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CONCERNING CERTAIN SPECIES OF REPTILES AND
AMPHIBIANS FROM CHINA, JAPAN, THE
LOO CHOO ISLANDS, AND FORMOSA

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INTRODUCTION

This paper is made up of a series of notes upon collections of reptiles and amphibians from China and the Japanese Empire, which the Academy has received during recent years. It is not in any sense an exhaustive account of these collections. Instead, it deals only with certain species, nearly all of which have been collected by Victor Kühne in Formosa and the Loo Choo Archipelago. A few species from China, Japan proper, the Pescadores, Botel Tobago, Wake, and the Bonin islands also are included; but a large proportion of the species, even from Formosa and the Loo Choo Islands, have not been studied at all.

One genus and the following species and subspecies are here first described, although advance diagnoses of these forms were published July 29, 1912.*

Hyla hallowelli

Japalura polygonata ishigakiensis

Japalura polygonata miyakensis

Eumeces barbouri

Eumeces marginatus amamiensis

Eumeces marginatus kikaigensis

Eumeces ishigakiensis

Eumeces chinensis formosensis

Sphenomorphus indicus formosensis

Sphenomorphus boulengeri

Leiolopisma laterale formosensis

Leiolopisma laterale boettgeri

Lygosaurus pellopleurus browni

Takydromus stejnegeri

Achalinus werneri

Calliophis swinhoei

From a study so incomplete as this, it is indeed difficult to draw conclusions of value regarding the past changes in the land and water areas of the region involved. We may, however, state rather positively that changes have been more numerous, and land-connections more complicated, than in the Galapagos Archipelago. Although not here set forth, there

* Advance Diagnoses of New Reptiles and Amphibians from the Loo Choo Islands and Formosa. Published San Francisco, July 29, 1912.

is evidence that Sakhalin has been rather recently connected with continental Asia. The various islands of Japan proper bear evidence of having been joined not only with each other but also with Sakhalin and Korea by way of Iki and Tsushima. The Loo Choo Islands probably are quite old. The majority of their reptiles and amphibians apparently reached them from the south, doubtless by way of a continental connection of which the present island of Formosa formed a part. The northern islands, however, must sometime have been united with Japan proper; as is shown, for instance, by the presence of *Eumeces barbouri*. The islands of this group were doubtless all connected for a considerable period—long enough to develop specific differences, such as exist between *Eumeces marginatus* and *Eumeces elegans*. Later they became separated into the various islands, and have had individual existence for a period long enough to permit subspecific, or in some instances specific, differentiation. The southern islands show the Formosan influence upon their fauna more strongly than the central and northern islands. The major portion of Formosa is occupied by a reptilian fauna which is practically Chinese modified by time and isolation. Southern Formosa, however, bears evidence of a former connection with the Philippines by way of Botel Tobago—as is shown, for example, by *Sphenomorphus boulengeri*.

From all this it would seem probable that this whole region has been gradually sinking; that formerly these various islands were united, as it were, into an enormous "barrier reef" off the whole eastern coast of Asia, and connected with that continent through Sakhalin, Korea and Formosa; that the Loo Choo portion of this "reef" then became separated from Japan, and later from Formosa; and that subsequent depression resulted in the present geographical conditions. Doubtless there have been minor elevations and depressions, more or less local in extent, resulting in temporary connections and isolations of portions of this area, and complicating the reading of the story in further detail.

Hyla chinensis Günther

Originally described from specimens from China, this was one of the species obtained by Swinhoe in Formosa. It has been recorded also from Taiwan, Formosa.

We have received twelve adult specimens from Formosa. In all, the heels overlap about the width of the tarsus. When carried forward, the heel reaches the anterior edge of the eye in five, the middle of the orbit in five, and the posterior edge in two. One specimen (No. 20075) twenty-six millimeters long from snout to vent, has no vomerine teeth. Two have only the left patch of vomerines. There is considerable variation in the number, shape, and distribution of the black markings on the legs and sides of body. One large specimen has no black markings. On the body there may be only one spot, a series of spots, or a continuous narrow line. On the legs the markings may be confined to the thighs, or may extend down to the feet; may be round, or may form longitudinal streaks. The brown streak in front and behind the eye seems to be constantly present. The vomerine teeth are a little farther back than in *Hyla arborea japonica* from Japan, but not farther than in the Loo Choo species. There seems to be no appreciable difference in the extent of the web.

Our specimens were collected at Kosempo, Keelung, Taihoku.

Hyla hallowelli Van Denburgh

Diagnosis.—Similar to *Hyla chinensis*, but never with black spots on legs and sides of body, and with only a trace of a dark streak on side of face; heels overlapping, tibio-tarsal articulation reaching anterior border of eye or beyond; tibia seldom less than half the length of head and body; no dark streak behind eye; green extending beyond wrist and ankle.

Type.—Adult male. California Academy of Sciences No. 23806. Kikaiga shima, Loo Choo Islands, Japan, April 30, 1910.

Description of the type.—Vomerine teeth in two small central groups between posterior edges of choanae. Tongue rounded, slightly indented, and free behind. Canthus rostralis distinct; loreal region slightly oblique and concave. Interorbital space much broader than the upper eyelid. Tympanum distinct, small, about half the diameter of eye. Fingers webbed at b.se. Toes webbed as in *H. chinensis*. Heels overlap about the width of

the tarsus when the legs are folded and held at right angles to the axis of body. Heel reaches a little beyond anterior border of eye. A strong dermal fold from eye to tympanum and along the side. A strong pectoral fold. Large external vocal sac.

The color above, in alcohol, is uniform bluish gray, doubtless green in life. This color extends down the upper surfaces of the limbs on to the external digits. There is a trace of a narrow gray line from nostril to eye. There are no other dark markings except a few indistinct gray dots on the sides of the body, the front of the thigh, and the back of the thigh and leg. The lower surfaces are uniform yellowish white, faintly clouded with gray on the vocal sac.

Variation.—With fifty-seven specimens at hand, but little variation appears. There is practically no variation in color. The dark spots of *H. chinensis* are always absent in this species. The heels overlap about the width of the tarsus in all these specimens. The heel reaches only to the middle of the eye in two, to the nostril in two, and to or slightly beyond the anterior edge of the eye in fifty-three. The tibia rarely is a little less than half the length of the head and body, but usually is more than half this measurement.

Relationship.—The slightly more posterior position of the vomerine teeth, the overlapping of the heels, the general shape of the head and body, and the uniform green coloration above, indicate relationship with *H. chinensis*, notwithstanding the fact that the absence of the showy black spots and red-brown head-streak give a certain resemblance to the *Hyla* of Japan. The following measurements, first, of the type of this species, second, of a Formosan specimen of *H. chinensis*, and third, of a Japanese specimen of *Hyla arborea japonica*, may be useful. All are males.

Snout to vent	33	mm.	33.4	mm.	32.3	mm.
Snout to tympanum	9.5	"	9.3	"	9.4	"
Tympanum to vent	25.	"	25.6	"	24.	"
Width of head	11.	"	11.2	"	13.	"
Fore limb ...	23.	"	22.5	"	23.5	"
Hind limb ...	55.	"	51.	"	52.	"
Tibia ..	18.	"	16.5	"	15.	"
Heel to tip of longest toe.	25	"	25.	"	24.	"

It will be seen that the new species has a much longer tibia, and that the Japanese form has a broader head.

