

its secret winter home seven times. Looking at this small bird—one of the 'lower animals,' I had a sense of being hopelessly and unutterably earth-bound.

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## ORIENTAL FORMS OF THE PYGMY WOODPECKER

BY JAMES C. GREENWAY, JR.

THE gray-headed forms of the pygmy *Dryobates* (*D. canicapillus*) of the eastern Asiatic mainland form a complex analogous to a super-species. The larger, darker birds inhabit China; the smaller and paler ones inhabit Burma, southern Siam, southern Annam and Cambodia. Within these two larger groups, which cannot be indicated by our trinomial system, there are many geographical races, all of which are more or less ill-defined, unsatisfactory forms. The Philippines, Sumatra and Borneo contain well differentiated insular subspecies. There are only five characters to be used for racial diagnosis. They are: (1) size, (2) relative amount of red on occiput of males, (3) relative number and size of spots on the upper tail coverts and central rectrices, (4) relative size of spots on secondaries, (5) relative color tone of body plumage (either black or brownish black above, with streaks below darker or paler).

This last character is subject to marked seasonal variations; birds taken in the months of April to September are, in general, paler and browner than those taken between September and May. But this seasonal variation is much more apparent in the southern forms than in the northern. The situation does not appear to be confused by any considerable post-mortem change; the darker forms of China have not become browner, less black, in museums.

Birds of the year can be identified by the first primary, the outer web of which is not attenuated at the tip. This feather is sometimes longer, but not always so. They sometimes have less well defined, rather darker, streaks below, but this character is obscured by seasonal variation, particularly in Malayan populations. The red occipital streaks which distinguish males appear in a nestling specimen.

In Malaya and perhaps Borneo this gray-headed species (*canicapillus*) breeds in the same localities as a considerably smaller, brown-headed form (*D. moluccensis moluccensis*), which I consider to be a geographical representative of the small, brown-headed forms of the Indian plains (*D. m. nanus*, *D. m. hardwickii*, etc.). *D. canicapillus*

and *D. nanus* are therefore not conspecific. In view of the fact that *D. m. nanus* of the Indian plains has a bare, crimson circumocular region whereas the slightly darker forms of Malaya, Java, Sumatra and Borneo have this region feathered, they may possibly be considered as distinct species. But in any case I do not think that the gray-headed *canicapillus* is conspecific with either group.

The application of names to the brown forms is a task of some difficulty and doubt, partly because the types are no longer extant and partly because there has been considerable inaccuracy in their identification. It is still an open question as to whether or not *Picus moluccensis* Gmelin is identifiable. The plate in Daubenton's 'Planches Enluminees,' no. 748, is very inaccurate. It lacks the white moustachial streak common to the whole group and is spotted below rather than streaked. But, on the whole, it could scarcely be anything but a female of this group, and though Stresemann (Arch. für Naturg., 87: 87, 1921) says of it: "Diese Grundlagen sind völlig unzureichend, um eine sichere Deutung des Gmelinschen Namens zu ermöglichen," it would seem considerably simpler to accept it. The type locality has been restricted to Malacca by Oberholser (Proc. Biol. Soc. Wash., 32: 7, 1919) and this restriction is followed by Chasen in his 'Handlist of Malaysian Birds': 145, 1935. Hargitt [Ibis (4) 6: 43, 1882] indicated that he was of the opinion that "Le Petit Pic des Moluques," figured by Daubenton, on which *Picus moluccensis* Gmelin was based, is the Javanese bird, and Riley (Proc. Biol. Soc. Wash., 40: 140, 1927), following him, restricted the type locality of this race to Java. However, until someone can find differences to separate these populations the question is of no great moment.

The theory that *moluccensis* and *auritus* are synonymous is indefensible, as I have pointed out below, for *auritus* is clearly described by Eyton as a gray-headed bird.

