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Memoirs of the Museum of Comparative Zoölogy  
AT HARVARD COLLEGE.

VOL. XL. No. 4.

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SOME CHINESE VERTEBRATES.

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INTRODUCTION . . . .	By SAMUEL HENSHAW.
PISCES . . . . .	By SAMUEL GARMAN.
AMPHIBIA AND REPTILIA . . . .	By THOMAS BARBOUR.
AVES . . . . .	By JOHN E. THAYER AND OUTRAM BANGS.
MAMMALIA . . . . .	By GLOVER M. ALLEN.

WITH SIX PLATES.

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CAMBRIDGE, U.S. A.:  
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## CONTENTS.

	PAGE
INTRODUCTION.— BY SAMUEL HENSHAW . . . . .	107
PISCES.— BY SAMUEL GARMAN . . . . .	111
AMPHIBIA AND REPTILIA.— BY THOMAS BARBOUR . . . . .	125
AVES.— BY JOHN E. THAYER AND OUTRAM BANGS . . . . .	137
MAMMALIA.— BY GLOVER M. ALLEN . . . . .	201



# INTRODUCTION.

BY SAMUEL HENSHAW.

THE collections described in the following pages were made in the Chinese provinces of Hupeh and Szechwan during the years 1907 and 1908. With hardly an exception they represent the work of Mr. Walter R. Zappey while he was attached to the expedition sent out by the Arnold Arboretum, under the direction of Mr. E. H. Wilson, the well-known botanical collector.

Mr. John E. Thayer, recognizing the need of zoölogical work in lower China, secured the consent of Prof. C. S. Sargent, the Director of the Arnold Arboretum, for a trained collector to accompany Mr. Wilson, and most generously provided the necessary financial support. The obligations of the Museum to Mr. Thayer, already very great, were much increased by this recent act of liberality, and his selection of Mr. Zappey for the work was very fortunate. Mr. Zappey's zeal was such as to require a constant word of caution that he might not overtax his strength, while the size and condition of the entire series of specimens afford evidence alike of his judgment, his energy, his skill in preparation, and his care and watchfulness during the many difficulties in transportation. The results of Mr. Thayer's liberality and Mr. Zappey's zeal would have been very much less, however, had they not been supplemented by the tact and administrative ability of Mr. Wilson. Mr. Wilson's earlier work in China was of distinct advantage for the success of the Arboretum Expedition. It had shown that he possessed the trustworthiness characteristic of his race, and the natural and ever present suspiciousness of the natives towards aliens engaged in a line of work the object of which is not wholly clear, was happily avoided, from the beginning.

It should also be recognized that all of Mr. Wilson's time and energy were required for his botanical work<sup>1</sup> and that every additional task he assumed, even though willingly and successfully, was nevertheless a burden.

The transcription of Chinese geographic names presents difficulties of orthography, syllabication, and capitalization; in some works the same name is variously given. It is believed that throughout the following pages a considerable degree of uniformity has been achieved, a result due to Mr. E. C. Drew, who has

<sup>1</sup> Some of the results of Mr. Wilson's work in China have been published by the Arboretum:—*Plantae Wilsonianae*. Part I. Cambridge, July 31, 1911, 144 pp. Part II. Cambridge, April 30, 1912, 168 pp.

most kindly revised a list of the geographic names and corrected many puzzling variations due largely to phonetic spelling.

The larger part of the material secured consists of birds and mammals, though other interesting vertebrates were collected together with a small series of invertebrates, chiefly insects.

Messrs. Wilson and Zappey landed at Shanghai the 4th of February, 1907; while outfitting, Mr. Zappey employed his time in collecting in the immediate environs of Shanghai, but here, as in the vicinity of other large cities, the density of the population precluded effective collecting. Ichang, Hupeh, the base for much of the work of the Expedition was reached on the 26th of February, and after several weeks spent in its vicinity Mr. Zappey left that city early in April and collected for about two months among the mountains north of the Yangtze. Here at varying altitudes of from 2,400 to 9,500 feet in well forested country, pheasants were abundant and the probable occurrence of the Takin, (*Budorcas*), noted.

With the exception of two weeks passed unfortunately in the hospital at Hankow, Mr. Zappey collected during June, July, and August in the Ichang region or between Ichang and Shasi; much rain fell during this period and the weather when fair was very hot. September and October also proved rainy in and about Ichang.

Between the 5th and 20th of November, Mr. Zappey worked at higher altitudes at Shihtowya, Kwangpow, Putze, and neighboring places, good weather prevailing, but cold and cloudy days were experienced again at Ichang between the 21st of November and the 1st of December. December proved fair, with the temperature cool or cold, and a considerable series of birds and mammals was secured. The search for Serow among the mountains was unsuccessful, though their tracks were found on several occasions and the alarm note which Mr. Zappey describes as "a series of snorting squeals sounding like \* \* \* tearing a piece of starched cloth such as a window shade" furnished additional evidence of their presence.

In 1908, January, February, and early March were spent in short trips down the river; on the 15th of January at Ichanghsien the first Goral, *Naemorhedus griseus*, was collected; others of both sexes, young and old, were taken later. These goat-like antelopes were not uncommon on the precipitous evergreen-clothed cliffs; they were seen, however, only in open places as they jumped from ledge to ledge and their capture was thus to a certain degree a matter of chance. Kwangtitzze, situated about fifteen miles below Shasi, with an abundance of

grass cover and numerous reedy pools, proved an ideal country for deer; and here, early in February, water deer, *Hydrelaphus inermis*, were plentiful and a fine series was secured.

Returning to Ichang the 18th of February, the interval until the 13th of March was occupied, principally, in the care of material and in the preparation for a long river trip to the west.

Leaving Ichang the 13th of March the following list of localities with dates will indicate the route travelled:—

1908: March	16 — Nantow.
	25 — Patunghsien.
April	1 — Wanh sien.
1908: April	4 — Changehow sien.
	11 — Chungking.
	21 — Juchi.
	26 — Nanchihsien.
	30 — Suifu.
May	6 — Kiating. The river-boat was left at this point.
	12 — Lungchi.
	15 — Washan.
June	13 — Kiating.
	21 — Hungyachsien.
	29 — Nitow.
July	4 — Tachienlu.
	14 — Yachiakun.
	18 — Lianghokow.
	24 — Cheto.
August	5 — Tongolow.
	7 — Nachuka.
	15 — Ramala Pass.
	16 — Shuowlow. Farthest west.
1908: August	26 — Nachuka.
	31 — Tachienlu.
September	6 — Lianghokow.
	17 — Tachiao.
	23 — Tachienlu.
October	9 — Yachow.
	17 — Omeihsien.
	22 — Washan.

	November	9 — Tsaikow.
		11 — Omeih sien.
		15 — Chinchiang.
		30 — Chiachianghsien.
	December	3 — Yachow.
		8 — Kiating. River-boat trip resumed.
		23 — Suifu.
		29 — Chungking.
1909:	January	14 — Ichang.
		22 — Hochiaping.
	February	2 — Changyanghsien.
		5 — Ichang.
	March	7 — Shasi.
		18 — Nankin.
		26 — Leave Shanghai.

As shown by the above itinerary, the Expedition was planned as a reconnaissance and covered too much ground to allow successful intensive collecting. At five localities only were fifty or more species obtained; the largest number, 194, was taken at Ichang, and 91, the next in number, at Washan. This last locality proved of great scientific interest and ten of the thirty-six new forms discovered were found there. It was at Washan that a herd of Takins, *Budorcas tibetanus*, was observed. Two individuals, a young male and a young female, said by the natives to be about a month old, were taken. The herd was feeding on the side of the steep mountain at an elevation of about 10,000 feet and was well concealed in the dense bamboo thicket. The flesh of these Takin proved palatable and in taste resembled mutton. The native names for the Takin are *Yare niu ngai nu* and *Parn nyang*.

Serow, *Capricornis argyrochaetes*, were also found at Washan, where they frequented the recesses of the most precipitous cliffs. The native name of the Serow is *Ngailu* (Cliff donkey).

Though formerly abundant throughout the region traversed by Mr. Zappey, the Musk deer, *Moschus sifanicus*, has been so persistently hunted for the sake of its valuable secretion that it is now practically exterminated. One specimen was shot at Shuowlow the 19th of August, 1908. The odor from the scent-gland was most powerful though quite different, Mr. Zappey notes, from that of the refined perfume. The habit of this species of frequenting the trunks of fallen trees is well known to the Chinese.



# PISCES.

By SAMUEL GARMAN.

The fishes, twenty-nine species, secured by this Expedition were taken at various points on the Yangtze Kiang and its affluent the Min, between Kiating and Shasi sixty miles or more below Ichang, Hupeh. Three of the species are Chinese perches, *Siniperca*, also said to be found in Japan; one is a clupeoid, *Coilia*, heretofore known as marine, the presence of which so far from the mouth of the river is probably due to a habit of spawning in fresh water; another is an *Ophicephalus* of wide range in eastern Asia; three others are siluroids, one of them very widely distributed, another peculiar to the locality, and a third apparently undescribed; twenty are cyprinoids which taken together might indicate rather less dependence on barbels in their region than farther to the south or to the west; three of these species appear to be undescribed; and finally one of the species is an eel, *Monopterus*, which has been taken in numerous localities of China, India, the East Indian Archipelago, and Japan. In early days the fishes of the valley of the Yangtze were more distinct, because more isolated, than at present. By means of the Grand Canal all streams of moderate length between Hangchow on the south and Peking on the north were linked together so that the basin of the Hwang Ho, draining into the Gulf of Chihli, and that of the Yangtze Kiang drained into the Yellow Sea are no longer so far as concerns their fishes to be treated as distinct faunal regions. This connection by the Canal accounts for the fact that Basilewsky, 1855, has described so many of the species contained in the present series, from collections in great part made in streams flowing into the Gulf of Chihli, and also for the fact that his types and specimens from the Yangtze differ so little. The Chinese types described by Bleeker were mainly taken near the mouth of the Yangtze, as were those described by Steindachner and the earlier of those of Günther. By later contributions Sauvage, Günther, and Regan have added to the knowledge of the species much nearer the sources of the river. The localities traversed by Mr. Zappey were thus pretty well surrounded by the localities of earlier workers. In the following list additions to original descriptions and variations of individual specimens are recorded by the partial diagnoses appended.

## SERRANIDAE.

## SINIPERCA CHUA-TSI (Basilewsky) Gill.

A number of specimens of the Chinese perch that would usually be placed under *S. chua-tsi* separate readily into two groups:— one, the species proper, characterized by an eye about one sixth of the length of the head, or one and one half times the interorbital width, and on which the maxillary reaches beyond a vertical from the hind edge of the eye, and another in which the eye is nearly one fourth of the length of the head, or about twice the interorbital width and in which there is a considerable distance behind the end of the maxillary in front of a vertical at the hind border of the orbit. In the numbers of fin-rays or in markings the two groups show little difference, but the scales on the specimens with the small eyes appear to be smaller. The presence of the two forms in the same locality may be ascribed to individual variation in a single species, or may be credited to an intermixture of two quite distinct species at some time or in some parts of their respective ranges. The two figures published by Basilewsky, 1855, represent the small-eyed form. Kner, 1867, under the same name, figured a specimen, in which the eye is much larger and the maxillary approaches a vertical from the hind edge of the orbit, which might better be placed in the group with large eyes, though the type of the latter described below has a still larger eye and an orbit extending farther backward than the end of the maxillary. As the theory of a mixing of two forms originally distinct is favored here, the large-eyed one is described as *Siniperca knerii* and certain characters of the specimen chosen for a type are noted.

Ichang.

## SINIPERCA KNERII, sp. nov.

D. 12 + 14, A. 3 + 9, V. 6, P. 2 + 14; Ll. 125 $\frac{25}{70}$  ca.

Similar to *S. chua-tsi*, but differing in a much larger eye. Diameter of orbit five sixths of its distance from the extreme end of the snout, nearly twice the width of the interorbital space, or twice the greatest width of the maxillary, or equal to the distance from the orbit to the front of the intermaxillary. Maxillary subtending the anterior three fourths of the eye. Dorsal origin above that of the pectoral; spinous portion twice as long as the soft; spines increasing in length to the fifth, which is about one third of the length of the head, a little shorter than the soft rays, or than the second anal spine which last is the longest and most robust on the body. First and third anal spines shorter and

more slender than the second. Markings differing little from those of the small-eyed form.

*Type*:—No. 29844 M. C. Z. Hupeh: Ichang.

#### SINIPERCA SCHERZERI Steindachner.

Agrees closely with the figure by Steindachner, the most noticeable difference being in the larger size and greater number of the teeth on the posterior edge of the operculum.

Ichang.

#### OPHICEPHALIDAE.

##### OPHICEPHALUS ARGUS Cantor.

D. 48, A. 32; Ll.  $63\frac{8}{18}$ .

Kiating.

#### CLUPEIDAE.

##### COILIA NASUS Schlegel.

D. 13, A. 98, P. 6 + 11; Ll. 76.

Ventral serration with twenty-two teeth in front of the ventral fins and thirty-six behind their origins. Intermediate between *C. nasus* and *C. ectenes* Jordan and Starks but not to be separated from the former.

Kiating.

#### CYPRINIDAE.

##### CYPRINUS CARPIO Linné.

D. 22, A. 8, V. 9, p. 17; Ll.  $35\frac{6}{5}$ ; Phar. teeth 3.1.2 | 2.1.3; 4 barbels.

Shasi.

##### CARASSIUS CARASSIUS (Linné) Nilsson.

D. 20, A. 8, V. 9, P. 16; Ll.  $29\frac{7}{8}$ ; Phar. teeth 3 | 3; no barbels.

Ichang.

##### PARABRAMIS PEKINENSIS (Basilewsky) Bleeker.

*Abramis pekinensis* BASIL., 1855, Nouv. mem. Soc. nat. Mosc., **10**, p. 237, pl. 6, f. 2.

*Acanthobrama pekinensis* BLEEKER, 1860, Ichth. Arch. Ind. Prodr., **2**, Cypr., p. 282.

*Culter pekinensis* KNER, 1867, Novara fische, p. 360, pl. 14, f. 4.

*Chanodichthys pekinensis* GÜNTHER, 1868, Cat., **7**, p. 327.

*Parabramis pekinensis* BLEEKER, 1871, Nat. verh. k. akad., **12**, p. 80.

D. 3 + 7, A. 3 + 32, V. 9, P. 17; Ll.  $53\frac{12}{7}$ ; Phar. teeth 5.4.2 | 2.4.4.

These specimens are not as dark on the body or fins as that figured by Basilewsky, but the scales have the light centres surrounded by punctulations of brown. Distally each of the fins is darker. The general effect of the color is silver rather than brown. Body keeled from the pectorals backward to the end of the anal base. Dorsal origin midway from end of snout to base of caudal. Kner's figure does not represent the species very well, as it is too slender; the description is good. Basilewsky described the species from affluents of Chihli; Mr. Zappey secured it at Ichang.

*OPSARIICHTHYS ACUTIPINNIS* (Bleeker) Günther.

*Barilius* (*Barilius*) *acutipinnis* BLEEKER, 1871, Nat. verh. k. akad., **12**, p. 81, pl. 13, f. 1.

*Opsariichthys acutipinnis* and *O. bidens* GÜNT., 1873, Ann. mag. nat. hist., ser. 4, **12**, p. 249.

The figure of *O. acutipinnis* was made from a half grown specimen. The description of *O. bidens* also was drawn from a specimen not fully developed. The specimens at hand make it evident that *O. bidens* is a synonym. The notches of the jaws are very evident on some and hardly noticeable on others. There is much variation in individuals aside from the peculiar sexual changes in the fins and the tubercles of the cheeks. The pharyngeal teeth vary from 4.2 to 4.3 and to 4.3.1. The difference in numbers of rays or of scales is not great. In the adult the markings on the fins and flanks are like those of *O. platypus*, but the interradiial spots are more distinct, and on some the lower half of the face is blackish.

Kiating, Min River.

*GARRA* (*AGENEIOGARRA*) *IMBERBA*, subgen. nov. sp. nov.

D. 13 (4 + 9), A. 8, V. 10, p. 17; Ll.  $50\frac{8}{4}$ , head to D. 17; Phar. teeth 5.4.2 | 2.4.5, slender, pointed.

Body elongate, greatest depth about equal to length of head or one seventh of the total length, compressed posteriorly, depressed and broadened in front. Head wider than deep, flattened below, slightly convex, both longitudinally and transversely, on the top. Snout very wide, short, broadly rounded across the end. Eye moderate, less than one fourth as long as the head and behind its mid length, in width of orbit less than half the interocular space. Nostrils close together, nearer to the eye than to the end of the snout. Snout without a lobe above, as in *G. lamta*, but with a group of pits at each side of the middle

of the upper surface. Mouth large, inferior, outline somewhat arched transversely; upper lip fringed, connected at the angles with a fold passing a short distance behind that at the hind edge of the disk; jaws sharp-edged. The deep transverse groove in front of the disk, behind the lower jaws, is not continued at its sides. No barbels. Pectorals short, reaching more than half way to the ventrals. Middle of dorsal base half way from snout to base of caudal; fin as high as long, hind margin deeply indented. Ventrals shorter than the dorsal, but extending a little farther backward, origins below the eighth ray of the dorsal. Anal smaller than the ventrals, origin midway between the bases of the ventrals and the base of the caudal. Caudal deeply notched. Total length 10.5 inches.

Lower surfaces uniform yellowish; back darker yellow to brownish, each scale with a transverse darker streak on its forward portion, those on the lateral line a little more distinct.

The generic diagnosis of *Garra* being modified so as to include *G. imberba*, with Bleeker's subdivisions, based on the number of barbels, the subgenera *Garra*, with four barbels, *Discognathus* with two, and *Ageneiogarra* with no barbels, are readily distinguished.

*Type*:—No. 29835 M. C. Z. Western Szechuan: Kiating, Min River. W. R. Zappey.

ONYCHOSTOMA LATICEPS Günther.

D. 4 + 8, A. 3 + 5, V. 9, P. 16; Ll. 49 $\frac{3}{8}$ ; Phar. teeth 5.3.2 | 2.3.5, slender, pointed.

Slight differences from the type are to be seen among these specimens. Head short, about one fifth of the length to the base of the caudal, moderately broad, blunt, arched from the snout to the eyes and across the interorbital region. Eye one fourth of the length of the head, in front of its mid length. No barbels. Mouth large, arched, reaching the sides of the head below the eyes; lower jaws very strong, with a slight knob below the symphysis; upper jaws thin and protrusive (downward); upper lip thin, distinct. Pectorals small, pointed, reaching a vertical from the origin of the dorsal. Dorsal with a strong serrated spine, the fourth ray longer than the head, hind margin of fin concave, angles acute, middle of base in the middle of the total length without the caudal. Ventral origin below the sixth dorsal ray, outer angle acute. Anal short, pointed, origin midway from the origins of the ventrals to the base of the caudal, third ray as long as the head. Caudal deeply notched, lobes

acute. Scales moderate, longitudinally with fine striations. Lateral line in the middle of the side of the tail. Largest specimen eleven inches.

Lustrous golden, darker on upper half of body and head; fins darker.

Originally described from Huisien.

Ichang.

CTENOPHARYGODON IDELLUS (Valenciennes) Günther.

D. 10, A. 11, V. 9, P. 20; Ll. 43 $\frac{7}{8}$ , 18 scales from head to dorsal; Phar. teeth 4.2 | 2.5.

Top and sides of head darkened by dots of black pigment; scales of back and flanks similarly darkened near the edges; fins dark on their edges, distally thickly dotted with black; lower surfaces uniform light.

Shasi.

MYLOLEUCISCUS ATRIPINNIS, gen. nov. sp. nov.

D. 10, A. 11, V. 9, P. 21; Ll. 42 $\frac{7}{8}$ ; 16 scales in front of the dorsal; Phar. teeth 5 | 5, in a single series.

Form resembling that of *Ctenopharygodon idellus*, elongate, compressed and rather deep in the caudal region. Head about one fourth and depth two ninths of the length from end of snout to base of caudal, a little deeper than broad posteriorly, pointed in front, subquadrangular in cross section; crown broad posteriorly, convex transversely. Eye large, length two ninths of that of the head; bones of the orbital series narrow, preorbital bone little longer than deep. Mouth moderate, somewhat oblique, width and length about equal; maxillary hardly reaching a vertical from the orbit; intermaxillary protractile. No barbels. Pharyngeal teeth in a single series of five, two of which are very broad, stout, rounded molars, the remaining three being longer, more slender, and compressed with crowns of a different shape and concave. Fins rather small. Pectorals reaching two thirds of the distance to the ventrals. Dorsal origin midway from end of snout to base of caudal. Ventral origin below the third ray of the dorsal, fin not reaching as far back as the dorsal. Anal origin midway from origins of ventrals to base of caudal. Caudal notch not half the length of the fin.

Body dark with punctuations of black; fins blackish.

Type:—No. 29817 M. C. Z. Hupeh: Shasi. W. R. Zappey.

The genus *Myloleuciscus* may be characterized by a single series of pharyngeal teeth, some of which are extremely broad, short, rounded molars and

others are longer, more slender and compressed, and have oblique, concave, pointed crowns. It is probable that *Leuciscus aethiops* Basilewsky, 1855, belongs to this genus. Günther's use of that species as the type of his genus *Myloleucus*, 1873, will not interfere, since the name *Myloleucus* had been applied by Cope, 1871, to other species not congeneric. *Myloleucus* of Günther, 1873, was "characterized by extremely broad, molar-like pharyngeal teeth, in a single series."

*SQUALIOBARBUS CURRICULUS* (Richardson) Günther.

D. 10, A. 11, V. 9, P. 17; Ll.  $45\frac{7}{8}$ ; Phar. teeth 5.3.2 | 2.3.4, compressed, pointed.

Dorsal origin midway from snout to base of caudal. Origins of the ventrals below the third ray of the dorsal. Anal origin midway from the axils of the ventrals to the base of the caudal. A minute barbel at the angle of the mouth.

Silvery; blackish on the bases of the scales of the flanks and the back, forming longitudinal vittae; silver-white under the edge of the opercle to the shoulders; fins dusky.

Ichang.

*SQUALIOBARBUS ELONGATUS* Kner.

D. 12, A. 12, V. 10, P. 19; Ll.  $68-70\frac{10}{4}$ , 30 scales from head to dorsal.

Mouth reaching to a vertical from the nostril, not to the anterior border of the eye. No barbels. Preorbital bone very large, close to the eye the nostrils and the mouth cleft; suborbitals narrow, elongate. Pharyngeal teeth 5.4.2 | 2.4.4, compressed and hooked. Peritoneum blackish, silvered. Origin of the dorsal halfway from the end of the snout to the base of the caudal, very little farther back than the origins of the ventrals. Scales lustrous silver; back darker, olivaceous. A close ally of *Squaliobarbus dahuricus* Basilewsky from Mongolia and Mantchuria but distinguished by fewer scales in the lateral line and by the position of the dorsal, nearer the head.

Ichang.

*XENOCYPRIS NITIDUS*, sp. nov.

D. 3 + 7, A. 3 + 9, V. 9, P. 18; Ll.  $60\frac{8-9}{5}$ .

Body much compressed, not keeled below, depth, or length of head, about two ninths of the length, without the caudal. Eye large, two sevenths of the head, equal its distance from the end of the snout. Suborbital bones narrow,

elongate. Snout produced. Mouth inferior, transverse, bent backward at the preorbital bone. Pharyngeal teeth 6.4.2 | 2.4.6, larger compressed pointed and rigid, smaller slender and movable in the inner rows. Pectorals small, not reaching the ventrals. Ventral origins below the middle of the dorsal base. Third ray of the dorsal strong, as long as the head. Anal small, base twice as far from the bases of the ventrals as from the base of caudal. Dorsal origin a little forward of midway from end of snout to base of caudal, fourth ray in the mid length, spine as long as the head. Caudal deeply notched. Scales moderate.

Cheeks and scales silvery; upper half of body, and top of head brownish.

Intermediate between *X. tapeinosoma* Bleeker and *X. argentea* Günther. *Xenocypris nitidus* is more elongate and less oval than *X. lampertii* Popta; the eye is larger and about half its length is in the hinder half of the head, it is also about twice as far from the upper outline of the head as from the lower; there is no keel in front of the vent; there are more scales in the lateral line and fewer in the transverse; and the origin of the dorsal is farther forward.

*Types*:—No. 29822, 29823 M. C. Z. Hupeh: Shasi. W. R. Zappey.

#### HEMICULTER LEUCISCULUS (Basilewsky) Bleeker.

D. 9, A. 16, V. 6, P. 15; Ll.  $45\frac{7}{8}$ , head to dorsal 19 scales.

Dorsal origin in the middle of the length from the end of the snout to the base of the caudal, at a vertical from the hind ends of the bases of the ventrals. Pectorals acuminate, ending in front of the origins of the ventrals at a distance greater than the length of the orbit.

The type of this species was taken in streams flowing into the Gulf of Chihli. The specimens in this collection were taken at Shasi on the Yangtze Kiang.

Among individual variations it is to be noticed that on some specimens the lateral line rises abruptly above the base of the anal, on four scales, then continues for eight scales in the middle of the caudal pedicel in a direct line; on others the rise is as gradual as that figured by Bleeker.

#### CULTER DABRYI Bleeker.

D. 3 + 7, A. 3 + 26, V. 9, P. 15; Ll.  $64\frac{11-12}{5-6}$ .

Depth equal four seventeenths of the length to the base of the caudal; head equal two ninths of the same length. Nape slightly convex. Abdominal



edge trenchant from the pectorals to the anal. Eye large, diameter nearly one sixth of the head; longer than the distance from the end of the snout. Mouth nearly vertical, maxillary reaching below the hinder nostril. Preorbital bone deeper than long; suborbitals narrow. Pharyngeal teeth 5.4.2 | 2.4.5, compressed, pointed, hooked at the apex. Dorsal origin half the length of the orbit behind the middle of the length from snout to base of caudal; third spine strong, as long as the head. Caudal pedicel longer than deep in the free portion. Lateral line curving downward on the flank and again up to the middle of the pedicel. Total length, six inches.

Silvery; back brownish or olive tinted.

Shasi.

#### LUCIOBRAMA TYPUS Bleeker.

D. 10, A. 13, V. 10, P. 15; Ll.  $150\frac{28}{12}$  ca.

Head long, pointed, scaleless, one fourth of the total length. Eye in the foremost third of the head. Mouth little longer than the eye; maxillary reaching nearly to the orbit. Dorsal origin in the middle of the length from the eye to the end of the caudal, about one length of the dorsal base farther back than the origin of the anal. Pectorals small. Pharyngeal teeth 5.1 | 1.5 nearly straight, slender, tapering to a point. Bleeker says of these teeth, "valde gracilibus insertis uniseriatis acicularibus vix curvatis 4 | 4," which indicates a considerable variation, with need of some change in the generic diagnosis. Caudal notch deep, lobes subequal. Bright silvery, somewhat darkened on the back.

Ichang.

#### HEMIBARBUS MACULATUS Bleeker.

D. 3 + 7, A. 3 + 6, V. 9, P. 20; Ll.  $49\frac{7}{8}$ .

Maxillary barbels half as long as the orbit. Orbit half as long as the snout, or two ninths of the length of the head. Pharyngeal teeth 5.4.2 | 2.4.5, pointed. Dorsal origin halfway from end of snout to base of caudal. Ventral origins below the fifth ray of the dorsal. Anal origin equidistant from ventral origins and base of caudal. About eight darker blotches on the second row above the lateral line, apparently under the scales; below these the scales are silvery, above they are darker and with dorsal and caudal fins somewhat maculate with dark.

Ichang.

## SAUROGOBIO DUMERILII Bleeker.

D. 9, A. 9, V. 8, P. 16; Ll. 59 $\frac{7}{8}$ .

A prominence below the symphysis of the lower jaws. Barbel reaching below the middle of the eye. Pharyngeal teeth 5 | 5; two of these teeth, in each series, are molar-like, resembling those of *Myloleuciscus atripinnis* but not so much differentiated. Dorsal origin at one third of the distance from the end of the snout to the base of the caudal, and anal origin in the hindmost fourth of this length. End of dorsal and ends of ventrals opposed. Pectorals reaching a vertical from the origin of the dorsal. Scales of the lateral line and below plain golden; three of the vertebral rows with brown hind margins, three other rows at each side of the dorsal three with a brown spot on the middle of the hinder edge of each scale, forming longitudinal vittae. Bases of fins yellow, distal portions darker. Total length 10 $\frac{1}{2}$  inches.

Ichang, Shasi.

## CORIPAREIUS, gen. nov.

Body compressed, deep in the caudal pedicel, dorsal and ventrals in the forward half; head tapering, entirely covered by thick skin; snout produced, blunt. Mouth narrow, inferior, lips thick. Maxillary barbels present. Pharyngeal teeth 5 | 5 or 4, compressed with large crown. Scales moderate, lateral line straight, in the middle of the tail. Dorsal small, without osseous ray, above the ventrals. Anal short.

Type. *C. cetopsis* (Kner).

## CORIPAREIUS CETOPSIS Kner.

?*Gobio heterodon* BLEEKER, 1864, Ned. tijd., **2**, p. 26.

*Labeo cetopsis* KNER, 1867, Novara fische, p. 351, pl. 15, f. 2.

*Barbus cetopsis* GÜNTHER, 1868, Cat., **7**, p. 135.

*Saurogobio cetopsis* BLEEKER, 1871, Nat. verh. k. akad., **12**, p. 8.

D. 9, A. 9, V. 8, P. 19; Ll. 54 $\frac{7}{8}$ .

The body is rather narrow, depth, or length of head, about one fifth of the total. Head posteriorly as wide as deep, tapering forward, prominent and bluntly rounded at the end of the narrow snout. Nostrils large, close together, near the eye. Eye small, one eighth or less of the head, with a comparatively wide adipose ring. Mouth as wide as long, cleft broadly rounded in front or subtruncate. Lips thick. Barbels two, reaching the hind edge of the preopercle. Entire head, including the opercles covered with loose thick skin.

Pharyngeal teeth 5 | 5 or 4, compressed with expanded crown. All fins acuminate. Pectorals reaching the origins of the ventrals, or a vertical from the fifth ray of the dorsal. Dorsal short, without an osseous ray, entirely in the anterior half of the total length, hardly reaching the mid length when depressed; height equal length of head. Ventrals short; origins below the third dorsal ray. Anal small; origin equidistant from that of caudal and origins of ventrals. Caudal deeply notched, lobes pointed, upper longer. Lateral line on middle of flank and tail, straight. Scales moderate.

Lustrous golden, more olive on back and head; each fin with a blackish area in the distal half, tipped with white behind the black.

Luchow, Ichang, Shanghai.

#### RHINOGOBIO TYPUS Bleeker.

D. 10, A. 9, V. 8, P. 16; Ll. 47 $\frac{8}{5}$ .

Maxillary barbel reaching behind the middle of the eye. Length of orbit half of its distance from the end of the snout. Pharyngeal teeth in two series 5.2 | 2.5, crowns hooked at the apex. Origins of pectorals below the fourth ray of the dorsal, fins extending to the origins of the ventrals. Ninth ray of the dorsal in the middle of the length from the snout to the base of the caudal; third ray shorter than the head. Anal origin about midway from ventral origins to base of caudal. Caudal deeply notched, lobes sharp; caudal pedicel elongate, not deep.

Ichang.

#### PSEUDOGOPIO FILIFER, sp. nov.

D. 10, A. 9, V. 8, P. 13-14; Ll. 42-44 $\frac{5}{3}$ .

Body elongate, slender, depth about one seventh and head one fifth of the total length. Eye moderate, one fifth of the head, nearly two thirds as long as the snout. Snout one third of the head length. Mouth not reaching a vertical from the eye; upper jaws the longer. Maxillary barbels extending farther back than the eye. Dorsal origin above the origins of the ventrals. Outer angles of pectorals and ventrals thread-like, second ray longest. Pectorals reaching behind the bases of the ventrals. Ventrals reaching nearly as far back as the end of the dorsal. Anal origin about midway from origins of ventrals to base of caudal. Caudal deeply notched, lobes acuminate. Middle of dorsal base equidistant from end of snout and base of caudal. Scales large; lateral

line descending little on the flank, ending on the middle of the tail. Form more slender than that of *P. rivularis*, as figured by Steindachner; back less high, dorsal lower; pectorals and ventrals much more produced; colors somewhat similar, but having a lateral band of silver with faint darker cloudings.

Lustrous silvery below the lateral lines; above the lines darker, blotched, and clouded faintly with brown. Fins, dorsal and caudal, with several oblique rows of small spots of darker brown parallel with the hind borders of the fins and not as in *P. sinensis* Kner.

*Types*.—No. 29833, 29834 M. C. Z. Hupeh: Changyanghsien, Yangtze Kiang River. W. R. Zappey.

*BOTIA VARIEGATA* Günther.

D. 12, A. 8, V. 10, P. 15; Ll. 215<sup>55</sup>/<sub>80</sub>; total length 15 inches.

Body compressed, depth nearly one seventh of the total length. Head compressed, little less than one fourth of the total, greatest width about two fifths of the length. Snout narrower than deep, high and broadly rounded at the end. Eye small, hardly one twelfth of the length of the head. Suborbital spine strong, rather slender pointed, not bifid. Barbels six; the maxillary applied to the side of the head reach the end of the snout. Mouth moderate, as wide as long; cleft subtruncate in front; upper jaws with a prominence on the symphysis. Cheek with small scales in front of the operculum backward from the mouth. Pectorals and ventrals with a membranous fold in the axils. Dorsal origin equidistant from eye and base of caudal. Ventral origins below the third ray of the dorsal. Anal origin halfway from the origins of the ventrals to the base of the caudal. Dorsal, pectorals, and anal slightly concave on the hind margin; ventrals little convex. Caudal deeply notched. Outer angles of all fins acute. Depth of caudal pedicel two fifths of its length.

Brownish; head with narrow vermiculations and spots of bluish; each fin with about four oblique irregular and broken bands of brown; body with about six broad transverse bands of dark brown; the first and narrowest behind the gill opening, the second between pectorals and dorsal, the third on the origins of the ventrals, the fourth at the end of the dorsal base, the fifth above the anal, and the sixth, as long as deep, on the base of the caudal.

The specimen described shows some variations from the type, though both were from the same locality.

Ichang.

## SILURIDAE.

## SILURUS ASOTUS Linné.

Ichang.

## PSEUDOBAGRUS VACHELLII Richardson.

Luchow, Ichang.

## LIOCASSIS NASO, sp. nov.

D. 2 + 7, A. 16, V. 6, P. 1 + 11.

Depth of body one sixth, and length of head one fifth of the total length. Head about as broad as high at the occiput, narrowing forward, and from below to the crown. Crown straight from the nape to end of snout. Snout produced, subtruncate, and curving upward and forward from the mouth; not depressed and thin as in species of *Macrones*, little wider than deep at the end. No labial teeth; palatal teeth in a transverse band narrowly divided in the middle. Eyes lateral covered by skin, folds rudimentary, above and below. Barbels eight; maxillary slender, not reaching the gill opening, narial reaching the middle of the eye. Nostrils separated; anterior in front of the snout; posterior near the eyes, with a slender barbel in front. Skull covered by thin skin, with a minute spine on each of the ridges above the snout. Denticles of the dorsal spine weaker than those of the inner side of the pectoral spines. Caudal deeply notched. Adipose fin shorter than the head.

Brownish, with clouded areas at the top of the head, at the sides of the dorsal and behind it.

*Type*:—No. 29847 M. C. Z. Hupeh: Ichang. W. R. Zappey.