Distribution.—No tree-toads have been recorded from any of the Loo Choo islands. We have received good series from Kikaiga and Amami Ō shima, but none from any other island of the group.

Rana okinavana Boettger

This frog was described by Boettger, in 1895, from three specimens secured by a Japanese collector for Mr. B. Schmacker. These were labeled Okinawa shima. The large collection which we have received from the Loo Choo Islands contains no specimens of this frog from Okinawa, where it was sought in vain; but on Ishigaki shima twenty-five specimens, which seem referable to this species were obtained.

Boettger's original description applies so completely that a detailed description of them seems uncalled for, but it will be well to call attention to certain variations occurring in the series now at hand.

The vomerine teeth normally begin about on a line connecting the posterior borders of the choanae—or a little anterior to this—and extend obliquely backward, being separated from each other and from the choanae by nearly equal spaces. Nineteen specimens show approximately this arrangement. Two specimens have the vomerine patches between the choanae (Nos. 22834 and 22845). One specimen (No. 22852) has the left patch much in advance of the right, so that the left is between, and the right chiefly behind, the choanae. One adult specimen (No. 22851) has no vomerine teeth, and two have them absent on one side.

In four specimens (Nos. 22851, 22838, 22847, 22852) the nostrils open about midway between the eye and the end of the snout. In the other twenty-one examples the nostrils are decidedly nearer to the end of the snout than to the eye. In No. 22846 the nostril is farthest forward.

The external metatarsal tubercle usually is not present, but five or six specimens (as Nos. 22851, 22835, 22852) show it as a distinct, small, round, white knob at the base of the fourth toe.

The skin usually is smooth everywhere except on the rump and hind legs, but in some specimens the sides bear small warts.

In two specimens (Nos. 22851 and 22852) the tibio-tarsal joints do not overlap. In six (Nos. 22841, 22853, 22847, 22838, 22842, 22835) they overlap one-half the width of the tarsus. In the other seventeen specimens they overlap the full width of the tarsus.

Nineteen specimens have a distinct mid-dorsal line. One (No. 22832) shows a mere indication of this line. Five are entirely without this light line.

Many of the specimens have the ends of the toes so much dilated that they might be said to bear pads.

The largest individuals have a length from snout to vent of 44 mm.

Rana ijimae Stejneger

This frog was described by Stejneger in 1901 from a single specimen preserved in the Science College, Tokyo, said to have been collected at Tanabinura, Okinawa shima. Careful collecting on Okinawa failed to bring to light any additional specimens, but on Ishigaki some ten specimens were secured which agree very well with Stejneger's type. For purposes of comparison I give the following description of the Ishigaki specimens:

Description.—Vomerine teeth in two oblique series, extending posteriorly from a line connecting the choanae, about equidistant from the latter and from each other; tongue without free conical papillae; snout somewhat projecting, nostrils much nearer to tip of snout than to eyes, and nearly over tip of lower jaw; interorbital space slightly narrower than upper eyelid; canthus rostralis well-marked; lores concave; tympanum one-half diameter of the eye; fingers free, first extending slightly beyond second, disks distinct, small, largest on third and fourth fingers, less than half diameter of tympanum; toes almost fully, or extensively, webbed; one or one and one-half terminal digits of fourth toe free, excision sometimes reaching to terminal third of basal phalanx of fourth toe; disks well-developed, a little less than half diameter of tympanum, about equal to or a little larger than those of fingers; subarticular tubercles very prominent; inner metatarsal tubercle oval, fairly well-developed, contained about two and one-half times in the distance from its distal border to the end of first toe; *no outer* metatarsal tubercle, except a mere thickening of skin in one specimen; no outer dermal fringe on fifth toe; no tarsal fold; tibio-tarsal articulation reaches *between eye and nostril* when the hind leg is carried forward, and overlaps about as much as the distance between eye and nostril; tibia equals or exceeds one-half length of head and body; skin of back usually smooth, occasionally with a few scattered tubercles; sides with numerous large tubercles interspersed with small ones; lores smooth or with asperities which sometimes are white tipped; similar asperities numerous on temporal regions and forming a ring about tympanum "like a string of pearls"; from two to four large glandular warts behind corner of mouth; dorso-lateral fold distinct, narrow or moderately broad, often not entirely continuous; under surfaces smooth except sometimes posteriorly and on thighs, where in many specimens they are granular.

The color in alcohol varies from dark slaty brown through chocolate brown, olive brown, and grayish cinnamon to a greenish or brownish gray.

The back usually is unicolor, but may have indefinite dark or light markings. The dorso-lateral fold may be light more or less edged with black (sometimes a complete line, sometimes only a few black dots), or the light streak may be absent. The edge of the lip is dark, but above this is a light streak, much more definite in some specimens than in others, which is continued on to the postoral tubercles. A dark line usually extends from the snout through the nostril, along the canthus rostralis and edge of upper eyelid to join the black edge of the dorso-lateral fold. The sides and limbs are lighter than the back. The former are spotted or blotched, and the latter are cross-barred with black or dark brown. There is a whitish pineal spot.

Number	22825	22827	22822	22820
Snout to vent	48	69	88	99
Width of head	17	22.5	30	34
Distance between nostrils	5.5	7	8.5	10
Distance bet. nostrils and eyes	5	6	7	8.5
Diameter of eye	6	8	10	12
Diameter of tympanum	3.5	4.5	4.8	6
Interorbital space	4	5.2	6.5	9
Fore leg	31	44	51	59
Width of largest finger disk....	1.3	1.8	2	2
Hind leg, vent to tip of longest toe	89	116	141	157
Tibia	29	36	45	52
Metatarsal tubercle	2	3	4	5

In one of the smaller specimens the tibio-tarsal joint reaches quite to the end of the snout.

***Rana namiyei* Stejneger**

An excellent series of twenty-two specimens of this frog is now at hand from Nago, Okinawa.

These specimens agree in almost every particular with the description given by Dr. Stejneger. A few points of variation may be noted. The tooth-like prominences in the lower jaw are farther apart than indicated in the figure, and between them on the median line is a smaller prominence. The head may be as wide as Stejneger states but, especially in the younger specimens, may be considerably (diameter of orbit) narrower. The nostrils may be a little anterior to the point midway between the eye and the end of snout. The interorbital space may be one and one-half or only one and one-fourth times as wide as the upper eyelid. The length of the metatarsal tubercle usually is considerably shorter than the diameter of the eye. The tibio-tarsal joint may not reach the eye; it usually reaches the posterior border of the eye, but may extend to the anterior border. The heels usually are as described by Stejneger, but they may nearly meet. The skin

above may be nearly smooth, or may have numerous warts and transverse or longitudinal folds. There are small warts on the upper eyelids, especially posteriorly.

The color above, in alcohol, is brown, gray, or olive, with very indefinite darker cloudings on the back and limbs. When most clearly marked there seem to be three dark blotches on the back behind the head, and three cross-bars on the limbs. The upper surfaces of the limbs, the temporal regions, and the upper eyelids are sometimes more or less stained with orange or brick-red. Individual warts may be reddish or blackish. On the hind limbs there often are whitish asperities.

