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## NEW CHINESE BATS<sup>1</sup>

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Over five hundred bats have been thus far sent back by the Asiatic Expeditions under the leadership of Mr. Roy C. Andrews. These are chiefly from Fukien, Szechwan, southeastern Yunnan, and North China. The series of skins is well supplemented by specimens in alcohol, and in many cases wide-ranging species are represented by a number of skins from the coastal regions as well as by others from the higher or more inland provinces, so that an unusual opportunity is afforded for a comparison of the lowland and the upland members of a species. This is undoubtedly the largest single collection of bats yet obtained by any one expedition in China, and my thanks are due The American Museum of Natural History for the opportunity to study this important series. The following are recognized as new.

### Rhinolophidæ

#### *Rhinolophus blythi calidus*, new subspecies

? *Rhinolophus cornutus pumilus* ANDERSEN, 1905, Proc. Zool. Soc. London, II, p. 127 (in part, as to specimen from Foo-chow).

TYPE.—Adult female, skin and skull, No. 44692, American Museum of Natural History, from Yenping, Fukien Province, China. Roy C. Andrews, collector. June 17, 1916.

DESCRIPTION.—Similar to *R. blythi szechwanus* Andersen, but much brighter, more cinnamon throughout. The bases of the hairs above are everywhere whitish, with a faint buffy tint, their tips dull cinnamon, near "sayal brown" of Ridgway (1912); below pale pinkish buff, the hairs becoming whitish near their bases.

MEASUREMENTS.—The skull is a very little larger than in *szechwanus*; its total length, occiput to front of canine, 16 mm.; palatal bridge, 1.8; maxillary tooththrow, 5.7; mandibular tooththrow, exclusive of incisors, 6.3. The forearm measures 38 mm.; tibia, 15; foot, 7.

This is a bright-colored lowland representative of *R. blythi* of India, and is very different in color from the series of smoky-gray specimens from Szechwan representing Andersen's *R. b. szechwanus*. The species was included as *Rhinolophus minor* in this author's preliminary revision of the small bats of the *lepidus* (= *pumillus*) group in 1905. A fragmen-

<sup>1</sup>Publications of the Asiatic Expeditions of The American Museum of Natural History. Publication No. 10.

tary skin from Foo-chow, included by him as possibly representing *R. cornutus pumilus*, may have been the present form. The nose-leaf has the characteristic form of the species, with the sella slightly constricted in the middle, and its rounded tip narrower than its base. The horn on the connecting process is nearly an isosceles triangle in side view. The dark-gray immature pelage is practically alike in both races. Twelve skins from Fukien Province represent this lowland form and fourteen from Szechwan are assumed to be typical of *szechwanus*.

### **Rhinolophus episcopus**, new species

TYPE.—Adult male, skin and skull, No. 56895, American Museum of Natural History, from Wanhsien, Szechwan Province, China. Third Asiatic Expedition. October 9, 1921.

DESCRIPTION.—A small species of the *macrotis* group. Ears large and broad, with a wide trapezoidal antitragus, about 7 mm. across, well marked off by a deep notch. Horseshoe of the nose-leaf broad, quite covering the muzzle, with a narrow median anterior notch. On each side below the horseshoe is a small supplementary outgrowth extending back nearly to the level of the nostril. Sella parallel-sided, with broadly rounded vertex, its base if anything narrower; the nasal lappets thin, their outer margins continuous with the sides of the sella, and vertically raised, to form a shallow cup at the base of the sella. The connecting process is well developed, commencing about a millimeter below the summit of the sella, prominent and convex. The terminal leaf instead of being pointed is ovate, with convex sides and rounded tip, recalling a bishop's mitre. It is thin and leaf-like, about as high as the sella itself (5 mm.) and stands erect between the ears. Front face of the sella as well as the terminal leaf with numerous minute hairs, smaller than those rising from the connecting process. Two pairs of much longer hairs rise from the sides of the latter and exceed the leaves in height.

Wings from the metatarsus. Third metacarpal shortest, fourth and fifth of equal length. Second phalanx of third finger one and one-half times the first. Tail about as long as combined tibia and hind foot.