## SYMBRANCHIDAE.

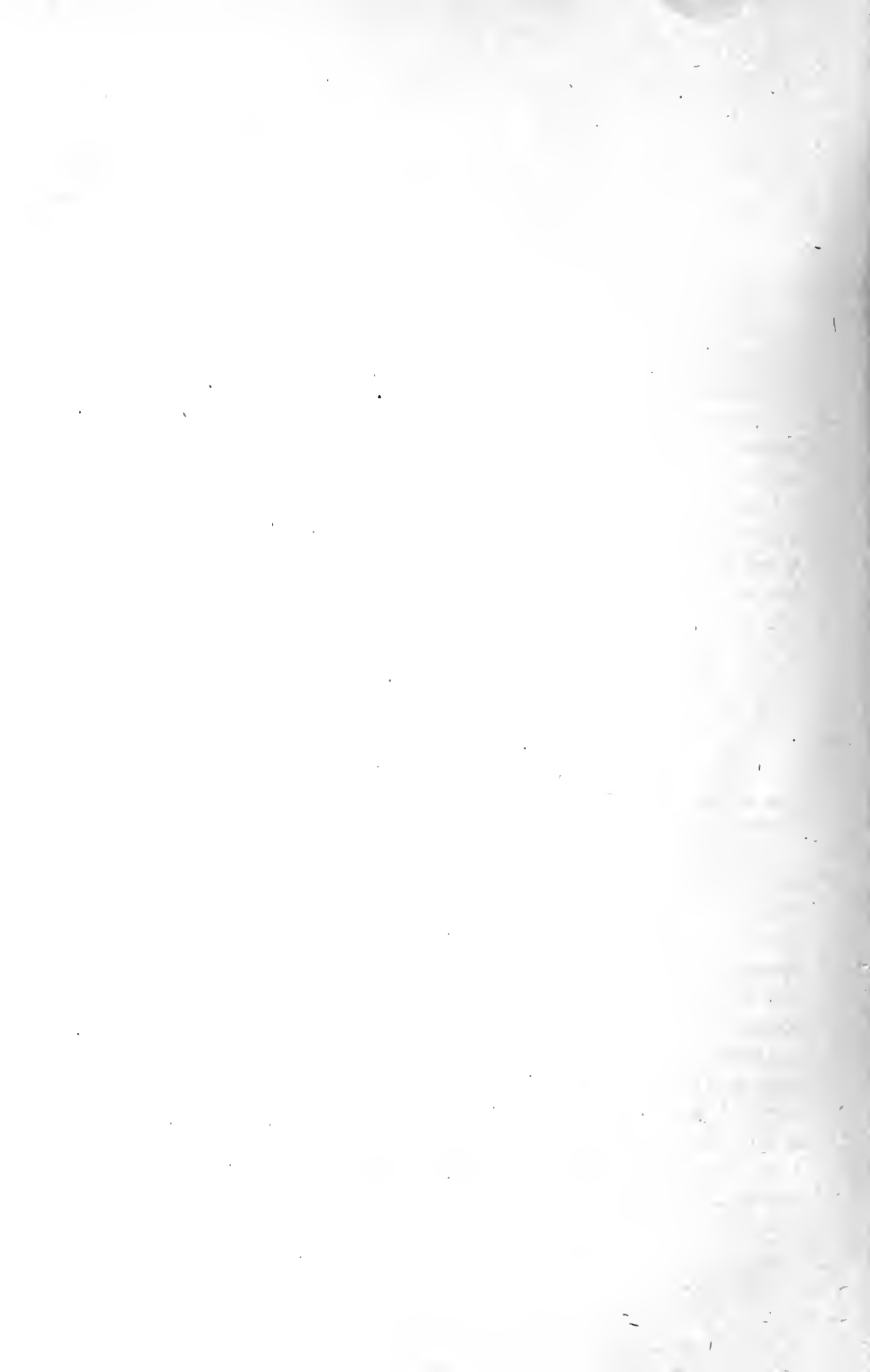
## MONOPTERUS JAVANENSIS Lacépède.

*Muraena alba* ZUIEW, 1793.

*Monopterus javanensis* LACÉPÈDE, 1800.

The arrangement of the colors on this eel is suggestive that the back and upper surfaces are exposed to the more direct rays of light; these portions of the body are dark while the lower half is much lighter and even white. Further, the chin and throat are much darker than the balance of the lower surfaces, which is probably due to the habitual carriage of head and neck raised above the horizontal.

Washan; from a marsh near the Tung River, at an altitude of 6,000 feet or more.



# AMPHIBIA AND REPTILIA.

By THOMAS BARBOUR.

The collection embraces twenty-three species. For the most part they are long known and wide-ranging forms. Three species, *Hyla monticola*, *Amblycephalus chinensis*, and *Agkistrodon tibetanus*, are described as new.

The geographical ranges of several species have been extended by the material in hand; and one species, *Batrachypterus sinensis* Boulenger, is interesting because of its rarity.

So few collections have been made in the higher regions of the Szechwan-Tibetan mountain area that even so small a series is of peculiar interest in that it affords another addition to our knowledge of a region which has doubtless been the centre of dispersal for very many different forms.

## AMPHIBIA.

### CRYPTOBRANCHIDAE.

#### MEGALOBATRACHUS JAPONICUS (Temminck).

TEMMINCK, Fauna Japon., 1837, pt. 3, Coup d'oeil, p. xxvi (fide Stejneger).

STEJNEGER, Bull. 58, U. S. N. M., 1907, p. 6-11.

Stejneger says that he has no means of verifying the fact that Boulenger regards *Sieboldia davidiana* Blanchard from China as identical with Japanese specimens. That Boulenger, as was expected, as well as Krefft and Gray were correct in this stand is proven by material now in hand. Mr. Zappey took a fine example about two feet long at Yachow, and a young one at Hungyachsien both towns in western Szechwan. They are not distinguishable from Japanese specimens.

Stejneger (*loc. cit.*, p. 7) notes the three records of Blanchard, Krefft, and Gray from China. Other specimens are, one taken by Mr. A. E. Pratt at Kiatingfu, Szechwan, which Günther called *Megalobatrachus maximus*, a synonym of *japonicus*. Walterstorff (Abh. Mus. f. natur. u. heimkunde Magdeburg, 1906, 1, 2, p. 123) records two young examples obtained from native sources somewhere in the country back of Canton, collection of Dr. Martin

Kreyenberg. Walterstorff adds (p. 132) "Sonst in China von Muping, West-Sze-Tschuan, bekannt."

Probably the species will prove widely distributed in China from the Yangtze southward.

### AMBLYSTOMATIDAE.

#### BATRACHYPTERUS SINENSIS (Sauvage).

Plate 1, Fig. 1.

SAUVAGE, Bull. Soc. philom. ser. 7, 1, p. 117.

BOULENGER, Cat. Batr. Grad., 1882, p. 37.

It is a pleasure to record the capture of this rare form at Lianghokow, western Szechwan, at an altitude of over 12,000 feet. Mr. Zappey tells me that the single example taken was walking over a bed of damp moss among the stunted spruces and firs at the very limit of tree growth. There was no pond or stream of running water near by. It varies considerably from Boulenger's description in that the tail is little compressed and shows much less fin than his figure does; the digits are somewhat more slender; and the coloration is slightly different. The most important difference, however, is that the palatine teeth, instead of being "in two short transverse arched series between the choanae," are in two straight series slanting sharply and converging slightly anterior to the choanae; but still with a wide interspace, as Boulenger describes. Altogether while a series might prove that this form is specifically distinct, it seems more likely that the differences are due to individual variation, which in such characters as length of digits, for instance, so often shows such marked differences in these lowly forms.

### BUFONIDAE.

#### BUFO BUFO GARGARIZANS (Cantor).

CANTOR, Ann. mag. nat. hist., 1842, 9, p. 483.

STEJNEGER, Bull. 58, U. S. N. M., 1907, p. 68.

Mr. Zappey took nine toads about Ichang. These have been referred with a certain hesitation to Cantor's subspecies as Stejneger defined its range. Unfortunately we have no Russian, Turkestan, or Upper Chinese material available for comparison. The specimens vary greatly in the distinctness of the tympanum, which is easily seen, and is half as large as the eye in some, while in



others it can be made out only by close scrutiny. The back of some, as well as the sides and thighs, are covered with large round tubercles, while in one the back has only scattered spine-bearing warts. In some the second finger is considerably longer than the first while in others they are of about equal size. In one the parotid gland has a tendency toward a crescentic shape, while in another it is simply elongate. The amount of black both above and below varies extremely.

## HYLIDAE.

### *HYLA ARBOREA IMMACULATA* Boettger.

BOETTGER, Ber. Senck. naturf. ges., 1888, Abh., p. 189.

STEJNEGER, Bull. 58, U. S. N. M., 1907, p. 82-84.

Two specimens agree perfectly with the description of this subspecies, except that there is a web between the outer fingers. Unfortunately the locality tags are missing, and it is impossible to state whether they came from about Ichang or from Szechwan. Stejneger has covered the question of the identity of the various east Asiatic tree toads so completely that there is no need of further remarks on the subject. The Chinese and Japanese specimens in the M. C. Z. collection substantiate his conclusions.

### *HYLA MONTICOLA*, sp. nov.

Plate 1, Fig. 2.

*Type*.—No. 2553 M. C. Z. Washan, western Szechwan, China. Altitude 10,500 feet. One adult specimen. W. R. Zappey.

Very distinct from *Hyla annectans* Boulenger and *Hyla chinensis* Günther with specimens of which it has been compared.

Vomerine teeth in two elongate series, well separated, converging backward, beginning between the middle of the extremely small choanae and extending considerably posterior to them. Tongue large and long, deeply nicked behind. Nostrils midway between eye and tip of snout, their distance from each other much greater than their distance from the labial margin. Inter-orbital space much greater than width of upper eyelid. Tympanum almost circular, its diameter less than half that of eye. Fingers distinctly webbed at base, slender, terminating in very small disks. Feet with rather slightly developed webs, tarsometatarsal joint, reaching tip of snout. Toes long, disks

slightly larger than those of fingers. Subarticular tubercles very weak; a weak inner and no outer metatarsal tubercle. Skin above smooth, below smooth on chest, but granular on throat and strongly granular on belly. An external vocal sac in male. Color *in alcohol*:—blue above with ocelli of dark brown, their centres brick-red. Throat dusky gray. Belly and inner side of limbs white, with many dark spots.

Color *in life*:—“green above, with ocelli of brown, with reddish centres. Inner side of thighs buff. Lower surfaces chrome-yellow” (W. R. Zappey).

The surmise from its structure that this was a ground-inhabiting form was confirmed by Mr. Zappey, who tells me that it was taken above tree line among low bushes and grass about two feet high.

## RANIDAE.

### RANA TIGERINA Daudin.

DAUDIN, *Hist. nat. rain.*, 1803, fol. ed., p. 42; quarto ed., pt. 20, p. 64; *Hist. nat. rept.*, 1803, 8, p. 125.  
STEJNEGER, *Bull.* 58, U. S. N. M., 1907, p. 139-142.

The forty-four specimens of this common and wide-ranging frog show no appreciable difference from specimens taken in India and Burma. As Bengal was the type locality for the species, this fixes beyond doubt the identity of the Chinese individuals. Stejneger states that Formosan specimens agree with Chinese from Hong Kong. Van Kampen (*Max Weber's Zool. ergeb.*, 1907, 4, 2, p. 388, pl. 16, fig. C.) has separated examples from Celebes under the name of *R. t. angustopalmata*. This is probably a distinct species. The Bornean species is *Rana schlueteri* Werner. Specimens from Java show other differences, as do also those from the Malay peninsula; and those from the Philippines are recognizable as *Rana vittigera* Weigmann.

Though of high interest and importance a complete study of this species is impossible owing to the lack of adults from the various localities. They are extremely shy. In this Ichang series not one is fully adult. I have taken specimens throughout the range of the species but have adults from Java only. The Museum has some from India.

*RANA NIGROMACULATA* Hallowell.

HALLOWELL, Proc. Acad. nat. sci. Phila., 1860, p. 500.

STEJNEGER, Bull. 58, U. S. N. M., 1907, p. 94-100.

Two specimens from Ichang show a slight variation from specimens from Peking, in that the vomerine teeth-groups are rather less prominent and slightly nearer each other. Externally the two lots agree. One of Mr. Zappey's two examples shows an interesting abnormality. On the left-hand side the tympanum is wanting and the left vomerine tooth group as well. The opposite side shows a perfectly normal condition.

*RANA PLANCYI* Lataste.

LATASTE, Bull. Soc. zool. France, 1880, 5, p. 64.

STEJNEGER, Bull. 58, U. S. N. M., 1907, p. 101-102.

Six frogs taken at Ichang belong to this species. Dr. Stejneger very kindly identified them for me, and from his account (*loc. cit.*) we find previous locality records as follows:—Peking (type locality), Shanghai, Chusan, Ningpo, and Formosa. These six specimens taken by Mr. Zappey extend the range of the species very greatly.

## REPTILIA.

## NATRICIDAE.

*PTYAS MUCOSUS* (Linné).

LINNÉ, Syst. nat., ed. 10, 1758, 1, p. 226.

STEJNEGER, Bull. 58, U. S. N. M., 1907, p. 345-347.

A single specimen from Ichang, about five feet long. Scale rows 17; ventrals 196, subcaudals 100, anal divided. There are 8 supralabials, and numbers four and five enter the eye. The three middle rows of scales are not keeled. There is but one loreal.

Widely distributed over all southeastern continental Asia.

*ELAPHE TAENIURUS* Cope.

COPE, Proc. Acad. nat. sci. Phila., 1860, p. 565.

BOULENGER, Cat. snakes Brit. mus., 1894, 2, p. 47.

STEJNEGER, Bull. 58, U. S. N. M., 1907, p. 319.

The record of this wide ranging form from 10,300 feet at Laolingkung near the Tibetan frontier of western Szechwan is interesting as giving a clew to the

extent of its vertical distribution in China. The scale formula of 23 rows, 230 ventrals, and 104 subcaudals is typical. Two other specimens without data are from either Hupeh or Szechwan.

Stejneger says, "Ranging from Darjceling in the west to Formosa and the Amur Province in the east, this species has the regular Himalayo-Chinese distribution."

*DINODON RUFOZONATUM* (Cantor).

CANTOR, *Zoöl. Chusan*, 1840, pl. 11; *Ann. mag. nat. hist.*, 1842, 9, p. 483.

BOULENGER, *Cat. snakes Brit. mus.*, 1893, 1, p. 361-362.

STEJNEGER, *Bull. 58, U. S. N. M.*, 1907, p. 358-363.

A specimen in every respect typical, from Ichang, Hupeh. This species is a common one ranging throughout China and Korea.

*LIOPELTIS MAJOR* (Günther).

GÜNTHER, *Cat. coll. snakes Brit. mus.*, 1858, p. 120.

BOULENGER, *Cat. snakes Brit. mus.*, 1894, 2, p. 279.

STEJNEGER, *Bull. 58, U. S. N. M.*, 1907, p. 338-340.

A single typical specimen increases considerably the known range of this species. Stejneger speaks of it as "apparently restricted to the lower Yangtse Valley and coasts of eastern China, between Hongkong and Shanghai, as well as to Formosa." The example in hand, however, comes from "eight days' journey northwest of Ichang, Hupeh." It has been compared with a specimen from Formosa, in this Museum (T. Barbour coll.), and found to be almost identical. In both specimens the rostral shield is divided.

*NATRIX ANNULARIS* (Hallowell).

HALLOWELL, *Proc. Acad. nat. sci. Phila.*, 1856, p. 151.

BOULENGER, *Cat. snakes Brit. mus.*, 1893, 1, p. 233.

A single specimen from Ichang whence the species does not appear to have been previously recorded. A. E. Pratt reported the species common about Kiukiang much lower down the Yangtze. The species ranges over middle China and Formosa. The specimen shows only 139 ventrals, while Boulenger notes a range of from 145 to 161. Another difference is the three postoculars in addition to the subocular on one side; on the other side the normal condition of 2 + 1 obtains. Again on one side the loreal is deeper than broad, while the normal opposite is found on the other side. The outer row of scales is without keel, as are also a considerable number in the second row. The tem-

porals are normal 2 + 3 on both sides. There is but one preocular and nine supralabials on each side; of these 4 and 5 enter the orbit. The scales are in 19 rows, anal is divided, ventrals, as already mentioned, 139, while part of the tail has been lost, only 54 pairs of subcaudals remaining.

PSEUDOXENODON SINENSIS Boulenger.

BOULENGER, Ann. mag. nat. hist., 1904, ser. 7, 13, p. 134.

This form, which Boulenger remarks is so very nearly related to *P. macrops* (Blyth), is nevertheless a distinct and easily distinguishable one. As it was reported by the describer from both Yünnan and Szechwan, it is not surprising to find a typical example from Laolingkung, western Szechwan at an altitude of 10,300 feet. Not long ago I was fortunate enough to get a specimen taken at Yünnanfu by Mr. Graham at 6,000 feet altitude. Boulenger's Yünnan records were based on specimens taken by the same collector in the same locality. Both of these examples come within the range of variation which Boulenger cites for the five previously published specimens.

So far as known the species is confined to Szechwan and Yünnan.

ELAPIDAE.

BUNGARUS CAERULEUS MULTICINCTUS (Blyth).

BLYTH, Journ. Asiat. soc. Bengal, 1861, 29, p. 98.

BOULENGER, Cat. snakes Brit. mus., 1896, 3, p. 369.

STEJNEGER, Bull. 58, U. S. N. M., 1907, p. 397-399.

Dr. Stejneger (*loc. cit.*) has treated this form as one which he must consider nominally of specific value until it can be actually shown to join the Indian Krait *B. caeruleus*. The differences, however, are of such slight value that they do not warrant more than subspecific rank, even though our present insufficient material does not permit of our showing now the intergrading with not only the typical race, but also with the considerably more distinct Malaysian form, *B. candidus*.

This race, which is distributed through southern China from "The mountains north of Kiu-kiang" on the Yangtze-kiang to Kwangtung, Kwangsi, and the islands of Hainan and Formosa. Mr. Zappey's example from Ichang, Hupeh seems the first taken in that province and extends considerably the hitherto known range into western China.

## AMBLYCEPHALIDAE.

## AMBLYCEPHALUS CHINENSIS, sp. nov.

Plate 2, Fig. 1.

*Type*.—No. 7326 M. C. Z. Luluping, western Szechwan, China. W. R. Zappey.

Closely related to *A. monticola* (Cantor) from the eastern Himalayas, Khasi and Naga hills, and the Nocobar Islands.

Rostral not quite as deep as broad; internasals not half as long as prefrontals; latter entering orbit; frontal slightly longer than broad, longer than its distance from the end of the snout, much shorter than the parietals; loreal present but excluded from and entering orbit by two rather small preoculars; two postoculars, which on one side are fused into one; temporals 2 + 3; seven upper labials of which the fourth barely enters the orbit on one side, while on the other all are excluded by the extended inferior prefrontals and postfrontals; three pairs of large chin shields, anterior longer than broad and in contact with the symphyrial. Scales in 15 rows, smooth; three rows of vertebrae slightly enlarged. Ventrals 180; anal entire; subcaudals 60.

Color:—brown above, with vertical blackish bars on the sides; a black line from eye extending along nape, which is connected with its fellow on the opposite side by a black line which curves forward so as to almost touch the parietals; another black line from the eye to the angle of the mouth; yellowish below with very scattered dots of blackish brown.

Although there can be no doubt as to the very great similarity of this species with Cantor's *A. monticola*, yet it may be easily distinguished by the fact that the loreal does not enter the eye; nor does more than one labial. The very slightly enlarged vertebrae have no tendency toward becoming hexagonal, and there are rather fewer of both ventral and subcaudal scales in the type specimen than the least number recorded for Cantor's species. It shows relationship also with *A. malaccanus* (Peters), which, however, has no preocular.

## CROTALIDAE.

## AGKISTRODON BLOMHOFFII BREVICAUDUS Stejneger.

Plate 2, Fig. 2.

To this recently described subspecies three specimens taken by Mr. Zappey may be assigned. Two are from Ichang, from whence specimens have been recorded from the collection of the British museum (Stejneger, *loc. cit.*, p. 454). The scales run 21 rows; 145 ventrals, 39 subcaudals, and 7 labials for one, the other is mutilated. The third specimen comes from Kweichowhsien, Hupeh. Scales in 21 rows; 141 ventrals; 35 subcaudals, and 7 labials.

Occurs in Korea, eastern and part of central and of western China, Formosa, and possibly Hainan.

AGKISTRODON TIBETANUS, sp. nov.

Plate 2, Fig. 3, 4.

*Type*.—No. 7327 M. C. Z. Ramala Pass beyond Tachienlu, western Szechwan: altitude 13,000 feet. W. R. Zappey.

Rostral as high as broad, scarcely visible from above; internasals large, roughly triangular, their suture almost as long as that of prefrontals, which are broadly in contact with supraoculars; frontal longer than broad, as long as the distance from rostral supraoculars, as long as frontal but narrower; parietals considerably longer than supraoculars; nostril round in the posterior part of the anterior nasal, which is slightly larger than the posterior; two loreals, one above the other, the lower one bordering the pit anteriorly; a narrow subfoveal enters the orbit with two preoculars, one of which also borders the pit posteriorly; pit very near eye, in fact meeting the orbit; two postoculars, of which the lower is long, narrow, and concentric, reaching far under the eye, but not approaching the scales behind the pit, as in *A. blomhoffii*; 2 + 4 temporals, of which the lower ones in each row are large hexagonal shields, those above being small scales (none keeled as in *A. blomhoffii*); the lower temporal of the third row large and shaped like those in front of it; the three lower temporals forming a series of large shields, larger than the adjoining labials; seven upper labials, second smallest, third and fourth very large, the rest gradually diminishing in size posteriorly; the third enters the eye for its entire superior margin, chin shields as in Stejneger's figure of the ventral view of head of *A. blomhoffii* (Bull. 58, U. S. N. M., 1907, p. 458, fig. 364); twenty-one rows of keeled scales, usually with indistinct apical pits; 152 ventrals; anal entire; 43 subcaudals, all divided.

The color is worthy of somewhat extended notice. The whole back is dull green with rhombic darker markings. Lower surfaces mottled black and dark grayish. Lower row of scales with light spots which alternate with light spots

on the extremities of the ventrals; between these two series of spots runs a zigzag black continuous band. On top of the head there is a dark blotch running from the edge of the frontal to a band from eye along neck. A rough horseshoe-shaped mark on the nape of the neck with the bow directed forward. The figures of this example compared with one of *A. b. brevicaudus* Stejneger show how radical is the difference in type of marking between the two forms, as well as the other divergences.

When showing the type of this species to Dr. Stejneger, he at once confirmed my decision to describe it as new, and remarked that he did not believe it to be very nearly related to any of the described forms, but to represent a species by far the most primitive of any in the genus. This is, of course, exactly what one might suppose would be the case with a form coming from the habitat of *A. tibetanus*.

#### AGAMIDAE.

##### JAPALURA YUNNANENSIS Anderson.

ANDERSON, Zool. W. Yunnan, 1878, p. 803, pl. 66, fig. 2.

BOULENGER, Cat. lizards Brit. mus., 1885, 1, p. 310.

Five specimens taken among Cacti on the sandy shores of the Tung River in western Szechwan. These show no essential differences from Anderson's figure except that in none of these examples, and one is an adult male, do the spines of the weak nuchal crest reach the length which his figure shows. For in that three or four spines on the nape have a length almost equalling the diameter of the orbit, in none of these is the length one third as great. The types came from Momein or Tengyuehchow in western Yunnan. Swinhoe has collected the species in Szechwan.

#### SCINCIDAE.

##### EUMECES XANTHI Günther.

GÜNTHER, Ann. mag. nat. hist., 1889, ser. 6, 4, p. 220.

A single specimen from Ichang, the type locality and the only one from whence the species has been reported, differs somewhat from the original description. There is only one loreal, which, however, forms a suture with the frontonasals. There is also only one pair of nuchals. The second azygos postmental is separated from the first by the meeting on the median line of a pair of large



gular shields. There are five light longitudinal stripes on the back and sides. The central one bifurcates on the head, and the resultants meet the laterodorsal bands at the anterior margin of the eye.

LEIOLEPISMA LATERALE (Say).

SAY, Long's exped. Rocky Mts., 1823, **2**, p. 324.

BOULENGER, Cat. lizards Brit. mus., 1887, **3**, p. 264.

STEJNEGER, Bull. 58, U. S. N. M., 1907, p. 218.

Careful comparison of a specimen taken by Mr. Zappey at Washan, western Szechwan, at 6,000 feet altitude, and another which the writer obtained, collected by Mr. John Graham at Yünnanfu at the same altitude, with North American examples, has forced the same conclusion previously reached by Boulenger and Stejneger as to the identity of specimens from both continents. Among a number of examples in the collection of the M. C. Z. from Florida, Texas, and Arkansas, individuals may be picked out which can not be separated from the two Chinese examples mentioned. Thus *L. reevesii* (Gray) becomes a synonym of *L. laterale* (Say).

This most remarkable distribution embraces the southeastern United States west to the Rockies, and including Mexico (Jalapa, example in British Museum), as well as almost all of southern and central China and the Riu Kiu Islands.

TRIONYCHIDAE.

AMYDA SINENSIS (Wiegmann).

WIEGMANN, Nova acta Acad. Leop. Carol., 1834, **17**, p. 189.

STEJNEGER, Bull. 58, U. S. N. M., 1907, p. 524-526.

A specimen from Chungking, Szechwan, which I have compared with examples in the collection of the U. S. N. M. from other localities, does not differ appreciably from specimens from Honan and Formosa, nor yet from Japanese examples, so that it adds evidence in support of Stejneger (Proc. U. S. N. M. 1910, **38**, p. 114).

TESTUDINIDAE.

GEOCLEMYS REEVESII (Gray).

GRAY, Synopsis rept., 1831, p. 73.

STEJNEGER, Bull. 58, U. S. N. M., 1907, p. 497-500.

Eleven specimens from Ichang.

Stejneger says: "In China it is known from Tientsin to Canton, and in the interior at least as far as Hankow." It occurs also in Cochin China, Korea, and Japan. It will be noticed that the capture of these Ichang specimens extends the range for some distance up the Yangtze beyond Hankow.

# AVES.

BY JOHN E. THAYER AND OUTRAM BANGS.

This collection of birds numbers 3,135 beautifully prepared skins, belonging to 358 species and subspecies. Considering the work that has been done in this region during the last forty years the collection is rich in novelties. In a preliminary paper — Descriptions of new birds from central China. Bull. M. C. Z., 1909, 52, p. 139-141,— we have already described eight new forms, and now add one new genus, five new species, and seven new subspecies.

When Mr. Zappey started it was expected that a Chinaman, perhaps one of the "shooting-men" trained by Mr. Styan, could aid in the collection and preparation of skins, but unfortunately none was available and Mr. Zappey did all the work himself, and deserves the greatest praise for his industry and zeal.

Specimens of nearly all the species seen were secured. Swans, cranes, and storks were now and then observed but were too shy to be shot with a gun, and were most frequently in places where it was too dangerous to use a rifle. The Solitary snipe, *Gallinago solitaria*, was seen on two occasions, one being shot near Ichang the first year, but its condition was such that it could not be preserved, and another flushed in the high grass lands of western Szechwan when with a rifle Mr. Zappey was stalking sheep. Another bird, a green pigeon, was seen twice, but was not taken. A flock of six or eight of these were feeding in the low shrubbery at a great altitude in the mountains of western Szechwan. They were very tame, but when approached to within gun-shot distance they were obscured by clouds and when the weather cleared the birds had disappeared. The second flock was seen by Mr. Wilson near the same place but when he was without a gun.

Time did not allow a visit to the Moupin district so famous, ornithologically, from the work done there by Père David, while the high mountains about Tachienlu, also a very famous region for birds, proved a great disappointment. The Chinese as they have gradually wrested this country from the Zolo tribesmen have burned the woods, reducing to ashes hundreds of miles of magnificent coniferous forest. This probably accounts for the absence in this collection of several of the species described from this region by Père David, Oustalet, and others. Of the places visited, one, the Washan mountains, needs special men-

tion. This high isolated range proved the richest field explored during the whole trip, and most of the peculiar birds and mammals secured came from it. It is to be regretted that so short a time, a few days in the spring and again a few in autumn, could be spent there.

All the altitudes were taken by Mr. Zappey himself with an aneroid.

We have followed the systematic sequence of Sharpe's Hand list, but our use of the 10th edition of Linné's Systema will account for the difference in many of the names employed. All measurements are in millimeters and the colors according to Ridgway's nomenclature.

We have compared many of our specimens with material in the U. S. national museum, and have received the constant aid and advice of Dr. Chas. W. Richmond and Mr. Harry C. Oberholser to whom our sincere thanks are tendered.

### TETRAONIDAE.

#### TETRASTES SEVERTZOVI Prjevalsky.

Three specimens were taken in western Szechwan, an adult male, at Tachienlu, 13,500 feet, July 9, 1907, an adult female and a young female about half grown at Shuowlow, 14,000 feet, August 19, 1908.

### PHASIANIDAE.

#### TETRAOPHISIS SZECHENYII Madarász.

Seven specimens, six adults of both sexes and a half grown young male were taken in western Szechwan, Ramala Pass, Shuowlow, and Nachuka, in August, 1908, at altitudes ranging from 14,000 to 15,500 feet.

The young is very different in color-pattern from the adult, the plumage of both upper and under parts being much marked and variegated with gray and buff on a dark brown ground color, giving the young bird a grouse-like appearance.

#### PERDIX HODGSONIAE SIFANICA Prjevalsky.

Five adults, both sexes, Tachienlu, Ramala Pass, and Lanerhyingpa, western Szechwan, 11,000 to 15,000 feet, midsummer.

This form is certainly only a smaller and otherwise slightly different subspecies of *P. hodgsoniae*. The principal color difference is that *P. h. sifanica*

lacks the black breast patch of true *hodgsoniae*; the other supposed color characters appear to be very variable.

COTURNIX JAPONICA (Temminck & Schlegel).

Twenty specimens, both sexes, Ichang, and Changyanghsien, western Hupeh, autumn, and April.

This series is entirely referable to this very distinct species. Some young males have a little black on the throat, but they show the long lanceolate throat feathers. Some young females show the elongate throat feathers very slightly, but otherwise are exactly like more adult females that show this character very plainly.

BAMBUSICOLA THORACICA (Temminck).

Four adult males, Kiating, Chungking, and Yachow, western Szechwan, November, and December.

ITHAGENES GEOFFROYI Verreaux.

Eight specimens, seven adults of both sexes, and one young male less than half grown were taken at Tachienlu, Tongolow, Shuowlow, Ramala Pass, and Kaoerhshan, western Szechwan, at altitudes ranging from 12,000 to 15,500 feet, in July, and August.

The young male, Tachienlu, 12,000 feet, July 19, 1908, has the head and nape blackish ashy, and the body feathers with conspicuous pale shaft-stripes; the gray tail feathers and pointed red tail-coverts of the adult plumage are just beginning to show.

ITHAGENES WILSONI, sp. nov.

Two adult males, Washan, western Szechwan, 9,000 feet altitude, November 2, 1908.

*Type*.—No. 52366 M. C. Z. adult ♂. Western Szechwan: Washan Mountain, 9,000 feet, November 2, 1908. W. R. Zappey.

*Characters*.—Similar in general to *I. geoffroyi* but about one third smaller. In color the Washan bird does not differ radically from *I. geoffroyi*, though there are some slight variances; the tail in *I. wilsoni* is rather darker ashy; and the white shaft-lines on the back, scapulars, and upper tail-coverts are wider.

*Measurements.*

<i>No.</i>	<i>Sex.</i>	<i>Wing.</i>	<i>Tail.</i>	<i>Tarsus.</i>	<i>Culmen.</i>
52366	♂	169	123.	55.	21.
52367	♂	171	129.	58.	21.

In a series of four adult males of *I. geoffroyi*, the wing averages, 211, the tail 167, the tarsus, 66, and the culmen 24.5.

We have named this little species after Mr. E. H. Wilson to whose energy and executive ability much of the success of the Arboretum Expedition is due.

This species is entirely isolated in the Washan Mountain and apparently is not common there. Mr. Zappey at the time of its capture noticed its small size, and other differences separating it from *I. geoffroyi* which he had taken at Tachienlu.

## TRAGOPAN TEMMINCKI (J. E. Gray).

Three adults, two males, Fangshen, Hupeh, July, and one female from Washan, western Szechwan, November.

## CROSSOPTILUN TIBETANUM (Hodgson).

Nine specimens, adults of both sexes and one young female about one third grown, Cheto, Tachienlu, Shuowlow, and Tongolow, western Szechwan, 12,000 to 14,000 feet, midsummer.

## PHASIANUS TORQUATUS KIANGSUENSIS Buturlin.

Eight adult specimens, both sexes, Ichanghsien, Hsienshanhsien, Changhsien, Kunganhhsien, Hupeh. All were taken in winter except one taken in June.

## PHASIANUS HOLDERERI Schalow.

Thirteen adult specimens both sexes Tawan, Changyanghsien, Hsien-shan, Mafuling, Puerhyangtze, and Kwangpow, Hupeh, spring, summer, autumn, and winter. Taken at altitudes ranging from 2,500 feet to 6,000 feet.

There can be no doubt as to the correct identification of these pheasants, which occur so very near each other, in fact in the same general region, though usually at different altitudes; and yet they hold their distinguishing characters so constantly that there is not one in the series in the least degree intermediate.

Mr. Zappey tells us that in Hupeh, the habits of *P. torquatus kiangsuensis*, and *P. holdereri* are quite different. The former being almost wholly restricted,

at all seasons, to the low ground of the river bottoms or as he expressed it being "semiaquatic," not only feeding and living in the wet marshes and rice-fields, but "roosting there at night, sometimes in places where the water is part way up its legs." He, however, took one male and two females in the upland country at Hsienshanhsien.

*Phasianus holdereri*, which is rather the more abundant, is on the other hand wholly a bird of the rolling upland country at altitudes ranging from 2,000 to 6,000 feet and probably even higher; it was never seen in the lowlands.

While thus apparently specifically distinct from *P. torquatus*, *P. holdereri* is in all probability a subspecies of *P. decolatus*; the descriptions of *P. berezowskyi* Rothschild, suggesting strongly its relationship to *decolatus* on the one side and to *holdereri* on the other.

The two species, with which we here deal, are easily separated in the adult male plumage by the following characters.

#### P. HOLDERERI.

1. White collar always narrow; commonly very incomplete; usually not, though sometimes very narrowly connecting behind; sometimes altogether wanting.
2. Head, with no distinct paler superciliaries; crown and occip concolor, or very nearly so, with nape.
3. Wing-coverts, olive-gray.
4. Rump greener.
5. Black bands on tail wider.
6. Size a little larger.

#### P. KIANGSUENSIS.

1. White collar, always wide, always connecting behind.
2. Head with conspicuous whitish superciliaries; crown and occip much duller, more brownish, than nape.
3. Wing-coverts ashy gray.
4. Rump grayer.
5. Black bands on tail narrower.
6. Size a little smaller.

The slight difference in size is the only character for the separation of the females, and this while it gives good average differences in the two series before

us, is within the limit of failure, if one should have a single unusually large specimen of one species, or a single unusually small one of the other.

Scores of pheasants of these two species were shot for food, and Mr. Zappey's notes were based on infinitely more material, than the comparatively small series made into skins. Transportation and space had constantly to be considered where large birds were concerned.

