

bander. Dr. Wood suggests "Rescue" as the designation. There is one objection to the term. It is misleading for it suggests that the bird was saved from danger, a deceptive connotation. At present, many are using the term "foreign recovery." There are more suitable words that should be considered, such as "Retrieve," "Regain" which are synonyms of recovery. Since the word retrieve is suggestive of the hunter's vocabulary, my choice is "Regain," a happy-sounding definition of what is usually a momentous occasion to the cooperator who catches the bird.

It is essential that a uniform set of terms be adopted and it is equally essential that the terms be kept simple and clear; otherwise it will be difficult to translate banding results in terms understood by other workers.—AMELIA R. LASKEY, Graybar Lane, Nashville 4, Tennessee.

**A Study of Bird "Pox," or "Foot Disease."**—The condition known variously as "foot disease," bird "pox," *epithelioma contagiosum*, etc., is well known to many bird banders. This disease is due to a virus infection which is in some manner passed from bird to bird. It produces wart-like, nodular or fungating growths on the toes and tarsi which deform, cause bleeding and scab formation, and often auto-amputation occurs. At times, it may spread to areas about the base of the bill. It is particularly common in chipping sparrows but has also been reported in other sparrows, finches, thrashers, flickers, and others.

Much remains to be learned regarding this ailment. I am making a study of some aspects of it. Bird banders have unique opportunities to observe it and to secure material for study. I would greatly appreciate whatever assistance they can give me.

From those who have observed this condition, I would like to have answers to the following questions. Name, address, location of banding station, in what species has the condition been observed (with details if possible), how often observed in various species, has any seasonal or annual incidence been noticed, have you seen it in any other location than your present station?

If, at any time, banders can secure any of the tumor material, I would like to receive it for experimental study. The virus remains viable in the tissues for relatively long periods (several days). Bits of it, or the diseased parts, can be broken off and sent by mail. Do not put in alcohol or water.—GORDON M. MEADE, M.D., University of Rochester School of Medicine, Rochester, New York.

---

## RECENT LITERATURE

Reviews by Donald S. Farner

### BANDING

**1. Recovery of Marked Birds.** E. P. Leach. 1944. *British Birds*, 38(2): 28-32. Several interesting recoveries are included in the 93 reported in this paper. Among them are records of a Starling, (*Sturnus vulgaris vulgaris* L.), banded in York, January 25, 1939, and recovered at Hvalpsund, Denmark, March 1943; another Starling banded at Malvern, October 28, 1936, and recovered at Heerenveen, Holland, June 19, 1943; a third Starling banded at the same locality, January 16, 1936, and recovered at Rotterdam, Holland, January 9, 1941; Swallow (*Hirundo rustica rustica* L.), banded at Sedbergh, June 26, 1942, and recovered in Cape Province, December 8, 1942; Teal (*Anas crecca crecca* L.), banded at Pembroke, October 26, 1939, and recovered at Karlshamn, Sweden, April 10, 1944; Teal, same banding locality, December 29, 1939, recovered at Nakskov, Denmark, August 27, 1940; Teal, same banding locality, December 12, 1939, recovered at Heerenveen, Holland, May 5, 1943; Widgeon (*Anas penelope* L.), banded at Pembroke, December 22, 1938, and recovered at Ovro, Denmark, February, 1943; Cormorant, (*Phalacrocorax carbo carbo* (L.)), banded at Lambay, June 13, 1939,

and recovered at Noya, Spain, January 1, 1943; Gannet, (*Sula bassana* (L.)), banded at Grassholm, August 15, 1938, and recovered at Rio de Oro, West Africa, February 1943; Gannet banded at same locality, September 10, 1938, recovered at Cape Ortegal, Spain, February 2, 1943; Black-headed Gull, (*Larus ridibundus ridibundus* L.), banded at London, November 23, 1943, and recovered at Ringsted, Denmark, July 12, 1943; Lesser Black-backed Gull, (*Larus fuscus graellsii* Brehm), banded at Faulshaw, July 23, 1937, and recovered at Noya, Spain, March 1943.

**2. A Black-headed Gull Fourteen and One Half Years Old.** (Une Mouette rieuse de quatorze ans et demi.) P. G eroudet. 1944. *Nos Oiseaux*, 173: 342. A Black-headed Gull, (*Larus ridibundus ridibundus* L.), banded June 21, 1929, at Katthammarsvik on the island of Gotland, was recovered dead near Geneva, Switzerland, February 7, 1944.

### ECOLOGY AND POPULATION STUDIES

**3. Measurement of Bird Populations.** S. Charles Kendeigh. 1944. *Ecological Monographs*, 14: 67-106. This is a painstaking analytical study of the various methods employed, both in this country and abroad, in attempting to measure bird populations. In this paper Dr. Kendeigh has rendered a real service to students and would-be students in this field by critically reviewing and evaluating both methods used and results obtained. A study of it is recommended as a guide to future undertakings in the field of bird population studies. It is also of importance to those engaged in wildlife management, as well as to ecologists.

Two points of view are presented—1. The search for an index of relative abundance. 2. The development of methods for ascertaining as closely as possible the actual number of birds in a known area.

The author details his own unsuccessful experience in attempting to find some sort of measuring stick whereby the mass of reports on bird observations reported in *Bird Lore* (now the *Audubon Magazine*) and in local bird lists can be utilized for the scientific determination of relative abundance.

Without stating it definitely he seems to show that the various methods, such as use of trip lists made under varying conditions of length, weather, season, time of day, etc.; the manipulation of figures; Christmas counts; time-unit counts; feeding station or banding station counts; counts from automobiles travelling country roads, are inconclusive. "There are inherent inaccuracies and objections that are difficult to eliminate." He notes the trend in modern ornithological investigation toward the method of determining actual numbers by detailed and repeated counts over an area of known size.

As to methods of ascertaining absolute abundance the following are examined: strip census, plot census, various methods of estimating game bird numbers, trapping and banding. He concludes that the most successful practicable method so far developed is the approximate mapping of territories as they become established throughout the season. By experimenting he finds that the use of this method during five visits to the chosen area will record 96% of the total bird population. He recommends as a minimum one visit in late April, one in mid- or late May, two or three in June, one in mid-July. It appears that 50 acres of forest and 75 acres of open fields or prairie are about all one person can handle efficiently for a nesting population study. For wintering birds, larger areas may be used.