Color above, smoke gray, the hairs dull whitish at their bases. Below, the chin, throat and middle of the abdomen are pale, almost white, the hairs at the sides of the body smoky (near "avellaneous"), paler at their bases.

The skull is characteristic of the group, with very low sagittal ridge, prominent globular nasal swellings, narrow zygomata, and a broad palatal bridge, equalling one-half the maxillary toothrow. The small  $p^2$  is fully in the toothrow and the third upper molar has its W-pattern nearly complete, the posterior commissure about half the length of the anterior. In the lower jaw the small premolar is external to the row on one side, and partly so on the other.

MEASUREMENTS.—Collector's measurements of the type are: head and body, 51 mm.; tail, 24; foot, 10; ear, 26; spread, 275. The forearm measures 47.5 mm.; the third metacarpal, 34.5; fourth and fifth metacarpals, 36; tibia, 18.

The skull measures: occiput to front of canine, 19 mm.; occipital condyle to front of canine, 17; palatal bridge, 3.7; mastoid width, 9.2; zygomatic width, 8.2;

maxillar width, 6.2; width outside canines, 4.4; maxillary tooththrow, 7; length of mandible, 12; mandibular tooththrow to front of canine, 7.2.

This is a larger species than *macrotis* with a peculiar terminal nose-leaf, which is rounded rather than pointed. Like *pearsoni*, it is represented in the low coastal area by a smaller, brighter-colored race which may be named as follows.

#### **Rhinolophus episcopus caldwelli**, new subspecies

TYPE.—Adult female, skin and skull, No. 44771, American Museum of Natural History, from Yuki, Fukien Province, China. H. R. Caldwell, collector. October 31, 1916.

DESCRIPTION.—Similar to the typical form but smaller (forearm 43 mm., against 48), the pelage above with a warmer, cinnamon tint, near "sayal brown," instead of smoky. The difference in tint is similar to that separating the upland and lowland races of *R. blythi* in China, and the differences in measurements are obvious from the following. The teeth are strikingly smaller. The small  $p^2$  is full in the tooththrow and has a long sharp cusp. The lower premolars are not crowded.

MEASUREMENTS.—Forearm, 43 mm.; tibia, 17; foot, 9; third metacarpal, 31.5; fourth and fifth metacarpals, 33. Skull: occiput to front of canine, 18 mm.; occipital condyle to front of canine, 15.5; palatal bridge, 3; mastoid width, 8.5; zygomatic width, 7.8; maxillar width, 6.7; width outside canines, 3.7; maxillary tooththrow, 6; length of mandible, 11.4; mandibular tooththrow to front of canine, 6.5.

The single specimen on which this form is based differs so strikingly from the Szechwan series that there can be no doubt of its distinctness. It was found in a cave at the summit of a mountain by Mr. H. R. Caldwell, whose coöperation has resulted in the addition of many interesting species and in whose honor the form is named.

#### **Rhinolophus rex**, new species

TYPE.—Adult female, skin and skull, No. 56890, American Museum of Natural History, from Wanh sien, Szechwan Province, China. October 12, 1921.

DESCRIPTION.—A large member of the *macrotis* group, with ears, horseshoe and sella enormously enlarged, but the terminal lancet much reduced.

Ears large, almost funnel-like, the antitragus fully half their height and almost an isosceles triangle with broadly rounded point, marked off by a deep notch from the rest of the conch. Horseshoe very broad extending far (at least 3–4 mm.) beyond the sides of the muzzle, with a deep narrow median cleft anteriorly. There is no accessory outgrowth external to it. The lappets covering the nostrils at the base of the sella are much enlarged, thin and membranous, about the width of the muzzle, their edges slightly raised to form a cup and their posterior wings enclosing the base of the sella. The latter is large, about 9 mm. high in the dried specimen (11 as measured by the collector), tongue-shaped, narrowest at base, and gradually expanding to the broadly rounded summit, which stands upright between the ears. Its front face is thickly beset with microscopic whitish hairs. The connecting process commences

about 4 mm. below the summit and is relatively low with a convex outline. The terminal lancet is very small, almost concealed by the fur of the occiput, and does not quite reach the summit of the connecting process in height. Its summit is broadly rounded instead of pointed.

