It is interesting, then, to reflect on the life of a naturalist so typical of his generation. The roots of his career lay in the field-collecting era that produced and was produced by the vogue of private collections of birds, birds' eggs, and mammals. He lived through and played a part in the period of great expansion of the United States Bureau of Biological Survey, which in his day devoted its energies and funds to a program essentially in pure science—the faunal survey of a continent and the attempt to derive meaning from its results. As head of a Division of Mammals and Chief Curator of a Department of Zoology in a great museum for thirty years, he helped to make both his Department and his Museum great. In the course of his career he acquired more than a specialist's command of his subject, so much so that he should be enumerated among the foremost of mammalogists, not merely of his own time, but of the whole period of the rise of systematic zoology since Linnaeus.

Chicago Natural History Museum, Chicago, Illinois, January 7, 1950.

THE RACES OF THE COLLARED SCOPS OWL, *OTUS BAKKAMOENA* PENNANT

BY H. G. DEIGNAN

IN an attempt to settle the vexing question of names to be used for the Collared Scops Owls of the Indo-Chinese Subregion, I have brought together a series of almost 150 specimens from nearly every part of the Asiatic range. With so many of the named forms before me, it has seemed worth-while to study the group as a whole and to present the results of such a survey for the benefit of those whose series are more limited.

It is not suggested that the present arrangement is otherwise than tentative. The much richer material at hand has led me to change opinions held in 1939, when I last investigated the Indo-Chinese races (Friedmann and Deignan, Journ. Wash. Acad. Sci., 29: 289–291, 1939), and I shall perhaps adopt other views when suitable specimens are available from certain critical areas.

Owing to the individual variation appearing in almost every character of any given form, it is scarcely possible to identify these owls except in numbers from topotypical populations. Twenty-two subspecies, of which two are proposed for the first time, are here considered recognizable in series.

For the loan of valuable material my thanks are due the authorities of the American Museum of Natural History, of the Academy of

Natural Sciences of Philadelphia, and of the Museum of Vertebrate Zoology, and for permission to make a personal examination of specimens in their collection, those of the Chicago Natural History Museum.

1. *Otus bakkamoena ussuriensis* (Buturlin)

Scops semitorques ussuriensis Buturlin, Messager ornithologique, 1 (2): 119, May 1–14, 1910 (Khanka Lake, Ussurii Area, Siberia).

?*Otus bakkamoena aurorae* Allison, Notes d'Ornithologie [Musée Heude], 1 (2): 2, May 30, 1946 ("taken in October . . . on vessels off the North China Coast").

Toes feathered.

REMARKS: According to Taczanowski (*fide* Hartert, Vögel der paläarktischen Fauna, 2: 976, 1913), this form should be more reddish than *semitorques* of Japan. Buturlin, however, described it as paler than the Japanese bird, especially in its light markings. Hartert (*loc. cit.*) found no color distinctions between *semitorques* and one specimen from Vladivostok. In the absence of any topotypical material, I am unable to reconcile these conflicting statements, but accept the race because it has been held valid by Japanese ornithologists and because of the specimen discussed below.

A female with a wing length of 187 mm. (A. N. S. P. No. 107584), shot at Wei-hsien, Shantung Province, China, on April 3, differs from every one of a series of 22 adults from the Japanese Archipelago (*semitorques*) by its paler, grayer tones and by having the light markings of the upper parts buffy white rather than warm buff. It thus seems to match Buturlin's description of *ussuriensis* and might be considered a winter visitor to Shantung. Peters (Check-list of Birds of World, 4: 98, footnote 1, 1940) has suggested that a Hupeh bird of January 29 is similarly a winter straggler of *ussuriensis*.

There remains, however, the possibility that comparison of breeding material from Ussuriland with adequate series from the northeastern provinces of China will disclose the existence of an undescribed race in this area, to which the odd specimens from Shantung and Hupeh may well belong. It is difficult to believe that no Screech Owl inhabits the vast expanse of territory between the Yangtze and Manchuria, as our present lack of knowledge would seem to indicate.

