme, one might have expected the radar

studies to be focussed more sharply on the larger birds, but the broad approach of the Canadian team is commendable.

M. T. Myres and S. R. Cannings describe (pp. 23-35) a large, localized spring migration of Canada Geese in British Columbia. The birds fly at altitudes between 6,000 and 15,000 feet, and evidently fly over the mountains of southern British Columbia at a considerable altitude. J. M. Speirs, J. J. C. Kanitz, and J. Novak (pp. 69-76) also describe migration of geese, in this case at Fort William, Ontario. The peak flight was on 3 October 1965, when about 5,000 flocks of geese passed through a 10,000 square mile surveillance area. The chance of a collision with an aircraft in these circumstances is calculated as 1 in 6500 for an aircraft taking off through the bird layer and 1 in 650 for an aircraft flying horizontally through it. The hazard is greatest in late September or early October and is probably greatest at elevations of 4000 to 6000 feet.

The longest paper (pp. 35-76), by W. J. Richardson and W. W. H. Gunn, is a study of bird movements in east-central Alberta (see *Bird-Banding*, **42**: 52, 1971, review no. **8**) and is an important contribution to knowledge of bird migration in North America. Spring migration peaks sharply in May; autumn migration is more protracted, from August to November. The main directions of flight are NW in spring, SE in autumn, but reversed movements at low densities are very frequent. Occurrences of migration at various intensities are plotted on the generalized weather map previously used by Richardson and Haight to describe Starling migration in Ontario (see *Bird-Banding*, **41**: 245-246, 1970, review no. **8**). Most large movements in Alberta were in the west or southwest parts of Highs in spring, and in the central or northeast parts of Highs in autumn. There were some significant differences from the behavior of the Starlings, which result in each area in a correlation of dense migration with favorable winds—SE winds in spring in Alberta, SW winds in spring in Ontario. When individual weather factors were examined, migration was correlated best with following winds and, in spring, with low humidity. After allowing for these factors, there was no marked correlation with temperature, pressure trend, wind speed or cloud cover, but these factors may have some effect as modifiers. Discussing differences between regions, the authors "believe that birds have evolved short-term migration timing mechanisms placing different weights on the separate weather parameters depending upon season and species. More specifically, the particular pattern of weights would depend primarily upon the "preferred" direction."

Of two papers by H. Blokpoel, one (pp. 95-104) is essentially a reprint of a paper given at the 1969 Kingston conference (see *Bird-Banding*, **42**: 52, review no. **7**). The other (pp. 77-94) is a technical account of the modification of an obsolete anti-aircraft type radar for bird studies, with some useful data on performance and a comparison with moon-watching results.—I. C. T. Nisbet.

CONSERVATION AND ENVIRONMENTAL QUALITY

(See 25, 40)

PARASITES AND DISEASES

16. Infestation of swallows by Louse-flies. J. Walters. 1971. *Bird Study*, **18**: 31-33.—Thirty of 138 Swallows (*Hirundo rustica*) mist-netted near Amsterdam in 1966-68 carried louse-flies (*Ornithomyia biloba*). More juveniles carried louse-flies than adults and the infested juveniles carried more louse-flies per individual than infested adults. Collection methods are not explained. This makes the data of questionable accuracy and reliability.—Edward H. Burtt, Jr.

PHYSIOLOGY

(See also 10, 14)

17. Adaptation to function and evolution in the avian acoustic system. (Adaptivnost v funktionirovanii i evolyutsii slukhovoi sistemy ptits.) V. Ilichev. 1971. *Biol. nauki*, **1971**(12): 19-24. (In Russian.)—Herein the author analyzed a series of adaptive transformations with regard to their role in the

evolutionary mosaic of the hearing system of birds. By comparison of ecological parallelisms founded on electro-acoustic studies, it is concluded that lines of development progressed by numerous "surges" running parallel in systematically remote but ecologically similar groups. Specializations in these groups were achieved by hypertrophy of certain links, or "rungs" in the line of development. In some cases adjacent "rungs," varying in trends, took on alternative divergent specialization (the alternate-specialty phenomenon). In all cases autonomous specialization of individual rungs of progress was accompanied by correlated inter-effects, affording guidance toward a common objective, perfection of the auditory system. One diagram illustrates graphically how the Long-eared Owl, *Asio otus*, purportedly perceives the direction of source of sounds of different decibels and frequencies.—Leon Kelso.