Of late years it has been the custom to use *Dryobates nanus* Vigors, 1831, as the specific name for the gray-headed forms (*canicapillus*). It is clear, nevertheless, that Vigors had a brown-headed form before him for he says: "*capitis fronte verticique brunneis.*" He supposed that the bird came from the Himalayan Mountains, but since no such form has since been found there, it would appear to have been an error and it would be wise to follow Stresemann (l. c.) who restricted the type locality to Cawnpore in the plains. It is not possible that these small brown birds are conspecific with the large, gray-headed forms and therefore the name *hardwickii* cannot be used, for it applies to a subspecies of *nanus*. It is unfortunate that Vigors's name

*pygmaeus*, which clearly applies to the gray-headed bird of the Himalayas, is preoccupied.

I am at present unable to decide whether the comparatively distinct forms of the Philippines and those of Japan, which Hachisuka has lumped under the name *moluccensis*, are really conspecific.

I have sincerely to thank Dr. Ernst Mayr and the authorities of the American Museum of Natural History, Mr. R. M. deSchaunsee and the Academy of Natural Sciences, and Mr. H. G. Deignan and the authorities of the U. S. National Museum, for the loan of valuable material and their advice.

***Dryobates canicapillus doerriesi* (Hargitt)**

*Yungipicus doerriesi* HARGITT, *Ibis* (4) 5: 398, 1881—Askold Id., Eastern Siberia.

This race is to be distinguished from all others by its large size. It differs from its neighbor, *scintilliceps*, in its average larger size and in having the white area of the rump less streaked with black.

RANGE.—Ussuri, Manchuria and Korea.

MATERIAL EXAMINED.—2 ♂, 2 ♀—Korea: Seoul, Songdo, Keikido (Oct., Dec., Jan., Feb.).

MEASUREMENTS.—Wing, ♂, 103, 106 mm.; ♀, 105, 113; (av., 106.7). Tail, ♂, 61; ♀, 61, 68; (av., 64.7). Bill, ♂, 20, 21; ♀, 20, 22; (av., 20.7).

***Dryobates canicapillus scintilliceps* (Swinhoe)**

*Picus scintilliceps* SWINHOE, *Ibis*, 5: 96, 1863—Pekin, China.

*Yungipicus pygmaeus clementii* LATOUCHE *Bull. Brit. Orn. Cl.*, 40: 51, 1919—Chang Yang Hsien, Hupeh.

This race differs from *nagamichii* LaTouche and *obscurus* LaTouche in being somewhat paler below with narrower black streaks.

*Y. clementii* LaTouche was described as intermediate between birds of north China and those of southeastern China, having the streaks of the under parts less heavy and the ground color of the under parts richer ochraceous brown. Eighty per cent of the seasonally comparable birds before me are, however, indistinguishable.

RANGE.—Chihli (Johol), Shantung, Kiangsu, and Chekiang.

MATERIAL EXAMINED.—11 ♂, 8 ♀—Chihli: Iyankow; Kiangsu: Chinkiang, Nanking; Shantung. 17 ♂, 9 ♀—Hupeh: Ichang, Chang Yang hsien (Jan., Feb., March, Oct., Dec.).

***Dryobates canicapillus nagamichii* (LaTouche)**

*Yungipicus scintilliceps nagamichii* LATOUCHE, *Bull. Brit. Orn. Cl.*, 53: 22, 1932—New name for *Yungipicus s. kurodai* LaTouche, *Birds East China*: 22, 1931—Fukien; nec *Dryobates leucotos kurodai* GOTZ, 1926.

As might be expected, this race is intermediate between *scintilliceps* and *obscurus*. It differs from the former in being more heavily streaked below as a rule. Only three specimens in a series of eighteen are not separable by this character. From *obscurus* it appears to differ in having a well-developed white collar, continuous, as a rule, though usually interrupted in *obscurus*.

Yen (Oiseau, Nouv. Ser., 3: 625, 1933) synonymizes this race with *omissus* Rothschild, a course which seems to me to be impossible. They differ by two characters. *Omissus* is darker and more heavily streaked below; the white nuchal collar is interrupted in *omissus*.

MEASUREMENTS.—*nagamichii*: wing, ♂, 100–102; ♀, 100–106; (av., 101.6). Tail, ♂, 59; ♀, 60–61; (av., 59.7).

“*clementii*” (Hupeh) = *scintilliceps*: wing, ♂, 95–104; ♀, 101–106; (av., 101.8). Tail, ♂, 51–60; ♀, 50–59; (av., 55.9).