Allison's *O. b. aurorae* is here considered a probable synonym of *ussuriensis*, a form evidently unknown to the author, but it might prove applicable to the hypothetical race discussed just above.

2. *Otus bakkamoena semitorques* Temminck and Schlegel

Otus semitorques Temminck and Schlegel, *in* Siebold, Fauna Japonica, Aves, pt. 1: 24, pl. 8, "1850" = 1844 (Japan; type locality here restricted to Nagasaki, Kiusiu Island).

Otus bakkamoena linae Floericke, Mitt. Vogelwelt: 103, 1921 (North Japan).

Otus bakkamœna sidai Momiyama "in litteris," Tori, 7 (33 and 34): 320, May 31, 1932 (Samen and Umen, Quelpart Island, off southern Korea). *Nomen nudum!*

Toes feathered.

Twenty-two adults from Japan are virtually uniform in the coloration of the upper parts, having them generally brown with buff markings, and thus differing from the specimen believed to represent *ussuriensis* as described above.

WING LENGTH: 153–184, once 194 mm. (22 specimens).

SPECIMENS EXAMINED: "JAPAN": no definite locality (3 unsexed). HOKKAIDO: Hakodate (3 males, 2 females). HONDO: Tokyo (2 males, 1 female, 1 unsexed), Yokohama (3 males, 3 unsexed), Matsumoto (1 female). KIUSIU: no definite locality (1 female), Nagasaki (1 female?). TSUSHIMA: no definite locality (1 female).

REMARKS: The extraordinary variation in wing length that appears in this series cannot be rationalized by sex or locality; five specimens from Hokkaido measure from 156 to 178 mm., while 16 from Hondo and Kiusiu are from 153 to 184 mm., and the female with exceptional wing length (194 mm.) was taken on June 2 in Tsushima.

Although *ussuriensis* is usually given as the race of Korea, a bird collected on March 20 at Fusan, with a wing length of 182 mm., is quite inseparable from the 22 Japanese specimens. It is probable that *ussuriensis* is the breeding form of northern Korea and even reaches southern Korea in winter, but I suspect that *semitorques* will prove to be the resident race of the south, especially since it is the only one recorded from Tsushima and Quelpart Island.

The birds from Japan are so similar to topotypes of *Otus asio kennicottii* (Sitka, Alaska) and *O. a. "saturatus"* (Victoria, Vancouver Island), and especially to the latter, that I believe there can be little question of their being conspecific. Their near relationship was long ago remarked by Ridgway (Baird, Brewer, and Ridgway, Hist. N. Amer. Birds, 3: 55–56, 1874), who, referring to *kennicottii*, said:

"In general appearance, size, and proportions, as well as in pattern and tints of coloration, except in their details, there is a wonderfully close resemblance in this race of *S[cops]. asio* to the *S. semitorques*, Schlegel, of Japan. Indeed, it is probable that the latter is also a mere geographical form of the same species. The only tangible points of difference are that in *semitorques* the jugulum is distinctly white centrally, there is a quite well-defined lighter nuchal band, with a more indistinct occipital one above it, and the pencillings on the lower parts are more delicate. The size and proportions are essentially the same; the shades of color are identical, while the markings differ only in minute detail, their pattern being essentially the same.

In *Kennicotti* the light nuchal collars are indicated, though they do not approach the distinctness shown by them in *semitorques*."

Specimens of "*saturatus*," as mentioned above, are even more like *semitorques*, and at least one of four topotypes, when placed in the Japanese series, is not readily separable by characters either of upper or under parts.