18. Aggregate responses of the auditory nerve as correlated to acoustic signal parameters in *Asio otus*, and *Athene noctua*. (Summarnye otvety slukhogo nerva v svyazi s parametrami svukogo signala u sov *Asio otus* i *Athene noctua*.) T. Golubeva, A. Chernyi, and V. Ilichev. 1970. *Zhurn. evolyutsionnoi biokhimii, i fiziologii*, **6**(2): 215-224. (In Russian, English summary.)—By oscilloscope recording of bilateral acoustic nerve responses according to frequency, duration, and intervals between paired impulses of the acoustic signals, it was found that at 4-6 kiloHertz for the Long-eared Owl, and 3-4 kHz for the Little Owl, the high frequency maximum or "N" component occurred. The difference was credited to the simpler auditory anatomy of the latter, *Athene noctua*. Corresponding kHz figures for the common pigeon are 1-2, Mallard 2-3, Magpie 0.8-1.6, Chaffinch and Bullfinch 3.2, and Starling 2 kilocycles. These response frequencies were correlated to the frequencies of the stimulating signals. The "recovery period" between responses in owls was shorter than in domestic fowl, but longer than in housecats.—Leon Kelso.

19. Operation of the tympanic muscle in the Long-eared Owl when subjected to a sonar tone signal. (Aktivnost timpanalnoi myshtsy ushastnoi sovy pri deistvii zvukogo tonalnogo signala.) T. Golubeva. 1971. *Vestnik moskovskogo, universiteta, biol. ser*, **26**(6): 104-106. (In Russian.)—For some time it has been uncertain whether the tympanic muscle is responsive to sounds or just maintains tension or tympanal tonus of the ear drum. Using *Asio otus* as subject, the author examined the middle ear operation by microphonal electronic recording apparatus. Among many details of an elaborate response pattern, it was found that at one level a fixed routine of muscle operation appears, correlated to the intensity of varied frequencies. At low signal intensity the tympanic muscle does not respond and the "microphonal cochlear potential" reverts to an inactive or initial state. At moderate sound intensity it shows periodic fluctuation of tonus. At 4.0 to 4.5 kiloHertz frequency the amplitude of cochlear potentials, per oscillograph, exceeds that at the initial stage. At still higher intensities, the muscle tonus amplitude holds to a fixed, non-fluctuating level for that frequency, recording as a straight sharp line. It is concluded that at high frequencies the tympanic muscle in this owl assumes a resistant or protective reaction, *i.e.*, it does respond according to sound.—Leon Kelso.

20. On the functional organization of the pigeon visual analyzer. (O funktsionalnoi organizatsii zritelnogo analizatora golubya.) V. Erchenkov. 1970. *Vestnik moskovskogo univ., ser. biol.*, **25**(5): 81-84. (In Russian.)—Finely sensitive microelectrode and oscillographically instrumented studies find that not only light but also movement in the field of vision affects electric discharges in neurons of the optic tectum: the deeper set the nerve cells, the less movement requisite to elicit reaction. They are moreover directionally sensitive, sharpening marginal or peripheral motion perception, and more perceptive of up-and-down motion. They are unaffected by brightness, color, or intermittency of illumination, or size and shape of objects in the visual field. Thus the motion-perceptive cells operate as more than an aggregation of light-exposure meters. This is largely an expansion and substantiation of: "Direction, movement, and horizontal edge detectors in pigeon retina", H. Maturana & S. Frenk, *Science*, **142:** 977-979, 1963, wherein one may read many pertinent details in English.—Leon Kelso.

21. On the interactive fluctuations of external electromagnetic field intensity, and the intensity" of neural excitation in the central nervous system. (O vzaimovliyanii izmenenii napryazhennosti vneshnego elektromagnitnogo polya i "napryazhennosti" nervnogo vozbuzhdeniya v tsentralnoi nervnoi sisteme.) M. Atayev. 1972. *Izvest. akad. nauk, otdel. biol., SSSR*, **1972**(1): 119-133. (In Russian.)—Elaborate experiments are reported, with analytical discussion, finding that no special tissues, perceptors, receptors, or analyzers are present and none are needed for effecting the various responses and sensitivities that animals have shown to magnetic fields; the perception and responses operate through the nervous system as a whole, and at the subcellular or molecular level. Experiments subjecting a mollusc, *Planorbis corneus*, and the domestic cat, to electromagnetic fields while they were being conditioned to various other stimuli and situations, found that switching the field on an off influenced their performance decidedly. An electromagnetic field of 20 to 100 hertz was most effective.—Leon Kelso.