In these Loo Choo specimens the toes vary a little in length; but nevertheless it may be said that they constantly bear the relations described by Stejneger. The same proportions are seen in a good series of frogs from Formosa which I recorded under this name.¹ None of these Formosan frogs is quite as large as some of the specimens from Okinawa. Otherwise, upon direct comparison, the two series seem to be absolutely alike except in the following particulars: 1. The free dermal margin along the outer edge of the fifth toe is considerably more extensive in the Okinawa specimens. 2. In these specimens, also, the web is constantly more extensive than in those from Formosa. 3. In all the specimens from the Loo Choos the dark band which passes through the posterior half of the upper eyelids is broad, and is indefinite behind, while in the Formosan frogs this band is narrower, is sharply limited posteriorly, and has a smaller dark cross-band, blotch, or series of spots immediately behind it.

Since these differences are constant in a considerable series of specimens, it is evident that the frogs of Formosa and of Okinawa must be regarded as distinct, though very closely related, species. The name *Rana namiyei* must be restricted to the Loo Choo frogs, for it was from Okinawa shima that Stejneger's type came. What, then, are the frogs from Formosa? Are they *Rana kuhlii* or a new species? These questions I shall leave for future consideration.

Rana namiyei has been secured only on Okinawa shima. Here it was found in crevices and under the stones of brooks,

¹Proc. Calif. Acad. Sci., (4), III, 1909, p. 55.

in deep and shaded valleys about three miles northeast of Nago. Its croak is a single very loud deep-toned bark. The stomachs of three specimens each contained a fresh-water crab. *Babina holsti* lives in the same situations, and when these two kinds of frogs were caught they were put into the same collecting bag. The result of this was that several specimens (as Nos. 22807, 22617, 22808) of *Rana namiyei* were badly wounded by the dagger-frogs. One was cut so deeply that much of the ovaries and small intestine protruded.

In life, the color above is olive bronze mottled with black, and beneath it is white mottled with brown. The front of arms, groin, inner surface of calves and the dorsum of the foot are golden brown. The pupil is garnet, rhomboidal, with long axis parallel to the mouth. The iris is golden-edged. From each angle of the pupil a dark band extends to the outer rim of the eye; the posterior is horizontal and broader, the anterior directed downward at forty-five degrees, the superior faintest. The upper half of the iris is tinged with bronze, the lower half is gray, and both show dark reticulations.

On May 8th, 1910, some eggs (No. 22675) were found in a little puddle by a brook, and from a crevice leading from this puddle one of the females was taken.

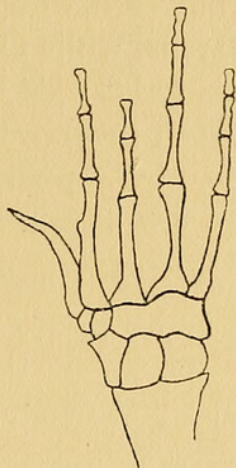
Babina Van Denburgh

Diagnosis.— Like *Rana*, but with a large, sheathed, bony spur on inner side of hand in the position of the metacarpal of pollex.

Type.—*Rana holsti* Boulenger.

Two large frogs from the Loo Choo Islands have been described as *Rana holsti* Boulenger and *Rana subaspera* Barbour. In the descriptions of both attention was called to the large development of the first metacarpal or rudimentary pollex. The abundant material in the present collection, and the field notes which accompany the specimens, indicate that this structure is so remarkable as to justify the placing of these frogs in a separate genus. What at first sight appears to be an innocent rudiment of a thumb is in reality a most formidable weapon.

Mounted upon the inner side of the carpus is a long, curved, sharply pointed bone, which seemingly is the first metacarpal. It is about equal in length to the other metacarpals. This bony spur is completely covered by the soft tissues about it. When, however, pressure is made upon the end of the "thumb," this sheath of soft tissue slips back and leaves the bony weapon



Bones of Right Hand of *Babina subaspera*

exposed and ready for use. When one of these frogs is caught, it strives to grasp a finger between its two hands, and when it succeeds—as the first one did—the spurs are driven into the finger down to the bone. Several specimens of *Rana namiyei* were badly slashed by some *B. holsti* that were put into the same bag. One received a clean-cut wound forty-five millimeters long in addition to several minor injuries. One can have only feelings of pity for any snake which might succeed in swallowing one of these dagger-frogs.

Both of these frogs have an unusual aggregation of glands above the insertion of the arm. It is probable that the secretion of these glands might often run down into wounds made by the spurs.

Babina holsti was found only on Okinawa, while *Babina subaspera* seems to be peculiar to Amami Ō shima.

***Babina holsti* (Boulenger)**

Although described in 1892, *Babina holsti* has been known only from the unique type specimen, which was collected by Holst in Okinawa. We have now secured an excellent series of this remarkable frog from Nago, Okinawa.

The specimens agree very well with the original description of this frog, the principal point of discrepancy being that the interorbital space is constantly wider than the upper eyelid. As in *B. subaspera*, there normally is a large gland above the axilla. *B. holsti* is a very much smoother frog than *B. subaspera* and in it the dermal fold on the external edge of the metatarsus rarely extends more than one-third of the distance between the toes and the tarsus, while in *B. subaspera* it usually exceeds half this distance. Otherwise I am unable to find any structural differences between them. The general smoothness of one and wartiness of the other, however, render them readily distinguishable, except in a few instances.

The coloration of *B. holsti* is usually browner and darker than that of *B. subaspera*, and the dark markings—particularly the blackish band from the snout through the eye to the shoulder—are more distinct and definite.

In both frogs the fold from the eye to the shoulder may be very distinct, indistinct, or absent. The dorso-lateral fold may be broken up into a mere series of small glands hardly worthy of the term. The outer metatarsal tubercle usually is not developed, but in both forms it is sometimes present as a small rounded pad at the base of the fourth toe. The tibio-tarsal joints may meet or not, but do not overlap; when turned forward they extend to the eye or between the eye and nostril. The tibia may be one-half the length of the head and body, but often is less. The web is not full, two terminal phalanges on the outer and one on the inner side of the fourth toe usually being free, except for the dermal margins. The vomerine teeth are between and extending behind the choanae. The diameter of the tympanum may be three times its distance from the orbit. There may or may not be a whitish pineal spot.

The white, pearl-like asperities vary very much in number in both frogs. Some specimens have very few anywhere. The chest may be entirely smooth. Others have them very numerous, so that they are crowded on the warts and over the chest and inner surface of the arms and first fingers. Sometimes they are scattered over the chin and upper surface of the head.

The coloration of a living specimen of *B. holsti* is described thus: The iris is golden above the level of the upper angle of the canthus, mahogany with black reticulations and golden sheen showing through below, rim golden. The pupil is black. Back uniform olive; sides olive brown with a few dark spots. A brown streak from tip of snout, through nostril and eye to temporal region. Lips dark brown with a golden stripe from nostril, below eye, under tympanum to above arm. The dorso-lateral fold is olive like the back, but along its outer edge are a few black blotches. The limbs are brownish olive above, the arms spotted with blackish brown, and the hind limbs with three broad, light-edged bars. The throat is dark brown. The chest is lighter, with gray granules showing through. The belly is dirty white.

This frog was found only near Nago, Okinawa. The land east of Nago is very hilly with deep, shaded valleys in which are clear cool brooks, deeply shaded. In crevices of the rocks near the brooks, and in recesses near waterfalls, this frog and *Rana namiyei* were prevalent. Fifteen specimens were secured.