The agreement appearing in skins of Screech Owls from northeastern Asia and northwestern America is matched by their similarity in colors of soft parts, habitats, behavior, and calls. Since from *ussuriensis* to the small, saturate (in humid regions) or washed-out (in arid regions) races of southern Asia, and from *kennicottii* to the similar races of the southern United States, there are unbroken chains of forms that intergrade with their neighbors so insensibly as to be distinguishable only in series, the temptation is strong to consider all the Asiatic birds subspecies of *Otus asio* (Linnaeus), 1758. That a contrary course has been followed in the present study is in deference to the opinion of Dr. Alden H. Miller of the Museum of Vertebrate Zoology, who has correctly pointed out that *O. trichopsis*, in some areas sympatric with *O. asio*, might equally well be considered an American representative of *O. bakkamoena*.

3. *Otus bakkamoena pryeri* (Gurney)

Scops pryeri Gurney, Ibis, ser. 6, 1 (3): 302, July, 1889 ("Rynkyn Naba" = Naha, Okinawa Island, Ryu Kyu Islands, northeast of Formosa).

Otus bakkamoena hatchizionis Momiyama, Dobuts. Zasshi, 35: 400, 1923 (Hachijo Island, Seven Islands of Izu, south of central Hondo).

Toes bare.

This race differs from *semitorques* by having the toes unfeathered and by having the plumage, above and below, strongly ferruginous.

WING LENGTH: 151 and 173 mm. (2 specimens).

SPECIMENS EXAMINED: OKINAWA: "northern part" (1 unsexed), Hedo (1 male).

REMARKS: No specimen has been seen from Hachijo, and I have followed the Ornithological Society of Japan's 'Hand-List of the Japanese Birds,' ed. 3, rev.: 98–99, 1942, in synonymizing *hatchizionis* with *pryeri*.

4. *Otus bakkamoena erythrocampe* (Swinhoe)

Lempijius erythrocampe Swinhoe, Ibis, (ser. 3) 4: 269, July, 1874 (Canton, Kwangtung Province, China).

Toes bare.

Nearest *O. b. semitorques* (Japan) in its brown upper parts with buff markings, but of a somewhat deeper color; from *O. b. glabripes* (Formosa) and *O. b. umbratilis* (Hainan) separable by the redder, less grayish, brown of the upper parts and by the less distinct dark markings; distinguished from *O. b. lettia* (eastern Himalayas) by the much deeper, less buffy, brown of the upper parts and by the less distinct dark markings.

WING LENGTH: 173–180 mm. (4 specimens).

SPECIMENS EXAMINED: FUKIEN: near Foochow (1 female). SZECHWAN: Chengtu (1 male), Kiating (1 unsexed). YUNNAN: Shweli-Salwin Divide (1 male).

REMARKS: A single female, with wing length of 174 mm., taken in April at Tengyueh, west-central Yunnan, is not readily placed; it might be considered intermediate between *erythrocampe* and the form of northern Burma (which occurs as near Tengyueh as Myitkyina), but nearer *erythrocampe*.

An unsexed bird, with a wing length of 170 mm., collected at Chapa, northwestern Tongking, in December, likewise seems to be intermediate between *erythrocampe* and the race of the Indo-Chinese countries, but somewhat nearer the latter.

The type of *Lempijius erythrocampe* has, through the cooperation of the authorities of the Norwich Museum, been recently examined by Jean Delacour, who found it to agree in all essential characters with other specimens of *Otus bakkamoena* from southern China.

5. *Otus bakkamoena glabripes* (Swinhoe)

Ephialtes glabripes Swinhoe, Ann. and Mag. Nat. Hist., (ser. 4) 6: 152, Aug., 1870 (South China and Formosa; type locality here restricted to Formosa).

Toes bare.

This form has the upper parts a dark gray-brown, with the black markings inconspicuous.

WING LENGTH: 180–188 mm. (3 specimens).

SPECIMENS EXAMINED: FORMOSA: Tai-peh-fu (1 female), Bankoro (1 female), Sankocho (1 female).