The wings arise from the metatarsus slightly below the toes. Calcaneum slender, about  $1\frac{1}{2}$  times the length of the foot. Tail with its tip projecting. Third metacarpal slightly the shortest, the fourth and fifth practically of equal length. The second phalanx of the third digit barely exceeds  $1\frac{1}{2}$  times the first; that of the fourth is less than  $1\frac{1}{2}$  times the first phalanx.

Fur rather long, about 16 mm. on the back, 10 mm. on the chest. In color it is light "cinnamon-buff" above, paler below except at the extreme sides under the armpits. A thin fringe of hairs borders the inner edge of the ear conch and the rib parallel to it on the lower three-fifths of the ear.

The skull is peculiar in having the surface of the braincase above the ear cancellar or spongy in appearance with numerous small fenestræ as far forward as the orbit. The nasal swellings are elliptical, with a deep cavity behind, but the sagittal crest is very low. The small  $p^2$  is fully in the toothrow, or even with a hair-space behind it and has a well developed cusp. In the lower jaw the minute middle premolar ( $p_3$ ) is fully in the row in all four specimens.

MEASUREMENTS.—The collector's measurements of the type are: head and body, 55 mm.; tail, 38; foot, 10; ear, 33; stretch of wings, 356. The forearm measures 58 mm.; third metacarpal, 41.5; its first phalanx, 17; its second, 26; fourth metacarpal, 43; its first phalanx, 12.7; its second, 17; fifth metacarpal, 43; tibia, 21.

The skull measures: occiput to front of canine, 22 mm.; occipital condyle to front of canine, 19.8; palatal bridge, 4.5; mastoid width, 11; zygomatic width, 10; maxillary width, 7; width outside canines, 4.8; maxillary toothrow, 8; length of mandible, 13.5; mandibular toothrow to front of canine, 8.

This extraordinary bat is a most interesting discovery. The exaggerated development of its anterior nose-leaves is in contrast to its otherwise primitive structure in the unspecialized wing and the unmodified position of the small premolars. The addition of this and the preceding species to the known Asiatic members of the *macrotis* series is of importance as pointing to the origin of the group from the central Asian land mass. The four specimens were captured in the Yen-ching-kao cave, whence also was obtained the Szechwan series of *Rhinolophus episcopus*.

### Hipposideridæ

#### *Hipposideros armiger swinhoii* (Peters)

*Phyllorhina swinhoii* PETERS, 1870, Proc. Zool. Soc. London, p. 616.

In his review of the horseshoe bats of the *armiger* group, Andersen (1906, Ann. Mag. Nat. Hist., (7) XVII, p. 37), working mostly with alcoholics, placed Peters' name *swinhoii* in the synonymy of this species. The fine series of skins obtained in Fukien Province, Szechwan and

Yunnan seems to show clearly that those from the coast are uniformly more brightly colored, with a strong buffy suffusion. The name may therefore be revived in a subspecific sense for the eastern, lowland form, type locality Amoy, Fukien Province.

### Vespertilionidæ

#### *Myotis chinensis luctuosus*, new subspecies

TYPE.—Adult male, skin and skull, No. 56867, American Museum of Natural History, from Wanh sien, Szechwan Province, China. October 12, 1921. Third Asiatic Expedition.

DESCRIPTION.—A large, dark *Myotis*, differing from typical *chinensis* of the lowlands in having the under surface evenly gray, instead of with black sides.

Color above a uniform grayish brown, nearly "buffy brown" of Ridgway (1912), the top of the head a trifle grayer; below uniformly gray, the hairs nearly fuscous at their bases with a minute whitish tip, which gives an evenly frosted appearance, darkened by the bases of the hairs showing through.

The calcar is long and slender, without keel. At the base of the fifth metacarpal a prominent membranous slip extends from the lower side of the carpus to the inner base of the digit.