We cannot leave this subject without noticing Buturlin's Distribution of the true pheasants (Ibis, July, 1904, ser. 8, 4, 377-414). For the systematic part of this very convenient summary we have only praise. This author has turned out a piece of work vastly better than that of any of his predecessors, and has also clearly shown the number of recognizable races and species into which pheasants in a state of undisturbed nature, divide and the very small area usually occupied by each.

On points of synonymy however, he is in some cases, entirely in the wrong.

It would be, we admit, an easy way of avoiding difficulties if when with adequate material a wide ranging, variable species is divided into its natural subspecies, the names of early authors could be ignored. This high-handed practice, however, can not be allowed. Buturlin disregards the fact that Gmelin's name *Phasianus torquatus* for the collared pheasant of China was quite adequate to Gmelin's time and must stand. *P. torquatus torquatus* must be used for some subspecies. We therefore use it for the one of southeastern China, to which Buturlin gave the name *P. holdereri gmelini*:—first, because this was apparently the last race left without a name; secondly, because Buturlin himself thinks it most probably the one to which Gmelin's name was applied; and thirdly, because it was the form to which David and Oustalet restricted the name.

Equally unpardonable on this author's part is his treatment of *Phasianus torquatus pallasi* Rothschild. Later when ample material shows that an author confused two or more forms under one name it is not customary to discredit the earlier authors' species entirely, but to restrict his name to one of the forms.

#### PHASIANUS ELEGANS Elliot.

Eleven specimens, adults of both sexes and two small chicks, Washan, Tachienlu, and Tashanling, western Szechwan, 6,000 to 10,000 feet, summer, and autumn.

A female taken at Kiating in the lowlands of south central Szechwan,



December 14, 1908, Mr. Zappey thinks belongs to another species, possibly *P. decollatus* Swinhoe. Pheasants were very scarce at Kiating and the few seen were very wild. He thought that the one or two males though observed at a distance, were not the same as *P. elegans* which he had taken in the mountains. The only difference we can see in the skin from Kiating is that it is a little larger than females of *P. elegans* and has a slightly larger bill.

SYRMATICUS REEVESI (J. E. Gray).

Thirteen adults, both sexes, Kwangpow, Changyanghsien, Putze, and Tawan, Hupeh, spring, autumn, and winter.

This magnificent game bird inhabits principally the oak belt on the mountains at from 2,000 to 5,000 feet where it feeds upon acorns.

Some of the specimens taken are superb with absolutely perfect tails, one measuring when stretched to its full length no less than six feet, nine and three fourths inches.

CHRYSOLOPHUS PICTUS (Linné).

Seven specimens, adults of both sexes and one young male. Tawan, Ichanghsien, Changyanghsien, and Kweichowhsien, Hupeh, winter, spring, and autumn.

The Golden pheasant, though very common in these regions, is extremely hard to shoot, as it keeps to the dense bamboo thickets, and refuses to take wing even when hunted with a dog.

CHRYSOLOPHUS AMHERSTIAE Leadbeater.

Three adult males, Washan, and Wuyaling, western Szechwan at 8,000 feet, May, and October.

TURNICIDAE.

TURNIX BLANFORDI Blyth.

Seven specimens, both sexes, Ichang, Hupeh, September, and October.

COLUMBIDAE.

COLUMBA LEUCONOTA Vigors.

Four specimens adults of both sexes, Tachienlu, Mohsinien, western Szechwan, July, 1908. The Snow pigeon was constantly seen at altitudes

ranging from 7,500 to 12,500 feet and even higher, but on account of the nature of the country it inhabits only four specimens were secured.

*COLUMBA RUPESTRIS RUPESTRIS* Bonaparte.

Seven specimens, adults of both sexes, Washan, Tongolow, Waszekow, Nachuka, western Szechwan, at altitudes ranging from 5,000 to 12,500 feet, July, and August.

PERISTERIDAE.

*TURTUR ORIENTALIS* (Latham).

Sixteen specimens, both sexes, Ichang, Ichanghsien, Yangchaho, Changyanghsien, Ituhsien, Hsienshan, Hsienshanhsein, Mafuling, Shihtowya, and Fangshen, Hupeh; Nachuka, Tachienlu, and Luitingchiao, Szechwan; all seasons and altitudes up to 12,000 feet.

*STREPTOPELIA DECAOCTA* (Frivaldsky).

Two adult males, Ichanghsien, Hupeh, February.

*ONOPELIA HUMILIS* (Temminck).

Twenty specimens, young and adult, both sexes, Ichang, Hupeh, and Tachienlu, western Szechwan, spring, summer, and autumn.

*SPILOPELIA CHINENSIS* (Scopoli).

Twelve specimens, young and adult, both sexes, Ichang, and Kunganhsien, Hupeh; Kiating, and Omeih sien Szechwan; spring, summer, and autumn.

RALLIDAE.

*RALLUS AQUATICUS KOREJEWI* Saruduy.

Plate 3, fig. 1.

One adult male, in full spring plumage, Ichanghsien, Hupeh, March 8, 1908.

Our skin agrees exactly in every detail, with the description of this strongly marked subspecies; the record, however, greatly extends its range.

*RALLUS INDICUS* Blyth.

One immature female Ichang, Hupeh, September 16, 1907.

*HYPOTAENIDIA STRIATA* (Linné).

One youngish female, Ichang, Hupeh, September 18, 1907.

*PORZANA AURICULARIS* Reichenow.

Three males, none in fully adult plumage, Ichang, Hupeh, September and October.

*PORZANA BICOLOR* Walden.

Two adult males, Washan, western Szechwan, May 29, and June 7, 1908, 6,000 feet.

This rail was not uncommon on the Washan Mountains where it was breeding; it proved very hard to shoot, and although two nests were found, one with six the other with five eggs, the parent birds were not secured. A bird was seen, as it left its nest and five eggs, and positively identified as belonging to this species. Both nests, one taken May 30, the other June 5 were found in small reedy islands in mountain streams.

*ORTYGOPS EXQUISITA* (Swinhoe).

One adult female, Luchow, central Szechwan, April 26, 1908.

*LIMNOBAENUS FUSCUS* (Linné).

One adult male, Ichang, Hupeh, July 8, 1907.

*AMAUORNIS PHOENICURA* (Forster).

Twenty-one specimens, adults of both sexes, and six little wholly black chicks July 21, Ichang, Hupeh, spring, summer, and autumn.

*GALLINULA CHLOROPUS ORIENTALIS* Horsfield.

One adult male, Ichang, Hupeh, June 17, 1907.

*GALLICREX CINEREA* (Gmelin).

Three specimens, an adult male, a young male, and a young female the young in the brown plumage, Ichang, Hupeh, July, September, and October.

## COLYMBIDAE.

## COLYMBUS CRISTATUS Linné.

One male, in winter plumage, Chachianghsien, western Szechwan, December 7, 1908.

## TACHYBAPTUS RUFICOLLIS POGGEI (Reichenow).

Two adult females, Ichang, Hupeh, September, and October.

The collection of the Museum of Comparative Zoölogy contains also two fine adults, ♂ and ♀, from Pekin. These specimens indicate that the slight characters that distinguish the Chinese form from true *T. ruficollis* (Pallas) and *T. r. philippensis* (Bonnaterre) are not wholly constant, and the subspecies is certainly not a strongly marked one.

## LARIDAE.

## STERNA SINENSIS Gmelin.

Seven specimens, adults of both sexes, Luchow, and Kiating, Szechwan, April, and May.

## LARUS RIDIBUNDUS Linné.

Four specimens, three adults of both sexes in winter plumage and one immature female, Ichang, and Changhsien, Hupeh, February, and March.

## LARUS AFFINIS Reinhardt.

One female, immature, in probably its second year, Chachianghsien, western Szechwan, December 7, 1908.

## LARUS CANUS Linné.

One immature female, Yachow, western Szechwan, December 5, 1908.

## CHARADRIIDAE.

## MICROSARCOPS CINEREUS (Blyth).

Three specimens, two adult females and a youngish male, Ichang, Hupeh, March, and October.

## VANELLUS VANELLUS (Linné).

Five specimens, both sexes, Ichang, Hupeh and Chachianghsien, Kiating, Kungyachsien, and Omeih sien, Szechwan, autumn, and winter.

## CHARADRIUS DOMINICUS FULVUS (Gmelin).

Two females, Ichang, Hupeh, October.

## OCHTHODROMUS VEREDUS (Gould).

One female, Loehichen, eastern Szechwan, April 10, 1908.

## AEGIALITIS PLACIDA (Gray).

Twenty-six specimens, both sexes, Ichang, and Lanjung, Hupeh, and Nanchihsien, Suifu, Kiating, Changshowhsien, Hochianghsien, and Chiachianghsien, Szechwan, autumn, and spring, some as late as May 5.

## AEGIALITIS DUBIA (Scopoli).

Nine specimens, both sexes, Ichang, Hupeh, and Hochianghsien, Chiangchinghsien, Chungking, and Luchow, Szechwan, March, April, and October.

## AEGIALITIS ALEXANDRINA (Linné).

One female, in winter plumage, Ichang, Hupeh, October 10, 1907.

This is, of course, *Ae. alexandrina dealbata* (Swinhoe) if that race is recognizable, which does not seem to be the case.

## IBIDORHYNCHUS STRUTHERSI Vigors.

Five specimens, adults of both sexes, Yachow, Chiachianghsien, and Shuowlow, western Szechwan, summer, and autumn.

## TOTANUS ERYTHROPUS (Pallas).

Four females, Ichang, Changkow, Hupeh, October, and February.

## HELODROMAS OCHROPUS (Linné).

Twenty-four specimens, both sexes, Ichang, Ichanghsien, and Changhsien, Hupeh, and Luchow, Washan, Dar-chi-kwan, Omeihsien, and Kiating, Szechwan, all seasons. \* May 5 is the latest date in spring on which a Green sandpiper was taken and July 8 is the earliest summer date.

## ACTITIS HYPOLEUCUS (Linné).

Seven specimens, both sexes, Ichang, Hupeh, and Omeihsien, Chiachianghsien, and Shuowlow, Szechwan, autumn, and spring.

*GLOTTIS NEBULARIUS* (Gunnerus).

Seven specimens, both sexes, Ichang, and Changkow, Hupeh, and Kiating, and Chiachiangsien, Szechwan, autumn, and winter.

*RHYACOPHILUS GLAREOLA* (Gmelin).

One adult female, Yachiakun, western Szechwan, 13,000 feet, July 14, 1908.

*PISOBIA DAMACENSIS* (Horsfield).

One male, Ichang, Hupeh, October 22, 1907.

*PISOBIA TEMMINCKI* (Leisler).

Three females, Ichang, Hupeh, and Luchow, central Szechwan, April.

*PELIDNA ALPINA SAKHALINA* (Vieillot).

Two females, Ichang, Hupeh, October.

*GALLINAGO STENURA* (Ruhl).

Twelve specimens, both sexes, Ichang, Hupeh, August, September, and April.

*GALLINAGO MEGALA* Swinhoe.

Ten specimens, both sexes, Ichang, Hupeh, August, and April.

*GALLINAGO GALLINAGO* (Linné).

Eleven specimens, Ichang, Hupeh, September, November, March, and April.

*SCOLOPAX RUSTICULA* Linné.

Fourteen specimens both sexes Ichang, Ituhsien, Nochaping, and Kwangpow, Hupeh, and Kiatung, and Chichiang, Szechwan, autumn, winter, and spring.

*ROSTRATULA CAPENSIS* (Linné).

Nine specimens, both sexes, Ichang, Hupeh, September, and October.

## CURSORIIDAE.

*GLAREOLA MALDIVARUM* (Forster).

Twenty-six specimens, both sexes, Kiating, Nichichang, Suifu, and Kungyahsien, Szechwan. All taken early in May, except one pair shot at Kungyahsien, June 21, 1908. The lateness of this date indicates that the bird breeds in this region.

## ARDEIDAE.

*ARDEA CINEREA* JOUYI Clark.

Twenty-one specimens, young and adult of both sexes, Ichang, Hupeh, and Tachienlu, Chiachiangsien, and Chungchowhsien, Szechwan, all seasons. From a large colony that was nesting in a grove surrounding a temple at Chungchowhsien Mr. Zappey secured on April 5, 1908, a fine series of birds in full nuptial plumage.

On comparing this large series with a number of skins from Europe, the pale colors of the eastern bird stand out in marked contrast and the race is easily recognizable.

*MESOPHOYX INTERMEDIA* (Wagler).

One male, in winter plumage without plumes and with a black tip to the bill, Ichang, Hupeh, October 9, 1907.

*HERODIAS ALBA* (Linné).

One adult male, M. C. Z. No. 52976, with the dorsal plumes fully developed, but with a yellow bill, Ichang, Hupeh, February 24, 1909.

From the large size of this specimen (surpassing most European skins) it seems impossible to refer it to *N. timoriensis* (Lesson), although it has light colored tibiae and a yellow bill at a time when the dorsal plumes are developed. It is of course possible that the dorsal plumes were carried over from the last breeding season, and that the bill would change to black.

The measurements are:— wing, 448.; tail 175; tarsus, 198.; culmen, 138.

*GARZETTA GARZETTA* (Linné).

Nine specimens, adults of both sexes, Chichiang, Minchihsien, Yachow, and Kungyahsien, Szechwan, June, October, November, and December.

*NYCTICORAX NYCTICORAX NYCTICORAX* (Linné).

Nine specimens, young and adults, both sexes, Hupeh and Changshowhsien, eastern Szechwan, spring, and summer.

*BUTORIDES JAVANICA JAVANICA* (Horsfield).

Three specimens, adults of both sexes, Ichang, Hochiaping, and Yangchiamiao, Hupeh, spring, and summer.

*ORDEOLA BACCHUS* (Bonaparte).

Seventeen specimens, young and adults of both sexes, Ichang, and Hungtze-kow, Hupeh, and Omeih sien, and Chiachianghsien, western Szechwan, spring, summer, and autumn.

*BUBULCUS COROMANDUS* (Boddaert).

Eleven specimens, young and adults of both sexes, Hungyahsien, and Omeih sien, western Szechwan, summer, and autumn.

*IXOBRYCHUS SINENSIS* (Gmelin).

Two males, Ichang, Hupeh, September, and October.

*NANNOCNUS EURYTHMUS* (Swinhoe).

Eighteen specimens, young and adults of both sexes, Ichang, Hupeh, and Washan, and Omeih sien, western Szechwan, summer, and autumn.

*DUPETOR FLAVICOLLIS* (Latham).

One young female Ichang, Hupeh, October 3, 1907.

*BOTAURUS STELLARIS* (Linné).

Seven specimens, both sexes, Ichang, Kunganhsien, Hupeh, and Changshowhsien, Szechwan, autumn, and winter.

These specimens show as is usually the case in a series of skins of the bittern, that there is considerable variation in size and that while the females are smaller than the males, individual variation is still very great.



## ANATIDAE.

*MELANONYX SEGETUM SERRIROSTRIS* (Swinhoe).

Three specimens, all youngish, one male and two females, Shasi, Hupeh, and Changshowhsien, Szechwan, February.

Immense numbers of geese were seen in the low country but they were extremely wary, and a rifle could not be used on account of the dense population. Other species, as well as swans, were seen.

*ANAS PLATYRHYNCHOS* Linné.

Sixteen specimens, both sexes, Ichang, Kunganhsien, Hsienshanhsien, Hupeh, and Kiating, Washan, Kungyachsien, Chiachianghsien, and Yachow, Szechwan, taken throughout the winter, November to March.

*POLIONETTA ZONORHYNCHA* (Swinhoe).

Eleven specimens, both sexes Kiating, Kungyachsien, Chiachiang, and Yachow, western Szechwan, all taken in December.

*MARCEA PENELOPE* (Linné).

Two males, one in immature the other in full adult plumage, Kiating, and Washan, western Szechwan, October, and December.

*NETTION FORMOSUM* (Georgi).

One adult female, Ichang, Hupeh, November 26, 1907.

*NETTION CRECCA* (Linné).

Twenty-one specimens, both sexes, Ichang, Changyanghsien, Shasi, and Yangtze near Shasi, Hupeh, and Yachow, Kiating, Kungyachsien, and Washan, Szechwan, taken throughout the winter from October to March.

*DAFILA ACUTA* (Linné).

One female, Washan, western Szechwan, 6,000 feet, October 25, 1908.

*QUERQUEDULA QUERQUEDULA* (Linné).

Five specimens, both sexes, Ichang, Hupeh, and Washan, western Szechwan, October.

Many of the Anatidae taken by Mr. Zappey are more or less colored a rusty red on the underparts; this is due to some extraneous stain obtained from the water and while all the specimens taken near Ichang are comparatively free from discoloration all those taken in small streams and ponds at higher altitudes are similarly discolored.

*NETTA RUFINA* (Pallas).

One very fine adult male in full plumage, Kiating, western Szechwan, November 22, 1908.

*MARILA FERINA* (Linné).

One adult male, Kiating, western Szechwan, November 22, 1908.

*MARILA FULIGULA* (Linné).

Four males, none in full adult plumage, Ichang, Hupeh, and Kiating, western Szechwan, November.

*CLANGULA CLANGULA CLANGULA* (Linné).

One adult male, Yachow, western Szechwan, December 5, 1908.

*MERGELLUS ALBELLUS* (Linné).

Two specimens, male and female, the male in eclipse plumage similar to that of the female, Ichang, Hupeh, November, and December.

*MERGUS MERGANSER MERGANSER* Linné.

Four specimens, adults of both sexes, Ichang, Hupeh, and Kiating, Szechwan, December, and January.

It is of course problematical where these birds were bred and they perhaps should all be referred to *M. m. comatus*, rather than to *M. m. merganser*, all being smaller than European specimens. In the slight color differences, and the character of the crest of the male, they are more or less intermediate though on the whole nearer to true *M. m. merganser*.

*MERGUS MERGANSER COMATUS* (Salvadori).

Two specimens, male and female adult, Kungyahsien, western Szechwan, December 6, 1908.

These skins are certainly referable to this subspecies; both are small and show all the characters of the Himalayan goosander.

They afford the following measurements:—

No. 52943, adult ♂, wing, 269; culmen, 54; tarsus, 45.

No. 52944, adult ♀, wing, 253; culmen, 46; tarsus, 41.

#### MERGUS SQUAMATUS Gould.

Six specimens, two adult males, three adult females and one young male. Ichang, Hupeh, and Yachow, Kiating, and Kungyachsien, Szechwan, November and December. The young male has the sides, lower back, and rump as in the adult, except that the squamatulations are not so black or so pronounced; the upper back is gray and the head is rusty, like that of the female, but paler and with no white on the throat; the crest, however, is nearly as long as in the adult.

This Merganser has been a very rare bird in collections; and for a long time was known only from the type, an immature male. Ogilvie-Grant, recently described, and figured for the first time, the adult male and female (Ibis, 1900, ser. 7, 6, p. 602, pl. 12).

#### PHALACROCORACIDAE.

##### PHALACROCORAX CARBO (Linné).

Five specimens, adults in non-breeding plumage and one young female, Kiating, and Yachow, western Szechwan, December.

These skins belong to the smaller, small-billed oriental race, which if recognized would probably bear the name, *Phalacrocorax carbo sinensis* Shaw and Nodd; the series of skins we have examined is not sufficient in numbers or in the range of the species to enable us to decide; Indian and Chinese birds are however noticeably small.

#### FALCONIDAE.

##### CIRCUS CYANEUS (Linné).

Four specimens, two adult males, one female and one young male, Ichang, Ichanghsien, Changkowhsien, and Ituhsien, Hupeh, winter (November 20 to February 18).

##### CIRCUS SPILONOTUS Kaup.

One male, not fully adult, Shihtowya, Hupeh, April 18, 1907.

## ASTUR PALUMBARIUS KHAMENSIS Bianchi.

Two specimens, male and female both in immature plumage, Ichang, Hupeh, November 20, 1907, and Ramala Pass, western Szechwan, 13,500 feet, August 11, 1908.

We are not positive that birds in immature plumage can be distinguished from the young of true *A. palumbarius*; our skin from the Ramala Pass is, on geographical grounds, *khamensis*, and the female in similar plumage, from Ichang, agrees exactly with it, so that we refer both to the same form. An additional reason for doing so is that the sparrow hawk of our region (also originally described by Bianchi from eastern Tibet) ranges east to Ichang.

## ASTUR SOLOENSIS (Latham).

Two males, one adult, one immature, Ichang, and Ichanghsien, Hupeh, June 10, and August 26, 1907.

If *A. soloensis* and *A. cuculoides* (Temminck) are distinct and not individual extremes of coloration of one species then the adult male before us is an intermediate, about as well referred to one as to the other.

## ACCIPITER NISUS LODYGINI Bianchi.

Eighteen specimens, young and adults of both sexes, Ichang, and Changyanghsien, Hupeh, and Washan, Kiating, Nichichang, Kungyahsien, and Dar-chi-kwan, western Szechwan, all seasons.

While our skins agree exactly with Bianchi's description, we have not been able to examine a specimen of *A. melanoschistus* Hume, and Bianchi makes no mention of that form, which by description would seem to be very similar to the Tibetan-central China sparrow hawk.

It is not easy to separate young birds of this subspecies from true *A. nisus* in corresponding stages of plumage, but there is no difficulty whatever in distinguishing adult males; the dark slaty black back and preponderance of rufous on the underparts is very different from the gray back and pale underparts of *A. nisus nisus*.

Birds killed in the neighborhood of Ichang are quite as extreme as those from western Szechwan which is in the same general faunal region as Kham, Tibet, the type locality; the subspecies thus has a wide range. Specimens from near Pekin are very pale and quite different from the bird of our region.

As illustrative of the fierceness of this little hawk, Mr. Zappey states that

on February 3, 1909 at Changyanghsien, he wounded a Golden pheasant, when immediately an adult male sparrow hawk dashed upon it, killed, and began devouring it.

*ACCIPITER GULARIS* (Temminck & Schlegel).

One immature female, Ichang, Hupeh, September 15, 1907.

*BUTEO BUTEO PLUMIPES* (Hodgson).

Five specimens both sexes, only one male in uniform chocolate-brown plumage (the fully adult dress?). Ichang, and Changkowhsien, Hupeh, and Washan, Szechwan, winter, and spring.

*GYPAËTUS BARBATUS* (Linné).

One male, Ichang, November 20, 1907. The Lammergeier was not uncommon, but it was almost impossible to kill one with a charge of shot, and to use a rifle was generally out of the question.

*MILVUS MELANOTIS* Temminck & Schlegel.

Seven specimens, young and adults, both sexes, Ichang, and Changyanghsien, Hupeh, and Minchihsien, Washan, and Kiating, Szechwan, autumn, and winter.

*FALCO PEREGRINUS ATRICEPS* Hume.

Two specimens, an adult female, Wushanhsien, eastern Szechwan, March 26, and an immature male Ichang, Hupeh, June 28.

*FALCO AESALON* Turnstall.

One immature male, Ichanghsien, Hupeh, February 10, 1909.

*CERCHNEIS SATURATA* (Blyth).

Six specimens, adults of both sexes and immature males, Ichang, Hupeh, and Wushanhsien, and Washan, Szechwan, autumn, and spring.

STRIGIDAE.

*ASIO OTUS* (Linné).

Two specimens, both males, Ichanghsien, and Changyanghsien, Hupeh, November 16, 1907, and March 14, 1908.

*ASIO FLAMMEUS* (Pontoppidan).

Three specimens, both sexes, Ichang, and Shasi, Hupeh, February 5, and May 1.

*BUBO BUBO SETSCHUANUS* Reichenow.

One female, Ichang, Hupeh, October 23, 1907.

*OTUS SEMITORQUES PLUMIPES* (Hume).

Two adults, male and female, Hsienshan, and Changyanghsien, Hupeh, June 4, 1907, and January 29, 1909.

These specimens have feathered toes, and seem to agree in every way with the descriptions of the Himalayan form of the Japanese *Otus semitorques*. However we have seen no Himalayan specimens.

Our ♂, No. 53060, M. C. Z. has the wing, 163. mm. long, and the ♀, No. 53061, M. C. Z. has the wing, 177. mm. long.

*STRIX NIVICOLA* (Hodgson).

One adult male, Washan, western Szechwan, 8,000 feet, November 1, 1908.

*STRIX DAVIDI* (Sharpe).

One adult ♀, Shuowlow, western Szechwan, 14,000 feet, August 19, 1908.

*GLAUCIDIUM WHITELYI* (Swinhoe).

Twenty-one specimens, both sexes, Ichang, Kwatzeling, Changyanghsien, and Ituhsien, Hupeh, and Chiachianghsien, Omeih sien, Kiating, Luchow, Kungyahsien, and Yachow, Szechwan, all seasons.

## PSITTACIDAE.

*PALAEORNIS DERBYANA SALVADORII* Oustalet.

Seven specimens, two adult males, two adult females, and three young males, Nachuka, western Szechwan, 10,000 to 12,000 feet, August, 1908.

This parrot is apparently rare and local. Mr. Zappey found it, in small numbers, only, at one or two places, where he was so unfortunate as to lose several fine adults, that when shot fell over cliffs into inaccessible ravines.

The differences in color that were at one time (see Ogilvie-Grant, Ibis, 1900, ser. 7, 6, p. 600) thought to distinguish *P. derbyana* Fraser from *P. salvadorii* Oustalet are sexual, males have bright red upper mandibles, no brownish mark across the neck, and lavender-blue underparts; females have black upper mandibles, a brownish purple marking crossing the side of the neck, and lavender-lilac underparts.

Young males have red bills, the inner edges of their primaries are yellowish green, their tails are short and their underparts, crowns, and under wing-coverts are mostly green.

Rothschild (Bull. B. O. C., 1899, 8, p. lvi) considers it best until the original locality of *P. derbyana* is known to recognize *P. salvadorii* as a subspecies on account of its apparently smaller size. Our two adult males have the wing 216 and 218 mm. and the two adult females, 210 and 213 mm.

#### CORACIIDAE.

##### EURYSTOMUS CALONYX Sharpe.

Five adults, both sexes, Fangshen, and Shuiyuehtze, Hupeh, May.

#### ALCEDINIDAE.

##### CERYLE LUGUBRIS GUTTULATA Stejneger.

Nine specimens, adults of both sexes, Ichang, Changyanghsien, and Hsien-shanhsien, Hupeh, and Hungyachsien, Szechwan, autumn, and winter.

##### ALCEDO ISPIDA BENGALENSIS (Gmelin).

Twenty-three specimens, both sexes; Ichang, Hupeh, and Kiating, and Luchow, Szechwan, all seasons.

##### HALCYON PILEATUS (Boddaert).

Five adults, both sexes, Ichang, Ichanghsien, Yangchiatamiaø, and Hsien-shanshan, Hupeh, May, June, September, and October.

#### UPUPIDAE.

##### UPUPA EPOPS SATURATUS Lönnerberg.

Twelve specimens, both sexes, Ichang, Hupeh, and Shuowlow, Foochow, Nachuka, and Tongolow, Szechwan. Taken in January, February, March,

April, and August. It is thus not certain that any of these were birds that would breed in the region. All are referable to this lately described form, the best character of which, as compared with European skins is the conspicuously darker interscapular region.

### CAPRIMULGIDÆ.

#### CAPRIMULGUS INDICUS JOTAKA Temminck & Schlegel.

One young male (in plumage not unlike that of the adult female), Ichang, Hupeh, September 13, 1907.

### MICROPODIDÆ.

#### COLLOCALIA INOPINA INOPINA Thayer & Bangs.

The type from Mafuling, Hupeh, taken June 1, 1907, was the only example of this form secured; others, however, were seen in the same general region.

#### COLLOCALIA INOPINA PELLOS, sub. sp. nov.

*Type*.—No. 52131 M. C. Z. adult ♂, Western Szechwan: Washan, 6,000 feet, May 31, 1908. W. R. Zappey.

*Characters*.—Similar to true *C. inopina* from Hupeh, and of the same size, but upper surface darker, more sooty, less brownish, and more uniform,—the rump scarcely paler than the back.

*Measurements*.—Type, adult male, wing, 135; tail, 59; tarsus, 11.5; culmen, 5. Topotype, adult ♀, No. 52125, wing, 134; tail, 60; tarsus, 12; culmen, 5.

*Remarks*.—Thirteen specimens of this form were secured at Chungchow-hsien, and Washan, Szechwan, where it was fairly common, in April and May. It appears to be easily distinguished from its more eastern representative, true *C. inopina*, by its much darker, more sooty, and uniformly colored back, without paler rump.

#### COLLOCALIA FUCIPHAGA CAPNITIS Thayer & Bangs.

Bull. M. C. Z., May, 1909, 52, p. 139.

One adult male, the type, Wantaoshan, Hupeh, June 5, 1907. But one specimen of this much smaller bird (the wing 10 mm. shorter than in *C. inopina*) was taken.



*CHAETURA CAUDACUTA* (Latham).

One male, Ichang, Hupeh, October 19, 1907.

*CHAETURA NUDIPIES* Hodgson.

Two adult males in full spring plumage, Hokow, western Szechwan, May 4, 1908.

*APUS PACIFICUS* (Latham).

Thirteen specimens, adults of both sexes, Waszekow, Wuyaling, and Tachienlu, western Szechwan, summer, and autumn.

CUCULIDAE.

*HIEROCOCCYX SPARVEROIDES* (Vigors).

Two adult males, Luchow, and Hochingsien, Szechwan, April, 1908.

*CUCULUS MICROPTERUS MICROPTERUS* Gould.

One male, not quite adult, Ichang, Hupeh, July 19, 1907.

*CUCULUS CANORUS TELEPHONUS* Heine.

Ten specimens, young and adults of both sexes, Ichang, Fanghsien, and Hsientientze, Hupeh, and Washan, Szechwan, spring, summer, and autumn.

*CUCULUS OPTATUS* Gould.

Three specimens, females — two adults and one young. Tachienlu, western Szechwan, July, and August, 1908.

*CUCULUS INTERMEDIUS INTERMEDIUS* Vahl.

Four adults, both sexes, Washan, and Tachienlu, western Szechwan, May, June, and July.

*CHALCOCOCCYX MACULATUS* (Gmelin).

Three adult males, Hsienshanhsien, and Hsientientze, Hupeh, May, and June.

*EUDYNAMIS HONORATA* (Linné).

Four adults, both sexes, Ichanghsien, Hsienshanhsien, and Hsienshan, Hupeh, and Chiachianghsien, western Szechwan, May, and June.

## PICIDAE.

## PICUS CANUS GUERINI (Malherbe).

Thirty-six specimens, both sexes, Ichang, Ichanghsien, Changyanghsien, Hochaping, Yangtze near Shasi, Kunganhsien, Ituhsien, Putze, Hsienshan, Omeih sien, Shaiyüchtze, and Hsienshanhsien, Hupeh, and Cheto, western Szechwan, all seasons.

Not one of these numerous skins, can be referred to *Picus occipitalis* (Vigors) though many approach it. Two skins from Cheto, for instance that on geographic grounds might be expected to be *occipitalis* have the completely barred tail of *guerini*, but they also have almost wholly black bills, the yellowish green of the lower mandible, so conspicuous in *P. guerini*, being restricted to a small spot near the base. Other specimens from Hupeh, occasionally show almost wholly black tails, but invariably have the yellowish lower mandible; and there is not one in the series that combines the black unbarred tail with the black bill.

## HYPOPICUS HYPERYTHRUS SUBRUFINUS (Cabanis &amp; Heine).

Two adults, male and female, Tachienlu, July 7, 1908, and Nochianghsien, Szechwan, April 23, 1908.

This species is very rare in the region under consideration; one other individual was shot but not secured.

## DRYOBATES CABANISI CABANISI (Malherbe).

Thirty-six specimens, young and adults of both sexes, Ichang, Hsienshanhsien, Chiliping, Shihtowya, Changkowhsien, Ituhsien, Changyanghsien, and Ichanghsien, Hupeh, and Wulungshih, Shuowlow, and the Ramala Pass, Szechwan, all seasons. No variation in any way correlated to altitude or locality in this large series can be traced; skins from Ichang being, on the whole, similar to those from western Szechwan at 15,000 feet. Individual variation in the color of the under parts, the color and width of the frontal band, the intensity of the red of the belly and under tail-coverts, and other minor points, is very great. The white marking, on the inner secondaries also varies somewhat.

## DRYOBATES PERNYI PERNYI (Verrcaux).

Two adults, a male taken at Changyanghsien, Hupeh, January 24, 1909, and a female shot at Wantaoshan, Hupeh, June 5, 1907.

Styan (Ibis), has already commented on the great rarity of this species, to which we can only add Mr. Zappey's experience, who in two years of active field work saw but these two individuals.

*PICOIDES FUNEBRIS* Verreaux.

One male, Shuowlow, western Szechwan, 14,500 feet, August 23, 1908.

This bird, a young male of the year, was moulting from the nestling plumage, to that of the adult.

During his whole stay in western Szechwan Mr. Zappey had hunted the high coniferous forest for this species, but until the above mentioned date his efforts were fruitless. On August 23, however, the pounding of a woodpecker in the dense firs attracted his attention and later he discovered two three-toed woodpeckers. Although Mr. Zappey waited a long time that both might be secured at one shot he was obliged to select one; thorough search failed to re-discover the second.

*YUNGIPICUS SCINTILLICEPS SCINTILLICEPS* (Swinhoe).

Twenty-nine specimens, both sexes, Ichang, Hsientientze, Hsienshanhsien, Kwatzeling, Shihtowya, and Changyanghsien, Hupeh, all seasons.

*PICUMNUS INNOMINATUS CHINENSIS* (Hargitt).

• One adult female, Changyanghsien, Hupeh, November 13, 1907.

HIRUNDINIDAE.

*HIRUNDO URBICA CASHMERIENSIS* (Gould).

Twenty-one specimens, adults of both sexes, Washan, and Tsaikow, western Szechwan, summer.

*RIPARIA RIPARIA* (Linné).

Two specimens, a male taken at Juchi, Szechwan, April 20, 1908, and a female from Washan, Szechwan May 30, 1908. Probably both these birds were migrants, the one killed May 30, being in company with a number of migrating *Chelidon tytleri*.

*RIPARIA FOLKIENENSIS* LaTouche.

Thirteen specimens, young and adults of both sexes Ichang, Hupeh, and Changshowhsien, Wanhsien, Luchow, and Foochow, eastern Szechwan, spring,

summer, and autumn. This very distinct species, easily separated from *R. riparia* by its small size, pale coloring, and short tail, seems to be the breeding form of Hupeh and eastern Szechwan. The eggs must occasionally be laid very early in the season, as Mr. Zappey took one nearly full grown young bird on the wing at Wanhsien April 2. Others of about the same size and in similar plumage were secured at Ichang on June 18.

*RIPARIA RUPESTRIS* (Scopoli).

Three adult males, Waliangping, and Waszekow, western Szechwan, October.

*CHELIDON RUSTICA GUTTURALIS* (Scopoli).

Twenty-one specimens young and adult of both sexes Ichang, Hupeh, and Foochow, Luchow, Changyanghsien, Juchi, Chiangchinghsien, and Hochianghsien, Szechwan, spring, and summer.

*CHELIDON TYTLERI* (Jerdon).

Five adults, both sexes, Washan, Szechwan, May 30, 1908. This species was seen on this one occasion only. They were part of a migrating flock and were feeding throughout a valley (6,000 feet); they had disappeared the following day.

*CHELIDON DAURICA NIPALENSIS* (Hodgson).

Twenty-three specimens, young and adult, both sexes, Ichang, Hupeh, and Luchow, Chinchihhsien, and Lochiehn, Szechwan, spring, summer, and autumn.

MUSCICAPIDAE.

*HEMICHELIDON SIBIRICA* Gmelin.