6. *Otus bakkamoena umbratilis* (Swinhoe)

E[phialtes]. umbratilis Swinhoe, Ibis (new ser.) 6: 342, footnote, July, 1870 (Hainan Island, South China Sea off southern China).

Toes bare.

Similar to *O. b. glabripes*, but apparently smaller, and with the gray-

brown upper parts somewhat lighter and the black markings accordingly rather more distinct.

WING LENGTH: 161–183 mm. (6 specimens).

SPECIMENS EXAMINED: HAINAN: Hoihao (2 females), Secha (1 female), Liudon (2 males), Utoshi (1 male).

7. *Otus bakkamoena lettia* (Hodgson)

[*Scops*] *Lettia* Hodgson, Asiatick Researches, 19 (pt. 1): 176, 1836 (Nepal).

Otus bakkamoena condorensis Boden Kloss, Journ. Siam. Soc., Nat. Hist. Suppl., 8 (2): 81, Nov., 1930 (Pulau Kondor, South China Sea off Cochinchine).

Toes bare.

From *O. b. erythrocampe* distinguished in series by its much paler general coloration; from *glabripes* and *umbratilis*, by the warmer color of the upper parts, which is a more buffy, much less grayish, brown.

WING LENGTH: 156–175 mm. (41 specimens).

SPECIMENS EXAMINED: "INDIA": no definite locality (1 female); SIKKIM: no definite locality (1 unsexed); BIHAR AND ORISSA: Champaran District: Bagaha (1 female); ASSAM: Cachar District: Hungrum (1 male); Lakhimpur District: Margherita (1 female); BURMA: Myitkyina District: Myitkyina (1 male); Upper Chindwin District: Hai Bum (1 female); Mandalay District: Maymyo (1 female); Rangoon Town District: Rangoon (1 female); SIAM: North: Doi Chiang Dao (1 male, 1 female), Chiang Mai (5 females), Ban Mae Khan (1 male), Doi Khnn Tan (1 female), Lampang (1 female); Central: no definite locality (1 unsexed), "Me Ping River" (1 male), Bangkok (4 males, 4 females, 1 unsexed), Ban Thap Chang (1 male), Chachoengsao (1 female); East: Ban Pak Chong (1 male); Southeast: Ko Samae San (1 male), Chanthaburi (1 male, 1 female), Khao Sa Bap (1 female); COCHINCHINE: Bienhoa Province: Trangbom (1 unsexed); ANNAM: Quangtri Province: Hué (1 male, 1 female).

REMARKS: This race possesses red, gray, and intermediate phases, and shows so much individual variation in depth of coloration, whether red or gray, that it is by no means a satisfactory one.

O. b. condorensis is just possibly a valid form restricted to Pulau Kondor, but this is made doubtful by the fact that Chasen (Handlist of Malaysian Birds, 1935: 86), presumably with the type before him, has used the name for peninsular Siamese birds. Cochinchinese examples should be not very different from the island population, and my few specimens from Cochinchine are in fact rather deeper in color than most Siamese birds, but are not separable from those of Upper

Burma and elsewhere; the race, if maintained, would have an irrational range. It appears that in any district of higher precipitation there is a tendency to nigrescence, but this is not yet sufficiently fixed anywhere to justify dividing *lettia* on the basis of material now available.

Five birds from the northern Siamese peninsula and one from the Amherst District of Tenasserim are not listed above, because they are not only consistently darker but are also rather small (wing length 151–157 mm.); it would be improper to name them, since they are probably intermediates between *lettia* and a possibly distinct race of the peninsula south of the Isthmus of Kra, no specimens of which have been examined.

8. *Otus bakkamoena kangeana* Mayr

Otus bakkamoena kangeana Mayr, Bull. Raffles Mus., 14: 14, Sept., 1938 (Kangean Island, Java Sea).

Toes bare.

This seems to be the only pale Malaysian race. The two specimens seen agree perfectly in color with many Siamese examples of *O. b. lettia* but are distinguishable by their small size.