Babina subaspera (Barbour)

Rana subaspera was first described by Barbour, in 1908, from a single specimen "taken in the Riu Kiu Islands, May, 1904 by a Japanese collector of Mr. Alan Owston." Its exact place of origin has remained unknown. The collection now at hand contains some thirteen specimens of a large frog from Amami Ō shima which I believe is identical with Barbour's species. There are certain points of difference between my specimens and the original description of *R. subaspera*, but Mr. Barbour, at my request, has been so kind as to re-examine his type specimen—which seems not to be in perfect condition—and writes me that the apparent differences are not real. Thus his specimen agrees with mine in the width of the interorbital space, the webbing of the toes, the length of the tibia, etc.

As already stated under the heading *B. holsti*, this frog seems to be structurally like the preceding species in every respect except in the greater number of warts and the extent of the metatarsal fold. Nevertheless, the series of each at hand prove that we have to do with distinct species. *B. subaspera*

usually is lighter in coloration than *B. holsti*; and the dark markings, especially on the head and limbs, are less well-defined. In both species the dorso-lateral folds may be more or less broken up. *B. subaspera* may be very little (but is always) more warty than some specimens of *B. holsti*, or it may be so warty as to look almost like a toad. The tympanum sometimes is nearly hidden.

The bony spurs do not become firm enough for use until the frog is of considerable size. It was an adult of this species which astonished the collector by clasping his finger between its hands and driving the sharp spurs, one on each side, clear down to the bone. When the spurs are not in use they are completely covered by the skin.

Two had eaten fresh-water crabs, and one a land snail.

This frog was found only on Amami Ō shima. About five hundred meters west of the middle of the harbor, and at an altitude of about one hundred and fifty meters, there are a couple of paddy-fields. The water supply flows from springs that are very cold and come from many deep crevices. In these, *B. subaspera* holds forth at night with a prolonged, very loud, three-toned croak. Tadpoles were found in the paddy-fields along with *Diemictylus*.

***Polypedates schlegelii* Günther**

This tree-frog was first described, in 1858, from Japanese specimens. Two years later Hallowell described his *Polypedates viridis* from a specimen taken on Loo Choo Island, (Okinawa). In 1907, Stejneger described specimens from Ishigaki shima under the name of *Polypedates owstoni*, and in 1908 Boulenger named the Formosan form *Rhacophorus mol-trechti*. All these tree-frogs, which may be spoken of as the *Polypedates schlegelii* group, are very closely related.

The following remarks are based upon two specimens from Japan proper, fifteen from Amami Ō shima, forty-six from Okinawa, one-hundred and thirteen from Ishigaki, and nine from Formosa.

It may be said at once, that there appear to be no constant structural differences between any of these members of the *P. schlegelii* group. The two Japanese specimens have no outer

metatarsal tubercle. This tubercle is slightly developed in one specimen (No. 23753) from Okinawa. There appears to be no difference in the width of the dermal margin of the fingers. In all the members of the group the distance from the tip of the coccyx to the end of the sacral diapophysis is usually less than the width of the head, and greater than the distance from the tip of snout to center of tympanum; but it may be equal to that, or greater, in all except perhaps the Japanese, of which the series at hand is too small to show this variation. In specimens from all these localities the heel may reach the posterior border, the middle, or the anterior border of the eye. There seem to be no differences in the vomerine teeth, or the size of the tympanum, digital disks, or web. On the other hand, in both Japanese specimens, when the head is viewed from the side, the nostril appears to be very nearly midway between the eye and the end of the snout, while in a very large majority of the Loo Choo and Formosan examples the nostril is distinctly anterior to this point. When the legs are folded and held at right angles to the axis of the body, the heels do not meet in the specimens from Japan proper, whereas they do meet in 73.4% of the frogs from Amami Ō shima, 97.8% of those from Okinawa, 99.1% of those from Ishigaki shima, and 88.8% of those from Formosa.

As one passes from the north southward, the dark markings on the legs and sides of the body tend to lose the character of reticulations or cloudings (Japan and Amami Ō shima) and to become discrete dots (Okinawa), spots (Ishigaki), or blotches (Formosa). These dark markings usually are lacking in the young, and their character is not constant in the adult Loo Choo specimens, although it probably is in the adults from Formosa.

In view of these facts it seems best to retain in use the four names that have been proposed for these tree-frogs, but to regard *P. viridis* and *P. owstoni* as subspecies of *Polypedates schlegelii*.

The principal characters of *Polypedates schlegelii* may be expressed in the following:

Diagnosis.—Fingers nearly half webbed; heel without dermal appendage; vomerine teeth in two straight, but oblique,

series between, and starting close to, the choanae; tibio-tarsal articulation reaching eye; color above uniform green in life, with dark markings on the legs and sides of body, usually taking the form of reticulations or cloudings; tibio-tarsal joints not meeting when the folded legs are held at right angles to body axis; nostril usually midway between tip of snout and eye. Japan proper.

***Polypedates schlegelii viridis* (Hallowell)**

Diagnosis.—Like *P. schlegelii* but with tibio-tarsal joints usually meeting when the folded legs are held at right angles to the body axis; nostril usually nearer to tip of snout than to eye; dark markings on thighs and sides of body either reticulations, cloudings, or very numerous small spots.

Amami Ō shima and Okinawa.

The tree-frogs of Amami Ō shima and of Okinawa seem not separable, although those from Okinawa show a greater average difference from true *P. schlegelii* than do those of Amami Ō shima. This subspecies has been partly discussed in considering the Japanese form.

No. 23845, an adult, has no vomerine teeth.

The specimens were collected at Naze, Amami Ō shima and at Nago and Naha, Okinawa, in April and May, 1910.

***Polypedates schlegelii owstoni* (Stejneger)**

Diagnosis.—Similar to *P. schlegelii viridis* but with spots on thighs and sides of body discrete, larger, and less numerous. Ishigaki shima.

This form has been commented upon above under head of *P. schlegelii*. It is probable that the width of the head is greater than the distance from tip of a sacral diapophysis more constantly in this subspecies than in *P. schlegelii viridis* of the more northern islands; but since this relation is found in a majority of the northern specimens, it is of but little value in classification. The dark spots are absent in young specimens, and are subject to considerable variation in adult ones. Nevertheless the difference in the spotting of these two subspecies usually is quite characteristic.

In life, the lower surfaces may be either white, cream, or yellow. The groin may be gray, straw or tinged with salmon.

The thigh may be gray, yellowish green, yellow, or salmon. The color above may be yellow green. The young are sometimes grayish green.

The specimens are all from Ishigaki; no tree-frogs of this group have been taken on Miyako or Iriomote shima.

Polypedates moltrechti (Boulenger)

Diagnosis.—Similar to *P. schlegelii owstoni*, but with dark markings on thighs and sides of body much larger and still less numerous. Formosa.

This tree-frog is perhaps smaller when adult than its more northern relatives. The young are without dark markings. The seven adult specimens at hand agree in the characteristic blotching of the thighs and sides of body. Occasionally, these dark blotches are so large as to be confluent. As has been said in writing of *P. schlegelii*, there seem to be no structural differences between this and the other members of the group, but the constancy of the color-difference makes it desirable to regard the Formosan form as a distant species.

In life, the color above is light green; the tip of snout olive. The lower surfaces are cream. The inguinal region, anterior and posterior surfaces of thighs and legs, the top of foot and the web are pale salmon.

This tree-frog was originally secured at Lake Candidje, Nanto district, central Formosa. Its presence at Kosempo, Formosa, has since been recorded by its describer. Our specimens were collected at Kosempo and Kanshirei, Formosa.