One adult male, Ichang, October 10, 1907.

*HEMICHELIDON FULIGINOSA* Hodgson.

Five specimens, adult male and female, and three young in nestling plumage, western Szechwan, August 10-18, 1908: Nachuka, 11,000 feet, Shuowlow, 12,500 feet, and Ramala Pass, 12,000 feet.

*ARIZELOMYIA LATIROSTRIS* (Raffles).

One adult male, Pootung, Hupeh, May 20, 1907.

*SIPHIA ALBICILLA* (Pallas).

Five specimens, both sexes, Ichang, and Mafuling, Hupeh, and Omeih sien, Szechwan, May, and October.

*SIPHIA STROPHIATA* Hodgson.

Two males, Lianghokow, western Szechwan, 12,000 feet, September. In one of these, in fully adult plumage, the usual crescent of rufous on the chest is replaced with feathers with white bases. This specimen is probably abnormal.

*CYORNIS TICKELLIAE GLAUCICOMANS* Thayer & Bangs.

Bull. M. C. Z., May, 1909, 52, p. 141.

Two adult males, one, the type, from Tanshuiya, Hupeh, May 7, 1907, the other from Hsienshan, Hupeh, June 4, 1907.

*DIGENEA LEUCOMELANURA CERVINIVENTRIS* Sharpe.

One male, Washan, June 3, 1908. This was one of a pair that was evidently nesting among the moss-covered rocks of the mountain side; Mr. Zappey was unable to find the nest.

*NILTAVA LYCHNIS* Thayer & Bangs.

Bull. M. C. Z., May, 1909, 52, p. 141.

Plate 3, fig. 2.

The type, an adult male taken at Patung, Hupeh, May 19, 1907, was the only example seen during the trip.

*PALOMYIAS HODGSONI* (Verreaux).

Three adult males, Nachuka, Wulungshih, and Ramala Pass, western Szechwan, 12,000 to 15,000 feet, August.

*XANTHOPYGIA XANTHOPYGIA* (A. Hay).

Four specimens, two adult males, an adult female and one male in the spotted nestling plumage, Ichang, Hupeh, and Kungyachsien, Szechwan, June, and July.

*CYANOPTILA CUMATILIS* Thayer & Bangs.

Bull. M. C. Z., May, 1909, 52, p. 141.

Eight specimens, adults of both sexes, Mafuling, Hsientientze, and Fangshen, Hupeh, May, and June.

This very distinct species, is quite different from *C. bella* (A. Hay) of Japan and Corea; where found it was not an uncommon breeding bird, though probably very local in its distribution.

*TARSIGER CHRYSAEUS* Hodgson.

Five specimens, adults of both sexes and young, Washan, Yachiakun, Tachiao, and Lianghokow, western Szechwan at altitudes, ranging from 10,000 to 12,000 feet, June, July, and September.

*TCHITREA INCEI* (Gould).

Twenty-two specimens, adults and young of both sexes, Ichang, Ichanghsien, Hsienshan, and Suichanping, Hupeh, and Omeih sien, Szechwan, May to October.

Of the old males with very long tails two are pied, maroon and white; the plumage of about half of the others is in the white phase, the remainder in the maroon phase.

*CULICICAPA CEYLONENSIS* (Swainson):

Five specimens, four adults of both sexes and one nestling, Tanshuiya, Hupeh, and Chungchowhsien, Luluping, and Minchihsien, Szechwan, April, May, and June.

*CRYPTALOPHA BURKII VALENTINI* Hartert.

Eight specimens, adults of both sexes, Hsientientze, Mafuling, Chetzekow, Hsienshan, and Hsienyuehtze, Hupeh, May, and June.

The color characters attributed this form by its describer do not hold in our series — some breeding males having the head-stripes pure gray, while with others there is considerable olive-green mixed with the gray. The wing, however, is much shorter than in *C. burkii tephrocephala* of the west — in six adult males varying from 55 to 57 mm. in length.

*CRYPTOLOPHA BURKII TEPHROCEPHALA* (Anderson).

One adult male, Ramala Pass, western Szechwan, 12,000 feet, August 26. This specimen has the wing 62 mm. in length.

*CRYPTOLOPHA SINENSIS* Rickett.

One adult male, Hsientientze, Hupeh, June 3, 1907.

*ABRORNIS FULVIFACIES* Swinhoe.

Nine adults, both sexes, Kiating, Nanchih sien, and Chiangching sien, Szechwan, April, November, and December.

*EUMYIAS MELANOPS* (Vigors).

Five adults, both sexes, Mafuling, and Hsientientze, Hupeh, and Chinghsien, Szechwan, May, and June.

## CAMPEPHAGIDAE.

*VOLVOCIVORA MELANOPTERA* (Rüppell).

Thirteen specimens, adults of both sexes, and one young female in spotted plumage, Ichang, Mafuling, Peiyang sze, Hsienshan, and Shinshenshan, Hupeh, May, June, and July.

*PERICROCOTUS BREVIROSTRIS* (Vigors).

Seven specimens, adults of both sexes, Hsienshan, Chetzekow, Wansonsan, and Showlungtu, Hupeh, and Wulungshih, western Szechwan, spring, and summer.

*PERICROCOTUS CANTONENSIS* (Swinhoe).

Eight adults, both sexes, Mafuling, Hupeh, and Luchow, Suifu, and Hochinghsien, Szechwan, spring, and summer.

## PYCNONOTIDAE.

*MICROSCELIS*<sup>1</sup> *LEUCOCEPHALUS* (Gmelin).

Eight males, Hsienshan, Pootung, Hsienhsien, Mafuling, Peiyang sze, Hupeh, and Omeih sien, Szechwan, spring, and summer.

*PYCNONOTUS XANTHORRHOS* J. Anderson.

Twenty-four specimens, young and adult both sexes, Ichang, Yangchiata-miao, and Hsienshanhsien, Hupeh, and Wushanhsien, Kiating, and Chinghsien, Szechwan, all seasons.

<sup>1</sup> As *Hypsipetes*, the current name of this genus is preoccupied, we take *Microscelis*, apparently the first available name.

*PYCNONOTUS SINENSIS* (Gmelin).

Thirty-three specimens, young and adults, both sexes, Ichang, and Kwatze, Hupeh, and Hochianghsien, Wanhsien, and Nanchih sien, Szechwan, and Shanghai, Kiangsu, all seasons.

*SPIZIXUS SEMITORQUES* Swinhoe.

Twenty specimens, both sexes, Ichang, Changyanghsien, Tawan, Kwatze ling, Hsienshanhsien, Shihtowya, and Hsienshan, Hupeh, and Kiating, and Changshowhsien, Szechwan, all seasons.

## TIMELIIDAE.

*BABAX LANCEOLATUS LANCEOLATUS* (Verreaux).

Seven adults, both sexes, from Hsientientze, Hsienshanhsien, Changyanghsien, Hochaping, and Kwangpow, Hupeh, taken at all seasons of the year.

*BABAX LANCEOLATUS BONVALOTI* Oustalet.

Six specimens, young and adult, both sexes, Ramala Pass, Tachienlu, and Cheto, western Szechwan, midsummer.

The one adult ♂, with a wholly striped belly, from the Ramala Pass, 14,000 feet, is apparently an extreme example of this large, dark western subspecies. As Oustalet has already mentioned Tachienlu specimens are somewhat intermediate, but they are so very much nearer the Tibetan subspecies than to true *lanceolatus*, that there is no question but that they should be placed with the former.

*TROCHALOPTERON ELLIOTI ELLIOTI* Verreaux.

Twenty-eight specimens, Washan, Tachienlu, Yachiakun, Tachiao, and Cheto, western Szechwan, and Changyanghsien, Hsienshanhsien, Mafuling, Hsienshan, Kwangpow, Patung, Tanshuiya, and Hsientientze, Hupeh, all seasons.

*TROCHALOPTERON FORMOSUM* Verreaux.

Three adults, two males and a female, taken at Washan, western Szechwan, 7,000 feet, October 31, 1908.



*TROCHALOPTERON CANORUM* (Linné).

Ten specimens, both sexes from Ichang, Changyanghsien, and Hsienshanhsien, Hupeh, all taken in autumn and winter, and from Tsaikow, and Kiating, western Szechwan, taken in October, and November.

*IANTHOCINCLA MAXIMA* (Verreaux).

Eleven specimens, young and adult of both sexes, Shuowlow, Ramala Pass, Yachiakun, Kaoerhshan, Wulungshih, and Lanerhyingpa, western Szechwan, midsummer.

*IANTHOCINCLA CINEREICEPS* Styan.

One adult female from Hsienshanhsien, Hupeh, December 19, 1907.

*POMATORHINUS STYANI* Seeböhm.

Ten specimens, adults of both sexes, Ichang, Hsienshan, Changyanghsien, and Hsienshanhsien, Hupeh, all seasons.

*POMATORHINUS MACCLELLANDI GRAVIVOX* David.

Two specimens, adult ♂ and ♀, from Peiyangsze, and Mafuling, Hupeh, May 12, and June 6, 1907.

*DRYONASTES PERSPICILLATUS PERSPICILLATUS* (Gmelin).

Ten specimens, adults of both sexes, Ituhsien, Kingaohsien, and Ichang, Hupeh, and Chungchowhsien, eastern Szechwan, all seasons.

*DRYONASTES SANNIO* (Swinhoe).

Fifteen specimens, young and adult, both sexes, Changyanghsien, Ichang, and Putze, Hupeh, and Lungchi, and Kiating, Szechwan, all seasons.

*ALCIPPE NIPALENSIS HUETI* David.

Sixteen specimens, both sexes, Kiating, and Changshowhsien, Szechwan, autumn, winter, and spring.

*PROPARUS CINEREICEPS* (Verreaux).

Fifteen specimens adults of both sexes, from Hsienshanhsien, and Hochaping, Hupeh, and Makaling, Tachiao, and Washan, western Szechwan, all seasons.

This series shows considerable variation in the colors of the head and back, a variation principally seasonal though in slight degree due to individual differences; there is however not a single specimen that could be referred to *Proparus fucatus* Styan described from Ichang.

MOUPINIA POECILOTIS (Verreaux).

Four specimens, adults and immature of both sexes, Tachienlu, and Chinchien, western Szechwan, at altitudes ranging from 8,000 to 12,500 feet, August and October.

SCHOENIPARUS VARIEGATUS Styan.

One adult ♂ in worn plumage, Chinshih sien, western Szechwan, June 27, 1908.

Ogilvie-Grant considers this species the same as *Schoeniparus genestieri* (Oustalet), which has two years priority over Styan's name; but Sharpe retains both species in his Hand List of Birds. With but a single specimen we are not in a position to decide.

STACHYRIDOPSIS PRAECOGNITUS (Swinhoe).

Seven specimens, adults of both sexes, Hsienshanhsien, Hupeh, and Kiating, Washanhsien, and Nanchih sien, Szechwan, spring, autumn, and winter.

The one skin taken at Hsienshanhsien, December 28, 1907, is paler below, more grayish and less greenish olive, above, than any of the Szechwan specimens. Though very pale in color below it is still, however, yellowish, and can not, we believe, be referable to *S. davidi* Oustalet, which was described as "cinerascentibus" on the breast and abdomen, though it would seem to approach that form in some degree.

MYIOPHONEUS CAERULEUS (Scopoli).

Five adults, both sexes, Kweichowhsien, and Ichang, Hupeh, and Nitow, and Kiating, western Szechwan, December, March, and June.

MYIOPHONEUS TIBETANUS Madarász.

This very distinct species with a yellow bill and *no semiconcealed white markings* on the feathers of the rump and sides, was taken at Nachuka, 10,000 feet, Tachienlu, 7,500 to 10,000 feet, Washan, and Cheto, 10,000 feet, western

Szechwan; ten specimens including young and adults were secured in spring and summer, 1908.

Hartert having examined the type, pronounced it a young bird and synonymous with *M. temminckii temminckii* Vigors (Die vögel der paläarktischen fauna, p. 676).

Our series contains six fully adult breeding birds, taken between the dates of May 18 and August 24, and as none of these show even the slightest indication of white spots so conspicuous on the rump and sides of *M. temminckii* and *M. caeruleus*, we believe that Hartert was mistaken in his disposition of the species. *M. tibetanus* is moreover of a rather duller blue color generally than *M. temminckii*, and the shiny blue spots are smaller both above and below.

HETEROXENICUS CRURALIS FORMASTER, sub. sp. nov.

Four specimens, an adult male, two young males, and an adult female, Washan Mountain, western Szechwan, 9,000 to 10,000 feet, May 31 to June 4, 1908.

*Type*.—No. 51970 M. C. Z. adult ♂. Western Szechwan: Washan Mountain, 10,000 feet, May 31, 1908. W. R. Zappey.

*Characters*.—Very similar to true *H. cruralis* (Blyth) of the eastern Himalayas, but larger; the adult male with the blue parts much grayer blue, less indigo; the adult female, duller, more olivaceous, less russet-brown. Thus, the new form seems to be in general color like *H. sinensis* (Rickett) of northwestern Fukien (which we have not seen) but is larger and has the lores black as in true *H. cruralis*.

*Measurements*.—Type, adult ♂, wing, 73; tail, 47; tarsus, 34; culmen, 14. Adult ♀, Topotype No. 51973, wing, 70; tail, 45; tarsus, 32.5; culmen, 13.

*Remarks*.—This bird was found only on Washan Mountain, where it lived in the rhododendron thickets; it was shot with great difficulty. There is no doubt that it is very closely related to true *H. cruralis* on the one hand and to *H. sinensis* on the other, still it differs from both in its larger size, and from each in other slight characters; and we believe it must be regarded as representing a distinct subspecies.

TESIA GRALLATOR, sp. nov.

Plate 5, figs. 1, 2.

*Type*.—No. 51975 M. C. Z. adult ♀. Western Szechwan: Washan Mountain, 10,000 feet, May 31, 1908. W. R. Zappey.

*Characters*.— Similar to *T. castaneocoronata* (Burton) (Plate 5, fig. 3, bill) of the eastern Himalayas, but with a *very much* smaller bill (Plate 5, fig. 2) which is of a yellowish color throughout; (the two specimens of *T. castaneocoronata* examined have the maxilla dark brown); crown orange-rufous instead of hazel or chestnut; underparts slightly paler yellow, with a narrow band of olive-green spots across chest; eye-ring, showing most distinctly just before and just behind eye, bright yellow.

*Measurements*.— Type, adult ♀, wing, 50.5; tail, 24; tarsus, 23; culmen, 8.5.

*Remarks*.— This *Tesia* also kept itself closely concealed in the thickets of rhododendron on Washan and the type was the only individual seen during the all too short stay on this exceedingly interesting mountain.

#### YUHINA GULARIS YANGPIENSIS Sharpe.

Two adults, male and female, taken together, on Washan, western Szechwan, at 8,000 feet altitude, October 27, 1908.

These skins agree exactly with Sharpe's description, and are very different from examples of true *Y. gularis* from the eastern Himalayas. We have however seen no specimens from Yünnan.

#### YUHINA DIADEMATA Verreaux.

Nine adults, both sexes, Hsienshanhsien, Changyanghsien, and Putze, Hupeh, and Nitow, and Washan, western Szechwan, all seasons.

#### LIOTHRIX LUTEUS LUTEUS (Seopoli).

Twenty-four specimens, adults of both sexes, Hsienshanhsien, Hsienshan, Patung, and Changyanghsien, Hupeh, and Yachow, Lungchi, and Luluping, Szechwan, all seasons.

#### CONOSTOMA AEMODIUM Hodgson.

Three adult males, Washan, western Szechwan, taken at altitudes of from 8,000 to 10,000 feet, May and October.

#### CHOLORNIS PARADOXA Verreaux.

Four adult males, Washan, western Szechwan, 8,000 to 8,500 feet, May, 1908.

*SUTHORA UNICOLOR CANASTER*, sub. sp. nov.

Two specimens, both males, Washan, and Yachiakun, western Szechwan, July and November.

*Type*.—No. 50709 M. C. Z. adult ♂. Western Szechwan: Washan Mountain, November 3, 1908. W. R. Zappey.

*Characters*.—Similar to true *Suthora unicolor* (Hodgson) (compared with specimens from Sikkim) but slightly smaller with a decidedly smaller bill; coloration grayer, the breast and chest much more ashy and less vinous, sides of head paler and grayer, forehead and forward part of crown pearly gray instead of vinous brown.

*Measurements*.—Type, adult ♂, wing, 88; tail, 101; tarsus, 30.5; culmen, 13. No. 50710, adult ♂, Yachiakun, western Szechwan, July 14, 1908, wing, 89; tail, 104; tarsus, 30; culmen, 13.5.

*SUTHORA CONSPICILLATA* David.

One adult ♂, Hsientientze, Hupeh, 6,000 feet, June 2, 1907.

*SUTHORA ALPHONSIANA* Verreaux.

Three adults, two males and a female, Kiating, and Luluping, western Szechwan, June, and November.

*SUTHORA WEBBIANA SUFFUSA* (Swinhoe).

Twenty-three specimens, adults of both sexes, Ichang, Hsienshanhsien, Shantau, and Kunganhsien, Hupeh, and Changshowhsien, eastern Szechwan all seasons.

*SUTHORA ZAPPEYI*, sp. nov.

Plate 4, fig. 2.

Seven specimens, adults of both sexes, all from Washan Mountain, western Szechwan, 8,500 to 10,000 feet, October, November, and May.

*Type*.—No. 50738 M. C. Z., adult ♂. Western Szechwan: Washan Mountain, 9,000 feet, November 3, 1908. W. R. Zappey.

*Characters*.—A medium sized species, with a small bill, much crested head, and of dull coloration. Back Mars brown; head and anterior lower parts gray; sides ecru-drab; flanks and under tail-coverts, drab.

*Color*.—Pileum mouse-gray; sides of face and neck smoke gray; back Mars brown; rump and upper tail-coverts drab; wings dusky margined with Mars brown; tail dusky narrowly edged with drab; throat and chest pale drab-gray; sides of breast ecru-drab; flanks and under tail-coverts drab; bill pale yellowish, more or less dusky at base of culmen (in dried skin).

Summer — May 31 — specimens are like autumnal ones, except in being duller in colors throughout with the plumage much closer, less fluffy.

*Measurements*.—Type, adult ♂, wing, 58.5; tail, 77; tarsus, 22; culmen, 7.5. Adult ♀ Topotype, No. 50743, wing, 57; tail, 79; tarsus, 22; culmen, 8.

*Remarks*.—This species, which we have named in honor of Mr. Zappey, was seen on Washan only, where it is probably resident. It occurred in fair numbers both in spring, and early summer, and in autumn.

### TROGLODYTIDAE.

#### NANNUS TROGLODYTES SZETSCHUANUS (Hartert).

Ten specimens, adults of both sexes and two young females. Ichang, Changyanghsien, and Hsienshanhsien, Hupeh, and Tachiao, and Wulungshih, western Szechwan, the latter at an altitude of 14,500 feet, all seasons.

#### PNOEPYGA MUTICA, sp. nov.

Plate 4, fig. 1.

*Type*.—No. 51974 M. C. Z. adult ♂. Western Szechwan: Washan Mountain, 10,000 feet, June 3, 1908. W. R. Zappey.

*Characters*.—Somewhat similar to *P. squamata* (Gould) of the Himalayas, the upper parts very similar, the under parts much darker, the dusky centres of the feathers much more extended and the white borders much narrower and nearly or quite disappearing on the feathers of the sides and flanks; the pronounced buffy suffusion of the whole under parts of *P. squamata* is, except for a light buffy wash on the low belly, wanting in the Washan bird.

*Color*.—Whole upper parts, including wings and tail, Prout's brown, each feather of the head and back with a small terminal spot of tawny; throat plain white; chest and breast, to middle of abdomen with each feather dusky gray in the middle and white around the edges, producing a regular scale-like appearance; flanks and under tail-coverts dull Prout's brown, the feathers tipped with

brownish white; bill dark brown, yellowish white at base of lower mandible; legs and feet brown.

*Measurements*.—Type adult ♂, wing, 61; tail, 17; tarsus, 25.5; culmen, 11.5.

*Remarks*.—The unique specimen of this extraordinary little bird was secured almost by accident. It was on the ground, under the dense, all but impenetrable masses of rhododendron that cover the high sides of Washan, when a slight movement of the bird attracted Mr. Zappey's attention.

### CINCLIDAE.

*CINCLUS CINCLUS CASHMERIENSIS* Gould.

One female Tachienlu, western Szechwan, 9,000 feet, September 30, 1908.

*CINCLUS PALLASII SOULIEI* Oustalet.

Twenty-two specimens, young and adults of both sexes, Ichang, and Changyanghsien, Hupeh, all seasons.

### TURDIDAE.

*PLANESTICUS MERULA MANDARINUS* (Bonaparte).

Sixteen specimens, adults and young of both sexes, Ichang, and Changkowsien, Hupeh, and Omeih sien, Hochianghsien, and Kiating, western Szechwan, all seasons.

*PLANESTICUS CASTANEA GOULDI* (Verreaux).

Sixteen specimens, adults and young of both sexes, Tachienlu, and Tachiao, western Szechwan, midsummer.

*PLANESTICUS KESSLERI* (Prjevalsky).

Four adults, two males and two females, western Szechwan: Tachienlu, 13,500 feet, Ramala Pass, 15,000 feet, Lanerhyingpa, 14,000 feet, and Kaoershshan, 15,000 feet, July, and August, 1908. This fine bird was found only in the highest grass-lands, and was very rare even in those regions.

*PSOPHOCICHLA AURITA* (Verreaux).

One adult male, Kiating, western Szechwan, November 28, 1908,

## OREOCINCLA AUREA (Holandre).

One adult male, Ichang, Hupeh, April 30, 1907.

## OREOCINCLA DAUMA SOCIA, sub. sp. nov.

Two specimens, male and female adults, Tachienlu; western Szechwan, 9,000 feet, September 28, 1908.

*Type*.—No. 51177 M. C. Z. adult ♂. Western Szechwan: Tachienlu, 9,000 feet, September 28, 1908. W. R. Zappey.

*Characters*.—Similar to true *O. dauma* (Latham) of the Himalayas, and with twelve tail-feathers; but smaller, much darker in general coloration, with all the black markings of the feathers wider and the ochraceous markings narrower; underparts more ochraceous or buff-yellow, less whitish; under tail-coverts wholly buff-yellow; pileum much darker, the feathers, except for the ochraceous spot on each, black instead of brown.

*Measurements*.—Type, adult ♂, wing 138; tail, 95.5; tarsus, 34.5; culmen, 22. Adult ♀ No. 51176. Topotype, wing, 135; tail, 90; tarsus, 32; culmen, 22.

*Remarks*.—Like so many other Himalayan birds, *Oreocincla dauma* has a well-marked subspecies in the high mountains of western China. It must be either very rare or very retiring in its habits as Mr. Zappey saw but the two collected and we can not find that any other collector has ever taken it in this general region or in eastern Tibet where it should also occur.

## TURDUS CARDIS LATEUS Thayer &amp; Bangs.

Bull. M. C. Z., May, 1909, 52, p. 140.

Four specimens, three adult males and a young male in nestling plumage, Ichang, Hupeh, April, June, and July.

This subspecies which is a well-marked form, easily separated from true *T. cardis* of Japan, was found only at Ichang where it was breeding. Mr. Zappey was away from Ichang in May, otherwise from April to July he occasionally saw or heard this thrush. He states that he might easily have secured additional specimens had he anticipated that it would not occur elsewhere.

## TURDUS NAUMANNI (Temminck).

Twenty-eight specimens, Ichang, Ituhsien, and Changyanghsien, Hupeh, winter, and early spring.



*TURDUS RUFICOLLIS RUFICOLLIS* (Pallas).

Two males, one taken at Ichang, March 22, 1907, the other a bird with but one leg and an old injury to one wing, was shot at Yachiakun, western Szechwan, 10,000 feet altitude, July 19, 1908. The partially disabled individual, which of course had been prevented from migrating northward in the spring, was in full breeding plumage.

*TURDUS FUSCATUS* (Pallas).

Eleven specimens, Ichang, Changyanghsien, and Tawan, Hupeh, and Washan, and Wanhsien, Szechwan, winter, and early spring.

*PETROPHILA SOLITARIUS SOLITARIUS* (Linné).

Thirteen specimens, adults of both sexes, Ichang, Changyanghsien, Nantow, and Hsienshan, Hupeh, and Waszekow, Wanhsien, Luchow, Foochow, and Luitingchiao, Szechwan, all seasons. Several males — three or four — have more or less ferruginous mixed in the blue of the belly and under tail-coverts, thus approaching *P. solitarius philippensis* (Müll.).

*LAISCOPUS COLLARIS NIPALENSIS* (Hodgson).

One, young male just beginning to assume mature plumage, Cheto, western Szechwan, 13,500 feet, August 30, 1908.

*APRUNELLA IMMACULATA* (Hodgson).

One adult male, Washan, western Szechwan, October 28, 1908.

*PRUNELLA STROPHIATA MULTISTRIATUS* (David).

Five specimens, young and adults, Ramala Pass, Yachia, and Shuowlow, western Szechwan, 10,000 to 15,500 feet, midsummer.

*ENICURUS SINENSIS* Gould.

Twenty-five specimens, adults of both sexes, Ichang, Yangchiatamiao, Yangchaho, Tatung, Chiliping, Chilitoyeh, Kwangpow, Hsienshan, Hsien-shanhsien, and Changyanghsien, Hupeh, and Yachow, and Luluping, western Szechwan, all seasons.

## MICROCICHLA SCOULERI (Vigors).

Nine specimens, adults of both sexes and one young female, Ichanghsien, Hsienshanhsien, Tawan, Changyanghsien, Ichang, and Tanshuiya, Hupeh, and Washan, western Szechwan, all seasons.

## CHIMARRHORNIS LEUCOCEPHALA (Vigors).

Thirty-four specimens, both sexes, Ichang, Ichanghsien, Hsienshanhsien, and Changyanghsien, Hupeh, and Washan, Cheto, Motuimien, Tsai-kow, Tachienlu, and Tachiao, western Szechwan.

## PHOENICURUS HODGSONI Moore.

Two adult males, Ichanghsien, Hupeh, February 4, 1909, and Kiating, western Szechwan, December 18, 1908.

## PHOENICURUS AUROREUS AUROREUS (Pallas).

Thirty-nine specimens, adults and young of both sexes, Ichang, Kwang-pow, Showlungtu, and Hsienshanhsien, Hupeh, and Nachuka, Washan, and Kiating, western Szechwan, all seasons. Mature birds and two nearly full grown young in spotted plumage, were taken August 12, and 14, at Nachuka, 10,000 feet altitude.

The recently described *Phoenicurus auroreus filchneri* (Parrot), if really distinct, has probably a slightly different range; at all events our birds are referable to true *auroreus*. The wing in our largest males not exceeding 75 mm. and in the females not exceeding 72 mm., breeding birds are no larger than those taken in winter.

## PHOENICURUS FRONTALIS Vigors.

Seven specimens, adults of both sexes, and one young male in spotted plumage, Washan, Yachiakun, and Yachow, western Szechwan, all midsummer, except one male taken December 3.

## PHOENICURUS SCHISTICEPS (Gray).

Five specimens, two adult males, one adult female, and two young males in spotted plumage, Ramala Pass, Shuowlow, and Wulungshih, western Szechwan, 12,500 to 15,000 feet, midsummer.

*RHYACORNIS FULIGINOSA FULIGINOSA* (Vigors).

Forty specimens, young and adults, both sexes, Ichang, Changyanghsien, Hsienshanhsien, Showlungtu, Pinshinpow, and Kwatzeling, Hupeh, and Washan, Tachienlu, Tsaikow, Suifu, and Lungchi, Szechwan, all seasons.

*CYANOSYLVA SUECIA ROBUSTA* (Buturlin).

Two males, Ichang, Hupeh, October 9, and November 1, 1907.

*HODGSONIUS PHOENICUROIDES* (Hodgson).

Eight specimens, adults of both sexes and young males, Chetzekow, Hupeh, and Washan, and Tachienlu, western Szechwan, spring, and summer.

*CALLIOPE DAVIDI* Oustalet.

Seven specimens, adults of both sexes, Yachiakun, and Lanerhyingpa, western Szechwan, 12,000 to 14,000 feet altitude, midsummer.

*IANTHIA CYANURA* (Pallas).

Twenty specimens, both sexes, Ichang, Kwatzeling, Hsienshanhsien, and Changyanghsien, Hupeh, and Kungyahsien, Shuowlow, Omeih sien, and Kiating, Szechwan, mostly winter, and early spring, though there is one female taken at Shuowlow, August 22, that is in very much abraded plumage.

*COPSYCHUS SAULARIS* (Linné).

Twelve adults, both sexes, Ichang, Changyanghsien, Kwangpow, and Shih-towya, Hupeh, and Hochiang, Szechwan, all seasons.

*Copsychus saularis* undoubtedly divides into a number of geographic races, as partly indicated by Sharpe in the Catalogue of the birds in the British Museum; many of these have received names. The Chinese and Indian birds differ somewhat and may have to be recognized, but we have far too little material at our command to attempt the subdivision.

*PRATINCOLA TORQUATA PRJEWALSKII* Pleske.

Nine specimens, adults of both sexes and young males in autumn plumage. Ichang, Tawan, Chetzekow, and Hsientientze, Hupeh and Washan, western Szechwan. Six of these — five males and a female — were taken during the breeding season, from late April to the middle of June; the other three are young

males taken in September, and October and may have been migrants, though they appear to belong to the same form as the others.

It is with some hesitation that we refer these breeding birds from central and western China to *P. t. prjewalskii*, as they are rather smaller than that form, judged by the measurements given by Hartert in *Die vögel der paläarktischen fauna*. On the other hand they are too large to be placed with *P. t. stejnegeri* Parrot.

It is probable that they are about intermediate between the two, though perhaps nearer *P. t. prjewalskii* than to *P. t. stejnegeri*.

OREICOLA FERREA HARRINGTONI Hartert.

Five specimens, adults of both sexes, Tawan, Hsientientze, and Kwangpow, Hupeh, and Luluping, western Szechwan, spring, and summer.

SYLVIIDAE.

LOCUSTELLA LANCEOLATA (Temminck).

Four females, Ichang, Hupeh, September, October, and November.

ANTELOCICHLA BISTRIGICEPS (Swinhoe).

Two adults, male and female, Ichang, Hupeh, September, and October.

ANTELOCICHLA AGRICOLA CONCINENS (Swinhoe).

One adult male, in rather worn breeding plumage, Hsientientze, Hupeh, 5,500 feet, June 3, 1907.

ACROCEPHALUS ARUNDINACEUS MAGNIROSTRIS (Swinhoe).

Five adults, both sexes, Ichang, Hupeh, June. These birds were breeding in the reed-beds of the river, and are in rather worn plumage. They appear to represent this form and not *A. inexpectatus*; the wing in the male is well over 80 mm. and the 2nd primary falls between the 3rd and 4th in length; the color of the upper parts moreover, is decidedly olive-brown.

We, however, recognize Swinhoe's name for the Chinese bird, separating it from the Japanese *A. arundinaceus orientalis* (Temminck and Schlegel) on account of its decidedly heavier bill and slightly larger size.

## ACROCEPHALUS INEXPECTATUS Berezowski &amp; Bianchi.

One adult male, taken at Ichang, Hupeh, October 8, 1907. This individual has the wing, 76 mm.; tail 61.5; tarsus, 27.; culmen, 17. The second primary falls between the 4th and 5th; and the color of the upper parts is a rich russet-brown. The specimen, therefore, agrees exactly with the description of Berezowski and Bianchi and is undoubtedly a migrant of the rather more northwestern species.

DUMETICOLA<sup>1</sup> BRUNNEIPECTUS (Blyth).

Nine specimens, adults of both sexes, Hsientientze, Hupeh, and Washan, western Szechwan, May, and June. All were taken at altitudes of between 6,000 and 8,000 feet.

Two nests with sets of eggs — one of two and the other of four — were secured May 31 and June 6, and in each case the female parent was also taken.

Our skins belong apparently to *D. brunneipectus* rather than to *D. russulus* (Slater), but we have had no specimens of the latter for comparison.

## CISTICOLA CISTICOLA TINTINNABULANS (Swinhoe).

Two males, Kiating, and Hochianghsien, Szechwan, April 22, and May 6.

## OREOPNEUSTE SUBAFFINIS (Ogilvie-Grant).

Ten specimens, adults of both sexes, Hsientientze, Tawan, and Showlungtan, Hupeh, and Kiating, Washan, and Tachienlu, Szechwan, at altitudes ranging from 5,000 to 8,000 feet, spring and summer. The one skin from Kiating which is in low country, was taken November 18, 1908, and is the only specimen in autumnal plumage.

A nest and set of four eggs was taken together with the female parent at Washan, 6,000 feet altitude, May 31, 1908.

## OREOPNEUSTE AFFINIS (Tickell).

At Yachiakun, western Szechwan, September, 1908, at an altitude of 13,500 feet Mr. Zappey collected one male (probably young in first autumnal plumage) that is very unlike any in the series of *O. subaffinis* even the single autumnal one from Kiating. This specimen we can not distinguish in any way from skins of *O. affinis* from Shillong, India, with which we have carefully compared it.

<sup>1</sup> This genus is unquestionably quite distinct and must be recognized as different from *Tribura*.

It can be separated at once from *O. subaffinis* by the lemon-yellow underparts, under wing-coverts, and superciliaries; by its darker more olive-green back, and by the smaller amount of black on the lower mandible. It was probably a stray migrant.

It does not seem possible that it can be *O. bianchi* Sharpe (originally described by Berezowski and Bianchi as *O. davidi*) which we consider, though without specimens, to be much nearer to, if not the same as, *O. subaffinis*.

OREOPNEUSTE FUSCATUS (Blyth).

Eight specimens, both sexes, Iehang, Hupeh, autumn — September 27 to November 28 — and one killed March 22.

OREOPNEUSTE ARMANDI (Milne Edwards).

Three adults, one male, two females, Tachienlu, western Szechwan, 9,000 to 10,000 feet, July.

REGULOIDES MACULIPENNIS DEBILIS, sub. sp. nov.

Two adult females, western Szechwan; Kiating, November 26, and Luluping, November 8.

*Type*.—No. 52502 M. C. Z. adult ♀. Western Szechwan: Kiating, November 26, 1908. W. R. Zappey.

*Characters*.—Similar to true *R. maculipennis* (Blyth) of the Himalayas, but head mouse-gray instead of brownish olive; back bright olive-green instead of yellowish or greenish olive; throat paler, grayish white instead of dull drab-gray; belly paler and purer yellow — pale sulphur-yellow, instead of dull olivaceous maize-yellow.

*Measurements*.—Type, adult ♀, wing, 48; tail, 33; tarsus, 16; culmen, 7.

*Remarks*.—This is another very distinct west China subspecies of a Himalayan species. It probably breeds in the coniferous forest on Washan and perhaps in other parts of this elevated region, although it was not taken during the breeding season.

REGULOIDES PULCHER (Blyth).

Three specimens, two males and a female all adults, Washan, Yachiakun, and Tachiao, western Szechwan, 11,000 to 12,000 feet, June, and July.

*REGULOIDES PROREGULUS* (Pallas).

Twenty-three specimens, both sexes, Ichang, Chetzekow, Hsienshan, and Hsienshanhsien, Hupeh, and Kiating, Luluping, and Washan, Szechwan. All seasons, during the breeding season, however, all the places were of high altitude — 7,000 to 10,000 feet.

*REGULOIDES SUPERCILIOSUS* (Gmelin).