The skull is obviously larger than that of a specimen of *chinensis* from Yunnan, though the forearm is no longer. In both, the second small upper premolar ( $p^3$ ) is drawn slightly in from the toothrow. There is no protoconule nor hypocone on the molars.

MEASUREMENTS.—The collector's measurements of the type are: head and body, 80 mm.; tail, 65; foot, 16; ear, 21; spread of wings, 456. The forearm measures, 65 mm.; third metacarpal, 64; fourth metacarpal, 62; fifth metacarpal, 59.

In the following measurements of the skull, those of a specimen of *chinensis* from Yung-chang, Yunnan Province, are added in parenthesis; greatest length, 24 (22.5); basal length, 22.5 (21); palatal length, 13.4 (12.4); mastoid width, 11.5 (11); zygomatic width, 15.5 (14.9); maxillary width, 9.7 (9.5); upper toothrow, 11.5 (11.3); lower toothrow, 12.2 (11.5).

A series of these large bats was secured in the same cave, Yen-ching-kaio, from which the two new *Rhinolophi* came. They agree closely in the characters given. A specimen of typical *chinensis* from Fukien Province is a much richer brown than any of the Szechwan series, and it is likely that this is a further difference separating the two races. Tomes, in his original description, gave no locality for his specimen beyond "China." It was received from "Mr. Fortune," a botanist who collected in southeastern China, hence undoubtedly came from somewhere along that coast, perhaps from Shanghai, where he obtained other bats. The contrasting black sides are mentioned as a distinguishing character.

**Myotis frater**, new species

TYPE.—Adult male, alcoholic, No. 48039, American Museum of Natural History, from Yenping, Fukien Province, China. August 10, 1920. H. R. Caldwell, collector.

DESCRIPTION.—A small species, structurally similar to *M. volans*, the long-legged bat of western North America, but differing in details, as follows.

Tail long, as in *volans*, about 50 per cent of total length; tibia very long, exceeding those of *volans*; foot much less than half its length equalling that of *volans*. Like the latter, the calcar has a low but evident keel about the length of the tarsus from the ankle. Wings ample, the metacarpals graduated, that of the third digit nearly reaching the elbow but falling short of it by 1.5 mm. Ears short, barely reaching the muzzle when laid forward, their tips less abruptly rounded off than in *volans*. Tragus similar in both, short, its anterior edge slightly concave, its lower half broad, the posterior upper margin slightly crenulate and abruptly bevelled off to the tip.

Below, the fur extends thinly on the under surface of the wing to a line from the middle of the femur quite to the elbow, as characteristic also of the American species. Its color is not evident in the alcoholic specimens, but is doubtless dark reddish brown as in *volans* of the Pacific coast of California.

The skull resembles closely that of the American species in its short, upturned rostrum, elevated forehead (in profile) and slightly inflated braincase. An important but minute detail of agreement is the conformation of the sagittal crest. Among the American species this is characteristic in that the temporal ridges, after uniting anterior to the occiput are continued back to meet the lambdoid crests not as concave but as convex lines.

The teeth in both are small and weak, but in the Asiatic species the second small upper premolar is much crowded inward from the toothrow instead of standing practically in the row, and it is proportionally as well as absolutely smaller than in the American bat. Similarly in the lower jaw the second premolar is more reduced in size and crowded a very little inward from the row.

MEASUREMENTS.—Total length, 94 mm.; tail, 47; foot, 8; ear from meatus, 11; forearm, 39; tibia, 20; combined length, knee to end of claw, 29. Skull: greatest length, 13.5; basal length, 13.2; palatal length, 6.6; maxillary width, 5.9; zygomatic width, 9.2; mastoid width, 8; maxillary toothrow, 5; mandibular toothrow exclusive of incisors, 5.4.

A most interesting discovery is this Asiatic counterpart of *M. volans* (long known as *M. longicrus*) of western North America, with which it agrees in all important structural details, though with even more elongated tibiæ and more progressive dentition in that the minute premolar 3 in both jaws has gone farther on its way to entire suppression. The more primitive condition of the American species indicates that it was derived from the Asiatic bat. The three specimens were found in holes of live bamboos on mountains at 2500 feet elevation. The bats of this group are distinguished by the combination of short ears, long tibiæ, keeled calcar, fur extending to elbow ventrally, inflated skull with short rostrum, elevated occiput, and convex outline of temporal ridges at occiput.