In order to demonstrate how data accumulated from various sources may be utilized to present a general picture, the author selects eight census studies representative of the climax deciduous forest biome in its regional variations. These include oak in West Virginia, oak-tulip in Virginia, oak-maple-beech in New York, oak-hickory with beech-maple in northern Ohio, beech-maple in eastern Ohio, and three beech-maple areas in northern Ohio, all totaling 293 acres. The birds nesting in these eight areas are combined into one list of 35 species, which are

taken to represent the numbers of pairs of breeding birds in the mature, relatively undisturbed climax deciduous forest. The 647.4 pairs of birds thus assembled represent a density of 221 pairs per 100 acres. In descending order of abundance the leading species in this compilation are Ovenbird, Red-eyed Vireo, Redstart, Wood Thrush, Wood Pewee, Hooded Warbler and Tufted Titmouse.

"Population studies should be put upon an absolute quantitative basis wherever possible. Probably the studies of the abundance of birds on the relative basis will eventually have to be done over, because such studies have only a limited application to problems that are coming to be more and more important." This is a timely discussion, because when the closing of the war releases present restrictions on civilian transportation, there will no doubt follow a large increase in the study of birds in the field both by local bird groups and by individuals. A study of this paper should make such work more effective.—ARTHUR B. WILLIAMS.

**4. The Natural History Background of Camouflage.** Herbert Friedmann. 1944. *Smithsonian Report for 1943*: 257-274. This is a brief but able review of the broader aspects of protective coloration in animals. Considerable attention is devoted to the principle of countershading by which the three dimensional body of the animal is made to appear as two dimensional. Attention is also given to color resemblance and disruptive coloration and their superposition on schemes of countershading. The author rightfully points out that our estimates of the effectiveness of protective coloration are based largely on the color vision of the human without, in most cases, any knowledge of the color-perception characteristics of the eyes of the enemies of the forms in question. Because of the brevity of the discussion the more controversial subjects such as mimicry have been omitted.

**5. The Log of Whiskey Stump: Water-fowl Ecology.** Herbert R. Mills. 1944. *Florida Naturalist*, 18: 1-7. In the last ten years the Florida and National Audubon Societies have acquired three refuges in Tampa Bay on which some 2700 birds were nesting; now the population reaches 265,000! In 1934 the submerged sands were barren, fish and other aquatic animal life a "mere remnant of their former abundance." Concomitantly with the protection of the birds, under-water vegetation began to flourish, edible crabs became abundant, and mullet now "occur in the fabulous numbers of fifty years ago." The author believes the water-fowl have "an important and indispensable function . . . in the ecology of the sea," namely, "the fertilization by bird guano of the aquatic plant life upon which the aquatic animal life is dependent."—M. M. NICE.

**6. The Present Status of the American Eider on the Maine Coast.** Alfred O. Cross. 1944. *The Wilson Bulletin*, 56(1): 15-26. In summarizing his studies on the increase in Eiders, (*Somateria mollissima dresseri* Sharpe), on the Maine coast the author summarizes his observations on 31 islands on which adult Eiders were observed during the summer. Adult Eiders were seen in the vicinity of fourteen others where they probably nested although actual observations were not made. The author believes that the increase in numbers of this species is due to the protection and educational program of the Audubon Society and to the decrease in egg-gathering. A nest is recorded from Mark Island, which, according to the author, is the most southwestern record of nesting Eiders on the Atlantic coast.

**7. Status of Cassin's Sparrow in Arizona.** Allan R. Phillips. 1944. *The Auk*, 61(3): 409-412. In mid-July relatively large numbers of Cassin's Sparrow, (*Aimophila cassinii* (Woodhouse)) come into Arizona as fall transients. These are mostly adults in full song, with testes greatly enlarged. Although they may occasionally build nests they are not known to complete them or to lay eggs.

**8. Nest Survival over Winter.** H. Elliott McClure. 1944. *The Auk*, 61(3): 384-389. Nests of birds and squirrels that withstood the winter were counted at Lewis, Iowa, in March, 1939 and 1940. Nests surviving the winter in greatest numbers were those of the Robin, (*Turdus migratorius* L.); Baltimore Oriole, (*Icterus galbula* (L.)); Mourning Dove, (*Zenaidura macroura* (L.)); and the Fox Squirrel, (*Sciurus niger rufiventer* Geoffroy). The nest of the Robin is important in the economy of the Mourning Dove since it is large enough to accommodate the dove nest which is often built in it and strong enough to survive the winter. Dove nesting success was found to be greater in those constructed in Robin nests than in the nests of dove construction only.

**9. Bonaparte's Gull on the Niagara River and Eastern Lake Erie.** Clark S. Beardslee. 1944. *The Wilson Bulletin*, 56(1): 9-14. This paper summarizes studies made on (*Larus philadelphia* (Ord)) from 1921 to 1943. In the eastern Lake Erie region the adults arrive in the latter part of March and the early part of April, depart during May, return in late July and August, and depart southward in September, October, and November. The young of the previous year arrive in May and drift northward in May and early June. The author feels that this group composes a large portion of the great November and December flocks. Because juveniles are so rare in fall the author feels that it is necessary to conclude that they follow another route southward.

**10. A Two-year Bird Census on San Juan Island, Washington.** Malcolm R. Miller. 1944. *The Auk*, 61(3): 395-400. San Juan Island supports a rich and varied avifauna, mainly transitional. The surveys upon which this paper is based were conducted during the summers of 1936 and 1937. Each area was covered approximately once a week. The density of population per unit acre of coniferous forest (with a few deciduous trees) was found to be 4.87 birds; for the meadow, 2.17 birds per acre; and for the second growth area, 2.18 birds per acre. The author regards these results as preliminary and not necessarily a reliable index to population densities for the Northwest.

**11. A Raptor Census in Montana.** Robert W. Hiatt. 1944. *The American Midland Naturalist*, 31(3): 684-688. On the basis of censuses taken while traveling by automobile throughout the state of Montana the author found that the Sparrow Hawk, (*Falco sparverius* L.), was the most common raptor in the western and southern parts of the state whereas the Marsh Hawk, (*Circus hudsonius* (L.)), was found to be the most common raptor in the north and east. For the entire state 54 percent of the total number of raptors observed were Sparrow Hawks; 18.5 percent were Marsh Hawks; 10 percent were Swainson's Hawks, (*Buteo swainsoni* Bonaparte); and 5 percent were Ferruginous Rough-Legs, (*Buteo regalis* (Gray)).