WING LENGTH: 144 and 147 mm. (2 specimens).

SPECIMENS EXAMINED: KANGEAN: Northwest (1 male), West (1 female).

9. **Otus bakkamoena cnephaeus,** new subspecies

TYPE: U. S. National Museum No. 179456, adult female, collected on the Rumpin River, southern Pahang State, Malaya, on July 22, 1902, by William L. Abbott.

DIAGNOSIS: Toes bare, as in the neighboring races.

From *O. b. lettia* (eastern Himalayas) easily separable by its small size and much more saturate coloration above and below.

From *O. b. lempiji* (Java) distinguished in series by having the general coloration of the upper parts a deep rufescent-washed brown, instead of a nigrescent gray-brown (eight adults from Malaya compared with 11 adults from Java).

WING LENGTH: 144–155 mm. (6 specimens).

SPECIMENS EXAMINED: "MALAY PENINSULA": no definite locality (1 male, 2 unsexed); PAHANG: Gunong Tahan (1 male), Rumpin River (1 male, 1 female); SELANGOR: Kuala Lumpur (1 male); NEGRI SEMBILAN: Bukit Tangga (1 male).

REMARKS: A single specimen from Singapore Island belongs with the following race.

10. **Otus bakkamoena hypnodes,** new subspecies

TYPE: U. S. National Museum No. 181065, adult male, collected on Pulau Padang, an island off the mouth of the Siak River, eastern Sumatra, on March 25, 1906, by William L. Abbott.

DIAGNOSIS: Toes bare, as in the neighboring races.

Nearest *O. b. cnephaeus* (Malaya), but separable in series by having the general coloration of the upper parts darker, less rufescent, and the black markings accordingly less conspicuous (10 adults from northern Sumatra and Singapore Island compared with eight adults from Malaya).

From *O. b. lempiji* (Java) distinguishable in series by having the upper parts a deep brown, slightly washed with rufescent, instead of a nigrescent gray-brown (10 adults from northern Sumatra and Singapore Island compared with 11 adults from Java).

WING LENGTH: 142–159 mm. (10 specimens).

SPECIMENS EXAMINED: SINGAPORE: Tanjong Kalong (1 male); SUMATRA: North: Pulau Padang (1 male), Mount Korinchi (1 female), Blangkedjeren (2 males), near Deli (3 males, 2 females).

REMARKS: So far as I have been able to learn, the only names possibly applicable to the Sumatran race are *Strix noctula* Temminck (Java, Sumatra, and Banda) and *Scops javanicus* Lesson (Java and Sumatra). Both have for so long been considered synonyms of *lempiji*, that it seems best to continue to treat them thus, especially since the authors probably saw only birds from *southern* Sumatra, where *lempiji* is quite likely to occur.

11. *Otus bakkamoena mentawi* Chasen and Boden Kloss

Otus bakkamœna mentawi Chasen and Boden Kloss, Ibis, (ser. 12) 2 (2): 279, Apr. 14, 1926 (Sipora Island, Barussan Islands, eastern Indian Ocean off Sumatra).

Toes bare.

The only adult seen has the general coloration of the upper parts ferruginous brown, with the black markings indistinct, and the under parts ferruginous with bold black streaks. A subadult specimen differs only in having the upper parts ferruginous, of the same shade as the under parts.

WING LENGTH: 157–165.5 mm. (5 specimens, *fide* Ripley, Bull. Mus. Comp. Zool., 94: 349, 1944).

SPECIMENS EXAMINED: BARUSSAN ISLANDS: Siberut Island (1 male, 1 female).

REMARKS: The adult has the upper parts indistinguishable from

those of one of the two specimens from Great Natuna mentioned below under the Bornean race.

12. *Otus bakkamoena* subsp.

Toes bare.