22. Circadian rhythms of motor activity, feeding and oxygen consumption in the Chaffinch during the migratory period. (Tsirkadnye ritmy lokomotornoi aktivnosti, pitaniya i potrebleniya kisloroda u zyablika. (*Fringilla coelebs*) v migratsionnyi period.) T. Dolnik. 1971. *Z. zhurn.*, **50**(12): 1835-1842. (In Russian. English summary.)—In late spring migration these rhythms, observed under natural light as compared with constant illumination, showed the usual sharp morning and evening peaks in the activity graph curves. At constant 30 lux illumination the maxima of locomotor activity shifted nightward with the passing days, as did those of feeding activity. Under constant darkness and absence of food, at 24°C, oxygen consumption was lower in both day and night hours than in normal outdoor conditions. The clockwise shift, along with trends of periods to spread over longer time at sunset, F. A. Brown and others would call it a lunar or solunar effect. This recalls contemporary findings in Bramblings, *Fringilla montifringilla*, by H. Pohl (*Ibis*, **113**(2): 185-193, 1971) of lowest body weights in birds kept under constant illumination.—Leon Kelso.

23. Seasonal variation in metabolic functions of Bramblings. H. Pohl. 1971. *Ibis*, **113**(2): 185-193.—Among a variety of facts about *Fringilla montifringilla* the more notable are: "Highest body weights were found in spring (April) in both outdoor and indoor birds exposed to changing photoperiods . . .; lowest weights were recorded during summer in birds kept out of doors (postnuptial molt) and during winter in birds held individually under constant photoperiod at 19°C. The latter gained weight during the following spring and summer. These birds did not molt." Body weight changes corresponded to time of *zugunruhe* (migratory activity).—Leon Kelso.

24. Seasonal fluctuations of energy metabolism and thermoregulation in the Black-headed Gull at rest. (Sezonnye izmeneniya energetskogo obmena i termoregulyatsii v pokoe u chaiki obyknovennoi.) A Davidov. 1971. *Ekologiya*, **2**(5): 59-63. (In Russian.)—Gas metabolism analysis in *Larus ridibundus* at rest at night revealed that the graphed winter curve was more horizontal (even) than in summer. Using 10 individuals of the Baltic population, trapped at Leningrad, birds that normally winter in Italy (at-10°C, the winter night average for Baltic roosts), the author found a metabolic rate about 45% higher than for the local summer temperature of 20°C. Cold adaptation led to reduced level of body temperature maintenance, by about 1°, with increased body weight (about 14%) in form of subcutaneous fat reserve. Greatest economy in energy requirement for winter seems to result from less flying along with very shortened winter days at arctic latitudes.—Leon Kelso.

25. Energy metabolism in oil-covered ducks. R. Hartung. 1967. *J. Wildl. Manag.*, **31**(4): 798-804.—This article has a point quite aside and beyond those emphasized in its text and summary. "The heat conductivity of the plumage increases as the amount of oil on the featers is increased. The rate of heat loss increases most rapidly for low levels of oiling. For heavily oiled ducks the heat losses may be more than twice those of normal ducks. A heavily oiled duck would

have to increase its dietary intake more than twofold to make up for its heat losses. This does not take into account the additional energy requirements of foraging and any inefficiencies of the digestive processes." The foregoing poses a question: what is the real role of the native "oiliness" of aquatic birds, and why do they have large uropygial glands?—Leon Kelso.

26. Cutaneous water loss in small birds. M Bernstein. 1971. *Condor,* **73**(4): 468-469.—"The occurrence of cutaneous evaporation water loss at substantial rates in five avian species over a 24-fold range in body weights, from Zebra Finch to Pigeon, and representing xeric and mesic habitats suggests . . . cutaneous evaporation in a larger variety of birds. Further work will be necessary to verify this and to clarify the factors involved in the control of cutaneous evaporation rates." Likewise, it is desirable to ascertain what components other than water emerge from the skin, and what may be their roles in feather physiology and in the life of bird lice and mites. Certainly the odors emerging from some birds indicate something other than water being extruded from it.—Leon Kelso.

MORPHOLOGY AND ANATOMY

(**See 19, 33.**)

PLUMAGES AND MOLTS

27. Swallows in wing-moult in southern Spain. S. L. Pimm. *Bird Study,* **17:** 49-51.—Twenty-eight of 147 (19%) adult Swallows (*Hirundo rustica*) caught on the Cota Doñana in southern Spain between 27 July and 13 August showed some molt of the primaries. The author suggests that the species arrests its molt only to continue it in the winter quarters. But it is not impossible that these 28 birds were among the earliest to molt and represented normal scatter about a mean. Data from the migration route are scarce and perhaps previous conclusions that molt occurs only in winter quarters were deduced in ignorance.

Swallows caught in the same area in January and February had completed their molt. These may be the minority of Congo birds that completed their wing molt earlier than most.