Polypedates eiffingeri (Boettger)

This species was first described from a specimen from the Loo Choo Islands. Although the exact place of origin of the type was unknown, Dr. Boettger thought that it came either from Okinawa or Amami Ō shima; probably the former. We have received no specimens from either of these islands, but have three collected on Ishigaki between May 25 and June 2, 1910.

Dr. Boulenger has recorded the presence of this tree-frog at Kanshirei, Formosa, whence we have received a very large series. We have it also from Koshun, Formosa.

December 13, 1912.

The specimens at hand agree very well with the original description, and upon direct comparison there appears to be no difference between the Loo Choo and the Formosan examples. There is considerable individual variation in the large series from Kanshirei.

The skin of many specimens is perfectly smooth almost everywhere on the upper surfaces of the head, body, and limbs. In others it is dotted everywhere with little white warts or asperities. Some have these asperities only on the limbs and head, others only on the supraocular regions and sides of head. Every degree of intergradation is found between the smoothest and roughest specimens. The white dots on the feet and arms usually are raised on little warts, but may be level with the rest of the skin.

The vomerine teeth normally are in two rounded patches near the choanae; but in several specimens they are in transverse series very much as in *P. buergeri*, but never longer than the interval. A few specimens seem to have no vomerine teeth. In other specimens the teeth are intermediate between these three conditions. One has a single large clump near the median line and no lateral patches.

In alcoholic specimens, the color above may be uniform light bluish gray, yellowish or brownish gray, dark brown, or slate, with only a few small dark spots on the sides of the body; or there may be definite dark markings on the back, head, and limbs. There may be an X-shaped blotch between the shoulders, or only spots there and posteriorly, or nearly the whole back may be covered by one large dark blotch. Often there is a dark band across the head, passing over the upper eyelids. The limbs may be cross-barred. There is often, especially in large females, a bright purplish pink suffusion about the dark blotches in the upper surfaces, recalling the coloration of *Microhyla fissipes*. The lower surfaces may be white or yellow, immaculate or clouded, or sparsely or densely spotted, marbled, or reticulated with dark brown. The rows of white dots along the foot and arm are almost always evident and are very characteristic.

One of the Ishigaki specimens, No. 23740, was colored in life as follows:—Iris bronze. Above light gray, a light green-

ish shading forming a V-shaped mark from top of eyelids backwards. A similar greenish tinge extends backward from the sacral region becoming brighter in the groin, where it shades off into dull yellow. Tympanum brownish with a darker line above. Hind limbs with three faint cross-bars. Throat white, abdomen cream. Between the colors of back and abdomen there are a few brown spots, increasing posteriorly to form considerable blotches, which are hidden when the limbs are folded in the sitting position. This is the bright coloration when on a whitish surface. When on a leaf, the green spreads to the sides and shoulders.

No. 23741, also from Ishigaki, in life was brown above with darker brown markings; yellowish below; groins straw.

No. 20087, from Kanshirei, Formosa, while living had the abdomen and sides white, thighs greenish straw, the light color of back and limbs light golden brown.

***Polypedates japonicus* (Hallowell)**

Originally described from Amami Ō shima and since reported from Okinawa, this species is now at hand from Ishigaki and Iriomote, of the Loo Choo group. Boulenger has recorded its presence in Formosa and we have received a series from there. Our material comprises one hundred and seventy-eight specimens from Amami Ō shima, thirty-six from Nago, Okinawa, sixty-eight from Ishigaki, seven from Iriomote, and seven from Formosa. Curiously enough this tree-frog was not found in Miyako shima.

Careful comparison of this enormous material has failed to develop any differences between the specimens from the various islands of the Loo Choo group. They seem to be quite alike in structure, proportions and coloration. The Formosan specimens lack the definite dark patch or streak on or above the tympanum, having at most a mere trace of it, although it is present in all the Loo Choo specimens. In other respects these Formosan examples are indistinguishable from the Loo Choo frogs, and this difference seems too slight to justify their recognition as a distinct subspecies.

***Polypedates robustus* (Boulenger)**

We have received one specimen of this tree-frog (No. 25043) from Koshun, Formosa. It is so like *P. buergeri* of Japan that the greater extent of the web between the fingers seems to be the only constant difference.

Boulenger's specimens were from Kankau, Alikang, and Kosempo, Formosa.

***Polypedates leucomystax* (Gravenhorst)**

Only one Formosan specimen of this tree-frog has been recorded, and this one bears no statement of more definite locality. We have received four specimens from Kanshirei and one from Koshun, Formosa. Both striped and unstriped styles of coloration are shown. In these Formosan examples the vomerine teeth are nearer the choanae, and the dark reticulation on the backs of the thighs is much coarser than in Philippine specimens. The general proportions are quite the same. Nevertheless, when larger series are at hand, it may become necessary to regard the Formosan frogs as a distinct subspecies differing from the Philippine in having vomerine teeth nearer the choanae, toes a little less extensively webbed, metatarsal tubercle somewhat larger, and thigh markings coarser.

***Gekko japonicus* (Duméril & Bibron)**

This species differs from *G. swinhonis* in the possession of a distinct interdigital web, more numerous dorsal tubercles and fewer enlarged tubercles near the ear.

We have one specimen labeled Eastern Asia, three from Shanghai, eleven from Formosa, two from Ishigaki, thirteen from Naha, Okinawa, twenty-eight from Naze, Amami Ōshima, and a few from Japan proper. The Formosan specimens are from Koshun, Kanshirei and Taihoku.

In this considerable series there appears but little variation. The Loo Choo specimens often have smaller chin-shields than the Formosan, and the latter tend to have fewer plates under the fourth toe than the Shanghai specimens. These differences, however, are neither constant nor great enough to warrant the recognition of separate subspecies.

Gekko swinhonis (Günther)

We have five specimens collected by Dr. Thompson at Chefoo, China, August 19 to 29, 1906. These are entirely without webs between the digits, and their enlarged dorsal tubercles are very few, and the tubercles near the ear many, as compared with specimens of *Gekko japonicus* from Shanghai, Formosa, and the Loo Choo Islands. There appears to be no constant difference in the chin-shields.

Hemidactylus frenatus Duméril & Bibron

The collection contains twenty-three specimens of this gecko from Formosa, where they were collected at Tainan, Kohekiryō, Kanshirei, Takao, Anping, Polisia, Koshun, and Ako. From the Loo Choo Islands we have received six from Okinawa, three from Miyako and seventy-four from Ishigaki. It therefore appears that this species is much more common than *H. bowringii*. We have also twelve specimens from the Pescadores, where they were found under stones on barren hill-sides.

Careful comparison has failed to bring to light any differences in the specimens from these various localities.

Hemidactylus bowringii (Gray)

We have received one male (21854) from Miyako, one male (21856) and one female (21855) from Ishigaki, and four males from the following localities in Formosa: 18066 Kanshirei, 18078 Taipeh, 18079 Taihoku, and 18080 Nanto.

There seem to be no important differences between these specimens. They may be readily distinguished from *H. frenatus* by the nearly uniform dorsal granulation, longer terminal portion of the inner digit, and the median interruption of the series of pores in the males.

Hemidactylus marmoratus Hallowell

We have received no specimen which agrees with Hallowell's description of *H. marmoratus* although we have one hundred and fifty specimens of various species of *Gekkonidae*

from the Loo Choo Islands. Stejneger's suggestion that Dr. Hallowell may have had a poorly preserved specimen of *Gekko japonicus* probably is correct.