*scintilliceps*: wing, ♂, 97–102; ♀, 97–105; (av., 100.5). Tail, ♂, 54–59; ♀, 50–59; (av., 55.8).

RANGE.—Fukien; recorded by Yen (l. c.) from central and western Yunnan, northern Kwangtung and “probably” southern Hunan and Kwangsi.

MATERIAL EXAMINED: 4 ♂, 6 ♀—Fukien: Kuang Tien, Min River, Ching Feng Ling, Hsia Yang; Kuantun (April, Nov., Dec.).

***Dryobates canicapillus kaleënsis* (Swinhoe)**

*Picus kaleënsis* SWINHOE, Ibis, 5: 390, 1863—Formosa.

This race is close to *nagamichii* but differs in having the lower back and rump more heavily barred, which makes most specimens of *nagamichii* appear whiter. Seventy-nine per cent are distinguishable in series by this character. The wing and tail are slightly shorter.

RANGE.—Island of Formosa (Taiwan).

MATERIAL EXAMINED.—6 ♂, 5 ♀—Formosa: Bankoro, Sharaishika, Tapposha, Schoschang (Feb., March, April, November).

MEASUREMENTS.—Wing, ♂, 96–100; ♀, 95–101; (av., 98). Tail, ♂, 54–58; ♀, 52–58; (av., 54). Bill, ♂, 19–21; ♀, 21; (av., 20.8).

***Dryobates canicapillus swinhoei* (Hartert)**

*Iyngipicus scintilliceps swinhoei* HARTERT, Novit. Zool., 17: 221, 1910—No-Tai, Hainan.

This race is smaller than *kaleënsis* and *tonkinensis* but is otherwise very close to both.

RANGE.—Hainan Island.

MATERIAL EXAMINED.—5 ♂, 6 ♀—Hainan Island: Lei Miu Mon, Mt. Wuchi, No-Tai, Tetsu.

MEASUREMENTS.—Wing, ♂, 92–96; ♀, 93–95; (av., 93.5). Tail, ♂, 45–52; ♀, 48–49; (av., 45.9). Bill, ♂, 19–20; ♀, 18–20; (av., 19).

***Dryobates canicapillus omissus* Rothschild**

*Dryobates pygmaeus omissus* ROTHSCHILD, Bull. Brit. Orn. Cl., 43: 10, 1922—Lichiang Range.

*Dryobates semicoronatus szetchuanensis* RENSCH, Abh. u. Ber. Mus. Tierk. Volk. Dresden, 16: 39, 1923—Kwanhsien, Sechuan.

*Dryobates pygmaeus permixtus* LATOUCHE, Bull. Brit. Orn. Cl., 43: 44, 1922—Milati and Yunnan-Fu.

This race is characterized by its darker gray head, the large area of black on the occiput, large area of white inner secondaries and darker, more heavily streaked under parts.

Fortunately, *omissus* has priority over *permixtus* which was described from an area populated by intermediates, which are closer to *omissus* than to *obscurus*. Rothschild's statement (Nov. Zool., 33: 238, 1926) that this race is much larger than *obscurus* is not borne out by my measurements.

Rensch apparently did not have an opportunity to examine either of these races for he compared his birds only to *scintilliceps*. My short series is very close to *omissus*.

MEASUREMENTS.—*omissus*: wing, ♂, 99–105; ♀, 103–104; (av., 102.8). Tail, ♂, 50–56; ♀, 53–57; (av., 54). Bill, ♂, 19–20; ♀, 19–20; (av., 19.5).

"*szetchuanensis*": Wing, ♂, 100; ♀, 100. Tail, ♂, 54; ♀, 54. Bill, ♂, 20; ♀, 19.

RANGE.—Kansu (Kham), northern Sechuan, and northwestern Yunnan.

MATERIAL EXAMINED.—4 ♂, 6 ♀—northern Yunnan: Kopoatsun, Yunnan Fu, Yangtze "Big Bend," Likiang Range (Jan., Feb., May). 1 ♂, 1 ♀—Sechuan: Kwanhsien (May) (topotypes). 1 ♀—Kham: Chung Chang (Aug.).