R. J. Dowsett, in a letter (*Bird Study,* **18**:53-54, 1971) on Pimm's article, cites several species that may suspend the wing molt while migrating. He does seem more aware, however, that the observed molt in the Swallow and in the cited species could have begun after arrival in Africa.—Edward H. Burtt, Jr.

28. Molt and the migratory state in cage-reared Chaffinches of early and late broods reared in captivity. (Linka i formirovanie migratsionnogo sostoyaniya u zyablikov (*Fringilla coelebs*) iz rannikh i pozdnikh vyvodov, vyrashchennykh v nevole.) M. Shumakov, N. Vinogradova, and V. Paevskii. 1972. *Z. zhurn.,* **51**(1): 113-118. (In Russian, English summary.)—Studies were conducted near Rybachi and the Courish Spit on the appearance of molt and the migratory state in 17 Chaffinches, whose age differences spanned a month, taken from the nest and cage-reared. With onset of the migratory season, the molt of the late-hatched birds accelerated to approximately equal that of the early-hatched individuals, with corresponding synchronization of rhythms in the group as a whole. Fat deposition, daily activity rhythms, and orientation of *zugunruhe* became synchronized to those of the adult population. All factors observed appeared so firmly established hereditarily as to assure orientation to and arrival on the winter range.—Leon Kelso.

29. Flightlessness in some moulting passerines in northern Europe. E. Haukioja. 1971. *Ornis Fenn.,* **48:** 101-116. (English, with Finnish summary.)—Flightlessness, as seen in four species in Finnish Lapland, involves simultaneous loss of many wing and tail feathers. It may happen more often than indicated by the few examples caught in nets. It may be added that Dementiev, Dathe, and others consider this a special or relict case of autotomy, the shedding or releasing of parts to frustrate predators.—Leon Kelso.

ZOOGEOGRAPHY AND DISTRIBUTION

30. Barn Swallow from Cornwallis Island, N.W.T. R. D. James and J. C. Barlow. 1970. *Can. Field-Nat.*, **84:** 181.—On 24 June 1969 an adult male Barn Swallow (*Hirundo rustica erythrogaster*), not in breeding condition, was collected at Resolute Bay, Cornwallis Island, N.W.T. This individual was 500 miles north of the species' breeding range and 150 miles north of any previous record for North America. Is it still necessary to kill a bird for species-identification, for a statistic, for one printed page?—Edward H. Burtt, Jr.

31. Birds. (Ptits.) (of Tadzhikistan) I. A. Abdusalyamov. 1971. *Fauna Tadzhik. Sov. Soc. Republic,* **19**(1): 403 pp. 122 figs. including maps. Publ. Akad. Nauk, Tadzhik. SSR, Dushanbe. (price uncertain, probably $10.00 U. S.)—Another avifaunal review of a southwestern Asiatic state which reflects very sharply contrasted habitats, lowland to high alpine. Four pages of details with photographs of the young of that weird shorebird, the Sicklebill (*Ibidorhyncha struthersi*), that have decurved bills from the first, are the most unique contributions of the book. This volume covers divers to woodpeckers inclusive; there is an author's foreword, introduction, bibliography of five pages and indices of Russian and Latin names. Most of the species are variously figured.—Leon Kelso.

SYSTEMATICS AND PALEONTOLOGY

(See also 38)

32. In defense of the species as the finite taxon. (V zashchitu vida kak konechnogo taksona.) P. V. Terentev. 1968. *Z. zhurn.*, **47**(6): 886-900. (In Russian.)—For modern taxonomic consideration this article might well be teamed with another, "Biosystematics: past, present, and future," (Biosistematika: proshloe, nastoyashchee, i budushchee, A. L. Takhtadzhyan, *Bot. zhurn.*, **55**(3): 331-345, 1970). The former article is introduced by the classic reminder that Carthage must be conquered (*Ceterum censeo Carthaginem esse delendam.*) by *Marcus Porcius Cato, major,* and the latter article warns us that "*In relation to the past the future is in the present. But in relation to the future the present is in the past.*" If the former scripture would hint that the present or old order must be overthrown at all costs, there is dubious urge toward that in the author's main conclusion: that the species in his opinion is the final taxon and that the formal efforts of the systematist should not be expended on intraspecific variability. "The setting up of innumerable sorts of infraspecific categories is fallacious by virtue of the incommensurability of biological items. Thus, the skeptical stand of the botanist, deceased academician V. L. Komarov and his school is closer to the truth than the ideas of most modern zoologists." Their leading botanist Takhtadzhyan, however, would not be so severe nor draw such strict limits, according to the latter article. He would consider the local population as the final unit. He advises all that international cooperation and a close working relationship among systematists is extremely important for future progress in their science.—Leon Kelso.