***Cosymobotus platyurus* (Schneider)**

The present collections contain no specimens of this gecko, which has been credited to Formosa on the evidence of a single specimen in the Bergen Museum, said to have been collected by Captain von der Ohe in the early sixties.

***Ptychozoon horsfieldii* (Gray)**

Regarding this lizard Dr. Stejneger writes (Bull. U. S. Nat. Mus. No. 58, p. 172),

"This remarkable species is an inhabitant of the Malayan Peninsula, the Natuna Islands, and Borneo.

"A single specimen presented by Mr. Pryer to the British Museum as having been obtained by his Japanese collector in the Riu Kiu [Loo Choo] Islands, is the only one thus far recorded east and north of the region indicated above. As no other collectors have found it in the Riu Kius or the intervening regions, I may perhaps be justified in expressing a doubt as to the correctness of the locality. It may be remembered that Pryer himself did some collecting in Borneo in 1880, and it is possible that the specimen in question may have become mixed up with the Riu Kiu collection."

The large collections now at hand from the Loo Choo Islands and Formosa contain no specimens of this lizard. There can be little doubt that it does not occur in these islands.

***Japalura swinhonis* Günther**

We have received *Japaluras* from Kagi, Kosempo, Nanto, Tainan, Jenshiko and Kanshirei, Formosa. These all seem to represent but one species. This species has keeled infralabials, while the *Japaluras* of the Loo Choo Islands have smooth infralabials. This character holds in more than 98% of the large series at hand, so we are justified in regarding the Formosan and Loo Choo lizards as distinct species.

In a few specimens the throat is nearly unicolor; in a considerable number it is light with converging dark lines; but in most it is dark with light spots or streaks.

Japalura swinhonis mitsukurii (Stejneger)

I am unable to find any constant point of difference between specimens of *Japalura* from Botel Tobago, and from Formosa. The differences in proportions which have been suggested as distinguishing characters do not hold good. In the Botel Tobago lizards the width at the superciliaries is constantly less than the length of the third toe, but the same proportions are to be found in a number of Formosan specimens. Still a majority from the latter locality have the superciliary width greater than the length of the third toe without claw. The number of specimens from Botel Tobago is too small, to enable us to reach any very satisfactory conclusion, and for the present it seems best to regard the Botel Tobago specimens as a doubtful subspecies.

Japalura polygonata (Hallowell)

We have examined one hundred and nineteen specimens from Naze, Amami Ō shima, fifteen from Nago and Naha, Okinawa, eight from Miyako, eight from Ishigaki, and sixteen from Funaoke, Iriomote. One hundred and forty-eight of these have no keeling of the infralabials, while a weak keel may be made out in one specimen from Ishigaki and two from Iriomote. Thus in 98% of the Loo Choo specimens the infralabials are smooth, while in 98.6% of the Formosan examples they are keeled. These Loo Choo lizards have a definite, though not continuous, row of enlarged scales on the back, separated from the crest row by about two or three rows of smaller scales. In the Formosan species no definite row of this description is to be found, the scales near the dorsal row being more nearly equal in size. The throat in Loo Choo specimens usually is light unicolor or, less frequently, with narrow, dark, converging lines. The Formosan and Botel Tobago specimens have dark throats with whitish markings showing either as spots or as transverse bands.

Specimens from the southern islands—Ishigaki and Iriomote—nearly always have a distinct whitish band under the eye. Those from Miyako and the more northern islands usually lack this light band. Thus this band is present in eight from Ishigaki and in sixteen from Iriomote; is absent from eight from Miyako, thirteen out of fifteen from Okinawa, and ninety-two out of one hundred and nineteen from Amami Ōshima.

Specimens from Iriomote, Ishigaki, and Miyako usually show a distinct light streak along each side of the body, as do most of the Formosan and Botel Tobago *Japaluras*. This streak usually is absent in specimens from Okinawa and Amami. This is shown in the following table:

LIGHT STREAK	Distinct	Slight	Absent
Botel Tobago	2		2
Formosa	77	10	17
Iriomote	11		5
Ishigaki	4	1	3
Miyako	6		2
Okinawa		2	13
Amami		47	72

These data may be arranged in the form of a key, as follows:

- a.—Infralabials keeled; throat usually dark with whitish markings.
 - b.—Width at superciliaries usually greater than length of third toe without claw. Formosa.
***Japalura polygonata*.**
 - b².—Width at superciliaries not greater than length of third toe without claw. Botel Tobago.
***Japalura polygonata mitsukuri*.**
- a².—Infralabials smooth; throat light, unicolor or with narrow dark lines.
 - bb.—A very distinct whitish band under eye; usually a lateral light band. Ishigaki and Iriomote.
***Japalura polygonata ishigakiensis*.**
 - bb².—No distinct whitish band under eye.
 - c.—Usually a distinct lateral light streak. Miyako.
***Japalura polygonata miyakensis*.**
 - c².—Lateral light streak absent or but slightly developed. Okinawa and Amami.
***Japalura polygonata polygonata*.**

The three forms from the Loo Choo Islands seem worthy of rank as subspecies. Since *Japalura polygonata* was originally established from specimens from one of the northern islands, we may regard the lizards of Okinawa and Amami as the typical form, and may name the other two as follows:

Japalura polygonata miyakensis Van Denburgh

Diagnosis.—Infralabials smooth; throat light, unicolor or with narrow dark lines; no distinct whitish band under eye; a distinct lateral light streak usually present.

Type.—California Academy of Sciences No. 21,353, Miyako, Loo Choo Islands, Japan.

Distribution.—Miyako shima, Loo Choo Islands, Japan.

Japalura polygonata ishigakiensis Van Denburgh

Diagnosis.—Infralabials smooth; throat light, unicolor or with narrow dark lines; a very distinct whitish band under eye; a lateral light streak usually present.

Type.—California Academy of Sciences No. 21,354, Ishigaki, Loo Choo Islands, Japan.

Distribution.—Iriomote and Ishigaki, Loo Choo Islands, Japan.

Eumeces

There are in China two very distinct species of the genus *Eumeces*. The one characterized by the possession of but one unpaired postmental is *E. elegans*. The other, which normally has two azygous postmentals, is *E. chinensis*. The former is represented in Japan, the Loo Choo Islands, the Pescadores and Formosa by a number of species and subspecies which may be spoken of as the *Eumeces elegans* group. The latter, *E. chinensis*, seems to have no representatives in Japan and the northern and central islands of the Loo Choo archipelago, but has close relatives in the southern islands and in Formosa. The Formosan specimens have been regarded as identical with the mainland examples of *E. chinensis*. The specimens from Miyako, Ishigaki and Iriomote have been described as *E. kishinouyei*.

The members of the *E. chinensis* group seem everywhere to be less numerous than those of the *E. elegans* group. We have received only one specimen from China, four from Formosa, and seven from the southern islands. This material is too limited to give really satisfactory results, but it seems to indicate that both the Loo Choo and the Formosan lizards should be regarded as distinct subspecies. The chief differences are indicated in the Key given below.

The *E. elegans* group is to be regarded as made up of three subgroups, as follows:—

1. The *Eumeces elegans* subgroup, characterized by the presence of a patch of much enlarged scales on the back of the thigh and the absence of a postnasal plate, and including only *E. elegans*.