***Dryobates canicapillus obscurus* La Touche**

*Dryobates canicapillus obscurus* LATOUCHE, Bull. Brit. Orn. Cl., 42: 14, 1921—Hokow, S. E. Yunnan.

From *nagamichii* and *scintilliceps* this race differs in having the ground color of the under parts somewhat darker and the black streaks somewhat wider in seasonally comparable birds. Wing and tail are shorter. It is very close to *omissus* Rothschild, its northern neighbor, but differs in having a smaller black occipital area and shorter wing and tail on average, though there is much overlap. There is likewise, as a rule, less white on the lesser wing-coverts. Four

specimens, two of which are from Yunnan-Fu, are intermediate. Indeed, this is clearly an intermediate population and the wisdom of its recognition may be questioned.

MEASUREMENTS.—*scintilliceps*: wing, ♂, 98–102; ♀, 97–105; (av., 100.5). Tail, ♂, 54–59; ♀, 50–59; (av., 56.2).

*obscurus*: wing, ♂, 97–98; ♀, 95–104; (av., 97.5). Tail, ♂, 49–55; ♀, 51–55; (av., 52.5).

RANGE.—Southeastern Yunnan.

MATERIAL.—3 ♂, 4 ♀—southeastern Yunnan (Jan., Feb., March, April).

*Dryobates canicapillus tonkinensis* (Kuroda)

*Yungipicus pygmaeus tonkinensis* KURODA, Bull. Brit. Orn. Cl., 44: 47, 1924—Yen Bai, Tonkin.

This race is smaller than *obscurus* and there is no overlapping measurement in this small series. As a rule there is less white on the inner secondaries than in *obscurus*; only two specimens in a series of fifteen are indistinguishable by this character.

In his original description, Kuroda speaks of the Tonkinese population as having a few distinct white spots on the interscapular region. I cannot, however, discern this character.

MEASUREMENTS.—Wing, ♂, 97–98; ♀, 95–104; (av., 97.5). Tail, ♂, 49–55; ♀, 51–55; (av., 52.5).

RANGE.—Tonkin, northern Laos.

MATERIAL EXAMINED.—3 ♂, 5 ♀—Tonkin: Chapa; Laos: Muong Sovi, Phu Kobo (near Xieng Khouang), Taloun (near Luang Prabang).

*Dryobates canicapillus semicoronatus* (Malherbe)

*Picus semicoronatus* MALHERBE, Bull. Soc. d'Hist. Nat., Metz, 5: 21, 1848.—Himalayas.

Typical specimens of this race (those from Nepal and Sikkim) differ from all other races in having the occiput entirely red or almost entirely so. To be sure, certain specimens have the red area interrupted by black, but there is considerably more red than in the next race (*canicapillus*) with which it intergrades in the Naga Hills, Assam and Cachar. Specimens from this region have less red on the occiput than typical *semicoronatus* but more than in *canicapillus*. Specimens before me from Assam have the central rectrices pure black as in *semicoronatus* while six specimens of a series of ten from Cachar have the two central rectrices more or less spotted with white. They are exactly intermediate in this character as in that of the occiput.

Seasonal variation in this form is very marked. Specimens taken in December, January, and February are darker and browner, not

as grayish, below than those taken in March and April. It is probable that there is likewise considerable individual variation, since a single specimen, taken in July, is also very brown below.

Stresemann (Arch. f. Naturg., 87: 85, 1921) apparently considers this to be a distinct species and calls the intermediates of the Khasia Hills "bastarde."

RANGE.—Sikkim, Bhutan (Kinnear), eastern Assam. All birds from south of the Brahmaputra examined by me are *semicoronatus*  $\cong$  *canicapillus*.

MATERIAL EXAMINED.—4 ♂, 4 ♀—Sikkim. 3 ♂, 3 ♀—northwestern Assam, Cachar, Gunjong. 1 ♂, 1 ♀—northern Bengal. 1 ♂, 2 ♀—"Assam" are intermediate.

***Dryobates canicapillus mitchellii* (Malherbe)**

*Picus mitchellii* MALHERBE, Rev. et Mag. Zool., (3) 1: 531, 1849—Nepal.