**12. Black-crowned Night Heron Nesting in Lincoln County, Ontario.** R. W. Sheppard. 1944. *The Canadian Field-Naturalist*, 58(2): 31-33. This paper contains notes of the heronries of (*Nycticorax nycticorax hoactli* (Gmelin)) in Lincoln County; the largest observed contained at least five hundred nests. It is believed that there has been a marked increase in this species in recent years in Lincoln County.

#### REPRODUCTION

**13. Nesting of the American Redstart.** Bernard W. Baker. 1944. *The Wilson Bulletin*, 56(2): 83-90. Five nests of (*Setophaga ruticilla* (L.)) were studied from late June to early August 1942 at Douglas Lake, Michigan. The preferred habitat in this locality is second growth maple. The author noted very little territorial defense by males during this period. Males were in full song

until the middle of July after which there was a gradual decline in singing. Only the female was observed to incubate and brood; at all nests except one the male assisted in the feeding.

**14. A Hybrid of the Pochard and the Ferruginous Duck.** (Un hybride des Fuligules milouin et nyroca.) J. de Beaumont. 1944. *Nos Oiseaux*, 173: 337-340. A record of a hybrid of (*Nyroca ferina* (L.)) and (*Nyroca nyroca* (Gueldenstaedt)) collected at Ouchy, Switzerland, November 4, 1935.

**15. Cross-mating of Canada Geese with Emden Geese.** Alexander W. Blain. 1944. *The Auk*, 61(3): 389-391. Some of the hybrids of the Canada Goose, (*Branta canadensis canadensis* (L.)) and the Emden Goose had the white feathers of the latter (one was pure white) and some were indistinguishable from the Canada Goose parents.

**16. Some Nesting Records from Murfreesboro.** Henry O. Todd. 1944. *The Migrant*, 15(2): 21-23. Nesting records for fifty species at Murfreesboro, Tennessee.

#### PHYSIOLOGY

**17. The Nature of Heritable Wildness in Turkeys.** A. Starker Leopold. 1944. *Condor*, 46: 133-197. The behavior, anatomy, and ecological relations of wild turkeys (*Meleagris gallapavo sylvestris*), domestic turkeys (*M.g. gallapavo*), and of hybrids obtained by the wild pen breeding method were studied from 1939 to 1943 in the Ozarks of southern Missouri. Domestic turkeys mature rapidly, as shown by juvenal molts, secondary sex characters of the head, and the fact that males breed before they are a year old; wild turkeys are the slowest of the three strains, the males not breeding before two years of age, while hybrids are intermediate. Domestic turkeys start gobbling in February, hybrids in March, wild birds in April. Most hybrid young hatch in May, most wild young in June. Corroborating Crile's work (1941), the author found the brain and pituitary and adrenal glands larger in relation to body weight in wild birds than in domestic ones, the hybrids again being intermediate. When young are under a month old, the reaction to danger of the wild mother and young is that of hiding; with hybrid birds the mother scolds, while some young hide and others run about—behavior ill-adapted to survival in the wild.

"The wild condition is not only favorable in the evolutionary sense to free-living populations—it seems to be immediately essential. Birds so endowed follow a pattern of behavior that promotes the survival of the individual as well as of the race. Wild turkeys are wary and shy. . . . They breed at a favorable season of the year. The hens and young automatically react to danger in ways that are self-protective. Reproductive success is high. Collectively these and associated actions and reactions literally adapt the native wild birds to existence in their ancestral environment. As a consequence, we find that populations of *sylvestris* are tenacious and thrifty under adversity and are readily responsive to protection and management. Birds of the domestic strain, on the other hand, are differently adapted. Many of their physiological reactions and psychological characteristics are favorable to existence in the barnyard but may preclude success in the wild" (p. 191). They have been selected for tranquillity and early breeding. Hybrids have too many of these tendencies for survival under difficulties.

"Wildness and domesticity are two heritable, physiological complexes; their dissimilarities stem primarily from differences in the form and function of the nervous and endocrine systems in the individual turkey," (p. 191). Lorenz points out that instinctive responses may drop out under domestication; with turkeys these lost responses chiefly concern escape reactions, while the adjustment to season for the start of breeding has also suffered. A very interesting study, attacking the problem from many angles.—M. M. NICE.

**18. Effect of Air Temperature on the Rate of Energy Metabolism in the English Sparrow.** S. Charles Kendeigh. 1944. *Journal of Experimental Zoology*, 96(1): 1-16. In the English Sparrow, (*Passer domesticus* (L.)), there is an inverse linear relation between the rate of energy metabolism and temperature decreasing from 37° C. There is a direct linear relation between the rate of energy metabolism and temperature increasing from 37° C. The relation between air temperature and moisture output is logarithmic with the greatest output at higher temperatures (above normal body temperature). The rate of breathing is at a minimum at air temperatures of 30° C. At lower temperatures the increase in breathing rate is correlated with the increased rates of metabolism which probably involved increases in carbon dioxide tensions in the blood. The precipitous rise in breathing rate with temperatures above 30° C. is correlated with the increased moisture loss at higher air temperatures. The above relations were obtained with birds in post-absorptive state, which in "small wild birds of less than 50-gm. weight" may be attained within 1.5 to 3 hours after being deprived of food. "Normal body temperatures are maintained with drop in air temperature until metabolic fatigue sets in. With rise in air temperature above 37° C. hyperthermia occurs which may lead to death."

**19. Effect of Light upon Time of Oviposition in Ring-Doves.** James Plummer Schooley and Oscar Riddle. 1944. *Physiological Zoology*, 16(2): 187-193. The authors recorded the time of oviposition of 1,604 eggs in a colony of Ring-Doves, (*Streptopelia decaocto* (Frivaldsky)), from November 18 to June 23. In clutches of two eggs the first egg is laid late in the afternoon at about 5:00 P.M.; the second is laid on the morning of the second day thereafter at about 8:45 A.M. It was found that as daylight increased from winter to summer the time of laying of "first eggs" changed correspondingly to later in the afternoon. Likewise there was noted the tendency of "second eggs" to be laid earlier in the morning. This suggests a relation between light and oviposition. Such a relation is further substantiated by the fact that on cloudy days "first eggs" were laid about 30 minutes earlier and second eggs about 45 minutes later. The authors suggest that psychologic factors and possibly also a hormone of the posterior lobe of the pituitary gland affect the time of oviposition.