EVOLUTION AND GENETICS

(See also 6, 17, 36, 42)

33. Variation in the tarsus length of birds in island and mainland regions. P. R. Grant. 1971. *Evolution,* **25**(4): 599-614.—Recently there has been considerable controversy over whether an increase in morphological variability seen in certain isolated populations is of an adaptive nature or whether it results from a transient release of variation associated with a deterioration of canalization. Consequently Grant has re-analyzed some of his work on the birds of the Tres Marias Islands and the adjacent mainland of western Mexico. Here he uses tarsus length exclusively, since this measure is apparently free of

seasonal variation. This means that samples may be lumped, permitting the attaining of the large sample sizes needed for such an analysis.

Populations from each island and several mainland localities were analyzed, and the analysis revealed that between-island and between-mainland population differences in variability were greater than that between mainland and island areas taken as a whole. Gene flow between the islands and the mainland is nearly non-existent (several island forms have attained subspecific distinctness from the mainland forms). Where significant differences in variation occurred within a region, these differences were between islands. Thus, all significant differences in variability involved populations that were separated by a water barrier, a fact which suggests that isolation is of importance in maintaining differences in magnitude of morphological variations and that selection is occurring. Further, there is no significant correlation between tarsus length and wing length or bill length; therefore, Grant concludes that selection is acting directly on tarsus length (or leg length). This strengthens the argument that the changes seen are of an adaptive nature. From here Grant advances the hypothesis that the differences are attributable to differences in environmental patchiness within the range of a population. This patchiness might be correlated with resources or with competitors that could prevent access to them. Critical data are not available for testing this hypothesis, though Grant feels that they may readily be gathered.—Douglass H. Morse.

FOOD AND FEEDING

(See also 22)

34. The hunting behavior and success of Forster's Tern. G. W. Salt and D. E. Willard. 1971. *Ecology*, **52**(6): 989-998.—Salt and Willard have measured the success of capturing fish by Forster's Terns (*Sterna forsteri*) at different predator and prey densities. This study was prompted by Salt's own well-known studies on predation in protozoans, and basically represents an attempt to test the generality of those laboratory-made observations, as well as models of predatory strategies put forth by Griffith, Holling, Watt, Lotka, Volterra, and others. Studies were made at a salt-evaporating pond near San Francisco. Bay water was introduced periodically, with stocks of fish fed upon by terns. The pond was drained regularly, and at this time fish were concentrated in small areas. Food was judged to be abundant (or easily available) at the time that new water was added and at the time that the pond was drained.

As the numbers of terns increased, the number of captures per individual declined. Effectiveness of attacks by terns increased from spring to fall; however, it could be demonstrated that they were feeding upon progressively smaller prey, so that their efficiency at gaining energy was constantly decreasing. Although little was known about the fish population, the authors suggest that this change may have been associated with a year-class of prey outgrowing their vulnerability to tern predation. Time of handling a prey item increased as the square of its length, whereas the food content increased as the cube of its length. For this reason within limits the terns should choose the largest food available.

The results are well-integrated with existing theory on predation strategies in an attempt to evaluate their relation to other animal populations. The present data fit the models of Griffith, Holling, and Watt in that the attack rate declined with increased density of predators. However, other studies have not reported such a change, and Salt and Willard state that further work will be necessary to determine which of the alternatives is the more frequent.—Douglass H. Morse.

35. The feeding ecology of Oystercatchers (*Haematopus ostralegus* L.) in winter in Northern Scotland. P. B. Heppleston. 1971. *J. Anim. Ecol.*, **40**(3): 651-672.—Although food is often assumed to be a limiting factor, rarely is the investigator able to provide convincing evidence to support this argument, partly because the types of critical data necessary are not often available. It is for this reason that Heppleston's study is of particular interest. In the short days of midwinter in Northern Scotland, daylength is potentially an important consideration in the resource exploitation patterns of diurnal animals.

Combined with this matter the problems will be particularly difficult for forms foraging in the intertidal zone, since tidal patterns result in these areas being uncovered for only part of a 24-hour period. Their realistic options appear threefold: to expand their activities into nocturnal periods, to leave such northern clines or to seek alternative or supplementary sources of foraging in the immediate area. In the study area the first and third options seem to be taken by Oystercatchers. There was some suggestion of foraging activity in the intertidal during the night, but observations in general were rather unsuccessful and remain one of the weakest points of this study. Activity appeared to be most marked during moonlit nights, which is reasonable because Oystercatchers feed primarily by visual clues. Oystercatchers also feed in adjacent pastures (a most unusual behavior for the species) where their primary foods are earthworms and larvae of crane flies. During the middle of winter Oystercatchers spend a greater proportion of the low-tide periods foraging than in the fall; however, the amount of food obtained decreases over 50 per cent, apparently the result of their primary food (mussels) decreasing in size during this period. As a result, Heppleston believes that this species is forced to move to the pastures as a supplementary food source. There is no evidence that Oystercatchers seriously deplete the intertidal fauna; the problem is simply that they cannot exploit the area efficiently enough in the time available to maintain a neutral or positive energy budget.