*Picus pygmaeus* VIGORS, Proc. Zool. Soc., London, 1: 44, 1831 (not *P. pygmaeus* LICHTENSTEIN, 1823).

*Yungipicus nanus nanus* of authors, not of VIGORS.

According to Baker (Faun. Brit. Ind., 4: 50, 1927) this form differs from *omissus* in being paler and smaller; from *canicapillus* in having black central rectrices. I have seen no specimens but there can be no doubt that this is the gray-headed bird of the Himalayas and that Vigors's type was a pale brown bird of the plains.

RANGE.—Nepal.

***Dryobates canicapillus canicapillus* (Blyth)**

*Picus canicapillus* BLYTH, Journ. Roy. Asiat. Soc. Bengal, 14: 197, 1845—Arrakan.

*Yungipicus pumilus* HARGITT, Ibis, (4) 5: 599, 1881—Maliwon, S. Tenasserim.

The characters in this group are so obscured by individual and seasonal variation that an attempt at diagnosis of geographical races can meet with only relative success. From the large, dark populations of China this group differs in being smaller and paler. Birds of northern Siam are larger and blacker than those of lower Burma (typical *canicapillus*) but differ from *obscurus* by their smaller size and also by the fact that a considerable number (seven of the series of twelve) have the central rectrices spotted with white. These are intermediate, but in size are referable to *canicapillus*. Birds of the Taok Plateau (about 16° N. Lat., 99° E. Long.), which I assume are typical *canicapillus*, are browner above, even when birds of the same season are compared. Birds from Mt. Victoria, Chin Hills, are perhaps slightly darker and average a little larger, but I do not think they should be described. In Peninsular Siam, birds may be said to be

intermediate, since six of the series of twelve have the central rectrices unspotted and the others have one or two irregular spots instead of the regularly spotted, almost barred, tail of *canicapillus*.

This population may be called *pumilus* Hargitt if one prefers to recognize an ill-defined, intermediate group. Deignan (Journ. Siam Soc. Nat. Hist., Suppl., 11, no. 2: 123, 1938) has revived this name for it because of its browner coloration. I cannot find that, when compared season for season, they are appreciably browner than birds from northern Tenasserim. Ticehurst (Journ. Bombay Nat. Hist. Soc., 41: 592, 1940) says: "In Burma brownness and blackness is due partly to individual variation and partly to wear . . . The race *pumilus* seems very doubtful." They may be called *canicapillus*  $\cong$  *auritus* if it is desirable to differentiate them.

RANGE.—Central Burma (Chin Hills) south and east to northern Siam (Chieng Dao, etc.) and south through central Siam to northern Malaya; southern Annam. If *delacouri* is not recognized, the range will include eastern Siam and Cambodia.

MATERIAL EXAMINED.—5 ♂, 3 ♀—Burma: Mt. Victoria, Chin Hills (Feb., March). 4 ♂, 11 ♀—northern Siam: Cheng Dao, Doi Dao, Doi Soutep, Me Rampan (Jan., March, Sept., Dec.). 2 ♂, 2 ♀—northern Tenasserim: Taok Plateau, Lakya and vicinity (Feb.). Western central Siam: 2 ♂, 1 ♀—Susaivat (July). 4 ♂, 10 ♀—southern Annam; vicinity of Dalat and Fimnon.

MEASUREMENTS.—Mt. Victoria: wing, ♂, 83–87; ♀, 84–90; (av., 86.4). Tail, ♂, 34–42; ♀, 40–41; (av., 39). Bill, ♂, 15–17; ♀, 16–19; (av., 16.5).

N. Tenasserim, Pegu Yomas (1): wing, ♂, 82–87; ♀, 77–88; (av., 82.8). Tail, ♂, 36–39; ♀, 36–39; (av., 37.2). Bill, ♂, 17–19; ♀, 16–20; (av., 17.4).

N. Siam: wing, ♂, 81–84; ♀, 83–93; (av., 84.5). Tail, ♂, 34–40; ♀, 38–46; (av., 39.1). Bill, ♂, 16–17; ♀, 16–19; (av., 16.8).