**20. The Ejection of Pellets by Passerine and Other Birds.** B. W. Tucker. 1944. *British Birds*, 38(3): 50-52. Brief notes, mostly from the literature, of pellet ejection by birds other than hawks and owls. The references cited should be useful to anyone interested in this subject.

#### FOOD HABITS

**21. A Study of the Inland Food Habits of the Common Curlew.** A. Hibbert-Ware and Robert F. Ruttledge. 1944. *British Birds*, 38(2): 22-27. The authors have added the following items not listed in the *Handbook of British Birds* to the list of those taken by (*Numenius arquata arquata* (L.)): young birds; fish fry; *Forficula* (Orthoptera); *Corixa* (Hemiptera); *Carabus*, *Phosphuga*, *Aphodius*, and weevils (Coleoptera); *Tipula* eggs (Diptera); blackberry seeds; wheat husks. There are also notes on the evacuation of the gizzard lining. From July to November the principal items in pellet examinations were various species of beetles. One pellet examined in February contained nothing but woodlice.

**22. Feeding Habits of the Black-Headed Gull.** Geoffrey C. S. Ingram. 1944. *British Birds*, 38(1): 12-13. The author states that Black-headed Gulls, (*Larus ridibundus ridibundus* L.), do not attack diving aquatic birds for the purpose of obtaining food. Rather they fly or swim about the spot where a diving bird has disappeared and pick up bits of food which rise to the surface. He also reports Black-headed Gulls diving like Gannets.

## BEHAVIOR

**23. Attacks on Diving Birds by Black-headed Gulls.** A. W. Boyd. 1944. *British Birds*, 38(1): 14-15. The author gives notes on his observations of Black-headed Gulls, (*Larus ridibundus ridibundus* L.), attacking other birds in order to rob them of fish. Among the species attacked for this purpose he lists the Great Crested Grebe, (*Colymbus cristatus cristatus* L.); Tufted Duck, (*Nyroca fuligula* (L.)); Goldeneye, (*Bucephala clangula clangula* (L.)); Smew, (*Mergellus albellus* (L.)); and Goosander, (*Mergus merganser merganser* L.). These and other species are apparently attacked on occasion because of the sheer pugnacity of the gulls. In such attacks there is no attempt to steal food.

**24. Bird Study and Semi-Captive Birds: the Rose-breasted Grosbeak.** H. R. Ivor. 1944. *Wilson Bulletin*. 56: 91-104. Very interesting account of two pairs of *Hedymeles ludovicianus* in "semi-captivity," i.e., "given day-time liberty during the period of egg laying and incubation and full-time liberty . . . during the time of rearing the young." Three of the birds were hand-reared, but one male was a trapped wild bird. An extraordinary description of courtship song and display is given: all contrasts in the male's plumage—rose, black and white—are strikingly exhibited. "The mating song poured forth from his open beak as he moved toward the female, weaving his head and body in an erratic dance in which he resembled some magnificent butterfly rather than a bird." For "pure rapture I cannot recall any song which equals" this courtship song. The female postured, coition followed, and the pair touched beaks. Sometimes after copulation the female "would repeatedly mount the male," and sometimes she became "quite ferocious toward him—even pulling whole tufts of feathers from his body."

Nests were built chiefly by the female, but both sexes incubated, the female invariably at night. Both gave signal songs when returning to the nest, both sang on the nest. The incubation period was 12 to 13 days, fledgling period 10 days, independence 20 days later. "To the newly-hatched young they gave very small amounts of soft-bodied insects that had been broken up and rolled around in the mouth until heavily coated with saliva." "This great care in the preparation of food may in some measure explain the statements" that this species regurgitates food to the young. Mr. Ivor was able to watch all of the activities of the hand-raised adults as closely as he desired, but the wild-trapped male flew at him, screaming, if he were at the nest when the author approached. "I could handle the eggs and young of pair No. 1 (both hand-reared birds) without arousing any resentment on their part."

"When the young of both pairs were within a short time of being ready to leave the nest, both females began to build again, outside of the aviary, leaving the care of the young almost entirely to the males." "All 13 eggs hatched and all 13 young were raised to maturity." When the young were 30 days old, the father "brought insects to the compartment, but . . . he literally jabbed the food into their mouths and immediately afterwards struck them on their bills." Although territory was respected, at one time when the trapped male neglected his brood temporarily, the hand-reared male went into the other compartment and fed the screaming nestlings. Migration restlessness was shown by the captive Grosbeaks, but this became less pronounced with age and in the third generation "it seems to be confined to wakefulness on moonlight nights." Important observations are made on prenuptial and postnuptial molts.

The author emphasizes the fact "that it is only birds kept in a proper environment that will yield valuable results in behavior study." "The comparatively close quarters of even the largest aviary may magnify antipathies, which can result in much more severe fighting than would be usual among wild birds." "That a controlled bird will differ from a completely free bird is self-evident, but it differs simply by the addition of learning to innate behavior." The present paper deals only with innate behavior patterns. A fine example of the unique work Mr. Ivor is doing on bird behavior.—M. M. NICE.

**25. A Statistical Investigation into Bird-song.** P. R. Cox. 1944. *British Birds*, 38(1): 3-9. In this study the author recorded the number of singing birds per species which he heard over a definite course at different seasons of the year and at different times of the day. Histograms show the seasonal variation in singing of ten passerine species. During the period from February to July these histograms fall into two general groups: those which approach the configuration of a normal frequency distribution and those with multimodal distribution. The first class consists principally of the Blackbird, (*Turdus merula* L.); Warblers (*Sylviidae*); and perhaps also the Great Tit, (*Parus major* (L.)); Sky-Lark, (*Alauda arvensis* (L.)); and Chaffinch, (*Fringilla coelebs* L.). The Song-Thrush, (*Turdus ericetorum* Turton); Blue-Tit, (*Parus caeruleus* L.); Hedge-Sparrow, (*Prunella modularis* (L.)); and possibly also the Wren, (*Troglodytes troglodytes* (L.)) show bimodal curves. The song of the Robin, (*Erithacus rubecula* (L.)); shows a gradual decline from February to July after which there is a gradual increase through October. The ratio of morning to evening singers is interesting. With the exception of the Blackbird morning singers exceed evening singers at all times. In the case of the Blackbird the ratio of morning to evening singers is 0.7 in March and nil (no morning singers) in July and August. In the case of Finches and the Song-Thrush the ratio, about twice as many morning singers, remains essentially constant from March to August. In the case of other passerine species there was an increase in the ratio from March to August. For example among the Warblers the ratio increased from 1.7 to 24.5 during this period whereas among the Tits it was from 1.6 to 12.8.