A series of seven adults from Borneo, north, south, east, and west, cannot be satisfactorily placed. Four are in a phase that is not distinguishable from the normal coloration of *lempiji* (Java); the remaining three have a dark rusty-red plumage quite unlike that of any other form. If three-fourths or more of the Bornean population should show this red phase, they may certainly be separated, regardless of the minority that resemble *lempiji*, but for the present I leave them unnamed.

WING LENGTH: 140–157 mm. (7 specimens).

SPECIMENS EXAMINED: BRITISH NORTH BORNEO: Mount Kinabalu (1 female), Abai (1 female), Tambunan (1 unsexed); SARAWAK: Mount Lambia (1 female); NETHERLANDS BORNEO: Kalei River (1 female), Sampang River (1 female), Sampit (1 female).

REMARKS: Hartert (Nov. Zool., 1: 481, 1894) has discussed two examples from Great Natuna (Bunguran) Island and identified them as *lempiji*, with the remark "inseparable from specimens from Malacca, Sumatra, Tenasserim, Borneo, etc."

The same two birds now lie before me; they are not like anything I have seen from Malaya, Sumatra, or Java, but are not too different from the form of Borneo, and at this time may be treated as inseparable from it, although more material might justify their being placed in a new subspecies.

13. *Otus bakkamoena fuliginosus* (Bowdler Sharpe)

Scops fuliginosa Bowdler Sharpe, Ibis, (ser. 5) 6: 197, Apr., 1888 (Puerto Princesa, Paláwan Island, Philippine Islands).

Toes bare.

The only specimen examined, a topotype, differs from red-phase examples from Borneo in having the general coloration, above and below, a slightly darker and duller, less ferruginous, brown, with the black markings of the upper parts somewhat less conspicuous.

WING LENGTH: 140 mm. (1 specimen).

SPECIMENS EXAMINED: PALÁWAN: Puerto Princesa (1 male).

14. *Otus bakkamoena whiteheadi* (Ogilvie-Grant)

Scops whiteheadi Ogilvie-Grant, Bull. Brit. Orn. Club, 4: 40, June 29, 1895 (Mountains of Lepanto Subprovince, Mountain Province, Luzón Island, Philippine Islands).

Toes bare.

REMARKS: Considered a distinct species by Peters (Check-list of Birds of World, 4: 97, 1940), *whiteheadi* is made a race of *bakkamoena* by Mayr, *in* Delacour and Mayr (Birds of Philippines, 115, 1946). The only specimen I have seen, a subadult, leads me to believe that the latter course is correct.

15. *Otus bakkamoena everetti* (Tweeddale)

Scops everetti Tweeddale, Proc. Zool. Soc. London for 1878, (pt. 4): 942, Apr., 1879 (Zamboanga, Zamboanga Province, Mindanao Island, Philippine Islands).

Toes bare.

REMARKS: I have not seen this bird which is treated as one of the *bakkamoena* group by Peters (Check-list of Birds of World, 4: 100, 1940) and by Mayr, *in* Delacour and Mayr (Birds of Philippines, 115, 1946).

16. *Otus bakkamoena boholensis* McGregor

Otus boholensis McGregor, Philippine Journ. Sci. (A. Gen. Sci.), 2 (5): 323, Oct., 1907 (Sevilla, Bohol Island, Philippine Islands).

Toes bare.

REMARKS: See remarks on *O. b. everetti* above.

17. *Otus bakkamoena lempiji* (Horsfield)

Strix Lempiji Horsfield, Trans. Linn. Soc. London, 13 (1): 140, May, 1821 (Java).

Strix noctula "Reinw." Temminck, *in* Temminck and Laugier, Nouveau Recueil de Planches Coloriées d'Oiseaux, 2 (livr. 17): pl. 99 and text, Dec., 1821 (Java, Sumatra, and Banda; type locality here restricted to Java).

Scops javanicus Lesson, Traité d'Ornithologie, (livr. 2): 107, May, 1830 (Java and Sumatra; type locality here restricted to Java).