2. The *Eumeces latiscutatus* subgroup, characterized by the absence of a patch of enlarged scales on the back of the thigh and the presence of a postnasal plate, and comprising *E. latiscutatus*, *E. latiscutatus okadae*, and *E. barbouri*.

3. The *Eumeces marginatus* subgroup, characterized by the absence of a patch of much enlarged scales on the back of the thigh and the absence of a postnasal plate, and made up of *Eumeces marginatus*, *E. marginatus kikaigensis*, *E. marginatus amamiensis*, and *E. ishigakiensis*.

The chief differences between these various forms are indicated in the following

KEY TO THE SPECIES AND SUBSPECIES.

a.—Only one azygous postmental; a strongly keeled scale behind corner of anus.

b.—A patch of much enlarged scales on back of thigh. No postnasal. (China, Formosa, Pescadores).

Eumeces elegans.

b².—No patch of much enlarged scales on back of thigh (sometimes slightly enlarged in *E. marginatus* subgroup).

c.—No postnasal. (Loo Choo Islands).

d.—Young with two lateral lines separated by about the width of two scales; lower lateral line separated from forelimb by not more than distance between lateral lines.

e.—Scales of two middle dorsal rows broader than those of next rows; upper lateral line confined to scales of third row from middorsal line; superciliaries not more than eight. (Okinawa).

E. marginatus.

e².—Scales of two middle dorsal rows normally not broader than those of next rows; upper lateral line on scales of third and fourth rows from middorsal line; superciliaries not less than eight.

f.—Normally with twenty-six rows of scales around middle of body. (Amami Ōshima).

E. marginatus amamiensis.

f².—Usually with twenty-eight rows of scales around middle of body. (Kikaiga shima).

E. marginatus kikaigensis.

d².—Young with three lateral lines; upper two separated by about the width of one scale; second lateral line, from above, separated from fore limb by more than distance between upper and second lateral lines. (Ishigaki shima).

E. ishigakiensis.

c².—A postnasal present. (Japan proper and Amami Ō shima).

dd.—Scales around middle of body not less than twenty-four. (Japan proper).

ee.—Scales around body normally twenty-six or twenty-four (rarely 28). (Japan).

E. latiscutatus.

ee².—Scales around body normally twenty-eight or thirty. (Idzu Seven Islands).

E. latiscutatus okadae.

dd².—Scales around middle of body twenty-two (Amami Ō shima).

E. barbouri.

a².—Azygous postmentals normally two; no keeled scale behind corner of vent.

bb.—No postnasal; two pairs of nuchals; median dorsal line in young broader. Fifty-four dorsals from parietals to backs of thighs, fourteen scutes under fourth toe. (China).

E. chinensis.

bb².—Postnasal often present; often three nuchals; median dorsal line in young narrower.

ccc.—Forty-eight to fifty-two dorsals from parietals to backs of thighs; fourteen to sixteen scutes under fourth toe; interparietal about twice as long as broad; dorsal and lateral scales spotted or edged with black or dark brown except in position of dorso-lateral light lines of young.

E. chinensis formosensis.

ccc².—Forty-five to forty-nine dorsals from parietals to backs of thighs; sixteen or seventeen scutes under fourth toe; interparietal much less than twice as long as broad; nearly unicolor or with dark-edged light lines, often dark lateral band.

E. kishinouyei.

Eumeces latiscutatus (Hallowell)

Diagnosis.—One azygous postmental; no patch of enlarged scales on back of thigh; postnasal normally present (rarely absent); posterior loreal short, normally touching two labials; fifteen to eighteen scales under fourth toe; twenty-six (rarely twenty-four or twenty-eight) scales around middle of body; forty-nine to fifty-five on back; young with one median and two lateral light lines; latter narrow, and separated by not less than width of two scales; lower lateral line separated from fore limb by less than distance between lateral lines, and running below the level of top of hind limb and top of ear.

This species is confined to the large islands which constitute Japan proper. We have at hand only eight specimens. Three are from Kobe, Setsu Province, Hondo, the others were secured near Kagoshima, Satsuma Province, Kiusiu.

Six have scales in twenty-six rows, one has twenty-four, and one twenty-seven; the scales between the parietals and a line joining the backs of the thighs vary from forty-nine to fifty-five, and the plates under the fourth toe vary from fifteen to eighteen. The frontal touches the frontonasal in only one specimen, but is in contact with three supraoculars in all. All have one postnasal on each side, and one azygous postmental. There usually is but one pair of nuchals, but two specimens have two additional small plates on one side. The posterior loreals are short and in contact with only two labials, except in two specimens in which they are longer and touch 2-3 and 3-3 labials. There is no patch of enlarged scales on the back of the thigh in any of these Japanese lizards.

Eumeces latiscutatus okadae Stejneger

Diagnosis.—One azygous postmental; no patch of enlarged scales on back of thigh; postnasal present; posterior loreal short, normally touching two labials; about eighteen scutes under fourth toe; one or two pairs of nuchals; twenty-eight or thirty scales around middle of body.

We have received in exchange from the U. S. National Museum one of the original specimens (U. S. N. M. No. 36531) described by Dr. Stejneger. This specimen, which was collected by Okada in Nii shima, Idzu, is now number 27,229 of the Academy's collection. It has twenty-eight scales around the body, fifty-four between the parietals and the backs of the thighs, eighteen under the fourth toe, seven supra-labials, and one and three nuchals. The frontal is in contact with three supraoculars and the frontonasal. The posterior loreals are short, and touch only two labials each. There is one postnasal on each side. There is no patch of enlarged scales on the back of the thigh.

Eumeces barbouri Van Denburgh

Diagnosis.—One azygous postmental; no patch of enlarged scales on back of thigh; postnasal present; posterior loreal short, normally touching two labials; fifteen or sixteen plates under fourth toe; twenty-two scales around middle of body; young with one median and two lateral light lines; latter narrow, and separated by not less than width of two scales; lower lateral line separated from fore limb by less than the distance between the lateral lines, and running below the level of top of hind limb and top of ear.

Type.—California Academy of Sciences No. 21545. Amami Ō shima, Loo Choo Islands, Japan; April 20-30, 1910.

Description of the type.—Similar to *E. latiscutatus*. Nasal small, in contact with rostral, supranasal, postnasal, and first labial plates. Anterior loreal forming sutures with postnasal, supranasal, prefrontal, posterior loreal, and second labial plates. Posterior loreal longer than high, in contact with two (right) or three (left) labials. First labial in contact with rostral, nasal, postnasal, and second labial. Frontal just separated from frontonasal, in contact with three supraoculars on each side. Parietals large, separated by interparietal. One left and two right nuchals. Upper temporal largest. Seven supralabials, the seventh largest. One azygous postmental. Scales smooth, except one behind each corner of vent; twenty-two around middle of body; fifty in a row from parietals to line joining backs of thighs; two middorsal rows slightly enlarged. Median subcaudal row broad. No patch of enlarged scales on back of thigh. Fifteen or sixteen scutes under fourth toe. Hind limb reaching between wrist and elbow. Tail forked at point of regrowth.

The color above is nearly uniform light brown, with a few dark brown spots at the bases of the scales posteriorly. A dark brown band extends from the temporal region to the base of the tail, and is edged above and below with lighter brown indications of the lateral light lines. The upper lateral and middorsal lines are evident on the tail. The limbs are brown, the centers of the scales being lighter. The lower surfaces are greenish white, clearer yellowish white on the chin, preanals and midcaudals.