**26. Starlings Feeding on the Backs of Cattle.** Clarence Cottam. 1944. *The Migrant*, 15(2): 24-25. The author discusses several observations concerning Starlings, (*Sturnus vulgaris* L.), feeding on the backs of cattle. In Australia this species has been praised for preying on sheep-ticks and sheep-maggot flies and has also been condemned for pulling wool from sheep. In New Zealand it is said to be effective in controlling cattle-ticks. In the United States it has been reported several times feeding on the backs of cattle. Stockmen in Kansas have reported that these Starlings were probing for ox-warbles. This would be beneficial except that the birds apparently develop a taste for flesh and blood and continue to feed on the live animal. "Complaints of this nature have been investigated and verified in Kansas, Nebraska, Missouri, Oklahoma, and Texas." These habits seem to be restricted to the severest parts of the winter. The author points out that these habits of the Starling are not surprising since similar behavior has been noted among other members of the Sturnidae.

**27. The Ferruginous Duck in the Region of Geneva.** (Le Fuligule nyroca dans la région de Genève.) P. G eroudet. 1944. *Nos Oiseaux*, 172: 314-316. This paper is devoted largely to a discussion of the Swiss records of (*Nyroca nyroca* (Gueldenstaedt)) and to criteria and characteristics for field identification. The author has noted the tendency of this species, during winters on Lake Geneva, to be found in flocks with the Tufted Ducks, (*Nyroca fuligula* (L.)); other species seem to be avoided.

#### LIFE HISTORY

**28. The Chestnut-Collared Longspur in Manitoba.** R. D. Harris. 1944. *The Wilson Bulletin*, 56(2): 105-115. This is an account of an excellent study of 23 nests of *Calcarius ornatus* (Townsend) near Winnipeg, Manitoba, during the years 1930-1932. Spring migration occurred between April 10 and 18. Immediately after arrival the birds settled on their breeding grounds, prairie with occasional low ridges and shallow sloughs. Courtship and territory selection began in the latter part of April and early May. Territories were approximately circular and 24,000 to 45,000 square feet in area. Egg laying began late in May. Ten



clutches varied from four to six eggs; the mean was 4.8. The usual number of clutches per season was found to be two, occasionally three. Incubation was by female only; both parents shared in feeding. Incubation period in three nests was ten days; nestling period was nine to eleven days. Seventy-two percent of 44 eggs observed resulted in young which left the nest. The postnuptial molt (complete) began about the middle of July.

**29. Notes on the Life History of the Emerald Toucanet.** Helmuth O. Wagner. 1944. *The Wilson Bulletin*, 56(2): 65-76. This is an interesting summary of 10 years' observation of *Aulacorhynchus prasinus* (Gould) in Chiapas, Mexico, near the Guatemala border. The habitat of this species appears to be restricted by atmospheric humidity to the virgin forests above 1000 meters; the breeding range is above 2000 meters on the Pacific coast and above 1750 meters on the Atlantic coast. The Emerald Toucanet is gregarious for most of the year, the adults leaving the flocks in February; the sexually immature yearlings remain in flocks during the breeding season. There is a downward migration during the non-breeding season. Eight stomachs examined contained nothing but vegetable food.

**30. Preliminary Notes on the Development of Nestling Pileated Woodpeckers.** J. Southgate Y. Hoyt. 1944. *The Auk*, 61(3): 376-383. Three nestling Pileated Woodpeckers, (*Ceophloeus pileatus* (L.)), were observed and weighed daily. Their weights on the first day were 20.4, 36.6, and 29.9 grams respectively. On the 24th day, the last before leaving the nest, the greatest weights, 244.4, 218.7, and 227.3 grams, were recorded. First signs of feather growth appeared on the third day and the first feathers broke through on the following day. On the eighth day it was possible to distinguish females by the darker color of the forehead.

**31. Brood Habits and Growth of "Blue Grouse."** Leonard Wing, James Beer, and Wayne Tidyman. 1944. *The Auk*, 61(3): 426-440. This paper is based on the studies conducted during the summer of 1940 in Okanagan County, Washington, on the east slope of the Cascade Mountains. Perhaps its most valuable contribution concerns the average brood size for Richardson's Grouse, (*Dendragapus obscurus richardsoni* (Douglas)); 99 broods (ages unknown) averaged 3.65 young per brood, four being the most frequent number. By a series of hypothetical calculations it is estimated that young do not reach "maturity" until October. Mixed broods of Richardson's Grouse and the Ruffed Grouse were observed. In the upward migration to the wintering grounds it appears that the males precede the females.

#### SYSTEMATIC ORNITHOLOGY

**32. The Kites of the Genus *Ictinia*.** George Miksch Sutton. 1944. *The Wilson Bulletin*, 56(1): 1-8. A careful study of the morphology and biology of the Mississippi Kite and the Plumbeous Kite leads the author to conclude that they are conspecific and that the races of *Ictinia plumbea* (Gmelin) should be listed as follows: *Ictinia plumbea plumbea* (Gmelin) and *Ictinia plumbea mississippiensis* (Wilson).

**33. Two New Subspecies of *Catharus aurantiirostris*.** John T. Zimmer. 1944. *The Auk*, 61(3): 404-408. Descriptions of *Catharus aurantiirostris inornatus* Zimmer, type locality San Gil, Santander, Colombia, known only from type locality; and *Catharus aurantiirostris insignis* Zimmer, "type from near San Augustin, Huila, Colombia; altitude 5000 feet," occurring in region of upper Magdalena River in Colombia.