Fifteen specimens, both sexes, Ichang, Hsientientze, and Kwatzeling, Hupeh, autumn, and spring as late as May 10.

*REGULOIDES MANDELLII* Brooks.

One adult male, Lianghokow, western Szechwan, 12,000 feet, September 8, 1908.

*ACANTHOPNEUSTE BOREALIS* (Blasius).

Two males, Ichang, and Mafuling, Hupeh. September 25, and May 12.

*ACANTHOPNEUSTE PLUMBEITARSUS* (Swinhoe).

One adult female, Ichang, Hupeh, October 6.

*ACANTHOPNEUSTE MAGNIROSTRIS* (Blyth).

Ten specimens, both sexes, Hsienthen, Wansow, Chetzekow, and Patung, Hupeh, and Tachienlu, Washan, and Yachiakun, Szechwan, spring, and summer.

*ACANTHOPNEUSTE LUGUBRIS* (Blyth).

One adult male, Luluping, western Szechwan, May 13, 1908.

*ACANTHOPNEUSTE CORONATA* (Temminck).

One adult male, Wanhsien, eastern Szechwan, April 2, 1908.

This is probably a very rare, or even an accidental migrant, so far inland. It is, however, a perfectly typical example of the species.

*ACANTHOPNEUSTE TROCHILOIDES* (Sundeval).

Ten specimens, adults of both sexes, and one young male in nestling plumage (August 8), Hsientientze, Kwangpow, Hongchikow, Hochaping, Hupeh, and Nachuka, and Tsai-kow, Szechwan, spring, and summer. Taken only at altitudes ranging from 5,000 to 10,000 feet during the breeding season.

*HORORNIS FORTIPES DAVIDIANA* (Verreaux).

Eight specimens, adults of both sexes and one young male, Ichang, Hsientientze, Hsienshanhsien, and Changyanghsien, Hupeh, and Kiating, Szechwan. All seasons; breeding specimens at high altitudes only, from 5,000 to 5,500 feet.

*NEORNIS ACANTHIZOIDES ACANTHIZOIDES* (Verreaux).

Eight specimens, adults of both sexes, Kiating, Washan, and Chungchowhsien, western Szechwan, winter, spring and summer.

*NEORNIS FLAVOLIVACEA INTRICATUS* Hartert.

Four specimens, adults of both sexes, Washan, Tachienlu, Yachiakun, and Lianghokow, western Szechwan, 10,000 to 13,000 feet, midsummer.

*NEORNIS CANTANS CANTURIANUS* (Swinhoe).

One adult male, Hsientientze, Hupeh, 5,500 feet, June 2, 1907.

*SUYA CRINIGERA* Hodgson.

Eight specimens, both sexes, Hsienshan, Nanyangho, and Patunghsien, Hupeh, and Kiating, Chinkowno, and Nashanhsien, Szechwan. This series includes skins in spring and summer plumage with black bills and comparatively short tails; and also examples taken in autumn and winter with pale bills, comparatively long tails, and considerably more reddish brown above with dusky markings on the throat and breast.

*PRINIA INORNATA* EXTER, sub. sp. nov.

Plate 5, figs. 4-5.

Six specimens, adults of both sexes, Nanchihsien, Hokow, and Kiating, Szechwan, spring, autumn, and winter.

*Type*.—No. 52580 M. C. Z. adult ♂ in breeding plumage. Western Szechwan: Hokow, May 4, 1908. W. R. Zappey.

*Characters*.—By far the darkest race of *P. inornata*. In summer plumage the upper parts are of a shade about between olive and hair-brown; the under parts strong buff. In winter plumage the upper parts vary from tawny olive to raw umber and the under parts are clay color. It is therefore a very much darker bird than either *P. inornata inornata* Sykes of India or *P. inornata exten-*



*sicauda* (Swinhoe) of Amoy and southeastern China. These two are not very different in color, the upper parts ranging, in summer plumage, from drab to wood brown; and the same parts in the winter plumage are about ochraceous cinnamon.

*Measurements*:—Type adult ♂, summer plumage, wing, 51; tail, 67; tarsus, 21; culmen, 10.5. No. 52578, adult male from Kiating, western Szechwan, in winter plumage, wing, 50.5; tail, 89; tarsus, 22; culmen, 10.5.

*Remarks*:—We can not find that this dark, well-marked form of *P. inornata* has been named, although it seems probable that Dr. Anderson's Yünnan specimens would be referable to it. The seasonal differences are the same as in other members of the genus, but in both plumages it is easily distinguished from any other of the subspecies by its much darker, deeper coloring.

## LANIIDAE.

### LANIUS BUCEPHALUS Temminck & Schlegel.

Three specimens, an adult male and two females, Ichang, Hupeh, October 29, and January.

### LANIUS TEPHRONOTUS (Vigors).

Sixteen specimens, young and adults, of both sexes, Tachienlu, Nachuka, Lanerhyingpa, Yachiakun, Cheto, Washan, and the Ramala Pass, Szechwan, at altitudes ranging from 8,000 to 15,000 feet, midsummer.

### LANIUS SCHACH SCHACH Linné.

Nineteen specimens, adults of both sexes, Changkowhsien, Kingaohsien and Ichang, Hupeh, and Luchow, Suifu, and Kiating, Szechwan, all seasons, though mostly in winter.

### LANIUS LUCIONENSIS Linné.

Twenty-seven specimens, young and adults, both sexes, Ichang, Hsienshan, and Fangshen, Hupeh, spring, and summer.

## PARIDAE.

### PENTHESTES AFFINIS (Prjevalsky).

Four adults, both sexes, Lianghokow, Yachiakun, Shuowlow, Tongolow, western Szechwan, at altitudes ranging from 11,000 to 14,000 feet, midsummer.

*PENTHESTES HYPERMELAENA* (Berezowski & Bianchi).

Seven specimens, both sexes, Hsienshanhsien, Mafuling, Fonghsien, and Chetzekow, Hupeh, at altitudes ranging from 5,000 to 7,000 feet, winter and spring.

*PENTHESTES DEJEANI* (Oustalet).

One pair of adults, taken at Nachuka, western Szechwan, at 12,000 feet altitude, August 14, 1908.

While we hope that our determination of the three species of *Penthestes* is correct we must admit that our material for comparison is wholly inadequate.

*LOPHOPHANES DICHROIDES* Prjevalsky.

Nine adults, both sexes, Tachiao, Tongolow, Shuowlow, Wulungshih, and Washan, western Szechwan, 9,000 to 14,500 feet, summer, and autumn.

*PERIPARUS ATER AEMODIUS* (Blyth).

One adult male, Hsienshanhsien, Hupeh, 5,500 feet, December 10, 1907.

*PERIPARUS RUFONUCHALIS BEAVANI* (Jerdon).

Sixteen specimens, both sexes, Washan, Shuowlow, Tongolow, Wulungshih, and Ramala Pass, western Szechwan, 8,000 to 14,500 feet, summer, and autumn.

This series appears wholly referable to *beavani* and not to *poecilopsis* Sharpe from Yünnan; the latter compared with the former is described as much paler below.

*PARDALIPARUS VENUSTULUS* (Swinhoe).

Thirty-two specimens, young and adult of both sexes, Hsientientze, Ichang, Hsienshan, Mafuling, Kwatzeling, Nochaping, and Fangshen, Hupeh, all seasons.

*PARUS MAJOR TIBETANUS* Hartert.

Perfectly characteristic examples of this form with an extreme amount of white in the tail, were taken in western Szechwan at Tachienlu, 9,000 feet, Nachuka, 10,000 feet, and Kiating in midsummer. Seven skins including one young ♂ and one young ♀, and adults of both sexes being secured. At Omeihsien, Hochiang, Lungchi, and Luluping seven skins including young and adults were taken, some of which are variously intermediate though all are nearer *tibetanus*, than the next form.

## PARUS MAJOR ARTATUS Thayer &amp; Bangs.

Bull. M. C. Z., May, 1909, 52, p. 140.

This recently described form occupies the very central part of China.

Twenty-nine specimens including young and adults, were taken, at all seasons of the year at Ichang, Hsientientze, Chiliping, Kwangpow, Changyanghsien, and Hsienshanhsien, Hupeh.

## PARUS MONTICOLA MONTICOLA (Vigors).

Ten adult specimens, both sexes, from Ichang, Chetzekow, Kwangpow, and Hsienshanhsien, Hupeh, and Omeih sien, Kiating, and Washan, western Szechwan, all seasons.

## AEGITHALISCUS CONCINNUS (Gould).

Thirty specimens, young and adults, both sexes, from Ichang, Yangchiata-miao, Changyanghsien, Hsienshanhsien, and Hsienshan, Hupeh, and Kiating, Chienweihsien, Wushanhsien, Nanchihsien, Chungking, Luchow, and Chungchowhsien, Szechwan, all seasons.

## AEGITHALISCUS BONVALOTI (Oustalet).

One male, not in fully mature plumage, shot at Shuowlow, western Szechwan, 14,000 feet altitude, August 21, 1908.

## AEGITHALISCUS FULIGINOSUS (Verreaux).

Fourteen specimens, adults of both sexes, Hsientientze, Hsienshanhsien, and Fonghsien, Hupeh, winter, and spring.

## AEGITHALUS GLAUCOGULARIS (Gould).

Twenty specimens, adults of both sexes, from Ichang, Hupeh, taken at all seasons.

These skins are all referable to true *glaucoocularis* and not at all to *calvus* (Pleske) which is said to range through Szechwan to central China.

## REGULIDAE.

## SYLVIPARUS MODESTUS OCCULTUS, sub. sp. nov.

*Type*:—No. 50745 M. C. Z. adult ♀. Western Szechwan: Kiating, November 15, 1908. W. R. Zappey.

*Characters*:—Similar to true *S. modestus* Burton of the Himalayas, but much grayer, and less greenish in color throughout; upper parts dark, grayish olive-green, much darker, more grayish, less brownish than in true *S. modestus*; under parts dull, grayish pea-green, very different from the pale yellowish olive-green under parts of true *S. modestus*.

*Measurements*:—Type adult ♀, wing, 54; tail, 51.5; tarsus, 15; culmen, 7.

*Remarks*:—Although we have but a single example this is so different in general color from Himalayan skins that it represents without doubt an easily recognized Chinese subspecies.

### SITTIDAE.

#### SITTA SINENSIS Verreaux.

Twelve specimens, adults of both sexes from Ichang, Kwatzeling, Fonghsien, Putze, Hsienshanhsien, and Changyanghsien, Hupeh in altitude up to 6,500 feet, all seasons.

#### SITTA MONTIUM La Touche.

Five specimens, four adults of both sexes and one young, Nachuka, 12,000 feet, Ramala Pass, 12,000 feet, and Yachow, western Szechwan, midsummer.

The differences, as pointed out by La Touche, distinguish a mountain from a lowland form of the Chinese nuthatch stand out so strongly in our series and are of such a nature that taken together with the distribution, would indicate specific rather than subspecific rank for the two forms.

#### SITTA PRZEWALSKII Berezowski & Bianchi.

One adult female shot Aug. 18, 1908, at Shuowlow, western Szechwan, 14,000 feet.

This specimen, though a female has a wholly blue-black crown and agrees minutely with the original description of the type, an adult male.

### CERTHIIDAE.

#### CERTHIA FAMILIARIS KHAMENSIS Bianchi.

One adult ♂, Lianghokow, western Szechwan, 13,000 feet, September 7, 1908. This specimen in fine fresh plumage, apparently belongs here, and is not referable to *C. familiaris bianchii* Hartert recorded from northern Szechwan.

## CERTHIA HIMALAYANA YUNNANENSIS Sharpe.

Three adults, two females and a male Ramala Pass and Nachuka, western Szechwan, 12,000 to 13,000 feet altitude, August.

## TICHODROMA MURARIA (Linné).

Four adults, both sexes, Ichang, Hupeh, and Kiating, Washan, and Kungya-hsien, western Szechwan, winter.

## ZOSTEROPIDAE.

## ZOSTEROPS SIMPLEX Swinhoe.

Four adults, both sexes, taken in spring, and summer at Hsienshan, and Kwatzeling, Hupeh.

These specimens, while probably referable to *Z. simplex* rather than to *Z. mussoti* Oustalet of Szechwan, which was not observed by Mr. Zappey, show some signs of being intermediate; they have smaller bills, and the black line from the side of the bill to and below the eye is more distinct than in *Z. simplex*; but the yellow of the throat does not extend far backward, and the color agrees with that of *Z. simplex*.

## DICAIEIDAE.

## DICAENUM IGNIPECTUS CYANONOTUM Styan.

Two adult males, one from Hsienshan, Hupeh, June 7, 1907, the other Wahsien, western Szechwan, April 2, 1908.

This well-marked form appears to be rare, and the two specimens taken were the only ones seen.

## NECTARINIIDAE.

## AETHOPYGA DABRYI (Verreaux).

Twenty-one specimens, adults of both sexes, Hsientientze, Mafuling, Wantaoshan, Patung, Hongsurkow, Hupeh, and Washan, western Szechwan, all taken in May, and June, at altitudes up to 10,000 feet.

## MOTACILLIDAE.

## MOTACILLA ALBA OCCULARIS (Swinhoe).

Eight specimens, both sexes, Ichang, Hupeh, and Kiating, Szechwan, all taken in September, October, and November.

## MOTACILLA ALBA LEUCOPSIS (Gould).

Twenty specimens, adults and young in first winter plumage, of both sexes, Ichang, Hupeh, January, March, September, and October.

*Motacilla alba baikalensis* (Swinhoe) should occur in this general region in winter, but Mr. Zappey did not take it. All adult birds in our series are certainly referable to *M. alba leucopsis*, and most of the young ones have the gray of the back more or less marked with black, and we consider all one and the same form.

## MOTACILLA ALBA HODGSONI (Blyth).

Eight specimens, adults of both sexes, and two young in nestling plumage, Washan, Hochianghsien, Wanhsien, Chiangchinghsien, and Tachienlu, western Szechwan, April, May, July, and October.

The two nestlings — nearly full-grown — were shot at Tachienlu, 9,000 feet altitude, July 23, 1908.

## MOTACILLA BOARULA MELANOPE (Pallas).

Nineteen specimens, adults and young in winter plumage of both sexes, Ichang, Kweichowhsien, Hongchikow, Kwangpow, Shuiyuehtze, and Chiliping, Hupeh, and Kiating, Tachienlu, Washan, and Tsaikow, Szechwan, all seasons.

A nest and clutch of eggs was taken, together with the male parent bird, at Washan, western Szechwan, 6,000 feet altitude, June 6, 1908.

## BUDYTES CITREOLA (Pallas).

One fine male in full spring plumage, Chiangaohsien, Szechwan, April 28, 1908.

## BUDYTES FLAVUS BOREALIS (Sundeval).

Two specimens were taken at Ichang, Hupeh, an adult male, September 14, 1907, and an immature male, October 22, 1907.

*BUDYTES FLAVUS SIMILLIMUS* (Hartert).

Four males, two in adult and two in immature plumage, Ichang, Hupeh, October 4, Luchow, April 26 (two adult males) and Yachiakun, Szechwan, September 5, 1908.

*DENDRONANTHUS INDICUS* (Gmelin).

One female, Ichang, Hupeh, October 12, 1907.

*ANTHUS HODGSONI* Richmond.

Thirty-one specimens, young and adults, both sexes, Ichang, Hsienshan, Hsientientze, Chetzekow, Showlungtu, Hupeh, and Washan, Luchow, and Kiating, Szechwan, all seasons.

A two thirds grown nestling was taken at Washan, Szechwan, at 8,000 feet attitude, with its male parent, May 31, 1908.

*ANTHUS RICHARDI* Vieillot.

Seven specimens, adults of both sexes and one young male, Ichang, Hupeh, and Luchow, Nanchih sien, Hongyalehsien, and Chungking, Szechwan, April, September, October, and December. A young male with some of the feathers of the nestling plumage remaining especially on the shoulders, head, and rump was shot at Ichang, October 19, 1907.

*ANTHUS CERVINUS* (Pallas).

Four specimens, both sexes, Ichang, Hupeh, and Chiangchingsien, Hochianghsien, and Wanchih sien, Szechwan, April, and September.

*ANTHUS ROSEATUS* Blyth.

Fourteen specimens, adults and young of both sexes, Ichang, Showlungtan, and Shentungchow, Hupeh, and Yachiakun, Tachienlu, Suifu, Ramala Pass, Luchow, and Cheto, Szechwan, autumn, spring, and summer. In the breeding season it was found up to an altitude of 15,500 feet.

Young birds with much of the nestling plumage, were shot during August (16th, 30th) at from 13,500 to 15,500 feet altitude.

*ANTHUS SPINOLETTA BLACKISTONI* (Swinhoe).

Seven specimens, both sexes, Ichang, and Hsienshanhsien, Hupeh, March, and December.

*ANTHUS SPINOLETTA JAPONICUS* (Temminck & Schlegel).

Five specimens, both sexes, Ichang, Hupeh, and Washan, and Kiating, western Szechwan, February, March, October, and November.

## ALAUDIDAE.

*OTOCORIS ELWESI ELWESI* Blanford.

Three specimens, adult male and female and nestling, nearly full grown, Lanerhyingpa, western Szechwan, 14,000 feet altitude, August 4, 1908.

This horned lark was found in the high grass-lands, of what is really eastern Tibet, but it must be very uncommon there, or at least local, in the breeding season, as one little family only was seen.

*ALAUDA GULGULA GUTTATA* Brooks.

Thirteen specimens, adults and young of both sexes, Ichang, Tawan, and Changyanghsien, Hupeh, and Lochichen, Washan, and Chiangchingsien, Szechwan, all seasons.

We have compared this series with the greatest care with all material available including a series from Cashmir in the U. S. national museum, from which our Chinese birds do not appear to differ; *Alauda gulgula guttata* is without doubt the sky-lark of central and western China.

*CALANDRELLA BRACHYDACTYLA DUKHUNENSIS* (Sykes).

One adult male, Juchi, central Szechwan, April 20, 1908.

This skin, like those in the U. S. national museum, recorded from Shensi by Richmond, belongs to the larger more deeply colored eastern subspecies.

## FRINGILLIDAE.

*CHLORIS*<sup>1</sup> *SINICA* (Linné).

Sixty-two specimens, adults and young, both sexes, Ichang, and Yangchiatamiao, Hupeh, and Kiating, Washanhsien, Hochingsien, Juchi, Chia-chiang, Luchow, and Lungchi, Szechwan. All seasons.

In the low lands this is one of the commonest of all Chinese birds, coming about the houses and in the groves that surround the temples.

<sup>1</sup> We see no necessity for using *Ligurinus* for *Chloris* as Sharpe does in volume 5 of the Hand list.



*EOPHONA MELANURA MELANURA* (Gmelin).

Thirty-four specimens, both sexes, Ichang, Ituhsien, Changhsien, Kungansien, and on the Yangtze near Shasi, Hupeh, all seasons.

This species was not found in Szechwan during the second years work.

*EOPHONA MELANURA MIGRATORIA* Hartert.

Three specimens, a male and two females all taken together at Ichang, April 30, 1907, are so small, and with such very small bills that they unquestionably belong to this northern form; they were probably migrating.

*COCCOTHAUSTES COCCOTHAUSTES JAPONICUS* (Temminck & Schlegel).

One pair, the only individuals of this species seen by Mr. Zappey were taken May 15, 1907, at Hongsurkow, Hupeh, at 6,000 feet altitude.

*FRINGILLA MONTIFRINGILLA* Linné.

Thirty-one specimens, both sexes, Changyanghsien, Hsiensbanhsien, and Kwangpow, Hupeh and Washan, western Szechwan, late autumn, and winter.

*MONTIFRINGILLA NEMORICOLA NEMORICOLA* (Hodgson).

Three specimens, an adult ♂ taken July 14, 1908 at Yachiakun, 14,000 feet altitude, and an adult ♀ and young ♀ in nestling plumage, August 30, 1908, at Cheto, western Szechwan, 13,500 feet altitude.

*PASSER MONTANUS MONTANUS* (Linné).

Thirty-one specimens, both sexes, Ichang, Hsienshan, Changyanghsien, and on the Yangtze near Shasi, Hupeh, and Washanhsien, eastern Szechwan. The Tree sparrow appears to be found at low altitudes only, as none were taken at any height in the mountains.

*PASSER RUTILANS CINNAMOMEUS* (Gould).

Eight specimens, adults of both sexes, Tachienlu, Nachuka, and Lungchi, western Szechwan, all at high altitudes, up to 12,000 feet. Spring, and summer.

These skins are typical, agreeing exactly with examples from Sikkim and Manipur.

*PASSER RUTILANS RUTILANS* (Temminck).

Fifteen specimens, both sexes, from Ichang, Hsienshanhsien, Fangshen, Mafuling, Wantaoshan, Nochaping, and Tanshuiya, Hupeh, and Omeihhsien, western Szechwan, 3,000 feet altitude.

All of these skins are much nearer *rutilans* than *cinnamomeus*, some being quite like Japanese specimens; others however show indications of being intermediates, and the two forms without much doubt intergrade in west central China.

Judged solely by Mr. Zappey's experience, *rutilans* is a bird of lower altitudes than *cinnamomeus*; it is also more eastern, and *cinnamomeus* does not appear in its extreme form till the high mountains of western China are reached.

CARPODACUS ERYTHRINUS ROSEATUS (Hodgson).

Fourteen specimens, both sexes, Hsienshan, Hupeh, and Washan, Hochianghsien, Shuowlow, and Tachienlu, Szechwan, ranging in altitude up to 13,000 feet, all seasons.

CARPODACUS<sup>1</sup> DUBIUS Prjevalsky.

Fourteen specimens, young and adult of both sexes, Yachiakun, Tongolow, Ramala Pass, Shuowlow, and Wulungshih, western Szechwan, at altitudes between 12,000 and 15,000 feet. Summer, and autumn.

CARPODACUS PULCHERRIMUS (Moore).

Nineteen specimens, adults of both sexes, Yachiakun, Tachienlu, Ramala Pass, Lanerhyingpa, Nachuka, and Cheto, western Szechwan, at altitudes of from 10,000 to 15,000 feet, summer.

CARPODACUS EDWARDSI Verreaux.

Four adult females, Washan, and Tachiao, western Szechwan, at altitudes ranging from 8,000 to 12,000 feet; summer, and autumn.

CARPODACUS RHODOPEPLUS VERREAUXII David.

Three specimens, an adult female from Yachiakun, 14,000 feet, and an adult male and female, shot together at Lianghokow, western Szechwan, 12,000 feet, August 8, 1908.

The two females agree with the description of the type and also with those of later authors, all of which were based on the type.

The adult ♂ is in rather well-worn midsummer dress. It is decidedly smaller than males of *Carpodacus rhodopeplus rhodopeplus* (Vigors), but so far as color is concerned it differs very little from that form. It appears to be

<sup>1</sup> We see no advantage in recognizing such a poorly defined genus as Propasser.

paler, more rosy, less crimson on fore neck and breast, these parts being little darker than the belly; but this difference, very likely, is due to fading and abrasion as there is a suggestion of darker more crimson coloration about the chin and throat where the feathers are less worn.

The three skins afford the following measurements:—

No.	Sex	Locality	Wing	Tail	Tarsus	Culmen
50229	♂ ad.	Lianghokow	73.	65.	19.	11.
50230	♀ ad.	Lianghokow	71.	64.5	18.	11.
50231	♀ ad.	Yachiakun	74.	64.	18.5	11.

#### CARPODACUS VINACEUS Verreaux.

Six specimens, adults of both sexes, Wantaoshan, and Chetzekow, Hupeh, and Washan, and Kiating, western Szechwan, summer, and autumn.

#### LOXIA CURVIROSTRA HIMALAYENSIS Blyth.

One adult ♂, Washan, western Szechwan, October 27, 1908. This is the only time that Mr. Zappey observed crossbills though for a long time he was in regions where they might be expected to occur; the specimen collected was one of two that were feeding in the spruce forest.

#### PYRRHULA ERYTHACA ALTERA Rippon.

Twenty-one specimens, adult and young of both sexes, Hsienshanhsien, Mafuling, and Changyanghsien, Hupeh, from 5,000 to 6,000 feet altitude and Tachiao, western Szechwan, 12,000 feet altitude, all seasons. At Tachiao this bullfinch was quite common about the entrance to the cave in which Mr. Zappey was living and one or two were shot every morning during his stay there in September.

The numerous males differ very much as to the color of the under parts; this varies from rosy scarlet in some individuals to deep chrome in others, with the bulk of the series showing many intermediate shades of yellowish red or reddish yellow. The upper parts in the males are invariably clear slate-gray, and our bird is without doubt the same as the western Yünnan form named *altera* by Colonel Rippon.

#### URAGUS SIBIRICUS LEPIDUS David & Oustalet.

Four adults, two males and two females, Nachuka, and Ramala Pass, western Szechwan; taken at altitudes of from 10,000 to 12,000 feet, in August, 1908.

*EMBERIZA PUSILLA* Pallas.

Thirty-nine specimens, both sexes, Ichang, Yangchiatamiao, Kwangpow, Changyanghsien, Hsienshanhsien, Kunganhsien, and Mafuling, Hupeh, and Foochow, Omeihsien, Kiating, Hochianghsien, Luluping, Wushanhsien, and Chiangchinghsien, Szechwan, winter, and spring.

*EMBERIZA RUSTICA* Pallas.

Twenty-four specimens, Ichang, Hsienshanhsien, Kunganhsien, and Changyanghsien, Hupeh, winter, and early spring.

*EMBERIZA FUCATA FUCATA* Pallas.

One female, Ichang, Hupch, September 29, 1907.

*EMBERIZA ELEGANS* Temminck.

Thirty-two specimens, Hsienshanhsien, Changyanghsien, Kwangpow, Hochiaping, Tawan, Mafuling, Hsienshan, and Wantaoshan, Hupeh, and Kiating, Washan, and Luluping, Szechwan.

Most of these specimens were taken in winter and early spring, but in 1907, at Mafuling, Wantaoshan, and Hsienshan, examples in worn plumage were secured throughout May and as late as June 5, and again in 1908 the species was found at Washan from May 23 to June 8; these dates indicate that the birds were breeding.

*EMBERIZA CHRYSOPHRYS* Pallas.

Five males, Ichang, Hsienshanhsien, and Changyanghsien, October, December, and January.

*EMBERIZA AUREOLA* Pallas.

Seven specimens, both sexes, Ichang, Hupeh, all taken in autumn except one adult male taken April 30.

*EMBERIZA SPODOCEPHALA SPODOCEPHALA* Pallas.

This form winters, perhaps sparingly, in the region visited, and the series collected contains some undoubted adult males; some adult females, and young birds of both sexes in winter plumage we are unable satisfactorily to distinguish, but as the majority of adult males belong to the resident breeding subspecies, it is probable that the majority of females and young also belong there.

We refer to this form four skins including one adult ♂ taken at Shanghai in February, 1907, one adult ♂ from Ituhsien, Hupeh, January 31, 1908, and three specimens including an adult male from Kiating, western Szechwan, taken in November, and December.

EMBERIZA SPODOCEPHALA MELANOPS Blyth.

Twenty-two specimens, Ichang, Kwangpow, Hochiaping, Changkowhsien, Kwatzeling, and Hsienshanhsien, Hupeh, and Washan, western Szechwan, all seasons. Breeding birds were taken at Kwangpow, Hochiaping, Kwatzeling, and near Ichang, Hupeh, and at Washan, Szechwan. At the latter place two nests with sets of eggs were taken, June 3, 1908, together in both cases with the female parent bird. It is not difficult to separate the adult male of this resident form from adult males of *E. spodocephala spodocephala*, the fore neck and breast of *melanops* are olive-green instead of gray and its belly is brighter yellow.

Adult females can also usually be distinguished, but immature birds killed in winter are very puzzling and their identification is, we believe, largely empirical.

EMBERIZA CIOIDES CASTANEICEPS Moore.

Thirty-one specimens, both sexes, Ichang, Kwangpow, Kwatzeling, Hsienshanhsien, Patunghsien, Peimuping, and Changyanghsien, Hupeh and Yünyanghsien, Wanhsien, and Washan, Szechwan, all seasons.

EMBERIZA YUNNANENSIS Sharpe.

Thirty-three specimens, young and adults of both sexes, Hsienshanhsien, Tawan, Kwangpow, Hsientientze, Changyanghsien, and Mafuling, Hupeh, and Tachienlu, Hwaliangmien, Washan, Luitingchiao, and Nachuka, Szechwan, all seasons.

A set of eggs together with the female parent was taken at Washan, western Szechwan, at 6,000 feet altitude June 7, 1908, and a full-fledged nestling in spotted plumage was shot at Tachienlu, July 7, 1908.

MELOPHUS MELANICTERUS (Gmelin).

One male, Kiating, western Szechwan, November 28, 1908. One other individual of this species was seen but not secured.

## PLOCEIDAE.

## UROLONCHA SQUAMICOLLIS Sharpe.

Six specimens, adults of both sexes and one young male, Kiating, and Chia-chianghsien, western Szechwan, and Changshowhsien, eastern Szechwan, April, and November.

## STURNIDAE.

## SPODIOPSAR CINERACEUS (Temminck).

Ten specimens, adults of both sexes, Changkowhsien, Ituhsien, and Ichang, Hupeh.

## SPODIOPSAR SERICEUS (Gmelin).

Four specimens, both sexes, Ichang, Hupeh, and Kungyahsien, western Szechwan, October, and December.

## AGROPSAR STURNINUS (Pallas).

Two specimens, male and female, Ichang, Hupeh, September 16, and 26, 1907.

## AETHIOPSAR CRISTATELLUS (Linné).

Twenty-seven specimens, adults, of both sexes, Ichang, Hsienshan, Changkowhsien, Changyanghsien, Hupeh, all seasons.

## ORIOLOIDAE.

## ORIOLOUS DIFFUSUS Sharpe.

Thirteen specimens, both sexes, from Ichang, Patung, Hsientientze, and Hsienyuehtze, Hupeh, and Luluping, and Chinkowno, western Szechwan, spring, summer, and early autumn.

## DICRURIDAE.

## CHIBIA HOTTENTOTTA BREVIROSTRIS (Cabanis).

Eight adults, both sexes, Wantaoshan, Hsienshan, Fongshen, and Hsientientze, Hupeh, and Kwanerhyingpa, western Szechwan, May, June, and October.

A nest and clutch of two eggs was taken, together with the female parent bird at Hsienshan, Hupeh, on June 8, 1907.

The short-billed Chinese birds when compared with Indian examples seem to constitute a perfectly valid race.

*BUCHANGA ATRA CATHOECA* Walden.

Eighteen specimens, adults and young of both sexes, Ichang, Peimuping, and Hsienshenshan, Hupeh, and Suifu, Szechwan, spring, summer, and autumn.

*BUCHANGA LEUCOGENYS* Walden.

Six adults, both sexes, Ichang, Shinshenshan, and Fongshen, Hupeh, and Luluping, Szechwan, May and June.

CORVIDAE.

*SITOCORAX PASTINATOR* (Gould).

Nine specimens, adults of both sexes Kunganhsien, Changkowhsien, Yangtze near Shasi, Hupeh, and Kiating, Hungyabsien, and Chiachianghsien, Szechwan autumn and winter.

*CORVUS CORAX TIBETANUS* Hodgson.

One adult male, Shuowlow, western Szechwan, 12,500 feet altitude, August 21, 1908.

*CORVUS MACRORHYNCHUS LEVAILLANTII* Lesson.

Thirteen specimens, adults of both sexes, Ichang, Changyanghsien, Hsientientze, Hsienshanhsien, Yangtze near Shasi, and Moshuiping, Hupeh, and Washan, western Szechwan, all seasons.

*CORVUS TORQUATUS* Lesson.

Ten specimens, both sexes, Ichang, and Changkowhsien, Hupeh, and Washan, and Chungchowhsien, Szechwan, all seasons.

*CORVUS CORONE ORIENTALIS* Evermann.

One adult female, Washan, western Szechwan, November 6, 1908.

There is also in the collection a young crow from Tachienlu, western Szechwan at 10,300 feet altitude that we consider this species. It is wholly in nestling plumage and was about two thirds grown. It was taken July 13, 1908.

## COLOEUS NEGLECTUS (Schlegel).

One old female, Tachienlu, western Szechwan, 10,000 feet altitude, July 20, 1908.

This specimen is rather larger than any in a series of five in the collection of the Museum of comparative zoölogy from near Pekin. Its wing being, 240 mm. long, as contrasted with 231 mm. in the largest of the Pekin skins. Tachienlu is also well beyond the known range of *C. neglectus* and very probably more specimens would show that a large race of the Black jackdaw occupies this region as well as a large race of *C. dauuricus*. We, however, hesitate to make such a separation on a single specimen.

## COLOEUS DAUURICUS DAUURICUS (Pallas).

Three adults, one male and two females, Ituhsien, Hupeh, February.

## COLOEUS DAUURICUS KHAMENSIS Bianchi.

Six specimens, both sexes, including four adults and two young, Tongolow, and Tachienlu, western Szechwan, 10,000 to 12,000 feet altitude, July, and August.

This fine large form, originally described from Kham, Tibet, is easily distinguished from true *C. dauuricus* not only by greater size, but by the slightly different shade of its belly. Bianchi (Ann. Mus. St. Petersb., 1903, 8, p. 11) first recorded the form under a *nomen nudum*, *C. major*, and three years later, when describing it, Bull. B. O. C., 16, p. 68, used another name, *C. khamensis*. Sharpe, however, in the Hand List, gives both names, apparently overlooking the fact that they apply to one and the same form.

## NUCIFRAGA HEMISPILA MACELLA Thayer &amp; Bangs.

Bull. M. C. Z., May, 1909, 52, p. 140.

Two specimens, an adult male, the type, from Hsienshanhsien, December 11, 1907, and an adult female from Tachienlu, western Szechwan, September 23, 1908.

This form is only slightly different from the Himalayan bird, true *hemispila*. It is, however, smaller and has a shorter and thicker bill, but the pronounced character of the white spotting in the Chinese bird does not hold good when compared with a large series of Indian skins.



## PICA PICA SERICEA Gould.

Thirteen specimens young and adults of both sexes, Ichang, and Changyanghsien, Hupeh, and Kiating, Luluping, and Washan, western Szechwan, all seasons.

## PICA PICA BOTTANENSIS Delessert.

Two specimens, youngish male and female, Shuowlow near the Ramala Pass, western Szechwan, at 12,500 feet altitude, August 22, 1908.

These birds were full grown and had wings and tail as in the adult; in the female most of the feathers of the back are of adult plumage; and in both, the lesser amount of white on the primaries is very evident. These specimens may be too immature to have acquired the wholly black back, but neither show any trace of a pale band on the rump.

## CYANOPICA CYANA SWINHOEI Hartert.

Eleven specimens, adults of both sexes, Ichang, and Changkowhsien, Hupeh, all seasons.

## UROCISSA ERYTHORHYNCHA (Gmelin).

Twenty-seven specimens, adults of both sexes, Ichang, Kwangpow, Shihtowya, Hsienshanhsien, and Changyanghsien, Hupeh, and Yachow, Kiating, and Chungchowhsien, Szechwan, all seasons.

## GARRULUS SINENSIS Swinhoe.

Twenty-seven specimens, adults of both sexes and one young female, Ichang, Changyanghsien, Hochaping, Shihtowya, Hsientientze, Hsienshan, and Hsienshanhsien, Hupeh, and Luchow, Changshowhsien, Nachuka, Washan, and Luluping, Szechwan, all seasons.

This series shows but little variation, except that certain specimens have more or less black streaking on the forehead and crown; and this variation occurs occasionally in various places.