Toes bare.

General coloration of the upper parts a nigrescent gray-brown, similar to that of *O. b. umbratilis* (Hainan), but darker and with the black markings accordingly less distinct.

WING LENGTH: 136–150 mm. (11 specimens).

SPECIMENS EXAMINED: JAVA: no definite locality (1 female), Batavia (1 male, 1 female), Buitenzorg (1 male, 2 females), Depok (2 males, 2 females), Mount Gedeh (1 unsexed).

18. *Otus bakkamoena bakkamoena* Pennant

Otus bakkamoena Pennant, Indian Zoology: 3, pl. 3, 1769 (Ceylon).

[*Strix*] *indica* Gmelin, Systema Naturae, 1 (1): 289, 1788 (Ceylon).

[*Strix*] *indica* (*Bakkamuna*) Forster, Faunula Indica, ed. 2: 5, 1795, (Ceylon, *ex* Pennant).

Sc[*ops*] *lettioides* "Jerdon, MS." Blyth, Journ. Asiat. Soc. Bengal, 14 (1): 182, Mar., 1845 (Coromandel Coast).

Scops griseus Jerdon, Madras Journ. Lit. Sci., 13 (2): 119, "Dec. 1844" = 1845 (Eastern Ghats).

[*Scops*] *malabaricus* Jerdon, Madras Journ. Lit. Sci., 13 (2): 119, "Dec. 1844" = 1845 (Near Periya Pass, Western Ghats).

Ephialtes jerdoni Walden, Ann. Mag. Nat. Hist., ser. 4, 5: 417, June, 1870 (Malabar).

Toes bare.

Very similar to *O. b. lempiji* (Java), but with the general coloration, above and below, slightly paler, and with the black markings of upper and under parts narrower—streaks, rather than spots or blotches.

WING LENGTH: 140–151 mm. (6 specimens).

SPECIMENS EXAMINED: CEYLON: Colombo (3 males, 2 females, 1 unsexed).

REMARKS: The birds of southern India are customarily combined with the race of Ceylon. In the absence of suitable material, I am assuming that this procedure is the correct one, although the three South Indian specimens before me (two in a red phase, one in a deep brown phase and with the wing measuring 160 mm.!) do not agree well with the small Ceylon series.

19. *Otus bakkamoena marathae* Ticehurst

Otus bakkamœna marathæ Ticehurst, Bull. Brit. Orn. Club, 42: 122, May 5, 1922 (Raipur, Raipur District, Chhattisgarh Division, Central Provinces, British India).

Toes bare.

REMARKS: No specimen has been examined.

20. *Otus bakkamoena gangeticus* Ticehurst

Otus bakkamœna gangeticus Ticehurst, Bull. Brit. Orn. Club, 42: 122, May 5, 1922 (Fategarh, Farrukhabad District, Allahabad Division, United Provinces, India).

Otus bakkamoena stewarti Koelz, Proc. Biol. Soc. Wash., 52: 80, June 5, 1939 (Baijnath, Kangra District, Jullundur Division, Punjab Province, India).

Toes bare.

Larger than *O. b. bakkamoena* (Ceylon) and much paler.

WING LENGTH: 161 mm. (1 specimen).

SPECIMENS EXAMINED: UNITED PROVINCES: Fategarh (1 female).

REMARKS: I should have been inclined to give Koelz's *stewarti* the benefit of the doubt had the author not failed completely to mention *gangeticus*, the form obviously most nearly related; under the circumstances, the validity of *stewarti* must be considered unproved.

21. *Otus bakkamoena deserticolor* Ticehurst

Otus bakkamœna deserticolor Ticehurst, Bull. Brit. Orn. Club, 42: 57, Jan. 3, 1922 (Hyderabad, Hyderabad District, Sind Province, India).