**34. The Type Localities of some Mexican Birds of the Genera *Aphelocoma*, *Cyanocitta*, and *Peucedramus*.** Pierce Brodtkorb. 1944. *The Auk*, 61(3) : 400-404. The type localities of *Garrulus sordidus* Swainson and *Pica sieberii* Wagler, both synonyms of *Aphelocoma ultramarina ultramarina* (Bonaparte) whose type locality has been restricted to Temascaltepec previously by van Rossem (1942), are restricted to Río Frío, State of Mexico. The type locality of *Aphelocoma unicolor unicolor* (Du Bus) is restricted to San Cristóbal, Chiapas. Río Frío, State of Mexico, is substituted for "E. Mexico (Mirador)" as the type locality of *Cyanocitta stelleri azteca* Ridgway. For *Aphelocoma unicolor concolor* (Cassin) the "eastern part of the state of Mexico" is substituted for "South America." In the case of *Cyanocitta stelleri coronata* (Swainson) the type locality is restricted to Real del Monte, Hidalgo, and that of its synonym, *Cyanocitta galeata* Cabanis, is changed to Jalapa, Vera Cruz. It is interesting to note that Aldrich (Proc. Biol. Soc. Wash., 57: 23-24) has previously restricted the type locality of this race to "somewhere in the mountainous regions south or southeast of Mexico City" stating that it is in agreement with the selection of W. B. Davis (in manuscript) of Cofre de Perote, Vera Cruz as the restricted type locality. The type locality of *Peucedramus olivaceus taeniatus* (Du Bus) is also restricted to San Cristóbal, Chiapas.

#### GEOGRAPHIC DISTRIBUTION

**35. The Birds of Timor and Sumba.** Ernst Mayr. 1944. *Bulletin of the American Museum of Natural History*, 83(2) : 129-194. This important paper consists of an annotated list of the birds collected by Georg Stein on Timor (141 species and subspecies, including twelve new subspecies), an annotated list of the birds collected by Stein on Soemba (93 species and subspecies, including four new subspecies), notes on the zoogeography of Timor and Soemba, and general zoogeographical considerations particularly in relation to avifaunal analyses. Although the earlier avifauna (pre-Pleistocene or early Pleistocene) of Timor consisted of a slightly stronger eastern (Australo-Papuan) element this group now constitutes only 30 percent of the present avifauna whereas the western element (Oriental or Holarctic) constitutes 62 percent. Colonization of Timor from the west occurred via two routes, the Malay Peninsula-Malay Archipelago route (33 species) and the Formosa-Philippine Islands-Celebes Route (17 species). Timor has a single endemic genus (*Büttikoferella*) and of 137 breeding species 22 of the Timor or Timor Group species are endemic. These endemic species represent the older avifauna which is slightly stronger in eastern elements. Zoogeographic data derived from avifaunal analysis lend no support to land bridges connecting Timor with Soemba, Wetar, southwest islands (Damar, Rota, Kisser, etc.), Celebes, or Australia. At the height of Pleistocene glaciation the Timor Strait narrowed from 300 miles to 45 miles facilitating a "considerable faunal exchange between Australia and the Malay Archipelago" and accounting for the stronger eastern element in the older endemic Timor avifauna. Soemba with 57 species of western origin and 44 species of eastern origin also belongs to the Oriental Region. The author discusses the facts which lead to a decline in the land bridge concept in the solution of zoogeographic problems. When a land bridge explanation is proposed the following considerations are pertinent: (1) No species constitutes evidence for a land bridge if it occurs on islands known to be oceanic. (2) Land bridges are temporary hence all species have reached an island by such a bridge must show the same age. Striking differences in ages of the faunal elements of an island indicate colonizations at different ages. (3) "A land bridge must have been utilized by a high percentage of the fauna to which it is available." (4) Group generalizations are dangerous; each case must be examined individually. Most postulated land bridges must be rejected because they disagree with the geologic facts, because they create more difficult zooge-

graphic problems than they explain, or because they are unnecessary to explain the facts. An examination of the avifauna of Australia shows that there has been a constant and continuing colonization by Asiatic species emphasizing that the relative positions of the two continents have remained essentially unchanged since Mesozoic times. This and other considerations indicate that there is no zoogeographic support for Wegener's drift theory of the origin of continents. Whereas many readers may find the first part of this paper of little interest except for strictly taxonomic work, the zoogeography will be found extremely interesting and informative.

**36. Contribution to the Ornithology of the Hawaiian Islands.** E. H. Bryan and J. C. Greenway, Jr. 1944. *Bulletin of the Museum of Comparative Zoology at Harvard College*, 94(2): 79-142. In 1778 when Captain Cook visited Hawaii there lived on these islands about 100 species and subspecies of birds. The checklist in this paper contains a total of 232 species some of which are extinct. Just how many of the species are actually extinct cannot be stated accurately because of the inadequacy of field work in recent years. Seventy-seven species (some extinct) are endemic; 19 species of native Hawaiian birds are indigenous and wide ranging sea birds; 8 are regular migrants; 34 are occasional and chance arrivals; 53 introduced species have become established; 41 introduced species have not become established. The checklist contains synonymy, common names, ranges, and Hawaiian records for each form. The discussion of the Drepanidinae by the junior author accepts the linear arrangement of the genera according to Gadow.

**37. The Zoogeographic Position of the Hawaiian Islands.** Ernst Mayr. 1943. *The Condor*, 45(2): 45-48. The Hawaiian avifauna is characteristically that of an oceanic island with a preponderance of Holarctic elements. The author regards the endemic family, Drepaniidae, as related to the cardueline finches or tanagers and therefore Holarctic in origin. Among the endemic genera, the rail, (*Pennula*), is of unknown origin; the honey eaters, (*Moho*) and (*Chaetoptila*), are Australasian in origin; the flycatcher (*Chasiempsis*), is Polynesian in its affinities; whereas the thrush, (*Phaeornis*) and the goose, (*Nesoche*) are American in their affinities. All endemic subspecies and species are American or Holarctic in origin.

**38. Wallace's Line in the Light of Recent Zoogeographic Studies.** Ernst Mayr. 1944. *The Quarterly Review of Biology*, 19(1): 1-14. This paper consists of a careful consideration of the various proposed lines of separation of the Oriental and Australasian faunal regions. Although the author's considerations are largely ornithologic, complementary and supplementary evidences are drawn from other groups of animals. Wallace's Line, under careful analysis, indicates "the edge of the area (Sunda Shelf) that was dry at the height of the Pleistocene glaciations" and thus separates a rich faunal area from an impoverished one. The faunal change in passing eastward from Wallace's Line is essentially one of a decreasing number of Indo-Malayan elements. Similarly there is a corresponding line representing the edge of the Sahul Shelf separating New Guinea and the Aroe Islands with their Australo-Papuan fauna from the Moluccas and the Kei Islands with their impoverished Australo-Papuan fauna intermingled with a few Indo-Malayan elements. Weber's Line indicates the transition from a numerical dominance of Indo-Malayan elements to numerical dominance of Australo-Papuan elements. Strangely, in considering Weber's Line, the author does not use the rather extensive amount of evidence accumulated by Dutch culicidologists on the geographic distribution of mosquitoes especially *Anopheles*. It is interesting that Swellengrebel's Line separating the Oriental and Australasian culicid faunae corresponds almost identically with Weber's Line. In this paper Mayr has done much to crystallize the almost confusing amount of zoogeographic data on the faunal affinities of the islands of western Australasia and insular Asia.