## BOANERGES, gen. nov.

*Type*.— *B. internigrans*, sp. nov.

*Characters*.— Similar to *Perisoreus* (*P. infaustus*) but bill much broader and more depressed basally, particularly the maxilla (bill but  $\frac{2}{3}$  as high as broad at base); the commissural edges of maxilla flattened and flaring basally; the culmen

much more flattened especially basally; nasal tufts less copious and more bristly; tarsus relatively longer.

*Color*:— Wholly dark gray with black wings, tail, and head; bill mostly dull green.

*BOANERGES INTERNIGRANS*, sp. nov.

Plate 6.

Six specimens, adults of both sexes, Shuowlow, western Szechwan, 14,000 feet, August 22 and 23, 1908.

*Type*:— No. 52587 M. C. Z. adult ♂. Western Szechwan: Shuowlow, 14,000 feet, August 23, 1908. W. R. Zappey.

*Color*:— Head, including cheeks and chin, wings, and tail dull black; rest of body dull grayish slate color, the breast and chest somewhat flecked with black; bill dull light greenish, darker at base and along sides of culmen; tarsus and foot black.

*Measurements*:— Type, adult ♂, wing, 167; tail, 161; tarsus, 42.5; culmen, 26. No. 52591, adult ♀, topotype, wing, 165; tail, 155; tarsus, 40.5; culmen, 24.

*Remarks*:— Mr. Zappey met with this remarkable species only at Shuowlow where he found it in small numbers in the coniferous forest, behaving exactly, he tells us, like the Canada jay of North America.

*PYRRHOCORAX PYRRHOCORAX* (Linné).

Eleven specimens, adults of both sexes and young, Tachienlu, and Cheto, western Szechwan, 9,000 to 12,000 feet, summer.

The Chough was abundant in the high mountains in western Szechwan but was not met with in Hupeh.

*GRACULUS GRACULUS* (Linné).

Four adult males, Tachienlu, and Yachiakun, western Szechwan, 14,000 to 15,000 feet, summer.

The Alpine chough was decidedly rarer than the last species and occurred only at greater altitudes, from 14,000 feet or thereabouts, upward; still at these lofty elevations it was constantly seen flying about like a swallow and now and then settling in the villages to feed on Yak excrement.

# MAMMALIA.

BY GLOVER M. ALLEN.

The splendid collection of mammals made by Mr. Zappey in the Provinces of Hupeh and Szechwan numbers some 375 well-prepared skins, together with a few trade skins and several large skulls and horns. The lack of comparable material has made the determination of some of the species rather difficult especially in the case of the genera *Epimys* and *Apodemus*, of which a number of closely allied forms inhabit southeastern Asia. Although Père David collected with considerable thoroughness in parts of Szechwan, and later travellers have sent collections of mammals to Europe, there appear to be several species among the smaller rodents that have hitherto escaped notice. Of these, perhaps the most interesting are two very well-characterized species of voles belonging to the subgenus *Eothenomys*, and a very dark brown *Craseomys*, also apparently new, which is the most southeastern Asiatic species yet found, for voles seem to be few in southern China.

All measurements are in millimeters and colors are according to Ridgway's Nomenclature of colors.

## BOVIDAE.

### *BUDORCAS TIBETANUS* (Milne Edwards).

In the mountains at Lianghokow, western Szechwan, Mr. Zappey obtained a fine adult female and at Washan two young Takins. Milne Edwards (1868-'74) who figured this animal and described its skeleton at some length, considered it a race of *B. taxicolor* of the Mishmi Hills. Lydekker in the London Field (1908, 111, p. 790) proposed the name *Budorcas taxicolor mitchelli* for a gray-colored female received by the British Museum from Szechwan, supposing it to represent a different race from the darker animal found in the same localities. Later, however, after comparison of specimens he (1908a, p. 795) reached the conclusion that the difference in color was merely sexual, and that *B. taxicolor* was specifically distinct from *B. tibetanus* of Szechwan. In a communication to the London Field, 19 March, 1910, 115, p. 520, he further records a gray male from Szechwan, apparently indicating that the two color phases are independent of sex. The adult female secured by Mr. Zappey represents the gray phase.

## NAEMORHEDUS GRISEUS Milne Edwards.

In his review of this genus, Pocock (1908, p. 173) has shown that the several varieties of Gorals described from southwestern China are, for the present at least, best referred to the one species, *N. griseus*; whose range is rather extensive in the highlands of that part of the country. A series of seven specimens, young and old, of both sexes, was collected by Mr. Zappey, and these show a fairly close agreement in color. Four were shot at Ichanghsien, one at Patunghsien, Hupeh, and two at Liuyang, in western Szechwan at an altitude of 7,000 feet. The variations shown by the Ichanghsien skins are quite as described by Pocock for specimens in the British museum from the same region, and I am unable to distinguish these from specimens taken in western Szechwan. The same variation in the horns described by Pocock is likewise present in the series studied. In adults from the same locality, there are some in which the horns curve sharply backward, and others in which they are straighter and nearly in the same plane with the frontal outline. These differences are rather striking at first but seem to be wholly individual.

## CAPRICORNIS ARGYROCHAETES (Heude).

Two specimens, adult females, from Washan in western Szechwan, agree in having no white on the knee or fetlock, but instead these portions are light buff and the anterior side of the fore leg below the knee (metacarpals) is blackish, with a slight admixture of reddish (nearly light "hazel") hairs. The gray rather than white mane is noticeable in both specimens. These characters are pointed out by Pocock (1908, p. 185) in his review of the Serows, as characterizing this race, of which he also mentions two specimens in the British Museum one from Szechwan, obtained from Berezowski in 1896, the other a mounted specimen said to have come from "Tibet" which has been made the subject of a communication by Lydekker (1905, p. 329, pl. 8). In a further communication Lydekker (1908b) maintains the specific rank of this Serow.

The two specimens shot by Mr. Zappey were measured by him as follows: —

Orig. No.	Length.	Tail.	Hind Foot.	Height at Shoulder.
175	1590	115	380	860
176	1675	120	388	900

The iris is described as hazel. The first animal is much the younger with horns 125 mm. long; the second has considerably longer horns, measuring 215 mm. in

length, in a straight line from base to tip. They are slightly curved backward and divergent.

A single skull obtained from the natives in the Province, probably also represents this subspecies, as it agrees with the two other skulls in the great breadth, 46 mm., of the combined nasals (these are 48.5 and 42 mm. respectively in the two other skulls). By some accident the left horn core of this skull had been broken off, but was completely covered by horn, smoothly worn.

In addition to the skins and skulls, Mr. Zappey brought back a half dozen pairs of horns, still attached to the occipital portion of their respective skulls. These are without data and hence are not subspecifically identifiable. The largest pair measures from the base at the outer side to the tip in a straight line, 257 mm. This pair is further remarkable in that the horns instead of diverging evenly from the base, after bowing out slightly for the first three quarters of their length are approximated toward their tips so that the latter are scarcely 33 mm. apart.

#### CAPRICORNIS SUMATRENSIS MILNE EDWARDSI (David).

A skin with skull, taken at Tachienlu, western Szechwan, at an altitude of 10,000 feet, seems undoubtedly to represent this eastern Tibetan Serow, which here must be nearly at the eastward limit of its range. The coloration of the fore legs, which is considered of diagnostic value in separating the various races of Serows, is nearly uniform cinnamon rufous with some admixture of buffy hairs, but no suggestion of the dark blackish metacarpal patches of the race *argyrochaetes*. The mane is also rather more conspicuously whitish. In the skull, which is that of an adult male, the greatest combined breadth of the nasals is markedly less (33 mm.) than in the skulls of the latter, and the entire nasal region is more arched and laterally compressed.

I have followed Pocock and Lydekker in considering this Serow as a race of the type species from Sumatra. It seems probable, however, that it might with equal propriety be considered a distinct species as their ranges have not been shown to be strictly continuous.

### CERVIDAE.

#### ELAPHODUS CEPHALOPHUS Milne Edwards.

An adult female, from Putze, Hupeh, agrees in cranial proportions with those given by Milne Edwards for his specimens from Moupin. The collector's

measurements in the flesh, are:—total length, 1700 mm.; tail, 70 mm.; hind foot, 440 mm.; height at shoulder, about 720 mm.

The skull, compared with that of topotypes of *E. michianus* from Ningpo, in the collection of the Museum, shows strikingly larger proportions than the small coastal form, and as pointed out by Lydekker, the two animals are probably distinct species. The latter author has recently (1904) described as new the tufted deer of Ichang (*Elaphodus ichangensis*) on the basis of two skins and skulls from that vicinity. But one of these is adult and though the differences between the supposed new form and *michianus* are apparent enough, the only character separating *ichangensis* from *cephalophus* is the supposed greater size of the latter. Lydekker gives the "basicranial length" of the male Ichang deer as  $6\frac{3}{8}$  inches, against  $7\frac{1}{4}$  inches for the corresponding measurements of a female *cephalophus*. This dimension in our adult female, from the same province as *ichangensis* is about  $7\frac{1}{8}$  inches. For the present, therefore, it seems preferable to consider our specimen as representing *cephalophus*.

#### MUNTIACUS LACRYMANS (Milne Edwards).

Hilzheimer (1906), has described a new Muntjac under the name of *Cervulus sinensis*, basing his diagnosis on a single skin and skull from Kiukiang on the middle Yangtze. The characters given are of a comparative nature and somewhat intangible, but the author considers his new species to be intermediate between the coastal *reevesi* and the upland *lacrymans* described from Moupin. Mr. Zappey obtained a series of seven skins and skulls from Ichanghsien and Changyanghsien, Hupeh, which should therefore probably represent *sinensis*. I am unable, however, to find any characters, that might not be other than individual peculiarities, to distinguish these from *lacrymans* as described by Milne Edwards. The distinctive features of the skull claimed by Hilzheimer do not seem to be constant in the series studied, and until more detailed comparisons can be made with typical specimens it seems better to consider the latter as representing *lacrymans*. A similar conclusion has been reached by Professor Matschie (1908). No doubt the two species *reevesi* and *lacrymans* will be found to intergrade, and thus to constitute geographical races rather than distinct species.

#### HYDRELAPHUS INERMIS (Swinhoe).

A fine series of eighteen water deer was obtained in Hupeh, all at or near Kwangtitzé, on the Yangtze River. The type locality of *inermis* is Chinhiang near the mouth of this same river. Hilzheimer (1906), has described as new,

*Hydropotes kreyenbergi* on the basis of a single male skull, unaccompanied by skin, from Hankow, also on the Yangtze, in east central Hupeh. Our specimens should thus be referable to the latter species if it is really distinct, but this does not seem clear from the material at present available. Hilzheimer bases his distinction on slight cranial differences, which may be more or less individual and which are mainly derived from a comparison of figures. These differences are chiefly:—(1) in *inermis* the rostral portion of the skull in front of the orbit is about thrice the length of the orbit, while in *kreyenbergi* it is but  $2\frac{1}{2}$  times this distance; (2) the least breadth of the combined nasals is in *inermis* somewhat more than  $\frac{3}{4}$  their greatest combined breadth; whereas in *kreyenbergi* they are so narrow that their least combined breadth is at most equal to one half their greatest combined breadth; (3) in *kreyenbergi* the upper rim of the orbit is so protuberant that in profile view it hides the median roof of the skull at that point, which is not the case in *inermis*.

In the skulls from Hupeh, these characters are not borne out. Thus in a male from Kwangtitzze, the nasals are hardly narrowed distally and at the narrowest point their combined breadth is exactly three fourths the total width at the widest point as in *inermis*. The orbit is contained three times and a slight fraction in the length of the preorbital part of the skull, and the upper orbital rim is on a level with the interorbital parietes. The series shows more or less individual variation in all these characters, and the females as a rule have rather narrower nasals and a more compressed rostrum than the males. Unless therefore, other characters can be discovered, the water deer of the upper and the lower Yangtze must be considered identical.

#### MOSCHUS SIFANICUS Büchner.

Owing to ceaseless persecution by the Chinese, the Musk deer has been nearly exterminated in the country where Mr. Zappey collected. The musk glands are keenly sought and much esteemed by the Chinese. In the mountains of western Szechwan, at Shuowlow, a single male was shot at an altitude of 14,000 feet. Although others were seen they were so shy that it was impossible to approach within range.

#### SUIDAE.

##### SUS MOUPINENSIS Milne Edwards.

Near Tachienlu, in western Szechwan, the skull of a wild pig was procured, which undoubtedly represents Milne Edwards's *Sus moupinensis*. The skull is

that of an old female, with the teeth all present, yet greatly worn down. The condylar region has been broken away, but otherwise the specimen is in excellent condition. Apparently no recent comparisons have been made between this species and those close to it geographically, nor am I able to throw further light on its relationships, though allowing for the worn condition of the teeth in the specimen studied, it seems rather close to the Indian *Sus cristatus*. The vertex of the skull, however, is strikingly broader. The following measurements in millimeters are taken from this skull:—greatest width at vertex, 63; greatest postorbital width, 120; greatest zygomatic width, 142; length from median border of vertex to tip of nasals, 306; length of nasals, 174; greatest combined width of nasals, 35; palatal length, 222; upper molar row, 130; lower molar row, 115; length of mandible, 282; last upper molar,  $37 \times 22$ ; last lower molar,  $41.5 \times 19$ .

#### LEPORIDAE.

##### LEPUS SWINHOEI FILCHNERI (Matschie).

A series of nine winter and two summer skins with skulls, appears to represent this inland race of the common Chinese hare. All were taken in Hupeh in the region about Ichang, but none was obtained in the more western province of Szechwan. These specimens agree well enough in color with those described by Swinhoe and Matschie, though without topotypes of the Chefoo hare of Swinhoe, no direct comparison can be made. With the latter, indeed, Thomas has suggested that *filchneri* of Matschie is identical, but Dr. J. A. Allen (1909, p. 426) considers that it is probably a valid subspecies and points out that inland animals from southern Shensi have shorter rostra than those from the coast as indicated by Swinhoe's measurements (1870, p. 449). On this account and on the probability that the inland animals would be slightly differentiated from those on the coast 1,200 miles away, Dr. Allen deems it best to regard Matschie's *Lepus filchneri* from southern Shensi as a distinct race, although the original description contains nothing that is particularly diagnostic. Our specimens agree with those from Shensi in the shortness of the measurement from the postorbital notch to the tip of the nasals as compared with that given by Swinhoe for his Chefoo hare.

Thomas has further indicated that Matschie's *Lepus stegmanni* is doubtless synonymous with *L. swinhoei* or the present subspecies, since the speckling of the black upper tail surface with lighter hairs is not a constant character but



occurs occasionally in any series of this species from a given locality. One or two of the specimens studied show this same variation.

*LEPUS SECHUENENSIS* deWinton and Styan.

A single male taken at the Ramala Pass, in western Szechwan represents this species. The peculiar grayish blue of the backs of the ears, and of the rump, thighs, and tail have been noted by the describers as markedly characteristic. The ears are strikingly long and the hind feet are stout and heavy. The only measurement given in the original description of this hare is that of the skull length — 97 mm. The following are the dimensions of the specimen studied:—total length, 533 mm.; tail, 70; hind foot, 120; ear from anterior base in the dried skin, 130. The skull measures:—greatest length, 90.5 mm.; basal length, 73; palatal length, 40; greatest length of nasals, 36; median length of nasals, 28; greatest breadth of nasals, 17; zygomatic breadth, 43; mastoid breadth, 36; greatest breadth outside upper molars, 22.7; length of palatal foramen, 23.5; mandible from condyle to tip of incisors, 72; alveolar length of upper tooth row, 14.7; alveolar length of lower tooth row, 15.

Notwithstanding that the ears are longer and the skull larger than in the preceding species, the audital bullae are notably smaller.

OCHOTONIDAE.

*OCHOTONA HODGSONI* (Blyth).

This mouse-hare seems to be somewhat widely distributed in the high mountains of western Hupeh and Szechwan. A series of eleven specimens representing various ages, was collected at the following localities:—Fanghsien, 9,000 feet; Washan, 8,200 to 11,000 feet; Lianghokow, 13,000 feet; Tachiao, 12,000 to 13,000 feet; Shuowlow, 13,000 to 14,000 feet. The series shows more or less variation in color from a general cinnamon to nearly bistre. The under parts vary according to age or season from grayish white to pale buff. The pelage when fully developed is remarkably full and long. Bonhote in his review of the Old World species of this genus, records specimens of *hodgsoni* from eastern Sikkim, "Gannsu in N. Thibet," and from Szechwan, whence also it has been described by Milne Edwards under the name "*tibetanus*." The specimen from western Hupeh probably marks the general eastward bounds of its range.

## OCHOTONA HUANGENSIS (Matschie).

Professor Matschie (1908) has named as new a mouse-hare of the *daurica* group from the upper Yangtze, and to this species I have provisionally referred an immature specimen that evidently is of the same group. Its coloration above is a general dark gray, buffy behind the ears and on the neck, with a tuft of buffy hairs at the inner base of the ear. The vibrissae are unusually long, mostly whitish, and the pelage is very fluffy, almost woolly. It was taken at Yachiakun, in western Szechwan, at an altitude of 12,500 feet.

## OCHOTONA ERYTHROTIS (Büchner).

Four specimens of this large species were taken at Nachuka, at altitudes between 10,000 and 12,000 feet, and a single one at Ramala Pass, 15,500 feet, all in western Szechwan, on the eastern borders of Tibet. The species is known from Kansu and from the Burchan Budda Mountains of northeastern Tibet, where it was obtained by the Prjewalski Expedition. The present records therefore extend its known range well to the southward. The measurements of the five adults, as taken by the collector, follow:—

No.	Locality.	Total Length.	Tail.	Hind Foot.
7587	Ramala Pass	191	7	35
7588	Nachuka	165	6	34
7589	Nachuka	204	7	35
7590	Nachuka	203	7	35
7591	Nachuka	215	6	35

The skull of No. 7591 measures:—greatest length, 48.2 mm.; basal length, 40.5; palatal length, 19; combined incisive and palatal foramina, 14; zygomatic breadth, 24.2; interorbital constriction, 5; mastoid breadth, 21.7; mandible from condyle to tip of incisor, 34.6; upper molar row, 9; lower molar row, 9.

## SPALACIDAE.

## RHIZOMYS VESTITUS Milne Edwards.

Five specimens of this Bamboo rat were obtained at Washan, in western Szechwan, at from 8,000 to 9,000 feet altitude. The species was described by Milne Edwards on the basis of two immature examples sent by Père David from the region of Kokonow, northeastern Tibet, some four hundred miles north of Washan. Our specimens seem to represent the same species, however, though the measurements differ slightly. Milne Edwards intimated that the dimensions

he gave were probably not maximum and this is undoubtedly true. Our smallest specimen is immature, and its skull agrees almost exactly in size and proportions with that figured by the describer. The four others are adult and considerably larger. The collector's measurements of these follow:—

<i>No.</i>	<i>Total Length.</i>	<i>Tail.</i>	<i>Hind Foot.</i>
7560	451	89	60
7561	434	76	58
7562	395	61	57
7563	386	55	52

The skull of No. 7562 measures:— greatest length, 75 mm.; basal length, 72; palatal length, 48.5; zygomatic breadth, 60; mastoid breadth, 36; inter-orbital constriction, 11; mandible from condyle to tip of incisor, 61.5; alveolar length of upper cheek teeth, 17; alveolar length of lower cheek teeth, 15; upper diastema, 24; lower diastema, 12.5.

Three of the four adults have a midventral white streak on the chest.

## MURIDAE.

### MYOSPALAX FONTANIERI (Milne Edwards).

This species was originally described on the basis of a specimen from Pekin, and later Milne Edwards recorded others from Siwan, sixty miles to the north-west. Thomas (1908a, p. 978) has recently recorded the species from the Ordos Desert in the Province of Shensi, and from localities in the Province of Shansi to the eastward. Two specimens were obtained by Mr. Zappey in Hupeh, at Showlungtan and Kongchikow respectively, constituting apparently the most southeasterly localities yet known for the genus. While seemingly representing Milne Edwards's species, it is possible that they may eventually prove to constitute a slightly different race. In cranial characters they agree closely with *M. fontanieri* as figured by Milne Edwards in his "Recherches." They seem to differ, however, in the absence of a white median streak in the forehead, although in both our examples there is more or less white about the muzzle and on the upper and lower lips. This marking was believed by Milne Edwards to be inconstant, but Thomas found some trace of it in all of his eleven specimens from Shensi and Shansi. Moreover the nose pad in our two specimens is produced at its upper median border into a somewhat mitre-shaped lobe instead of being evenly rounded dorsally as figured by Milne Edwards. The exact value of these differences is not clear in the lack of material for comparison. From

*M. cansus* they differ in smaller size, and from the recently described *M. rufescens* in this and certain cranial characters as noted by Dr. J. A. Allen (1909).

The measurements of the two specimens as taken by the collector are: —

No.	Sex.	Total Length.	Tail.	Hind Foot.
7130	♀	193	38	31
7131	♂	190	35	27

The skulls show that the two specimens are nearly comparable in age, yet that of the female is the smaller. Thomas has pointed out the fact that the skulls of *M. cansus* show a sexual differentiation of a similar nature, those of the males being markedly the larger. The dimensions of the two skulls follow, those of the male in each case first: — greatest length, 39, 37; basal length, 33.5, 31; palatal length, 21, 19.5; diastema, 11.3, 11.2; zygomatic breadth, 26.5, 24.4; interorbital constriction, 8, 8; mastoid breadth, 21.8, 18.5; median length of nasals, 14.4, 13.5; mandible from condyle to tip of incisor, 27.2, 25.8; upper molar row, 9.5, 8.4; lower molar row, 10, 9.

#### MICROTUS MANDARINUS (Milne Edwards).

This rare mouse is represented by six skins and skulls, three from Ramala Pass (at 16,000 feet) and three from Shuowlow (13–15,000 feet), in western Szechwan on the border of Tibet. Milne Edwards described this field mouse from Chinese Mongolia where it was obtained by Père David. His figure and description of the exterior (*Recherches hist. nat. mammifères*, 1868-'74, p. 129, pl. 12, fig. 4) probably refer to a highly colored specimen as none of the five studied is so brightly ochraceous as he indicates, though in other respects the agreement is close enough. In his figures of the teeth on plate 13, the figures 4c and 4d are interchanged, being the lower and upper molar series respectively. All our specimens agree in color, having the dorsal surfaces a finely grizzled mixture of ochraceous and black-tipped hairs, the lower surfaces gray, with plumbeous bases to the hairs. The tail is short and bicolor like the body.

The measurements in the flesh of five specimens are: —

No.	Length.	Tail.	Hind Foot.
7793	120	28	17
7794	123	23	16
7795	119	23	16
7796	125	24	16
7797	134	27	17

The skull of No. 7796 measures: — total length, 23 mm.; basal length, 21; palatal length, 13; zygomatic breadth, 13.6; interorbital constriction, 3.7;

mastoid breadth, 11; mandible from condyle to tip of incisor, 17; upper molar row, 5.4; lower molar row, 5.3.

Mr. Oldfield Thomas (1909, p. 976) has recorded two specimens of this species from the Province of Shansi, twelve miles northwest of Kolanchow at an altitude of 7,000 feet.

*MICROTUS CHINENSIS* Thomas.

The type of this vole was taken from the stomach of a snake at Kiatingfu in western Szechwan. At Washan, western Szechwan, Mr. Zappey obtained a series of twenty-one skins at altitudes of from 6,000 to 10,000 feet and Thomas (1911, p. 175) has recorded specimens from Omeih sien and 23 miles south of Tachienlu. The remarkable development of the third upper molar, the comparatively long tail, the presence of six pads on the sole of the hind foot, and the possession of four mammae are peculiarities already pointed out by Thomas and used by Miller as the basis of the separation of this species as the type of the subgenus, *Anteliomys*.

*MICROTUS (EOTHENOMYS) MELANOGASTER* (Milne Edwards).

Apparently this is a commonly distributed species in the highlands of southwestern China. Mr. Zappey obtained specimens from Hsientientze and Changyanghsien, Hupeh, and from Washan in western Szechwan, at altitudes of from 4,150 feet at the second locality to 8,000 feet at the last named. Thomas has also recorded it from northwestern Fukien. One specimen of our series is partially albinistic with a white median ventral line from the chin to a point between the fore legs where it joins a small white patch some 14 mm. in transverse diameter.

The measurements of an adult, No. 7800, taken in the flesh by the collector, are:—total length, 129 mm.; tail, 39; hind foot, 16. The skull of No. 7802 measures:—greatest length, 23.4; basal length, 21.5; palatal length, 12.2; zygomatic breadth, 13; mastoid breadth, 11; interorbital constriction, 4; mandible from condyle to tip of incisor, 16.2; greatest depth of mandible from coronoid process, 7.6; upper cheek teeth, alveoli, 6; lower cheek teeth, alveoli, 6.1.

*MICROTUS (EOTHENOMYS) AURORA*, sp. nov.

*Type*:—Skin and skull No. 7788 M. C. Z., male, from Changyanghsien, Hupeh, China. February 2, 1909, Walter R. Zappey.

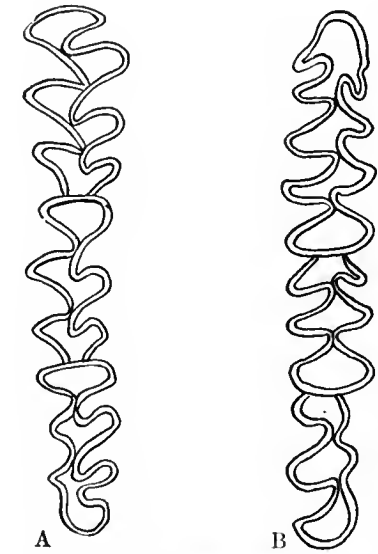
*General Characters*.—Larger than *M. (Eothenomys) melanogaster*, pelage long and soft, ears rather small. Color reddish brown above, and dark slate washed with brownish below. Skull large, with rather prominent postorbital shelf-like ridges; teeth essentially as in *M. melanogaster*, but the third upper molar longer and with a long, narrow external heel.

*Color*.—Dorsal surface of body, forehead, and cheeks, nearly "tawny" of Ridgway, with peculiar bright yellow brassy reflections. The individual hairs are about 11 mm. long, dark slate-black except at the tips which are tawny to tawny-ochraceous; mixed with these hairs are others of the same fine texture but slaty black throughout, so that a general tawny appearance is produced in which the black is less conspicuous than in those species that have the black hairs longer than the general body hairs. The muzzle is a grizzled gray without tawny. Sides of the body hardly lighter than the back, the color grading insensibly into that of the ventral surface which is gray washed conspicuously, except on the thighs and throat, with ochraceous buff. The slaty bases of the hairs show through everywhere so as to darken the grayish of the belly but not to such

an extent as to produce the blackish seen in the ventral surfaces of *M. melanogaster*.

Tail covered with short blackish hairs above, which become slightly grayish below, so that the tail is indistinctly bicolor. Feet with short brown hairs, nearly Prout's brown, with grayish reflections. The short round ears are thinly covered with minute hairs of a similar color.

*Skull*.—Compared with that of *M. melanogaster*, the skull is larger and heavier, with more prominent ridges and angles. The postorbital processes protrude as narrow shelf-like ridges, and the zygomata are stouter and more bowed. The palate is marked by two shallow longitudinal grooves that end posteriorly each in a deep pit or perforation of the palate. The



*Microtus (Eothenomys) aurora*. Type No. 7788. A, Enamel pattern of right upper molars; B, Enamel pattern of right lower molars.

hinder margin in the type is practically straight across, though in another specimen it is slightly protuberant medially, yet not forming a spinous process.

The enamel pattern of the first upper molar (Figs. A, B) consists of four closed triangles, succeeded by a fifth space in which the two folds of opposite

sides are confluent medially. There are three salient angles externally and four internally. The second upper molar is essentially similar but with one less triangle, so that there are three salient angles on each side and the enamel folds of opposite sides are partly open at their bases. The third upper molar has the usual anterior transverse prism succeeded by two nearly opposite folds, then a trefoil of three lobes, two internal, one antero-external, so that the tooth has three external and four internal salient angles or slightly rounded lobes.

The anterior lower molar consists of an anterior closed enamel space having one external and two internal projections, followed by three transverse spaces formed by the confluence medially of the enamel folds of opposite sides. This tooth has therefore four external and five internal salient angles. The second lower molar is of the usual three transverse prisms formed by the confluence of the enamel folds of opposite sides. The third lower molar is similar but the external reentrants are shallow notches while those of the internal side are deep and run forward at a strong angle to the longitudinal axis. Each of these two last teeth has thus three external and three internal angles.

*Measurements:*—The measurements of the type and three other specimens, taken in the flesh by the collector, follow:—

No.	Total Length.	Tail.	Hind Foot.
7788 Type.	148	43	18.5
7185	145	41	15
7186	147	48	17
7188	139	40	16

The skull of the type presents the following dimensions:—greatest length, 25.8; basal length, 23.3; palatal length, 13; zygomatic breadth, 14.3; interorbital constriction, 4.4; mastoid breadth, 11.8; upper diastema, 6.7; mandible from condyle to tip of incisor, 17; alveoli of upper molars, 6; alveoli of lower molars, 5.8.

*Remarks:*—Four specimens of this interesting species were secured by Mr. Zappey, in Hupeh, three at Changyanghsien and one at Kwangpow. It is a very rusty-looking animal approaching a dark *Evotomys* in color above, due in part to the suppression of black hairs, while the tawny wash on the belly is remarkably unlike the color of *M. melanogaster* or the next species about to be described. In these respects it probably approaches *M. (Caryomys) inez*, recently described by Mr. Oldfield Thomas (1909, p. 976) from the mountains of Shansi and differs equally from his newly described *M. melanogaster eleusis* from northern Yunnan which it approaches in size. It is noteworthy that Mr.

Zappey did not find any representative of the subgenus *Caryomys* (Thomas, 1911, p. 175), four species of which are now known, *alcinous*, *inez*, *nux*, and *eva*.

*MICROTUS (EOTHENOMYS) MUCRONATUS*, sp. nov.

*Type*.—Skin and skull No. 7789 M. C. Z., female adult, from Tachiao, western Szechwan, at an altitude of 12,000 feet. August 11, 1908, Walter R. Zappey.

*General Characters*.—A large *Eothenomys*, with larger ear and hind foot, browner color, longer and fuller pelage than *M. melanogaster*. Skull larger than that of *M. aurora* with distinctly bowed zygomata, broader muzzle, and with deeper palatal grooves and a prominent median spine at the posterior edge of the bony palate. Third upper molar with but six prominent angles and its posterior heel nearly bilaterally symmetrical.

*Color*.—Entire upper surface of the body a fine grizzle of blackish hairs and hairs with cinnamon-rufous tips, producing a general "mummy brown" tone. The bases of the hairs are dark slaty black, with the cinnamon-rufous confined to a space of a millimeter or two at the tip. Under a lens, many of these rusty-tipped hairs are seen to have a very fine darker point. The lower surfaces, including the upper lips and base of the nose are dark slate color with a very slight buffy wash between the fore legs. Feet and tail covered with short hair-brown hairs, those of the latter slightly paler ventrally.

*Skull*.—In general appearance the skull is like that of a large *M. melanogaster* but the zygomata are more bowed. The palatal region shows several striking peculiarities. The palatal grooves, which in *melanogaster* are so shallow as to be scarcely appreciable, in *mucronatus* are deep and conspicuous, running one from each of the incisive foramina to near the posterior edge of the palate, where in both species they end in two pit-like perforations. The bony palate instead of ending in an evenly truncated shelf, has a prominent median spine as in *M. chinensis* of the related subgenus *Antelionomys*. The lower jaw is very massive and strikingly broad in side view as compared with *M. aurora* and *M. melanogaster*.

The teeth are essentially as in the latter species, but much heavier throughout (Figs. C, D). The first upper molar shows the usual large anterior transverse prism succeeded by three *closed* triangles and a posterior enamel space which is formed by the confluence of two small folds of opposite sides, the outer of which is slightly in advance of the inner. There are thus three external and four



internal salient angles. The second upper molar consists of three closed transverse prisms, the outer angles of which are slightly in advance of the corresponding angles of the inner side. The tooth has three salient angles on each side. The last upper molar is much like the one preceding, but the posterior enamel space, which has two small and opposite prisms at its anterior end, is produced in the long axis of the tooth into a narrow heel, with nearly parallel sides. There are therefore six salient angles in this tooth as in the second molar. In the specimen figured, however, there are indications of a small additional pair of angles, one on the outer and one on the inner side of the posterior heel, and this condition I also found in a specimen of *M. melanogaster*.

The first lower molar has four closed enamel spaces the anteriormost with two internal and one external prominent projections; the three other spaces, are formed by the confluence of the prisms of opposite sides into a single transverse space. The tooth has four external and five or even six internal salient angles according as the very small antero-internal point is less or more developed. The second and third lower molars show each three transverse closed spaces, and each has three salient angles on either face. The reentrants of the third lower molar are somewhat deeper externally than in *M. aurora*.

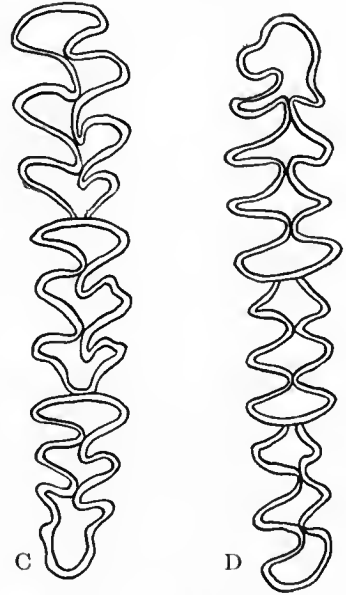
*Measurements*:—The type and three other specimens were measured in the flesh by the collector, as follows:—

No.	Total Length.	Tail.	Hind Foot.	Sex.
7789 Type.	144	39	19	♀ ad.
7790	162	44	19	♀
7791	105 <sup>1</sup>	45	19	♀
7803	130	37	19	♀ imm.

The ears of the dried skins measure 11 or 12 mm. in length from the meatus, which is 3 or 4 mm. greater than the corresponding dimension in skins of *M. melanogaster*.

The skull of the type measures:—greatest length, 26; basal length, 23.8;

<sup>1</sup> Probably a mistake since the skin as made up is quite as large as the other specimens and measures 137 mm. in length.



*Microtus (Eothenomys) mucronatus*.  
Type No. 7790. C, Enamel pattern of  
right upper molars. D, Enamel pat-  
tern of right lower molars.

palatal length, 14.3; zygomatic breadth, 15.5; mastoid breadth, 12; interorbital constriction, 4.6; mandible from condyle to tip of incisor, 18.4; greatest vertical height of mandible at tip of coronoid process, 9; alveoli of upper molar row, 6.7; alveoli of lower tooth row, 6.8.

*Remarks:* — The relationship of this species is undoubtedly with *M. melanogaster*. The enamel pattern of the molars is essentially similar and the coloration not so brown as is that of *M. aurora*. The presence of a distinct median spine at the posterior edge of the palate is apparently unusual in the subgenus and recalls the condition in the subgenus *Anteliomys*, between which and *Eothenomys* the new species may be somewhat annectent.

The fur of *M. melanogaster* is close and short, recalling that of the subgenus *Pitymys*, and this in connection with the small ear may indicate that the species is more subterranean in its habits than *M. aurora* or *M. mucronatus* in both of which the fur is long and soft and the ear larger. From the former, *M. mucronatus* is at once distinguished by its blacker coloration, quite without the rusty tinge above and the brassy reflections, while the belly is blacker much as in *melanogaster*. The slight but constant differences in the shape of the enamel folds of the molars, as well as the more massive skull with the deep palatal grooves and prominent median spine are further striking differences.