**Nyctalus velutinus**, new species

TYPE.—Adult male, skin and skull, No. 44649, American Museum of Natural History, from Futsing, Fukien Province, China. Edmund Heller and R. C. Andrews, collectors. July 29, 1916.

DESCRIPTION.—Color above Prout's brown; below paler, near Dresden brown of Ridgway, slightly grayer on the chest. The bases of the hairs are darker, fuscous, both above and below.

On the dorsal surface, the fur of the body extends out as far as a line joining the proximal half of the humerus and the knee, and back on the interfemoral membrane nearly to a line joining the middle of the tibiae. Below, the wing membrane is thickly furred from the knee to the basal third of the fifth digit and on the base of the fourth digit, as well as on the propatagium and the under side of the humerus itself. The extent of fur on the interfemoral membrane is much like that on its dorsal side.

MEASUREMENTS.—The collectors' measurements of the type are: head and body, 75; tail, 52; foot, 11; ear, 15. The forearm measures 49 mm.; third metacarpal, 49.5; first phalanx of same, 18; second phalanx, 21.5; fourth metacarpal, 48; first phalanx of same, 18; second phalanx, 8.3; fifth metacarpal, 39.5; first phalanx of same, 9.3; second phalanx, 5.3.

The skull measures: greatest length, 18; basal length, 18.3; palatal length, 9; mastoid width, 11.2; zygomatic width, —; maxillary width, 8.5; upper toothrow to front of canine, 7; mandible, 13; lower toothrow to front of canine, 7.3.

I have been unable to reconcile the characters of this Chinese noctule bat with those of any of the described species. In a previous paper (1912, Mem. Mus. Comp. Zoöl., XL, p. 243), I referred specimens from Ichang and eastern Szechwan to Hodgson's *labiatus*, but this seems to be a larger animal, though the two may eventually prove to be but sub-specifically related. Until a more thorough study of their distribution and relationships can be made, the eastern bat may stand as a full species.

**Miniopterus schreibersi parvipes**, new subspecies

TYPE.—Adult male, skin and skull, No. 44656, American Museum of Natural History, from Yenping, Fukien Province. Roy C. Andrews, collector. June 16, 1916.

DESCRIPTION.—In general similar to *M. schreibersi chinensis* Thomas from Chili Province, but the coloring much richer, a deep brownish instead of smoky gray, and the hind foot shorter and narrower.

Color of the type, a uniform dark cinnamon-brown above, nearly "Verona brown" of Ridgway; below slightly paler, about "snuff brown." On the lower parts the roots of the hairs are darker, but on the back they are nearly uniform, only a shade deeper in color at their bases.

The females, as usual in this genus, are darker than the males, from chestnut-brown to blackish.

MEASUREMENTS.—The forearm and finger measurements are the same as in the more northern form, but the foot is smaller and more slender. The type measures: forearm, 48; third metacarpal, 43.5; first phalanx, 10.5; second phalanx, 39; fourth

metacarpal, 42; first phalanx, 8.5; second phalanx, 19; fifth metacarpal, 39; tibia, 17; foot, 9.5 (10.5 in *chinensis*).

The skull measures: greatest length, 16; basal length, 15.5; palatal length, 8; mastoid width, 8.5; zygomatic width, 8.7; maxillary width, 6.5; upper tooththrow (exclusive of incisors), 6; mandible, 12; lower tooththrow (exclusive of incisors), 6.8.

A small series of these bats from Fukien Province is obviously different from others obtained in Chili Province, representing the subspecies *chinensis*. They are much browner and lack the dark smoky color of the latter which, in combination with the smaller and slenderer foot, will at once distinguish the more southern race. Its relation to the Indian *Miniopterus* remains to be studied further. In other respects the two seem sufficiently alike to make it probable that the South China form is only subspecifically distinct.