**39. The Number of Australian Bird Species.** Ernst Mayr and D. L. Serenty. 1944. *The Emu*, 44: 33-40. Australia has 488 "good species of freshwater and land birds," 29 "additional semispecies of land birds," 37 species of breeding sea-birds, 83 visitors, and 14 species found on adjacent islands only; the total is 651. The corresponding figures for New Guinea are 509, 28, 4, 80, and 29; the total for New Guinea is 650. It is interesting to note that although Australia is ten times as large as New Guinea it has the same number of species. If only passerine birds are considered the New Guinea fauna (296 species) is richer than the Australian (288 species).

**40. A Collection of Birds from Northern Guanacaste, Costa Rica.** Alexander Wetmore. 1944. *Proceedings of the United States National Museum*, 95(3179): 25-80. An annotated list of 148 species and subspecies observed and collected by the author in Guanacaste in the fall of 1940 in addition to the original description of *Myioborus miniatus comptus* Wetmore from 900 meters above Hacienda Santa María, Guanacaste, Costa Rica.

**41. Preliminary Report on the Birds and Mammals of Kootenay National Park, British Columbia.** J. A. Munro and I. McTaggart Cowan. 1944. *The Canadian Field Naturalist*, 58(2): 34-51. Contains an annotated list of 79 species of birds observed by the authors in this region.

**42. Notes on the Status and Distribution of Certain Mammals and Birds in the Mackenzie River and Western Arctic Area in 1942 and 1943.** C. H. D. Clarke. 1944. *The Canadian Field Naturalist*, 58(3): 97-103. Contains brief notes on 23 species of birds derived from observations made during the summer and autumn of 1942.

**43. Birds of the Katmai Region, Alaska.** Victor H. Cahalane. 1944. *The Auk*, 61(3): 351-375. The Katmai region lies in the Hudsonian and Arctic (modified) Life Zones. This paper contains an annotated list of 94 species and subspecies based on the author's observations made during September, 1940, as well as those of McKay and Johnson (1881, 1886), Osgood (1902), and Hine (1919).

#### HEREDITY, VARIATION AND EVOLUTION

**44. Ecological Aspects of Species—Formation in Passerine Birds.** David Lack. 1944. *The Ibis*, 86: 260-286. The systematic and genetic aspects of species formation have received much attention lately from Mayr, Dobzhansky, Huxley, and others, but the ecological aspects have not yet received their full share of attention. David Lack has made a special study of the speciation of the Galapagos Finches (Geospizinae) from the ecological standpoint and has attempted to determine how widely the conclusions which he reached are applicable elsewhere. In the present study mention of genetic aspect is omitted, although it is assumed to be operating.

Lack points out that during the last ten years abundant evidence has accumulated that the normal way in which bird species originate is via the subspecies, differentiated in geographic isolation, which later meet in the same region and keep distinct. This has been demonstrated in continental areas where two end forms, linked elsewhere by a chain of geographic races, have come together into the same region and do not interbreed.

Mayr, in his recent treatment of the subject, considered that geographic isolation is the essential precursor to species formation. Lack calls our attention to the fact that if this method is the normal one it would seem puzzling that closely related species should so often occur together in the same region but occupying separate habitats. The author has abandoned his previous theory that habitat differences between groups of individuals of the same species might lead to segregation of these groups sufficient to bring about their differentiation into distinct

species. His reasons for abandoning these views were that he considered the degree of isolation not complete enough, and furthermore that he knew of no cases of incipient species in process of differentiation in adjoining habitats. He now has accepted the conclusions of Mayr that geographic isolation is necessary for the origin of the incipient species, but then goes on to advance an alternative explanation of the habitat differences between related species occurring in the same region.

The theory is advanced that after two populations have become specifically differentiated through geographic isolation they can again come together and occupy the same geographic region, retaining their specific distinction providing that they are restricted to separate habitats, or that their food habits have become so different that they do not conflict to any great extent. Failing these differences either one of two things may happen. Either one of the two forms may be so much better adapted to the environment than the other that it spreads quickly over the entire region, bringing about the extinction of the other, or one species may be better adapted to the environment of one portion of the region, and the other species to another portion, bringing about a distinct geographic segregation usually with a zone of overlap where both species are equally well adapted. Numerous cases illustrating these different types of species segregation on the islands of the South Pacific, the Galapagos Islands, and the British Isles, were set forth. Examples demonstrating these principles are apparently more numerous on islands than continental land masses because on the former there is much greater chance for differentiation of populations through physical isolation and redistribution by widely spaced invasions. It seems to the reviewer that it is much more difficult to point to a definite barrier which would be effective in bringing about complete isolation of continental populations. Presumably this condition retards the rate of species formation. On the other hand there are, in North America, numerous cases of apparently closely related species living in the same region, but occupying different habitats, or of possibly sufficiently different size to produce non-conflicting food requirements.

Lack makes the statements that "—no cases are known in birds of incipient species in process of differentiation in adjoining habitats. All bird subspecies are isolated from each other geographically and though they at times differ in habitat as well, geographic isolation is the key factor." Although the reviewer takes no exception to the thesis that geographic isolation is the key factor in allowing the formation of new *species*, he wonders about the statement that no incipient species (races or subspecies) are known from adjoining habitats. How about the case of the song sparrows in the San Francisco Bay region with one race occupying the marsh and the other the adjoining upland (Miller, Amer. Nat. 76: 34), or the same species in Utah differentiated into a mountain race and a valley-bottom race (Marshall and Behle, Condor 44: 122)? In the eastern United States the song sparrow has a race occupying the narrow and *discontinuous* salt marshes along the Atlantic coast, ecologically but not physically isolated from another subspecies which lives on the adjoining coastal plain. It is true that few cases of this sort have been recognized in current literature as valid subspecies. However, leaving the matter of nomenclatural recognition out of the picture the reviewer feels that cases are rather common of detectable morphological differences, presumably the reflection of genetic differences, among populations of birds that are more closely correlated with ecological differences than they are with geographic segregation. Whether these would ever develop into distinct species or not is, of course, another story. In the light of our present knowledge it would seem that swamping of character differences through interbreeding would prevent this; yet if ecological segregation should become strict enough it is possible that interbreeding would not take place and we would have species formation through ecological isolation alone in accordance with Lack's earlier but now discarded ideas.