In addition to the type, Mr. Zappey obtained three other specimens, all at Tachiao, western Szechwan, where however, he did not find any other species of the subgenus. Milne Edwards in his original description of *melanogaster* remarks on what he calls a brown phase of that species, occurring in the same localities and it is not impossible that these brown animals are really the new species here described. The skull, figured of natural size, seems to be a trifle larger than that of our specimens of *melanogaster*, but the details of structure as well as the description and measurements given in the text refer clearly to the small black species.

The two species of the subgenus *Eothenomys* here described do not seem referable to any of the half dozen forms lately described by Mr. Thomas from western and southern China.

#### CRASEOMYS AQUILUS, sp. nov.

*Type:* — Skin and skull No. 7190 M. C. Z., male adult, from Showlungtan, Hupeh, China. May 17, 1907, Walter R. Zappey.

*General Characters:* — A very brown species, appearing superficially much like a brown *Microtus*; tail long, more than half the length of head and body.

Skull with well-developed ridges, zygomata slightly bowed, palate normal with a slight median convexity at the posterior edge. Last upper molar with six salient angles, the posterior enamel space somewhat Y-shaped.

*Color:* — Dorsal surface of the head and back a general dark rusty, between russet and cinnamon of Ridgway. This is produced by a mixture of entirely blackish hairs with others whose bases are slaty black with narrow tips of bright tawny approaching orange-rufous. Under a lens, many of these latter hairs are seen to have a minute dark tip. Towards the sides of the head and body the bright-tipped hairs predominate producing a nearly clear tawny ochraceous. A small dark patch in front of each thigh, about 10 mm. in vertical height by 5 mm. in length is of a slate-gray. Ears prominent and thinly clothed with short hairs nearly Prout's brown in color.

Lips, ventral surface of the throat and limbs nearly gray No. 6 of Ridgway, becoming whiter on the ventral surface of the body on account of the whitish tips to the hairs which conceal the slaty bases. Upper surfaces of the feet covered with short pale gray hairs. Tail bicolor, Prout's brown above, grayish below, with a distinct pencil about 4 mm. long.

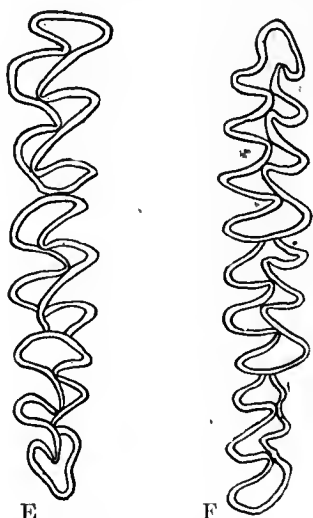
Five other specimens agree with the type in color except that one or two have a faint buffy tinge to the gray hairs of the belly. All five are females and do not show the spot on the hip that covers the lateral gland in the male.

*Skull:*— The skull has the general appearance of that of an *Evotomys*, short and rather delicate but the postorbital ridges of the squamosal are more prominent, the zygomata are slightly expanded, and the second upper and third lower molar are distinctly encapsuled. The palate is normal but instead of ending in a straight-edged shelf posteriorly, has a slight median convexity. The palatal grooves are distinct but shallow from each of the incisive foramina, and end in the usual perforation close to the posterior palatal margin. In all the skulls this perforation is completely bridged by the bony palate. The pterygoids are nearly parallel distally and their hamular processes abut each against the antero-internal end of the audital bulla. The diastema is practically as long as the alveolar length of the molar row.

The teeth (Figs. E, F) show less complexity in the enamel pattern than those of the *Evotomys* available for comparison, and there seems less tendency for the triangles to be open. The first upper molar has the usual five spaces, all closed, and three salient angles on each side, the internal more rounded than the external. The second upper molar has four closed spaces as usual with three external and two internal angles. The third upper molar resembles that of *Evotomys* ("*Phaulomys*") *smithi* in its simplicity and approach to bilateral

symmetry. It consists of an anterior transverse enamel space, succeeded by two small closed triangles, the outer slightly in advance of the inner and more sharply angular. Then follows a terminal Y-shaped space whose outer anterior

lobe is slightly the longer. The tooth has thus three external and three internal salient angles. No variation from the condition here described is shown by any of the six specimens.



*Craseomys aquilus*. Type No. 7189. E, Enamel pattern of left upper molars. F, Enamel pattern of right lower molars.

In the first lower molar of the type there are four salient angles on either side. The posterior enamel space is the usual transverse crescent, anterior to which are two inner and two outer alternating closed triangles. The anteriormost closed space has a small angle on either side at its posterior end. The second lower molar has but two closed triangles and at each end of the tooth a transverse closed space, the anterior of which is deeply cut by the first outer reentrant. The third lower molar has the usual three transverse loops, the anteriormost smallest and almost oval in outline. Like the preceding tooth, it has three ex-

ternal and three internal salient angles, but the outer reentrants are very much shallower than the inner.

In Nos. 7189 and 7192, the antero-internal notch of the first enamel loop of the first lower molar is so well developed that it nearly cuts off a fifth triangle while in No. 7191 this reentrant is still deeper and completely cuts off this triangle so as to produce two external and three internal closed triangles in addition to the anterior loop and the posterior transverse crescent. In this specimen, therefore, there are four external and five internal salient angles. In No. 7194 this tooth is as in the type.

*Measurements*.—The following measurements were taken in the flesh by the collector:—

No.	Total Length.	Tail.	Hind Foot.
7189	152	57	17
7190 Type	160	59	20
7191	144	55	18
7192	157	55	19
7194	150	54	17
7196	145	52	19
Average	151	55	18

The skull of the type measures:— greatest length, 23.8; basal length, 22; palatal length, 12.3; upper diastema, 6.6; zygomatic breadth, 13.5; mastoid breadth, 11.6; interorbital constriction, 3.5; mandible from condyle to tip of incisor, 16.5; alveoli of upper molar row, 6; alveoli of lower molar row, 5.

*Remarks:*— The type, as stated, came from Showlungtan, Hupeh. The five other specimens are from the same Province; two from Fanghsien at altitudes respectively of 7,600 and 9,000 feet; one from Wansonshan at 7,225 feet, and the two others from the type locality, altitude not noted. It is doubtless a boreal representative found at the higher altitudes, and is the most southern species of its genus hitherto discovered in China. In its brown *Microtus*-like coloration and its molar pattern with the simple structure and approach to bilateral symmetry of the upper third molar, it seems to approach *Evotomys* (*Phaulomys*) *smithi* of Thomas, from Hondo, Japan. It is quite unlike the other described species of *Craseomys* from southeastern Asia — the large-bodied, richly colored *C. regulus* of Korea and North China, and the large pale *C. shanseius* from the Province of Shansi.

According to Anderson (1909) who has recently compared a large series of *Evotomys smithi* there is much doubt if the subgenus *Phaulomys*, based on that species, is really distinguishable.

#### APODEMUS AGRARIUS NINGPOENSIS (Swinhoe).

Thomas has recently shown that *Apodemus* antedates *Micromys* for the small *Mus*-like species having three inner tubercles on the first and second upper molars, and in his summary of the described forms of the *agrarius* group (Thomas, 1908b, p. 8) differentiates *A. a. pallidior* of the Shantung peninsula as a grayer race than the more southern *A. a. ningpoensis*, in which, moreover, the dorsal streak is usually obsolete. Mr. Zappey obtained a fine series of thirty skins and skulls from Ichang and vicinity. These skins, although showing great individual variation are probably best referred to *ningpoensis*, the type of which came from Ningpo, on the coast, some six hundred miles to the west. All were taken in December and January, 1908. In three the black dorsal line is splendidly marked from a point between the ears to the root of the tail, broad, clear, and conspicuous. Three others have it nearly as well marked, but it begins on the nape or between the shoulders. In four other skins, the stripe is still well defined, but no longer clear black on account of a slight admixture of the buffy hairs of the rest of the back. In the remaining twenty specimens the stripe

is more or less obsolete; in six or seven it is scarcely noticeable except as a slightly darker median band. There is said to be no trace of a dorsal stripe in the type specimen of this race. In size and cranial measurements our specimens seem to agree with the dimensions given by Bonhote (1905, p. 397). Mr. Zappey did not obtain this species higher up the valley so that it may be of lowland distribution. Bonhote, however, records *A. a. manchuricus* from southern Shensi.

APODEMUS MINUTUS PYGMAEUS (Milne Edwards).

A young, though nearly full-grown specimen was taken at Changyanghsien, Hupeh, November 16, 1907, but elsewhere the species was not met with. It was originally described from Szechwan by Milne Edwards, and Bonhote (1905) records specimens in the British Museum from Kuatun and Shanghai.

APODEMUS SYLVATICUS DRACO (Barrett-Hamilton).

A series of twenty-five specimens of the long-tailed field mouse seems, after careful comparison, to represent but this single race, although they come from widely separated localities, namely:—Changyanghsien 8,000 feet, Fanghsien, 8,500 feet, and Showlungtan, Hupeh; Mohsimien 8,000 feet, Washan, 6,000 to 9,000 feet, Lianghokow, 12,000 feet, and Tachiao, 12,000 to 13,000 feet, in Szechwan. About one third of the specimens have acquired the mature coloration, a bright russet or ochraceous buff above and on the sides, with a dorsal black area while the remainder exhibit various darker shades in which black hairs predominate on the back and are mixed on the sides to a less extent. The tails of these darker individuals are much less markedly bicolor than those of the russet-colored adults. One of the latter from Washan is almost clear orange-ochraceous, on the nape, shoulders, and sides, with but a slight admixture of black hairs on the lower back. The collector's measurements for seven adults average:—total length, 184 mm., tail, 95, hind foot, 23. Bonhote (1905) gives 186, 95, and 20 respectively. The skull of No. 7139, from Fanghsien, measures:—greatest length, 26.8; basal length, 21; palatal length, 12; upper diastema, 7; incisive foramina, 4.5; nasals, 10.8; breadth of brain case, 12; upper molars, 4.4. These dimensions agree very closely with those given by Bonhote for specimens from Kuatun, northwest Fukien.

APODEMUS MAJOR (Radde).

In the high mountains of western Szechwan near the eastern borders of Tibet occurs a large field mouse evidently related to *A. sylvaticus*, that I have

referred to Radde's "*Mus sylvaticus* var. *major*" (Reis. Sib., 1862, 1, p. 180). In his review of this group, Barrett-Hamilton (1900, p. 412) states that he has seen no specimens but considers it as probably "the western Siberian representative of *M. s. princeps*" of southeastern Europe. He also believes that the specimens obtained by Przewalski in the mountains of Kansu, and described by Buechner as *Mus chevrieri*, are the same animal. In the absence of material for direct comparison, our series agrees well enough with the description to make this conclusion seem probable. Sixteen skins with skulls were collected by Mr. Zappey at Lianghokow, 12,000 feet; Tachiao, 12,000 to 13,000 feet; Shuowlow, 13,000 to 15,000 feet; and Ramala Pass, 15,000 feet. Possibly these localities indicate approximately the southeastern border of this mouse's range which may thus extend north through Kansu to Siberia. The fact that at Tachiao it occurs together with undoubted examples of the smaller *A. sylvaticus draco* seems to indicate its specific distinctness from the latter. The coloration is decidedly paler than in the latter, between buff and ochraceous buff above finely lined throughout with black, especially on the mid-dorsal area; the tail is sharply bicolor even in the immature examples; the feet are white, and the under parts whitish, with the slaty bases of the hairs slightly showing through. The ears are conspicuously large, measuring in the dried skins from 18 to 20 mm., as against 15 and 16 for *A. s. draco*.

The following measurements were made by the collector in the field:—

No.	Locality.	Total Length.	Tail.	Hind Foot.
7641	Lianghokow	230	113	27
7642	Shuowlow	221	117	25
7644	Shuowlow	220	110	27
7643	Shuowlow	231	112	26
7646	Tachiao	214	113	27
7648	Tachiao	211	109	26
Average (6)		221	112	26

Radde gives total length 215; tail, by calculation, 97; hind foot 24.

The skull is large, the teeth broad and heavy. The interorbital constriction is so great that the external faces of the molars can be seen when the skull is viewed from above. The supraorbital ridge extends backward to a point about opposite the posterior root of the zygomatic arch. The notch formed by the upper edge of the antorbital foramen is very much deeper in the long axis of the skull than in the skull of *A. s. draco*. The following cranial measurements are taken from No. 7644:—total length, 29.9; basal length, 23; palatal length, 14.6; nasals, 12; incisive foramina, 6; upper diastema, 7.2; zygomatic breadth,

14; interorbital constriction, 4.4; mastoid breadth, 12; greatest width outside last upper molar, 6; length of mandible from condyle to tip of incisor, 19; upper molar row, 5.3; lower molar row, 5.

An adult female has eight mammae, four pectoral, four inguinal.

Since the above was written, Mr. Thomas has described as *Apodemus speciosus latronum* a field mouse from Tatsienlu which seems to be the same as that here referred to *A. major*.

#### APODEMUS CHEVRIERI (Milne Edwards).

Originally described from the 'principality of Moupin,' this mouse has remained rare in collections, if not practically unknown. At Washan, in western Szechwan, Mr. Zappey obtained a series of thirteen specimens, at altitudes of between 6,000 and 8,000 feet; and at Hsienshanhsien, Hupeh, a single male at 4500 feet, which though a trifle grayer than the Washan series is probably identical. Barrett-Hamilton (1905) has considered this form as probably a race of *Apodemus sylvaticus*, but it undoubtedly is a distinct species. Moreover, it occurs in the same districts with *A. s. draco*. More recently Thomas (1911, p. 172) made it a race of *A. speciosus*, but in a later paper (1912) received as this goes to press, recognizes its specific rank. Milne Edwards's figure of '*Mus chevrieri*' is very nearly matched by an adult female in our series, the brightest of the specimens obtained. In general appearance, the majority are rather paler ochraceous buff, everywhere on the back and sides lined with coarse black hairs which are so evenly distributed over the entire upper surfaces of the head and body as to produce an unusually uniform and equal admixture, scarcely darker even in the mid-dorsal region. The lower surfaces of the body are gray, slightly darkened by the dull slaty bases of the hairs showing through. The tail is bicolor, without sharp line of demarcation, and the feet are whitish. The long hair of the back tends to be hispid, which gives a much coarser appearance to the pelage as compared with the full soft fur of *A. s. draco* for example. In one old female, No. 7657, the hair is practically spiny. As shown in Milne Edwards's figure (Recherches, pl. 40, fig. 2) the ear is short, its base partly concealed in the fur, markedly smaller than in the specimens of the *sylvaticus* group available for comparison (13 mm. in dried specimens). This fact as well as the shortness of the hind foot are remarked by Milne Edwards. Barrett-Hamilton states that Mr. Oldfield Thomas has examined the typical series in the museum at Paris, and has noted the spiny character of the pelage in certain of the specimens.



One measured by Mr. Thomas was 190 mm. in total length; tail, 90; hind foot, 21.5. The following measurements were made in the field by Mr. Zappey:—

No.	Total Length.	Tail.	Hind Foot.
7622	180	84	24
7623	181	84	23
7625	183	85	24
7630	203	95	23
7631	204	106	22
7657	198	99	22
7658	199	102	24
Average (7)	192.5	93	23

The skull, compared with that of *A. s. draco*, is scarcely longer notwithstanding that *chevrieri* is a larger animal. This is due to the relative shortness of the rostrum, which in *draco* is more elongated and slender. The supraorbital crests are strongly developed and extend backward to a point opposite the posterior zygomatic root. The teeth are conspicuously heavier, the palate wider and the audital bullae larger than in *draco*. Following are the measurements of the skull of No. 7657, from Washan:—greatest length, 28.3; basal length, 24.8; palatal length, 14.6; incisive foramina, 6; upper diastema, 8; nasals, 11; zygomatic breadth, 13; mastoid breadth, 11.7; interorbital constriction, 4.4; greatest breadth outside third upper molar, 5; length of mandible from condyle to tip of incisor, 18.4; upper molar row, 5; lower molar row, 4.6.

There are four pectoral and four inguinal mammae.

#### MUS MUSCULUS Linné.

But a single specimen of the House mouse was obtained by Mr. Zappey, this a female at Ichang, Hupeh. Bonhote (1905, p. 394) notes that this mouse does not seem to be common in China though the British Museum has specimens from widely separated localities in that country.

#### EPIMYS CONFUCIANUS (Milne Edwards).

Milne Edwards described this species from specimens collected by Père David in the mountains of Moupin and the Province of Szechwan. Mr. Zappey obtained one at Kiating, in western Szechwan, which may therefore be considered practically a topotype. It is nearly identical with three other specimens

obtained in Hupeh, at Ichang, Ichanghsien, and Changyanghsien, respectively. Two of these taken in January seem to have completely assumed the winter pelage which is soft and full. The other two, mid-November skins, are in process of moult and retain numerous stiff spiny hairs in the dorsal areas. Although the series is too small to warrant definite conclusions, it is possible that the stiff hairs are more characteristic of the summer pelage, as in some species of *Apodemus*. According to Thomas (1908b, p. 6) however, "the members of this group are not known to change seasonally in this respect." In all four the tip of the tail above as well as below is white for about the distal third.

Bonhote in his review of Chinese species of *Mus* (*Epimys*), gives the following dimensions:—head and body 164, tail 192, hind foot 39. These measurements seem very large, since Milne Edwards in his original description gives 170, 165, and 30 mm. for the corresponding dimensions. Thomas, for the Chefoo race, *E. c. sacer*, which he says is of about the same size, gives for extremes:—head and body, 130–156; tail, 170–186; hind foot, 28–31. Bonhote's measurement of the hind foot, 39 mm., must be a misprint, although used as a differential character in his key.

Our specimen from Kiating, Szechwan, was measured by the collector as follows:—head and body, 149; tail, 177; hind foot, 28–32.

#### EPIMYS JERDONI Blyth.

This is a hill species, originally described from Sikkim. Its distribution is stated by Blanford (*Mamm. Brit. India*, 1888, p. 412) to be the eastern Himalayas. At Ramala Pass on the eastern border of Tibet, and at an altitude of 12,500 feet, Mr. Zappey obtained two specimens that seem undoubtedly to represent this species, here probably nearly at the northeastern limit of its range. Farther east its place seems to be taken by the closely allied *E. confucianus*. The first of these specimens was captured August 11, 1908, and is in good summer pelage. The somewhat brighter ochraceous tint of the dorsal surface is noticeably in contrast with that of specimens of *E. confucianus*, and the abundance of whitish spines gives a slightly grayish cast to those parts where their bases show through. The upper surface of the fore feet is clear white without the dark median area of *confucianus*, and the tail is without a white tip. The second specimen is slightly smaller but apparently of the same species. The collector's measurements of these two are:—total length, 365, 360; tail, 192, 163; hind foot, 34, 30.

## EPIMYS ZAPPEYI, sp. nov.

*Type*.—Skin and skull No. 7607 M. C. Z., male adult, from Washan Mountains, western Szechwan, China, at an altitude of 9,000 feet. October 26, 1908, Walter R. Zappey.

*General Characters*.—Resembling *E. confucianus*, but with darker face, ears, and back, the ochraceous of the sides much richer and brighter, encroaching more on the belly and extending on to the thighs and on the lower throat to the axilla. Ventral surface pure white, without the faint sulphury suffusion. Skull slightly smaller than that of *E. confucianus* with more slender rostrum and zygomata, longer and narrower incisive foramina, narrower palate, and smaller, more flattened bullae.

*Color*.—Muzzle and an ill-defined patch extending from the base of the vibrissae to the ear, slate color; forehead and crown, nape, and a somewhat oval mid-dorsal area a mixture of hairs mainly slate minutely tipped with ochraceous buff, and longer hairs entirely black. The ochraceous buff tips in this area are so restricted that the dark color predominates forming a darker and more pronounced mid-dorsal area than in *M. confucianus*. Cheeks, sides of the neck, upper surfaces of forearms, the flanks, inner sides of the thighs and lower legs, and the anal region bright tawny ochraceous, only very slightly mixed with scattering short black hairs. A small spot of the same color on the upper chest medially between the fore legs. The color of the back and sides encroaches farther on the belly than in *M. confucianus* and is sharply marked off from that of the lower surfaces, which including the upper lips, chin, and throat, are clear snowy white to the bases of the hairs, quite without the wash of sulphury found in *E. confucianus*. Upper surface of fore and hind feet clove-brown medially, the toes and borders white. Tail white ventrally and for the terminal third dorsally, the proximal two thirds nearly clove-brown above, covered with minute setae that become short hairs distally till they form finally a distinct pencil about 6 mm. long.

*Skull*.—The skull of the type is evidently adult but not old; the teeth are somewhat worn but the supraorbital ridges are not very strongly developed. Compared with that of *E. confucianus* the rostrum and the zygomata are much slenderer, the nasals narrower and more compressed laterally at their free end. The incisive foramina are longer and narrower, not short and broadly expanded; the palate is narrower and the anterior end of the interpterygoid fossa scarcely expanded. The audital bullae are conspicuously smaller and flatter.

*Measurements*:—The external measurements of the fresh specimen are recorded by the collector as follows:—total length, 310; tail, 184; hind foot, 31. The size is thus practically as in *E. confucianus*. The measurements of the skull follow, and for comparison the corresponding dimensions of *E. confucianus* from No. 7605, from Kiating, western Szechwan are added in parentheses:—greatest length, 35.5, (37); basal length, 29.7 (30.3); palatal length, 17 (17); incisive foramina,  $6.5 \times 1.8$  ( $5.4 \times 2.8$ ); nasals, 13 (15); zygomatic breadth, 16 (17.6); mastoid breadth, 12.7 (13.2); palatal width outside last upper molar, 6.1 (6.8); mandible from condyle to tip of incisor, 22 (22.5); upper molar row, 6 (6.2); lower molar row, 5.8 (6).

*Remarks*:—This is a species of the *Epimys niveiventer* group, and as already pointed out, seems nearly related to *E. confucianus*. I should have hesitated to describe the species on the basis of a single specimen were it not for its striking color and cranial characteristics. It is not impossible, also, that as in case of certain other vertebrates, it is a species that has become locally differentiated and is confined to this isolated group of mountains. One of its noticeable peculiarities is the encroachment of the lateral coloration on the venter, producing a narrowed white median area, which is only about two thirds as wide as in similarly prepared skins of *E. confucianus*.

I have named the species in honor of Mr. Walter R. Zappey, to whose zeal and skill is due the discovery of this interesting animal.

#### EPIMYS NIVEIVENTER (Hodgson).

Four specimens from near the eastern border of Tibet seem to represent this Himalayan species; two are from Ramala Pass at 12,500 feet and two from Nachuka at from 11,000 to 12,000 feet in extreme western Szechwan. Probably as in case of other Himalayan species, these highlands mark the eastern boundary of the range of this rat.

#### EPIMYS LING (Bonhote).

This small rat, recently described by Bonhote from Chinfenling, in north-western Fukien, seems to be a species of the lower elevations of eastern China. At all events Mr. Zappey did not find it west of the Province of Hupeh. In this province, however, he obtained ten specimens at the following localities:—Changyanghsien, Chetzekow, Hsienshanhsien, and Ichanghsien, between altitudes of 4,500 and 5,600 feet. The extremes measured by the collector are:—total length, 250–280; tail, 135–170; hind foot, 26–31.

## EPIMYS FLAVIPECTUS (Milne Edwards).

Three specimens from Ichang, Hupeh, represent this species, which, though originally described from Moupin, seems to be widely spread in southern China. In but one is the white breast mark apparent, and all are a pale cream-buff below. Two measured by the collector are as follows: — total length, 303, 325; tail, 155, 178; hind foot, 34, 31.

## EPIMYS GRISEIPECTUS (Milne Edwards).

The collection contains a single adult male that seems undoubtedly referable to this rat, the type locality of which is Szechwan. Our specimen comes from the same province, at Kiating. Bonhote points out that this rat differs strikingly from *E. flavipectus* in its larger size. The bicoloration of the tail is scarcely noticeable in the specimen studied, but the pure white fore feet as stated by Bonhote, seem to be a character constantly distinguishing the species from *flavipectus*, in which the upper sides of the feet are brown edged with whitish. The color of the under parts is also a trifle whiter. The measurements of our specimen, which seems to be of maximum size, are: — total length, 376; tail, 194; hind foot with claws, 41. The skull measures: — greatest length, 47.4; basal length, 41; palatal length, 25; nasals, 18.7; incisive foramina, 8.2; upper diastema, 12.7; interorbital constriction, 6.3; zygomatic breadth, 21; mastoid breadth, 17; mandible from condyle to tip of incisor, 30.5; upper molar row, 8; lower molar row, 7.5.

## EPIMYS NORVEGICUS (Erxleben).

A single adult was taken at Ichanghsien, Hupeh, and two immature examples at Kiating, in western Szechwan. It is interesting to note how distinctly this rat stands out from among the native species by its peculiarly coarse long pelage.

## SCIURIDAE.

## MARMOTA HIMALAYANUS (Hodgson).

Milne Edwards described this marmot from the mountains of Moupin as a species distinct from *himalayanus* which he knew by descriptions only. He supposed that it differed in color and named it *Arctomys robustus*, but DeWinton and Styan (1899) agree with Blanford in considering it identical with *hima-*

*layanus*. Mr. Zappey obtained an adult female from Shuowlow, in the western border of Szechwan, at an altitude of 15,500 feet and a smaller specimen from Kaoerhshan, a few days later at a similar elevation. The color is less ochraceous than that represented in Milne Edwards's plate, more nearly a cream-buff. The adult specimen measured by the collector: — total length, 705; tail, 135; hind foot, 88. The skull measures: — greatest length, 103; basal length, 94; palatal length, 57; zygomatic breadth, 64; breadth between tips of postorbital processes, 46; postorbital constriction, 17.3; mastoid breadth, 46; upper diastema, 27; mandible from condyle to tip of incisor, 79; upper molar row, 23; lower molar row, 22.3.

#### DREMOMYS PYRRHOMERUS (Thomas).

This squirrel has been recorded from Ichang, Hupeh, and Sinyang, Kweichow, to the southwest. Mr. Zappey obtained three specimens from Hupeh, one at Tongkowshih, and two from Changyanghsien. Two of the skulls measure as follows: — greatest length, 57, 56.3; basal length, 44, 42; nasals, 19, 19.3; zygomatic breadth, 31, 30; interorbital constriction, 17, 16; upper diastema, 13, 13.4; upper tooth row (excluding  $p^3$ ), 9.2, 9; lower molars, 9.8, 10.

#### DREMOMYS PERNYI (Milne Edwards).

Twelve specimens of this species were obtained by Mr. Zappey in the mountains of western Szechwan at the following localities: — Tachienlu, 9,000 feet; Nachuka, 12,000 feet; Ramala Pass, 12,500–13,000 feet; and Shuowlow, 13,000 to 14,000 feet. Milne Edwards's specimens came also from Szechwan and "les montagnes de la principauté de Moupin, où elle paraît fort rare." Six adults were measured by the collector as follows:—

No.	Sex.	Total Length.	Tail.	Hind Foot.
7571	♂	312	119	48
7573	♀	328	150	50
7575	♂	335	150	50
7576	♂	345	153	52
7579	♀	350	150	50
7580	♂	350	156	49

Styan (in DeWinton and Styan, 1899) records this squirrel from western Hupeh, northern Kweichow, Anhwei, northwestern Fukien, and Yünnan, and states that it is a mountain species, probably not descending below 3,000 feet. Two specimens collected by Mr. Zappey in the neighborhood of Ichang, Hupeh, however, are quite different from our series of *D. pernyi*, and are here described

as a new species, although it may eventually be found that intergradation takes place between these eastern and the typical western representatives of the high altitudes. Possibly also Styan's remarks apply in part to the undescribed species.

DREMOMYS SENEX, sp. nov.

*Type*.—Skin and skull, No. 7582 M. C. Z., female adult, from Nantow, Ichanghsien, Hupeh, China. February 5, 1909, Walter R. Zappey.

*General Characters*.—Nearest to *D. pernyi*, from which it differs in its greater size, with notably longer tail and larger skull, in having the postauricular patch white instead of deep ochraceous buff, and the median area of the ventral surface of the tail nearly uniform clay color instead of whitish.

*Color*.—Forehead, top of head, neck, outer surface and anterior margin of ears, dorsum, and external surfaces of fore and hind feet a uniform grizzled olivaceous, the separate hairs with a plumbeous base, succeeded by one or often two narrow rings of buff which are separated by a slightly longer black ring. The tips of the hairs are black and in the dorsal region there are a few scattered hairs entirely black. Sides of the muzzle nearly clear gray; a poorly defined eye ring of buff; cheeks washed with buff. Postauricular spots *clear white*. Ventral surface of body from chin to anus and the inner surface of the limbs, white washed with buff, especially on the outer edge of the thighs. The white hairs of the chin and throat are very slightly gray at their bases, but those of the rest of the under parts have the bases dark slate color. Anal region, posterior edge of thighs and base of tail below, light orange rufous. Tail above mixed black, pale buff, and white, the separate hairs ringed at the base with very pale buff, then black, then buff, followed by a longer black ring and a grayish white tip, that forms a bordering fringe. Ventrally the color is similar except that the hairs of the central area of the tail are *buff* or *clay color*, slightly grizzled by the black rings, and quite without the long white hairs that in *D. pernyi* predominate in this area.

*Skull*.—The skull is similar to that of *D. pernyi* but slightly larger as shown by the measurements below.

*Measurements*.—The collector's measurements of the type are:—total length, 373; tail, 171; hind foot, 54. A second specimen from Ichanghsien, No. 7583, ♂, measured:—total length, 375; tail, 176; hind foot, 52. The skull of the type shows the following dimensions (the figures in parentheses are those of a large specimen of *D. pernyi*):—greatest length, 53 (51); basal length,

43 (41); palatal length, 25 (23.8); nasals, 17 (14.3); zygomatic breadth, 27 (27); mastoid breadth, 20.3 (20); interorbital constriction, 14 (13.8); greatest breadth outside  $m^3$ , 12 (11); upper diastema, 12 (12); mandible from condyle to tip of incisor, 36 (35); upper molar row (excluding  $p^3$ ), 9 (9); lower molar row, 9.3 (8.7).

*Remarks:*— Apart from its greater size and differently colored tail, the most striking characteristic of this squirrel is the *white* postauricular patch. In our series of *D. pernyi* from Szechwan, as well as in Milne Edwards's plate (Rev. mag. zool., 1867, ser. 2, 19, pl. 19) and description, the bright ochraceous buff of these patches is a marked feature.

SCIUROTAMIAS DAVIDANUS (Milne Edwards).

A series of nine squirrels of this curious genus proves to be of considerable interest. Milne Edwards originally described *Sciurus (Tamias) davidanus* from the environs of Peking and pointed out the peculiar cranial characters which seem to ally it to the chipmunks (*Tamias*). Through the courtesy of the United States National Museum, I have been loaned a topotype of this squirrel which agrees well in color with that described by Milne Edwards. In his remarks under the head of "*Sciurus pernyi*," this author (*Recherches*, p. 304-305) briefly describes, "*Sciurus consobrinus*" which he contrasts with the first-named species, stating that in cranial characters it is almost exactly the same as *S. davidanus* and evidently of the same "type spécifique." This squirrel came from the principality of Moupin and is said to differ from *S. davidanus* from Peking in the possession of the reddish tones of the upper surfaces. The brief description given is sufficient to indicate the characteristic differences that separate the uniformly grizzled pale ochraceous and black squirrel of Peking from the more western highland form with the posterior part of the back darker and redder, in contrast to the grayer tint of the shoulders. These differences have been well described by Dr. J. A. Allen (1909, p. 428) who names this darker form *Sciurotamias owstoni*, on the basis of six specimens from Taipasiang, Shensi. Through the kindness of Dr. Allen I have been enabled to compare this series with our material from Hupeh, and there seems no doubt that the name *consobrinus* is applicable to the dark reddish-backed form of which *S. owstoni* therefore becomes a synonym. Two of our specimens from Mafuling, Hupeh, (5,000 feet) seem to be nearer *S. davidanus* than to the race *consobrinus*, and are here referred to that species. A specimen from Tanshuiya, (3,000 feet) is also practically



identical. Thomas (1911) mentions a specimen from 40 miles north of Kaichow, southern Kansu.

SCIUROTAMIAS DAVIDANUS CONSOBRINUS (Milne Edwards).

*Sciurotamias owstoni* J. A. ALLEN, Bull. Amer. mus. nat. hist., 1909, 26, p. 428.

In western Hupeh, and doubtless through northern Szechwan and into Shensi this darker, reddish-backed race of David's Squirrel is found. Four specimens of our series from Chiliping, Fongshan, Moshuiping, and Hsienshanhsien are certainly representative of this subspecies, and are identical with *S. owstoni* from Shensi. Thomas (1911, p. 169) has recently recorded other specimens from Omeishan and from 23 miles south of Tachienlu. There is much variation in the extent of the median white area on the throat. It is apparently lacking or practically so in one of the specimens from Hsienshanhsien, but in the other covers nearly the whole throat. In two others it is more restricted, and appears in one as a narrow median streak. In the series of six specimens of "*owstoni*," two have this white patch well marked, while in the type and one or perhaps two of the others it is represented by a mere fleck.

SCIUROTAMIAS DAVIDANUS THAYERI, subsp. nov.

*Type*.—Skin No. 8008 M. C. Z., male adult, from Washan, western Szechwan, China, at an altitude of 6,000 feet. May 17, 1908, Walter R. Zappey.

*General Characters*.—Similar to *S. d. consobrinus*, but much richer and darker colored throughout, feet blackish, ears (in the type) nearly without white postauricular patches; pelage very long and full.

*Color*.—Sides of the throat, cheeks, muzzle, and upper surface of head as far as a line joining the bases of the ears a rich orange-ochraceous, nearly clear at the sides of the throat and nose, but elsewhere mixed with a nearly equal amount of black. An indistinct black stripe from below the eye to below the ear; a sharply defined buff eye-ring. External surfaces of the ears seal-brown, the postauricular white patches so restricted as to be unnoticeable. The upper surface of the body is a finely grizzled mixture of black and orange-ochraceous in which the black so predominates as to produce a very much darker color than in the previous subspecies, and in the back there is a practical absence of the reddish tone, though the shoulders are ticked with a slightly paler shade of ochraceous which tends to be more conspicuous in a longitudinal line from behind each ear producing a short and very ill-defined stripe. The hands and

feet are seal-brown to blackish above, the former with a very slight admixture of ochraceous hairs.

Ventrally the colors are richer and darker than in *consobrinus*, the dark of the sides encroaching nearly to the mid line of the venter and on the inside of the limbs. Chest and mid ventral area washed conspicuously with tawny-ochraceous; the bases of the hairs slaty. Median area of the throat pure white.

The basal fifth of the tail is colored above like the back; the rest is nearly clear tawny with a black border and an outer fringe of white. The ventral surface is similar but the tawny median area is partly obscured by long black hairs tipped with white.

*Measurements*:—The type was measured in the flesh by the collector as follows:—total length, 363 mm.; tail, 148; hind foot, 54.

*Remarks*:—This very well-marked race will probably prove to be confined to the Washan Mountains, whose peculiar conditions and isolation seem to have induced the differentiation of a number of local races or species. Unfortunately the skull of the type was lost, and no other specimens were obtained. It appears, however, to be sufficiently well characterized for recognition, and I have named it in honor of Col. John E. Thayer through whose generosity the collection was made possible.

TAMIOPS MACCLELLANDI SWINHOEI (Milne Edwards).