[*Otus bakkamoena*] *deserticola* Koelz, Proc. Biol. Soc. Wash., 52: 80, June 5, 1939 (Sind Province, British India). *Lapsus calami* for *Otus bakkamoena deserticolor* Ticehurst!

Toes bare.

REMARKS: No specimen has been examined.

22. *Otus bakkamoena plumipes* (Hume)

Ephialtes plumipes Hume, Ibis, ser. 2, 6: 439, July, 1870 (India).

Ephialtes Plumipes Hume, My Scrap Book: or Rough Notes on Indian Oology and Ornithology, 1 (2): 387 (in key), 397, "1869" = 1870 ("near Murree, . . . Kotegurh, . . . Gurhwal"; type locality commonly restricted by authors to Murree, Rawalpindi District, Rawalpindi Division, Punjab Province, India).

Toes feathered.

WING LENGTH: 162–182 mm. (*fide* Stuart Baker, Fauna of British India, Birds, ed. 2, 4: 426, 1927).

REMARKS: So far as I can learn, no one has yet compared *plumipes* with *semitorques* (Japan), with the result that all descriptions of the former might apply equally well to the latter. Stuart Baker (*loc. cit.*) has so far ignored the forms of northeastern Asia as to say of *plumipes* that it differs from "all other races in having the feathering of the tarsi extended on to the toes"!

Two specimens from the Rothschild Collection, wholly without data, have been at some time identified as *plumipes*. One, with wing length 160 mm. (A. M. N. H. No. 629837), is inseparable above from the Shantung bird I have called *ussuriensis*, but differs from it below by having the shaft streaks much narrower and the vermiculations much finer. It is not darker than *bakkamoena* (Ceylon), as Stuart Baker says *plumipes* should be, but paler. Since only the extreme bases of the toes are feathered, it cannot be *plumipes* in which the feathering should reach the subterminal phalanges, but might represent *gangeticus*.

The second, with wing length 177 mm. (A. M. N. H. No. 629835),

is nowise distinguishable from my long series of *semitorques* and is, in my opinion, a bird of Japanese provenience.

United States National Museum, Washington, D. C., February 5, 1948.

ADDITIONAL OBSERVATIONS AND COMMENTS ON "ANTING" BY BIRDS

BY HORACE GROSKIN

ORNITHOLOGISTS in America and in several other countries have recently become greatly interested in the strange behavior of birds known as "anting." When a bird "ants," it seizes an ant and usually rubs it under the wings and often at the base of the tail or, as some observers have reported, holds the ant somewhere in its feathers for some unknown purpose. Many theories have been advanced as to why birds do this, but up to the present time no one has discovered the reason, and "anting" still remains a mystery.

W. L. McAtee (1938) summarized nearly all the recorded observations and inferences to that date, and since then many additional observations of "anting" have been recorded in various countries throughout the world. Some ornithologists were rather sceptical about the reports of this peculiar bird behavior and they remained doubtful until they actually observed it for themselves. "Anting" by birds is thought to be a rather rare occurrence but, in the opinion of the writer, it is not as rare as it appears to be and is quite often mistaken for preening; it is, therefore, overlooked until the observer becomes aware of the fact that the bird is behaving in an unusual manner, different from ordinary preening, and is picking up something from the ground and applying it to the feathers.

Some of the theories advanced as to the reasons for birds "anting" are as follows: (1) birds place ants in their feathers to get rid of ectoparasites; (2) birds use the ants to annoint themselves with the formic acid excretions of the ant to give tone to the muscles and also for the general agreeable effect; (3) birds rub ants on their feathers to wipe off the formic acid before eating them, as a means of ridding themselves of endoparasites; (4) birds place ants under their wings as a reserve food supply during migrations. This inference seems rather farfetched, but an observation recorded by Charles T. Ramsden (1914) of birds carrying snails under their wings during migration requires that we give this theory further consideration and investigation.

I made my first observation of "anting" on October 2, 1941, at