—JOHN W. ALDRICH

PALEONTOLOGY

**45. A Pliocene Flamingo from Mexico.** Loye Miller. 1944. *The Wilson Bulletin*, 56(2) : 77-82. The author describes *Phoenicopterus stocki* L. Miller from Pliocene deposits in Chihuahua, Mexico. This is the second fossil Flamingo described from America and dates the family back to Pliocene times. Because of the extensive tertiary mammalian beds in North America and South America which are almost lacking in Flamingo fossil the author suggests that Eurasia is the ancestral home of the family and that they are of recent arrival in the new world.

DISEASES AND PARASITOLOGY

**46. Studies in Neotropical Mallophaga (III) (Tinamidae No. 2).** M. A. Carriker, Jr. 1944. *Proceedings of the U. S. National Museum*, 95(3180) : 81-233. This extensive paper together with the author's earlier treatise on the Mallophaga of the tinamous (Studies in Neotropical Mallophaga, Part I: Lice of the tinamous. *Proceedings of the Academy of Natural Science of Philadelphia*, 88: 45-218) constitute a monumental contribution to the knowledge of bird lice. This paper contains descriptions of two new genera, 13 new species, and 68 new subspecies in addition to new records for previously described forms. The list of tinamou hosts and their mallophagan parasites deals only with those treated in this paper (46 species and subspecies of tinamous) and should be added to the list in the author's 1936 paper. The 29 figures, all prepared by the author, are well-done and useful. This is an outstanding contribution to avian ectoparasitology.

**47. Ticks and Other Parasites Attacking Northern Cliff Swallows.** W. J. Baerg. 1944. *The Auk*, 61(3) : 413-414. Infestations of Northern Cliff Swallows, (*Petrochelidon albifrons albifrons* (Rafinesque)), in a nesting colony near Fayetteville, Arkansas, by *Ixodes baergi* Cooley was first observed in 1941 and have substantially increased since that time. Although the ticks attach themselves in considerable numbers to the chin, forehead, and eyelids of the nestlings no serious injury was noted. Other nest and nestling parasites observed were the bug, (*Oeciacus vicarius* Hovath) : the flea, (*Ceratophyllus celsus* Jordan) ; and a bird louse (*Myrsidea dissimilis* Kellogg).

**48. Occurrence and Distribution of the Trematode, (*Collyriclum faba* (Bremser)), in Birds.** D. S. Farner and B. B. Morgan. 1944. *The Auk*, 61(3) : 421-426. The authors record the Cowbird (*Molothrus ater* (Boddaert)), as a new host record for this species. Also the second recorded occurrence of this fluke in the Robin (*Turdus migratorius* L.) is reported. *Collyriclum faba* has been recorded from 26 species in thirteen families and two orders (Galliformes and Passeriformes). All records fall into three geographic regions: (1) Central Europe including Switzerland, Austria, southern Germany, south-eastern France, and northern Italy; (2) Eastern United States including Maryland, New Jersey, and Massachusetts; (3) North-central United States including Wisconsin, Michigan, and Minnesota. One species (*Passer domesticus* L.), has been found infected in each of these three regions.

**49. The Relation of Selenium to Western Duck Sickness.** H. W. Lakin, E. R. Quotrup, and Neil Hotchkiss. 1944. *The Auk*, 61(3) : 415-420. The authors present extensive evidence leading them to the conclusion that it is "most unlikely" that selenium can be designated as the cause of the losses due to western duck sickness. Birds which died from this disease had livers showing the same range of selenium content as those of normal birds.

**50. Bird Mortality.** Banner Bill Morgan. 1944. *The Passenger Pigeon*, 6(2): 27-34. This is a readable non-technical authoritative summary of diseases known to occur among birds. Special reference is made to the similarity of certain avian parasites to species parasitic on man and to the use of birds in medical research. This brief summary is recommended as general information essential for all ornithologists.

### HISTORY

**51. Henry Rowe Schoolcraft.** A. W. Schorger. 1944. *The Passenger Pigeon*, 6(2): 35-37. Schoolcraft's journals and memoirs (1821, 1834, 1851, and 1855) give the first "pretentious notes" on Wisconsin birds based on the expeditions by Schoolcraft into various parts of the state. On April 23, 1823, he received a specimen of a "grosbec" species which was sent to William Cooper. This species, the Evening Grosbeak, was described by Cooper in 1825 as *Fringilla vespertina*.

### BOOKS

**52. Snowshoe Country.** Florence Page Jacques. 1944. Illustrated by Francis Lee Jacques. University of Minnesota Press, Minneapolis. 110 pp. \$3.00. Another of the Jacques' fascinating books of adventure in wild places, this time telling of late fall and winter in the border country of Minnesota and Canada, the same land as "Canoe Country" at another season. The earlier volume describes a journey through wilderness; this one shows us not only nature but the people that live in the forest and on the lakes—old Finnish woodcutters, Chippewa Indians, trappers, guides, the remarkable Justine and her beguiling youngsters, the foresters with their scientific management of the woods. Mrs. Jacques has a great friendliness for nature and for people; she gets no end of fun out of her experiences and she is able to share it with her readers. She writes with humor and originality; her keen descriptions bring the character and beauty of the north country vividly before us, and her fine appreciation of trees and water, of bird and beast, is an inspiration. The final touch is given by Mr. Jacques' spirited and lovely drawings.—M. M. NICE.

**53. Conspicuous Birds of the South Pacific.** Ken Stott, Jr. 1943. *Bulletin No. 19 of The Zoological Society of San Diego*. 29 pp. This little bulletin was prepared primarily for members of the armed forces who have no technical knowledge of ornithology. It is designed to introduce such individuals to the birds which the inexperienced observer is most likely to encounter. The various species are considered in natural groups (Emus and Cassowaries, Kiwis, "The Pelican and His Kin," Hawks and Eagles, etc.). In achieving its stated objective this publication is a notable success and is recommended together with its companion bulletin, "Conspicuous Mammals of the South Pacific," (Bulletin 20, same author) to the casual observer in the armed forces in the South Pacific.