Peninsular Siam—"pumilus": wing, ♂, 77–84; ♀, 81–85; (av., 82.3). Tail, ♂, 31–36; ♀, 35–37; (av., 34.4). Bill, ♂, 17–18; ♀, 16–19; (av., 17.3).

Southern Annam: wing, ♂, 85–89; ♀, 88–91; (av., 88). Tail, ♂, 35–39; ♀, 37–45; (av., 36.3). Bill, ♂, 17–19; ♀, 17–19; (av., 18.1).

? *Dryobates canicapillus delacouri* deSchaunsee

*Dryobates hardwickii delacouri* DE SCHAUNSEE, Proc. Acad. Nat. Sci. Phila., 40: 110, 1938—Ubol-Chanuman, eastern Siam.

In the dry areas of eastern Siam and perhaps Cambodia there are populations which, in series, are somewhat paler brown above, with



wider, paler and less well-defined streaks below. This is true when either summer or winter birds are compared with skins in seasonally comparable plumage. They differ from birds of the higher portions of southern Annam by their smaller size and paler coloration, but resemble them in having the streaking of the under parts pale and ill-defined.

I recognize this subspecies with some doubt, for it may be questioned whether the paleness of this form is truly a genotypical character. Furthermore, unless the bird of Annam be described, the range of *canicapillus* is discontinuous, but I am unwilling to describe it because of its similarity to birds of northern Siam.

RANGE.—Eastern-central and eastern Siam.

MATERIAL EXAMINED.—5 ♂, 11 ♀—eastern-central and eastern Siam: Watha, Sriacha, Ubol, Kulu, Kha Sabab, Ubol Chanuman, Muek Lek, Chantuk, Pak Chong (Jan., Feb., May, June, July, Oct.).

MEASUREMENTS.—(eastern Siam): wing, ♂, 80–85; ♀, 79–84; (av., 81). Tail, ♂, 34–39; ♀, 34–36; (av., 33.9). Bill, ♂, 17–18; ♀, 17–18; (av., 17.4).

*Dryobates canicapillus auritus* (Eyton)

*Tripsurus auritus* EYTON, Ann. Mag. Nat. Hist., (1) 16: 229, 1845—Malacca.

This form, though it is very close to *canicapillus*, differs by having the central rectrices, as a rule, unspotted. Four specimens of a series of five have black central rectrices. Of a series of nineteen birds representing both races, four cannot be diagnosed. Of a series of twelve birds from the area of intermediacy in Peninsular Siam and southern Tenasserim, six have more or less spotted rectrices. However, instead of three well-defined white spots (almost bars) as in *canicapillus*, birds from Malaya have one or two small, ill-defined marks, when any mark is present. In series it appears that the area of black on the occiput is greater in *auritus*, but individuals cannot be thus diagnosed.

Eyton, in his original description, characterized this bird thus: "*fronte verticique cinereis brunneis leviter tinctis*," which would lead one to think that *auritus* must be the gray-headed bird; but, on the other hand, Hargitt (*Ibis*, ser. 4, 6: 244, 1882) examined the type in the British Museum and says, "*pileo sepiario brunneo*," and further remarks that it does not differ from birds of Sumatra, Java, and Borneo. We have two choices: either Eyton's original description is inaccurate or Hargitt mistook Eyton's type. Stresemann (*Arch. f. Naturg.*, 87: 87, 1921) has accepted Hargitt's dictum, but Chasen (*Bull. Raffles Mus.*, no. 11: 145, 1935) seems to have believed it to

be the gray-headed form. The situation is, however, confused, for Chasen has listed *auritus* as a subspecies of *hardwickii*, itself a brown-headed form.

In my opinion, neither Eyton nor anyone else could have described the brown-headed bird as having the "*fronte verticique cinereis*," and I believe that Hargitt was mistaken in his choice of the type.

RANGE.—Malay Peninsula from Trenggam on the east coast and, perhaps, the vicinity of the Siamese border on the west, south to Singapore.

MATERIAL EXAMINED.—2 ♂, 3 ♀—Malay: Trangunu, Tanjong Dungun; Perak Temerloh, Sungei Lebeh; Johore, Tanjong Silantei (Jan., May, July, Sept.).