Consistent with the argument of food limitation is the finding that mortality of the Oystercatcher population is strongly correlated with periods in which the pastures temporarily become largely or totally unsuitable for foraging (they become frozen or covered with snow). Most of the dead have been recovered at times that the pastures have been unavailable. These individuals were significantly lighter than those in the population as a whole and were predominately immatures. During the period of the study over a few winters several dozen dead individuals were recovered, a most unusual phenomenon for studies of this sort. Apparently many of these individuals died in the intertidal zone and were washed in and deposited by the high tide. Heppleston does not imply that these individuals represent total mortality; however, they do serve as an impressive minimal mortality level.

Although this study has its weak points (mentioned above), these very points are rendered much more credible than in most studies of this sort. In all, the paper presents a valuable insight into the problems of time and resource exploitation facing a population during a potentially severe period. It is likely that these very considerations act to limit the winter distribution of this species and many others at their northern edge.—Douglass H. Morse.

36. Demonstration of the selective advantage of mimetic *Limenitis* butterflies presented to caged avian predators. A. P. Platt, R. P. Coppinger, and L. P. Brower. 1971. *Evolution*, **25**(4): 692-701.—This is another in a long series on mimicry in butterflies by Brower and his co-workers. Here they extend the evidence for Batesian mimicry to another species, the red-spotted purple (*Limenitis arthemis astyanax*), commonly believed to be a mimic of the unpalatable blue swallowtail (*Battus philenor*). Birds enter the picture as the predators responsible for the origin and maintenance of this system. Blue Jays (*Cyanocitta cristata*) served as the obliging forms for these experiments. In feeding tests using dead butterflies they selected non-mimics much more readily than mimics, though with not quite the precision that they did in earlier tests upon the viceroy (*L. archippus*)-monarch (*Danaus plexippus*) relationship. The results suggest that a relationship between model and mimic need not be perfect to be of selective advantage to the mimic. As usual there is no direct evidence of predatory pressures from the field to back up these studies. Although admittedly most difficult to obtain, it would strengthen the argument considerably.—Douglass H. Morse.

37. Impact of *Asio otus* L. on the small mammal population in Romania. M. Hamar and B. Schnapp. 1971. *Ann. Zool. Fenn.*, **8**(1): 157-159. (In English.).—During 1957-1968, 14,875 pellets of the Long-eared Owl were collected, wherein were identified 2,741 birds (88%), 28,305 mammals (91.7%); bird biomass, 72,960; of mammals 622,816 g; during 120 days sojourn in a roosting colony, the owls took 0.3-7.6 mammals per foraging hectare. Owls at the roost varied from 1-20; mammal density was about 450 per hectare. It is concluded that the predation effect for the 120 days was slight.—Leon Kelso.

BOOKS AND MONOGRAPHS

(See also 31)

38. ***Annual Review of Ecology and Systematics.*** R. Johnston, P. Frank, and C. Michener. 1970. Vol. 1, ix + 406 pp. Annual Reviews Inc., Palo Alto, Calif. ($10.00).—The preface states that its (ARES) goals are to cover the important and vigorous topics and to generate interest by reviewing fields wherein a potential for major advances seems to exist. The question is: can the standard of this first volume be maintained? The 15 chapters herein, better than most collective works, are on a high-thinking and philosophic level, even in titles which do not indicate their strong ornithological and mammalogical content. Especially prominent in this regard are: Analysis of character variation in ecology and systematics, T. Crovello; Ecological aspects of endogenous rhythmicity, J. Enright; Spacing patterns in mobile animals (largely territorial) J. Brown and G. Orians; Refuging, W. Hamilton, Jr. and K. Watt; Mesozoic mammalian evolution, W. Clemens. Large bibliographies accompany each, and these are summarized in an author index of nine pages, and a subject index of seven pages.