A single specimen of this prettily striped species was collected at Tachiao, western Szechwan, September 20, 1908, at an altitude of 12,000 feet.

Milne Edwards based his description on specimens from the "principauté de Moupin." Our specimen is thus practically from the same locality, and since I have found no good description of the species I append the following particulars.

Forehead and crown a grizzled gallstone-yellow and black; nape, shoulders, flanks, and upper side of limbs olive becoming lighter on the sides and passing into raw umber on the rump. Five black stripes on the back, the median dorsal beginning on the nape, becoming broadest in the middle region of the back, then narrowing to the base of the tail. A shorter but equally broad black stripe on each side from shoulders to rump, the intermediate space clay color. A broad clear stripe of pale ochraceous succeeds this black stripe laterally, on either side and is bordered by a short and ill-defined blackish line; inner surface of the ears pale ochraceous, outer surface bordered by black and provided with an erect fringe of long white hairs. A buff line runs from the muzzle, below the eye to the posterior base of the ear, and there is a narrow eye-ring of the same

color. Below, the color is grayish washed with buff, particularly on the throat and mid-ventral line. The tail is colored a mixture of black and raw umber with a narrow buff border and a black tip.

Collector's measurements:—total length, 248; tail, 107; hind foot, 33. The skull measures:—greatest length, 38.5; basal length, 30; palatal length, 17; zygomatic breadth, 21; interorbital constriction, 12.5; mastoid breadth, 16.6; mandible from condyle to tip of incisor, 25; upper molar row (excluding  $p^3$ ), 6.9; lower molar row, 7.

Bonhote (1900, p. 52) in his synopsis of the squirrels of the *maclellandi* group considers this a subspecies, though Trouessart in his "Catalogus" retains it as a species.

*SCIURUS CASTANEOVENTRIS BONHOTEI* Robinson & Wroughton.

A series of eight specimens collected at the extreme western border of Szechwan, at altitudes of from 10,000 to 13,000 feet, in Nachuka and Ramala Pass, probably represents this newly described race. It seems closely related to *Sciurus castaneoventris* of the southeast coast of China in the province of Fukien. In his original description of that species Gray states that "the ears are gray." The strikingly orange-rufous ears of our series together with the pale dorsal coloration seem to characterize it distinctly, although in their brief diagnosis, Robinson and Wroughton make no comparison with other races.

Matschie (1908, p. 210) has shown that the squirrel described by Hilzheimer (1905) as *Sciurus tsingtauensis* is really the same as *S. c. ningpoensis* for it since appears that the skin on which it was based came from the hills near Ningpo, instead of from Tsingtau, to the north, as supposed.

Six adults were measured in the flesh by the collector as follows:—

No.	Locality.	Total. Length.	Tail.	Hind Foot.
7826	Ramala Pass	405	200	55
7828 <i>Type</i>	Nachuka	405	185	53
7829	Nachuka	407	195	53
7830	Nachuka	417	185	53
7832	Ramala Pass	390	184	53
7833	Nachuka	390	170	54
Average		402	186	53

The skull of the type measures:—greatest length, 51.8 mm.; basal length, 43.8; palatal length, 24.5; zygomatic breadth, 30.5; interorbital constriction, 17.6; mastoid breadth, 22.9; upper diastema, 11.5; mandible from condyle to tip of incisor, 35.5; upper molar row, 10.2; lower molar row, 10.

## PTEROMYS ALBO-RUFUS Milne Edwards.

A trade skin of this beautiful flying squirrel was obtained by Mr. Zappey in the Province of Hupeh in 1907. It is identical in color with Milne Edwards's fine plate 45 (*Recherches hist. nat. mammifères*).

## FELIDAE.

## FELIS INGRAMI Bonhote.

I have identified with this species a skin without skull obtained by Mr. Zappey at Changyanghsien, Hupeh, in January, 1909. In color it is similar to the specimen described by Bonhote (1903, p. 374) from the Wanchinshan Mountains in the neighboring province of Kweichow with which it further agrees in the shortness of the tail compared with the length of head and body. Bonhote gives for dimensions:—head and body, 480; tail, 200; hind foot, 75. Our skin measures (dried) much the same, except that the hind foot seems longer, but exact measurements are now impossible to obtain.

## FELIS SCRIPTA Milne Edwards.

A skin of a fine male from Suifu, western Szechwan, agrees well with Milne Edwards's figures and description of the type from the same province, in the principality of Moupin.

## FELIS PARDUS FONTANIERI (Milne Edwards).

Two partially dressed leopard skins were obtained by Mr. Zappey from the King of Tachienlu, western Szechwan. These seem undoubtedly to represent Fontanier's Leopard, described by Milne Edwards from the neighborhood of Peking. The fur is thick and woolly, and the general color above is very pale, nearly buff-yellow of Ridgway, agreeing well with the plates in Milne Edwards's "*Recherches*." One of these skins measures approximately 1800 mm. from muzzle to tip of tail, and the tail alone measures about 760 mm.; in the second and larger skin these measurements are approximately 1950 mm. and 640 mm. Milne Edwards gives 1920 and 750 for these two measurements respectively.

The black spots in our skins are apt to be somewhat brownish due to the length of the chocolate-colored bases of the hairs. In the larger specimen, the black areas on the back are somewhat confluent producing a very confused and mottled pattern.

The thick woolly fur of this leopard is indicative of its high mountain habitat in Szechwan.

Cabrera (1910, p. 426) attempts to show that Gray's name *japonensis* should replace *fontanieri* on the ground that Gray's specimen came probably from North China instead of Japan, a conclusion that may prove well founded; but the name is inapplicable since it was previously employed by Boddaert for a variety of the house cat.

FELIS PARDUS VARIEGATA (Wagner).

In the Yangtze valley, at Changyanghsien, Hupeh, Mr. Zappey shot a fine adult male leopard, which is clearly a very different animal from *fontanieri* of the Szechwan highlands. Compared with our skins of the latter from Tachienlu it is larger and much richer in color, with more deeply black spots. The dorsal tawny areas are between ochraceous and orange-ochraceous paling to buff on the flanks. The spots are more sharply defined and of a deeper shining black. The hair, too, notwithstanding that this is a winter specimen killed February 2, 1909, is comparatively much shorter (26 mm. in length mid-dorsally between the shoulders as against about 40 in *fontanieri*) and without the woolly underfur of the latter. The black hairs are only very inconspicuously chocolate-colored at their extreme bases. The collector's measurements of this specimen in the flesh are:—total length, 2080; tail, 850; hind foot, 260; height at the shoulder, 610. The skull is large and heavily built and does not appear to differ remarkably in general proportions from that of *fontanieri*. It measures:—greatest length from occiput to front of incisors, 228; condylobasal length, 201; zygomatic breadth, 152; greatest breadth across supraorbital processes, 73; greatest length of mandible, 151; length from back of upper molar to front of canine, 71; length from back of lower molar to front of canine, 80.

This leopard probably represents the race inhabiting the lowland portion of southeastern China and I have provisionally referred it to *F. p. variegata*, whose range is supposed to be "Indo-China, Java, Sumatra" (Trouessart). That the leopard of the coastal region of southeastern China is different from those of India and North China was long ago pointed out by Swinhoe (1870, p. 628), who says, "judging from skins procured at Canton, the Chinese race is of a much richer yellow colour, and has the spots larger and blacker than is usually seen in skins from India."

## VIVERRIDAE.

## VIVERRICULA PALLIDA (Gray).

A female from Ichang, Hupeh, agrees well with Bonhote's (1898, p. 119) description. The black collar is lacking on the under side of the throat, which is uniformly colored like the belly. Above is a narrow black stripe on each side of the neck, and an indistinct median one. The shoulders are without stripes or spots, but the lower back and rump have five or six well-marked narrow, black stripes. Matschie (1908, p. 198) has described as a new species *Viverricula hanensis* on the basis of a skin from Hankow. It is said to differ from *V. pallida* through the absence of a cross stripe on the shoulder and the possession of six well-marked longitudinal stripes on the back and eight instead of six dark rings on the tail. Our specimen has six rings with an indication of a seventh, but otherwise does not materially differ from this description, though the longitudinal stripes on the back might be considered as five, six, or seven owing to the indistinctness of the outer ones. In view of the great variation in color of these animals, as pointed out by Bonhote, and the fact that no cranial characters are mentioned by Matschie, it seems best for the present to consider the Ichang specimen as *V. pallida*. Its measurements, taken by the collector, are:—total length, 830; tail, 290; hind foot, 91.

The skull measures:—greatest length, 95; basal length, 88; zygomatic breadth, 42; mastoid breadth, 30; length of bulla, 20; mandible from condyle to tip of incisor, 65; upper tooth row (exclusive of incisors), 37; lower tooth row (exclusive of incisors), 41.

## CANIDAE.

## VULPES VULPES WADDELLI Bonhote.

A trade skin from Lhasa, Tibet, seems to be of this race, which according to Bonhote, differs from *V. v. flavescens* of northwest India in having the mid-dorsal area a bright red in contrast to the rest of the upper surface. In *flavescens* this portion is more uniform and of a more brownish yellow.

## NYCTEREUTES STEGMANNI Matschie.

Professor Matschie has briefly characterized several geographical races of the Raccoon dog from eastern Asia in his report on the mammals of the

Filehner expedition. In addition to *N. viverrinus* and *N. albus* from the Japanese islands, he recognizes *N. procyonides* of Gray from east central China (of which he makes *N. sinensis* Brass, 1904, "Nutzbare Tiere Ostasiens," a synonym) and describes as new *N. ussuriensis* and *N. amurensis* from Siberia, and *N. stegmanni* from the Yangtze basin. The last is said to differ from *N. viverrinus* in having the bases of the woolly hairs on the back blackish gray instead of reddish gray, the shoulders ticked with whitish gray on a dark ground instead of being blackish brown, while the sides of the body are not much darker than the clear band back of the shoulder. In size, the Yangtze animal is superior, being 82 cm. instead of 70 cm. in total length.

The skin of a single female, without skull, obtained by Mr. Zappey in December, 1908, at Suifu, western Szechwan, agrees well enough with Matschie's description of *N. stegmanni*. The dried skin measures about 82 cm. in total length. The general color is pale buff, clear on the sides of the neck, behind the shoulders, and on the lower surfaces of the body and tail, but elsewhere is mixed with black particularly on the mid-dorsal area and on the terminal half of the tail above. The lower limbs and patch below the eye are dark chocolate and the chin and throat are tinged with the same. No doubt further material will show intergradation between these described species.

## MUSTELIDAE.

### LUTREOLA MOUPINENSIS Milne Edwards.

A male and a female from Tachiao (12,000 feet) and a second female from Washan (9,000 feet), western Szechwan, are in the collection, the two former in summer pelage, the latter in winter. The two summer skins were taken on the 17th and 20th of September respectively and are essentially similar in coloration, a nearly uniform Vandyke-brown above, darkest on the forehead and muzzle shading into pale cinnamon on the ventral surfaces. The extreme tip of the tail is a seal-brown or blackish with one or two white hairs. The female in freshly assumed winter pelage, October 28, 1908, is cinnamon above, slightly darker along the median line, shading into a clear buff below. These specimens measured by the collector are as follows:—

No.	Locality.	Sex.	Length.	Tail.	Hind Foot.
7834	Tachiao	♂	543	198	59
7835	Tachiao	♀	428	156	37
7836	Washan	♀	432	167	49

The dimensions of the skulls of Nos. 7834 and 7835 are respectively:— greatest length, 62.8, 49.8; basal length, 57.5, 46; palatal length, 28, 22.6; interorbital constriction, 14.5, 11.8; zygomatic breadth, 33.5, 25.5; mastoid breadth, 30.8, 22.3; length of mandible from condyle to tip of incisor, 36.5, 28; upper tooth row from back of molar to front of canine, 19, 15.4; lower tooth row from back of molar to front of canine, 22.6, 18.

LUTREOLA SIBIRICA (Pallas).

Three males and a female of this mink were taken at Ichang, Hupeh. They appear to agree in size with measurements given for more northern examples and the adult male skull seems identical with that from Chefoo, figured of natural size by Milne Edwards in his "Recherches," except that the pterygoids may be longer than there shown. The dimensions of these specimens, as noted by the collector are:—

No.	Sex.	Length.	Tail.	Hind Foot.
7104	♂	565	200	70
7105	♂	585	195	65
7107	♂	600	200	70
7106	♀	495	172	50

The cranial measurements of ♂ 7105 and ♀ 7106 are respectively:— greatest length, 65.5, 55; basal length, 60, 51; palatal length, 29, 23.2; length of audital bulla, 19.7, 17.5; zygomatic breadth, 34.4, 26.8; mastoid breadth, 30.5, 24; mandible from condyle to tip of incisor, 39, 30.6; upper tooth row from back of molar to front of canine, 19.5, 16; lower tooth row from back of molar to front of canine, 22.8, 18.

In the female, No. 7106, the lower first incisor on the left side is so reduced as to be hardly more than half the width of its fellow on the opposite side.

Swinhoe (1870, p. 624) records this species from Tientsin, Amoy, south China, and Formosa and states that it lives in the walls of houses, in most of the Chinese towns, feeding on rats and snakes.

Matschie (1908, p. 150) has described *Lutreola stegmanni* from Kiaochow on the Shantung Peninsula from four skins without skulls. Our specimens agree more or less with his description and may be referable to this form if it prove to be sufficiently characterized.

MARTES FLAVIGULA BOREALIS (Radde).

A perfectly typical skin of this race was obtained from the Chinese traders, probably from Hupeh or to the northwest.



*ARCTONYX LEUCOLAIMUS* Milne Edwards.

A trade skin, probably from Hupeh, is in the collection.

## URSIDAE.

*AILURUS FULGENS STYANI* Thomas.

A fine male skin, unfortunately without skull, from the Chinchiang Valley, western Szechwan, represents this race, recently described from Yanglinpa in the northwestern part of the same province. The collector's measure of the foot is 125 mm.; Thomas gives 112 for the foot without claws.

*URSUS THIBETANUS MACNEILLI* (Lydekker).

The black bear of eastern Tibet has recently been described by Lydekker (1909) as a distinct race with a longer pelage and different skull as compared with its nearest geographic representatives of the Indian Himalayas. The skull is actually and proportionally broader, the palate is narrower and distinctly vaulted, instead of plane, and the third lower molar is narrower. The type is a skin and skull from Tachien, eastern Tibet, and the describer mentions also a female skull from Szechwan, in the collection of the British Museum. Mr. Zappey secured an adult skull somewhere near the eastern border of Szechwan which bears out the characters claimed for this subspecies. The palate is narrow and slightly vaulted and corresponds closely in measurements with those given for the type. The dimensions follow, together with those published for the type specimen in parentheses (here reduced to millimeters):—basal length, 264 (251.5); zygomatic breadth, 197 (170.2); length of three last upper cheek teeth, 64 (54.1); last upper molar, length, 29.2 (24.9); width, 15.5 (15.2); length of three last lower cheek teeth, 59.2 (55.4); last lower molar, length, 17 (15.5); width, 12.4 (10.7); length of penultimate lower molar, 21.6 (20.3). Our specimen is probably a male.

## TALPIDAE.

*UROPSILUS SORICIPES* Milne Edwards.

This species was described from specimens collected by Père David in the principality of Moupin, and has been recorded by Pousargues (1896, p. 1) from the northern part of Yünnan. Mr. Zappey obtained a series of nine specimens

from Washan, Lianghokow, and Tachiao, all in western Szechwan, at altitudes of from 3,000 to 12,000 feet. The skins are very uniform in color and agree closely with the excellent figures by Milne Edwards. The collector's measurements of the fresh specimens show the following extremes: — total length, 127–155 mm.; tail, 59–72; hind foot, 14–17.5; average of nine specimens, 137, 65 and 16 mm., respectively for these three dimensions.

The tooth formula of this species was supposed by Milne Edwards to be  $I \frac{2}{1} C \frac{1}{1} P \frac{3}{3} M \frac{3}{3}$ . Thomas (1912), however, in a series of specimens from Omisan found that the formula included *four* upper premolars and two lower incisors; and although in other respects the specimens showed no differences, he founded for them the genus and species *Rhynchonax andersoni*. Curiously enough, our series shows still a different formula. All the specimens have a large and a second minute lower incisor, as in "*Rhynchonax*"; but four have *three*, and three others have a *fourth* upper premolar. It would seem that the variation is individual rather than generic, since the two variations occur in specimens from the same locality that are otherwise identical. I prefer to regard these as variants of a single species, which is in process of losing the minute upper third premolar and the small lower incisor, and which in the individual presence or absence of these teeth shows parallelism with numerous similar cases among the Chiroptera.

## SORICIDAE.

### ANUROSOREX SQUAMIPES Milne Edwards.

A fine series of this almost tailless shrew was secured from Washan, in western Szechwan, and a few additional specimens are from Hupeh, at Hsien-shanhsien, 4,500 feet, and Changyanghsien, 5,500 feet. These all show a close agreement among themselves, and average smaller than the measurements given by Milne Edwards for the type, as will appear from the following table which includes, first the dimensions of the type, then those of three specimens from Hupeh: —

	Type	Hupeh 7227 ♂	Hupeh 7228 ♀	Hupeh 7226 ♀
Total length	110	100	98	98
Tail	9	10	10	11
Hind foot	16	15	15	15
Length of skull	27	24	25.5	—
Greatest breadth of skull	15	—	13.2	—
Upper tooth row	13	11.2	12	11.7
Lower tooth row	12	10	11	10.7

The average of twenty-five specimens from Washan measured by the collector is: — total length, 102 mm.; tail, 12; hind foot, 15, with extremes, total length: 86–104; tail, 9–15; hind foot, 14–16.

Milne Edwards's specimens came from the mountains and plains of Szechwan and Tibet. He describes the pelage as "d'un gris uniforme tirant un peu sur le brun verdâtre" and his excellent figure is colored in this way. Our specimens show an additional color character of which he makes no mention. In thirteen skins taken in late October and early November, there is present on either side of the head, at the auricular region, a small ochraceous patch in marked contrast to the otherwise dark gray coat. If our specimens are all correctly sexed (sometimes not an easy matter in this group) this coloring is more frequent in the males, since nine of the thirteen thus marked are of this sex, while of fifteen females, but five show the patch on both sides, five others have it more or less distinct on one side only, and the other five females as well as three males do not show it.

Four specimens taken between the 18th and 29th of May seem to be acquiring the summer pelage which is shorter and more blackish without the silvery sheen of "brun verdâtre," when viewed from behind. Two of these collected May 28th and 29th respectively, seem still to retain the long rump hairs of the winter coat, that project as a conspicuous tuft nearly hiding the tail, while the other two, taken May 18th and 28th respectively, show no such contrast, but appear to have quite shed the winter coat.

#### CROCIDURA ATTENUATA Milne Edwards.

A single specimen of this shrew was taken at Ichang, Hupeh, and agrees well with Milne Edwards's diagnosis. The color above is gray washed with a light tint of Prout's brown; below, uniform silver-gray, the tail bicolor like the body. The ears are prominent, their surfaces minutely haired; the longer hairs of the tail are relatively few and confined to the proximal three fourths. As shown in Milne Edwards's figure, the second upper unicuspidate tooth is smallest, the third slightly larger and the first largest. The dimensions of our specimen follow, as well as those of the type from Moupin in parentheses: — total length, 115 mm. (122); tail, 50 (48); hind foot, 13 (14). Skull: total length, 20 (21); mastoid width, 9; width outside second upper molar, 6.6; mandible from condyle to tip of incisor, 12.8; upper tooth row, 9; lower tooth row, 8.4.

Thomas (1911, p. 168) has recently recorded it from Kansu.

## CROCIDURA COREAE Thomas.

A single specimen of a small Crocidura was taken by Mr. Zappey at Ichang, Hupeh, which, if not identical with *C. coreae* is at least very closely related to it. Thomas (1907, p. 860) described the species from material collected at Min-gyong, 110 miles southeast of Seoul, Korea. Later he (1908a, p. 639) reported specimens from the Imperial Tombs, 65 miles east of Peking, China. Our specimen appears to extend its known range south into the Yangtze valley. It was taken January 24, 1908, is broccoli-brown above, slightly mixed with grayish, below pale ecru-drab, tail colored like the body. As stated by Thomas the longer bristly hairs of the tail are numerous and extend nearly to the tip. The ears are prominent and minutely haired. Its measurements are as follows, with those of the type corresponding in parentheses: — total length, 98 mm. (95); tail, 40 (37); hind foot, 13 (11.5). Skull, greatest length, 17.5 (17.5); basal length, 15.5 (15.1); mastoid width, 7.7 (8.2); width outside second upper molars, 5.3; mandible from condyle to tip of incisor, 10.8; upper tooth row, 7.9 (7.8); lower tooth row, 7.0.

## ERINACEIDAE.

## ERINACEUS ? HANENSIS Matschie.

I have provisionally referred to this newly named species a skin with skull from Ichang, Hupeh. The single specimen on which Professor Matschie bases the species came from Hankow, about 175 miles farther east in the same province. The original description contains little that is particularly diagnostic, and the distinction is based wholly on color. The spines are said to be of two sorts, whitish and light brown, the latter with long, dark horn-colored tips. These spines are about 25 mm. long. The color of the ventral side, of the head and of the limbs is a deep hair-brown, sprinkled with gray hairs on the sides of the body, on the limbs, breast, flanks, cheeks, chin, and nose. The claws are dark horn-color. The ears are dark and very small.

Our specimen is apparently immature though probably nearly full grown. The wholly white spines are more numerous near the periphery of the spiny area, but occur also in the mid-dorsal region, where there are a few wholly dark spines of nearly a broccoli-brown. Most of the spines are of a similar color at the base with a subterminal white band and a brown tip. The hair of the lower surfaces, head, and limbs is stiff and rather sparse but instead of being hair-brown is very pale vinaceous buff, darker on the forehead and the upper surfaces of the feet.

About the eye is a narrow ring of hair-brown, and a few dark brown hairs are scattered along the sides of the body. Without additional specimens it is impossible to decide how great may be the individual or age variation in color so for the present it seems best to consider this Ichang specimen as representing *E. hanensis*. The collector's measurements are:—total length, 225 mm.; tail, 19 mm.; hind foot, 43 mm.

The skull seems to be that of a nearly adult animal, and is but a trifle smaller than that of *E. dealbatus* from Pekin. Its dimensions are:—greatest length, 49.5; basal length, 46; palatal length, 29; zygomatic breadth, 30; mastoid breadth, 24; width outside first upper molar, 20; mandible from condyle to tip of incisor, 39; upper tooth row, 27; lower tooth row, 25.5. The anterior prolongations of the frontals do not reach the intermaxillaries so that there is a maxillonasal suture of some 3.5 mm. in length.

#### VESPERTILIONIDAE.

##### PIPISTRELLUS ABRAMUS (Temminck).

Between July 24 and August 5, 1907, a series of twenty-five specimens was collected at Ichang. A number of these are immature with the metacarpal epiphyses still distinct. The species was also obtained at Kiating, Hochingsien and Kweifu, in Szechwan. The adult males are nearly hair-brown above and females are of a redder tinge, nearly 'Prout's brown.' In both sexes the bases of the hairs are darker, near seal-brown. This sexual dichromatism was noticed by Swinhoe (1870, p. 618) who says that "the female is a rich brown, with lighter and dusky underparts; the male is black." The skulls of our series show some variation in size, though this is often more apparent to the eye than the measurements would indicate. Thus the smallest skull is 13 mm. long but is in every way lighter and more delicate than the largest which measures 14 mm. In some the upper canine and pm<sup>3</sup> actually touch, while in others there is a considerable space between the two teeth. Usually, however, this space is slight.

##### VESPERTILIO MURINUS SUPERANS (Thomas).

One male was taken at Ichang, Hupch, April 22, 1907, and a pair on March 28, 1908, at Kweifu, in eastern Szechwan.

##### NYCTALUS NOCTULA LABIATA (Hodgson).

An immature skin and skull from Ichang, July 21, 1907, and an adult skin from Kweifu, eastern Szechwan, March 28, 1908, represent a very dark colored

race of the noctule bat, to which I have provisionally applied Hodgson's name. "*Vespertilio labiata*" was very briefly described by Hodgson in the Journal of the Asiatic society of Bengal, 1835, 4, p. 700, from the "central region of Nipal," as "saturate brown throughout; skin wherever denuded purpurescent." "Teeth  $\frac{2.2}{6}$   $\frac{1.1}{1.1}$   $\frac{6.6}{6.6}$ , snout to rump three inches; tail two." It is said to be "closely affined to M. Geoffroy's *noctula*," with which Dobson, in 1878, considered it synonymous. Jerdon, four years previously had done the same, and in his "Mammals of India" gave its measurements as:—length  $4\frac{1}{2}$  to 5 inches; tail, nearly 2; forearm,  $1\frac{10}{12}$  = about 46 mm. Barret-Hamilton has recently described under the name of *P. montanus* a noctule bat from Mussoree, north-western Himalayas, to which Hodgson's name may be applicable although its measurements seem a trifle less (forearm 42.5 mm.). Our two specimens from Hupeh and Szechwan are very similar to *P. noctula*, but darker throughout, nearly Prout's brown above and slightly paler below, the hairs practically unicolor to their bases. The immature specimen from Ichang is slightly the darker with a faint gloss to the upper surface. It is also albinistic in that the tips of both ears are white. The adult from Kweifu measures:—forearm, 49 mm.; thumb, 8; second metacarpal, 52.5; third metacarpal, 52.5; fourth metacarpal, 50.5; fifth metacarpal, 42. The forearm of the immature specimen measures 46 mm.; its skull is similar to that of *P. noctula* with the first upper premolar very small (not fairly prominent as in *P. leisleri*) and hidden in the angle between the canine and the upper second premolar.

## RHINOLOPHIDAE.

### RHINOLOPHUS MINOR Horsfield.

Four specimens from Kiating, Szechwan, taken November 29, 1908, agree closely with the description and measurements given by Andersen in his review of the species of this group (Proc. Zool. soc. London, 1905, 2, p. 126–128). The forearm measurement is 38 mm. In all,  $pm_3$  stands practically in the tooth row.

### RHINOLOPHUS ROUXI SINICUS Andersen.

This race was described from a single specimen taken at Chinta, Anhwei, on the lower Yangtze. Mr. Zappey obtained two specimens of a Rhinolophus belonging to the *simplex* group, at Ichanghsien, Hupeh, that undoubtedly represent the same race but are even smaller than the type, with forearms 43 and 44

mm. respectively, against 46. They represent a light and a darker phase, the former between russet and wood-brown above, the latter a drab. The following cranial measurements show that the skulls are a trifle smaller than that of the type:—

	Type.	No. 7223.	No. 7224.
Total length of skull to front of canine	19.8	19	18.5
Upper tooth row     "   "   "   "	7.7	7.5	7.
Lower tooth row     "   "   "   "	8.1	8.	7.3
Mandible	13.5	12.8	12.5

In both specimens the first upper premolars are in the tooth row on each side. In No. 7224 lower premolars 2 and 4 are in contact, with premolar 3 forced to the outside in the angle between them. In No. 7223, however, lower premolar 3 is only slightly external and separates the two others by a slight space.

### CERCOPITHECIDAE.

#### MACACUS LASIOTIS Gray.

A young female of this short-tailed baboon was obtained in the mountains of western Szechwan, at Nachuka, 10,000 feet. The fur is fine and silky, of an olivaceous tint on the head, brightening to nearly clear pale orange-ochraceous on the hips. The feet and fore limbs are grayish. The collector's measurements are :—total length, 515 mm.; tail, 156; hind foot, 125.

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PLATE 1.

PLATE 1.

Fig. 1.— *Batrachypterus sinensis* (Sauvage). Page. 126.

Fig. 2.— *Hyla monticola*, sp. nov. Type, M. C. Z. No. 2553. Washan, western Szechwan. Page 127.

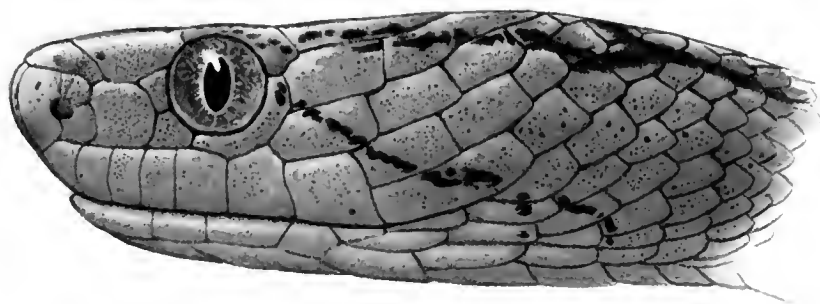




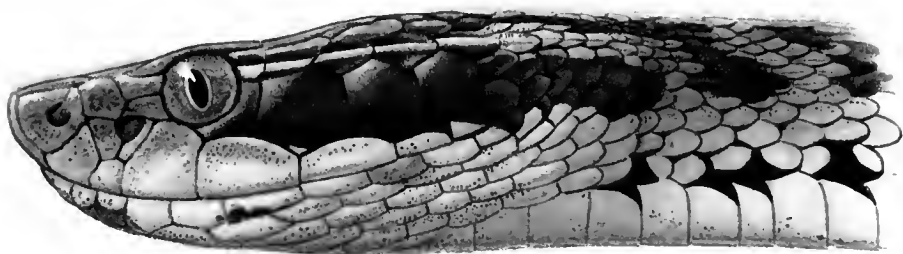
**PLATE 2.**

PLATE 2.

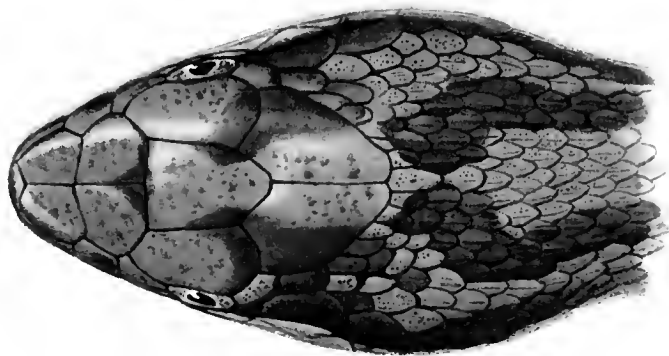
- Fig. 1.— *Amblycephalus chinensis*, sp. nov. Type M. C. Z. No. 7326. Luluping, western Szechwan. Page 132.
- Fig. 2.— *Agkistrodon blomhoffii brevicaudatus* Stejneger. Page 132.
- Fig. 3. *Agkistrodon tibetanus*, sp. nov. Type M. C. Z. No. 7327. Ramala Pass beyond Tachienlu, western Szechwan. Page 133.
- Fig. 4.— The same.



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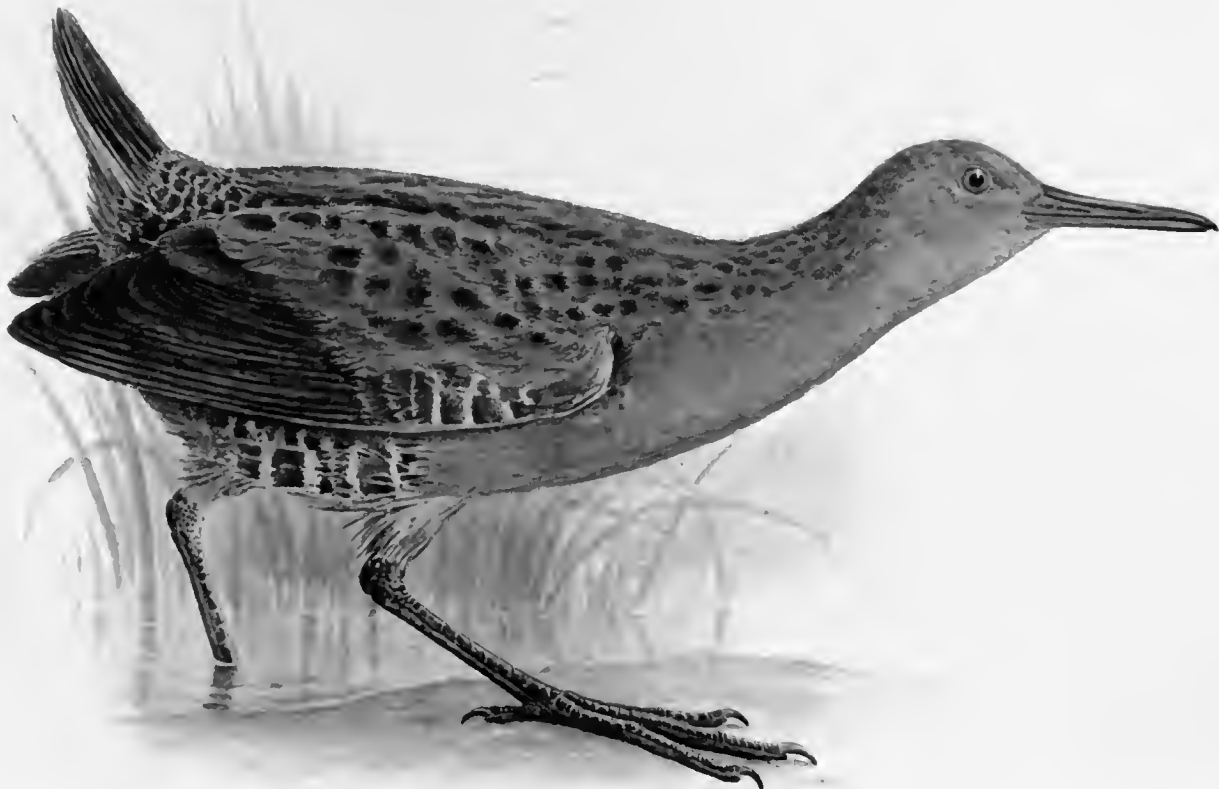
**PLATE 3.**

PLATE 3.

- Fig. 1.— *Rallus aquaticus korejewi* Saruduy. M. C. Z. No. 52601. Ichanghsien, Hupeh, March 8, 1908.  
Page 144.
- Fig. 2.— *Niltava lychnis* Thayer & Bangs. Type, M. C. Z. No. 50001. Patung, Hupeh, May 19, 1907.  
Page 163.



2



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PLATE 4.

PLATE 4.

- Fig. 1.— *Pnoepyga mutica*, sp. nov. Type M. C. Z. No. 51974. Washan Mountain, western Szechwan, June 3, 1908. Page 172.
- Fig. 2.— *Suthora zappeyi*, sp. nov. Type M. C. Z. No. 50738. Washan Mountain, western Szechwan, November 3, 1908. Page 171.







PLATE 5.

PLATE 5.

- Fig. 1.— *Tesia grallator*, sp. nov. Type M. C. Z. No. 51975. Washan Mountain, western Szechwan, May 31, 1908. Page 169.
- Fig. 2.— Bill of *Tesia grallator*.
- Fig. 3.— Bill of *Tesia castaneocoronata* (Burton). Page 170.
- Fig. 4.— *Prinia inornata exter*, subsp. nov. M. C. Z. No. 52578 Kiating, western Szechwan. Adult male in winter plumage. Page 183.
- Fig. 5.— *Prinia inornata exter*, subsp. nov. Type M. C. Z. No. 52580, Hokow, western Szechwan, May 4, 1908. Adult male in spring (breeding) plumage. Page 182.

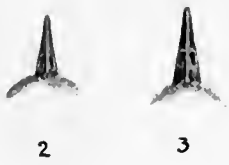




PLATE 6.

PLATE 6.

*Boanerges internigrans*, sp. nov. Type M. C. Z. No. 52587. Shuowlow, western Szechwan, August 23, 1908. Adult male. Page 200.









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