***Dryobates canicapillus volzi* Stresemann**

*Dryobates canicapillus volzi* STRESEMANN, Verh. Orn. Gesellsch. Bayern, 14: 288, 1920—Laut Tamar = Lake Takengon, N. W. Sumatra.

From all others (except *aurantiiventris*) this race differs sharply by its golden-brown under parts. The ground color of the back is black and the central rectrices are unspotted. *D. c. aaurantiiventris* Salvadori of Borneo has the ground color of the breast and belly deeper orange and is somewhat less heavily streaked below. The bill is shorter.

RANGE.—Mountains of northwestern Sumatra (3000–9300 ft.).

MATERIAL EXAMINED.—3 ♂, 3 ♀—northwestern Sumatra: Blangnanga (3600 ft.); Mt. Löser (9300 ft.).

MEASUREMENTS.—wing, ♂, 78–82; ♀, 82–86; (av., 82.3). Tail, ♂, 36–39; ♀, 34–40; (av., 33.9). Bill, ♂, 14–16; ♀, 16–17; (av., 16).

***Dryobates canicapillus aaurantiiventris* (Salvadori)**

*Picus (Baeopipo) aaurantiiventris* SALVADORI, Atti R. Accad. Sci. Torino, 3: 524, 1868—Borneo = Sarawak.

Like *volzi*, this is a very distinct insular race. It differs from all others in its deep orange under parts.

Chasen (Bull. Raffles Mus., Singapore, no. 11: 145, 1935) lists *Iyngipicus picatus* Hargitt (Ibis, ser. 4, 6: 41, 1882—northwestern Borneo) as a synonym but with a note to the effect that Kuroda lists this form from northeastern Borneo. Chasen says: "There is just a possibility that this is a good race with a very limited range."

RANGE.—Northern and eastern Borneo.

MATERIAL EXAMINED.—1 ♂—Sarawak.

***Dryobates obscurior* Rothschild**

*Dryobates obscurior* ROTHSCHILD, Bull. Brit. Orn. Cl., 43: 10, 1922—Lichiang Range, N. W. Yunnan.

Hartert (Nov. Zool., 32: 147, 1925) says: "This peculiar bird is known only from the type specimen. It is very peculiar, the crown to the base of the upper bill nearly black, underside heavily striped. I am not sure about its relationship."

Hartert and Steinbacher (Vögel pal. Fauna, Ergänzungsband, 4: 374, 1935) says: ". . . das man für ein melanistisches stück halten möchte, doch hebt der Autor den schlankeren und spitzeren Schnabel noch besonders hervor."

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## FACTORS IN THE INCUBATION BEHAVIOR OF THE COMMON TERN<sup>1</sup>

BY NELSON MARSHALL

THE publications of Watson (1908) and Lashley (1915) contributed, among other things, an initial demonstration of the use of the egg, nest, and nest locality as subjects for controlled experiments on incubation behavior. Since their work on the Noddy and Sooty Terns, *Anous stolidus* and *Sterna fuscata*, respectively, many recent studies have centered on the relation of such factors to the incubation instinct. Though much of this research has been confined to members of the family Laridae, the accumulation of knowledge has not enabled the formation of generalizations applying throughout. Species differences occur within this family, as is clearly illustrated in the discussion by Noble and Lehrman (1940).

One might suggest that comparable experimental results of much greater value would be available if certain techniques were adopted as standards. The triangle test evolved by Kirkman (1937), working on the Black-headed Gull, *Larus ridibundus*, in which the eggs, the nest, and the nest site were offered as alternatives to the adult, is an example of a test worthy of repetition where possible. In practice, however, specific differences with respect to behavior and habitat often prevent such duplication. My program of experimentation on the Common Tern, *Sterna hirundo hirundo*, was greatly influenced by the methods of others, but the final program could not be planned till various techniques were actually tried in the field.

The research to be discussed was conducted from the F. T. Stone Laboratory of Ohio State University, Put-In-Bay, Ohio. Dr. C. F. Walker of the Laboratory staff has contributed with help and suggestions which have added greatly to the progress of the work.

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