The most strictly systematic contribution is: Contemporary systematic philosophies, by D. Hull of the University of Wisconsin Philosophy Department. A major phenomenon in the entire history of taxonomy is the massive discussion and pontification in print today. Perhaps it is healthy to recognize that something is wrong at last. As a sample of the thirty-plus pages here on this topic consider (p. 43):

"As unflattering as the apellation may sound, *phenetic* has been a weasel word in phenetic taxonomy. Its meaning changes as the occasion demands. When the principles of other schools of taxonomy are being criticized, it is given a strict interpretation. Phenetic taxonomy is look, see, code, and cluster. A methodologically sophisticated ignoramus could do it." How many times and in what branch of biology has that not been said: "Just a compilation; no original research; any kid could do it." As the late W. L. McAtee said on various occasions about his own food habits and compilatory efforts: "It's clerk work but no clerk can or will do it." Continuing: "But when the pheneticists turn to elaboration of the methods and procedures of phenetic taxonomy, it takes on a whole spectrum of more significant meanings, heedless of the fact that under the various interpretations the original criticisms of other taxonomic schools lose much of their decisiveness." Review comment here is that passing generations see the same sharpness of sarcasm and acrimony as before. Less of it would be helpful. Darwin and Fitzroy are said to have fought verbally during the voyage of the Beagle and not had their careers blasted therefor, but the slightest disagreement may now be seized as evidence of "temperamental unsuitability" and many other things dependent on the inventiveness of the onlooker. "It has been assumed in this paper that decreasing the amount of art in taxonomy is desirable." Agreed. "Taxonomists as classifying machines, however, have several undesirable qualities. Although taxonomists once trained, tend to produce consistent, accurate classifications, the programs by which they are producing . . . are unknown to other taxonomists, and vary from worker to worker." This yields admission that what any of them writes or approves correlates to his own personal history, temperament, and taste; also, by implication, that as ecological population studies show more and more, an organism or a calling cannot well survive as a nonaggregate of diffusely scattered individuals becoming less able to communicate with each other, unable to agree on meaning of descriptive terms, let alone the degree of "splitting" or "lumping."

"In addition, just when a taxonomist is reaching the peak of his abilities, *he tends to die.*" A more lively phrase would be the familiar "drop dead," that being what is expected of him rather than disagree with the entrenched or old case hardened of his calling.—Leon Kelso.

39. ***Everybody's Ecology.*** C. Schoenfeld. 1971. A. S. Barnes and Co. New York. 316 pp.—The title of a Mozart opera, *Cosi fan Tutti* (Everybody's doing it.) would serve as a proper subtitle for this, yet another journalistic book on the now popular general subject. This book is quite readable, but not so agreeable, in passages like the following (p. 186): *"Zeroing in on the freeloaders.* The list of outdoor spongers is long and varied. There is the non-hunting bird lover

who never buys a duck stamp, although the stamp provides money for marshlands. There is the wildflower fan who never buys a fishing license, although the license helps pay for the acquisition and management of woodlands. There is the outdoor picture bug who spends hundreds of dollars on cameras, and not a cent on scenery." A retort to the above, indicating how such moneys *are* spent, is implied in *"Feed the ducks and pass the ammunition"* (G. Laycock, *Audubon*, **74**(2): 108-110, 1972). —Leon Kelso.

40. ***Chemical Ecology.*** E. Sondheimer and J. Simeone, editors. 1970. Academic Press, New York and London. 336 pp., illus. $16.50.—Along with the present publication and information explosion, the march of discovery into new fields and the influx of new facts is astonishing. A well-planned and illustrated book, this tackles the summarization of new finds regarding remote chemical influences among organisms, including those items nominated pheromones on this side of the Atlantic, and telergones (Y. Kirshenblatt, 1968, *q.v.*) on the other. Outstanding is the lack of evidence in these works of their existence in bird life, in contrast to their prevalence in all other animal groups, and the obvious evidence of their involvement in "anting." In the plant world, remote chemical influence, allelopathy, has received considerable attention as indicated here.

There is an introduction and 11 chapters by as many authors: Chemical ecology of cells in the soil, J. Bonner; Chemical ecology among lower plants, J. Roper; Biochemical ecology of higher plants, R. Whittaker; Plants and the chemical environment, F. Went; Chemical interactions between plants and insects, V. Dethier; Hormonal interactions between plants and insects, C. Williams; Chemical communication within animal species, E. O. Wilson (facts herein the most trenchant); Chemical defense against predation in arthropods, T. Eisner; Chemical ecology of fish, A. Hasler; The chemistry of nonhormonal interactions, R. Clayton; Chemical aspects of hormonal interactions, J. Siddall There are author and subject indices.—Leon Kelso.

41. ***Telegones - Chemical Media of Vital Action.*** (Telergony - khimicheskie sredstva vozdeistviya zhivitnykh.) Y. D. Kirshenblatt. 1968. "Nauka" publishing house, Moscow. 106 pp. (price uncertain, about $2.00 U. S.) (In Russian.)—Although the book may not be easily available, the gist of the contents is adequate for notice. An introductory article of about the same title appeared previously. *J. obshchei biol.*, **24**(6): 415-427, 1963. The substances concerned and their effects suggest the lines:

Some thirty inches from my nose
The frontier of my Person goes,
And all the untilled air between
Is private pagus or demesne.
Stranger, unless with bedroom eyes
I beckon you to fraternize,
Beware of rudely crossing it:
I have no gun, but I can spit. (W. H. Auden, 1965)

Recalling some personal emanations, one might willingly allow someone even greater radius and circumference. Many Metazoa produce biologically active substances called here "telergones" which effect remote influence on other organisms. They are so named in preference to "pheromones" as employed in the Western World, the author regarding that term too mongrelized etymologically. These substances are products of external secretion and are produced in special glands, uni- or multicellular. They are classified as first, Homotelergones (affecting animals of the same species), subdivided into: (1) Epagones, attracting others of the same species, mainly of the opposite sex; (2) Odmikhnones, put on objects as odor signals, and serving as orientors in unfamiliar territory; (3) Toribones, effecting fear, flight, or attack by members of a group; (4) Gonofiones, effecting manifestation of or change of sex; (5) Gonofiones or gamofiones, effecting gonad activity and onset of reproduction; and (6) Ethofiones, evoking behavior patterns and appearance of certain instincts. Heterotelergones (affecting other species of organisms) include: (1) Likhneumones, produced by ant symbionts, affecting behavior of ants and termites, evoking a stimulative or narcotic effect; (2) Aminones evoking defense from enemy attack; and (3) Progaptones, immobilizing or killing prey. The high chemical effectiveness of certain epagones is emphasized

by examples of attractance of male Gypsy moths over distances of 3.8 km and those of the large nocturnal *Saturnia pyri* as remote as 8 km. Gonofiones of male mice suppressing pregnancy in alien female mice are a forceful example in mammals. The point in reviewing this is that no such emanations have so far been found in birds, alone among the main classes of animals. Yet, their behavior in various forms of "anting" would indicate sensitiveness to "-ones" or pheromones. Although not recalled by Eastern or Western researchers on the subject, relative would seem to be the tales of women of the "minority" race having a mulatto child, then continuing to have such whatever the parentage, and also the question involved in ultra-modern "swinging" human society: whether one can let herself be a "seminal sump" or trough and not be profoundly and variously affected by it, notwithstanding Weissmannism.—Leon Kelso.

42. ***Extinction of Organisms - The Causes.*** (Prichiny vymiraniya organizmov.) L. I. Davitashvili. 1969. "Nauka" publishing house, Moscow. 440 pp. (In Russian.) (Price uncertain, about $10.00.)—The prominent and perhaps dominant theme of this inclusive text by this eminent Soviet-Georgian paleontologist, author of a number of basic texts, is that since evolutionary advance must emerge from a matrix of the old, extermination of the latter is as basic, inevitable and requisite as the origin of species. A review of this work (*Vestnik zool.*, **5**(2): 88-90, 1971) by a contemporary, I. Pidoplichko, finds this book a great contribution on the problems of organic extinction, and the major one published from the Marxist viewpoint, and fundamental to modern research on this subject. "However," he adds, "it must be recognized that the problems of organic extinction are far from settled, and an arena of vast controversy; far from clear are the reasons for the disappearance of certain groups, and in some cases these have been examined from a decidedly antimaterialistic viewpoint." Not the least controversial and unwelcome at this particular time is their widely regarded Brokkistic, or Brochistic, commemorating its innovator, explanation (or rationalization some would say): that genera and species become senile and die off as do individuals. Regarding birds, on their scroll is the charge of suppression of some Mesozoic reptiles (p. 220); avian extinction prehistorically is discussed (p. 245); and in modern times (338-348).

Following a foreword and an introduction are 10 divisions: (1) "Internal" cause hypotheses; (2) "Monodynamic" or "shock" factors; (3) Problems posed by Darwin and classic Darwinism; (4) Extinction of certain major invertebrate taxons; (5) Extinction in vertebrate history; (6) Extinction in plant world history; (7) Suggested "faunistic gaps" in history of the bios, and their actual significance; (8) Declining (and recently extinct) animals and relicts; (9) Extinction with regard to regional and local abiotics conditions; (10) Biotic factors in the extinction of organic forms. Seven pages of conclusions, and sections on literature cited, major stratigraphic subdivisions, author, topical, and Latin indices are excellent.—Leon Kelso.