A young specimen is black above with two narrow lateral pale blue lines on each side, and a broader middorsal line which bifurcates on the head as in other species of the group. The tail is very bright blue.

Length to anus.....	66	49 mm.
Length of tail.....		90 "
Snout to ear.....	13	10 "
Snout to fore limb.....	22	28 "
Fore limb....	19	15 "
Hind limb	28	22 "
Base of fifth to end of fourth toe.....	12	10 "

Variation.—The smaller specimen differs from the type in having the frontal in contact with the frontonasal, the second loreal touching only two labials on each side, the superposition

of the first loreal, the presence of two nuchals on each side, and sixteen plates under each fourth toe. The scale counts around the body and along the back are twenty-two and fifty.

Distribution.—This lizard was found only on Amami Ōshima.

Remarks.—This lizard must be rather rare; for of eighty-one specimens of this genus taken on Amami Ōshima only two are of this species, the others being *Eumeces marginatus*. *Eumeces barbouri* is practically a *Eumeces latiscutatus* with the scales around the middle of the body reduced in number to twenty-two.

The presence in the Loo Choo Islands of a close relative of *Eumeces latiscutatus* is one of the most interesting facts brought out by these collections, since it affords, as I believe, the first definite evidence of a former land-connection between these islands and Japan proper.

It is a pleasure to name this lizard in honor of Mr. Thomas Barbour of Harvard University.

***Eumeces marginatus* (Hallowell)**

Diagnosis.—One azygous postmental; no patch of much enlarged scales on back of thigh; no postnasal; posterior loreal long, usually in contact with three supralabials; sixteen to twenty plates under fourth toe; twenty-six (rarely twenty-eight) scales around middle of body; young with one median and two lateral light lines, the latter narrow and separated by not less than width of two scales, lower lateral line separated from forelimb by less than distance between lateral lines, and running at about the level of top of hind limb but below top of ear; scales of first row on each side of middorsal line wider than those of next dorsal rows; superciliaries not more than eight; upper lateral line narrow, confined to scales of third row from middorsal line.

Variation.—We have received only eleven specimens of the *Eumeces* of Okinawa. All have one azygous postmental, no postnasals, upper temporal largest, frontal in contact with frontonasal and with three supraoculars of each side, seven supralabials, and posterior loreals much longer than high. Both posterior loreals touch three labials except in No. 21641,

in which they are in contact with only two. One specimen has but one pair of nuchals, one has one and three; the others all have three pairs, of which the first are much the largest. The scales around the middle of the body are twenty-six except in one specimen, which has twenty-eight. The scales in a row from the parietals to a line joining the backs of the thighs vary in number from fifty to fifty-seven:—fifty in one specimen, fifty-one in one, fifty-three in five, fifty-four in two, fifty-five in one, and fifty-seven in one. The scales under the fourth toe are sixteen in one specimen, seventeen in one, eighteen in three, nineteen in four, and twenty in two. The superciliaries are eight or seven. The greater breadth of the middorsal rows is nearly constant, being clearly shown by all but one specimen.

Distribution.—Typical *Eumeces marginatus* seems to be confined to Okinawa shima, where it has been taken at Naha and Nago.

Remarks.—This lizard of Okinawa is closely related to the subspecies of Amami Ō shima and Kikaigo shima, and less closely to *Eumeces ishigakiensis*. It differs from all these in coloration and in the breadth of the upper rows of dorsal scales.

When Hallowell wrote the original description of this species he had specimens from both Amami Ō shima and Okinawa shima. ("Ousima, Japan, and Loo Choo Islands"). There is nothing to indicate either as the type. Stejneger has since stated that the Okinawa specimen should be regarded as the type, the Amami Ō shima example having been lost. It therefore seems best to regard the Okinawa lizard as the typical *Eumeces marginatus*.

Eumeces marginatus amaniensis Van Denburgh

Diagnosis.—One azygous postmental; no patch of much enlarged scales on back of thigh; no postnasal; posterior loreal long, usually in contact with three supralabials; seventeen to twenty-one plates under fourth toe; twenty-six (rarely twenty-four or twenty-eight) scales around middle of body; young with one median and two lateral light lines, latter broader but separated by not less than width of two scales, lower lateral line

separated from forelimb by less than distance between lateral lines, and running at about the level of top of hind limb but below top of ear; scales of first row on each side of middorsal line very rarely wider than those of next dorsal rows; superciliaries not less than eight; upper lateral line broader, on scales of third and fourth rows, from middorsal line.

Type.—California Academy of Sciences No. 21615. Amami Ō shima, Loo Choo Islands, Japan; April 26 to May 1, 1910.

Description of the type.—Nasal small, in contact with rostral, supranasal, anterior loreal, and first labial plates. Anterior loreal forming sutures with nasal, supranasal, frontonasal, prefrontal, posterior loreal, and first and second labial plates. Posterior loreal longer than high, in contact with two (left) or three (right) labials. First labial in contact with rostral, nasal, anterior loreal and second labial. Frontal not separated from frontonasal, in contact with three supraoculars on each side. Parietals large, separated by interparietal. Three nuchals. Upper temporal largest. Seven supralabials, the seventh largest. One azygous postmental. Scales smooth, except one behind each corner of vent; twenty-six around middle of body; fifty-four in a row from parietals to line joining backs of thighs; middorsal rows not appreciably enlarged. Median subcaudal row broad. No patch of much enlarged scales on back of thigh. Seventeen to twenty-one scutes under fourth toe. Hind limb reaching wrist.

The color above is nearly uniform light brown, more yellowish on the head and tail. A brick-red band runs from the temporal regions along the side of the neck and body. The lower surfaces are greenish or yellowish white.

Length to anus	85 mm.
Length of tail.....	116 "
Snout to ear-opening.....	19 "
Snout to fore limb.....	28 "
Fore limb	23 "
Hind limb	33 "
Base of fifth to end of fourth toe.....	13 "

Variation.—Of seventy-nine specimens at hand, all have one postmental, no postnasals, and upper temporal largest. The frontal is in contact with the frontonasal in all but two, in one of which a small plate intervenes. In two the frontonasal is divided. No. 21566 has the second and third left supraoculars merged. The posterior loreal is much longer than high in all but four, and touches three labials on both sides of the head in all but ten specimens, of which eight have the loreal of one side touching three labials, while only two have both posterior loreals in contact with only two labials. The scales around the middle of the body are twenty-six in all but three specimens; Nos. 21572 and 21580 have twenty-four and No. 21576

has twenty-eight. The frontal touches three supraoculars on each side except in three cases, where it is in contact with only two on one side of the head. In twenty-five specimens the plates under the fourth toe are 17 in one, 18 in three, 19 in thirteen, 20 in seven, 21 in one. The scales in a row from the parietals to a line joining backs of thighs vary from fifty-three to fifty-six:—53 in 5 specimens, 54 in 6, 55 in 13 and 56 in 1. The supralabials are 6-7 in 3 specimens, 7-8 in 2 and 7-7 in 20. A few specimens have the upper dorsal rows slightly enlarged, and a few have somewhat enlarged scales on back of thigh, but never as in *E. elegans*. The young have five light lines and blue tails.

Distribution.—This subspecies is known only from Amami Ō shima, Loo Choo Islands, Japan.

Remarks.—*Eumeces marginatus amamiensis* is most closely related to *E. m. kikaigensis*, from which it differs as indicated under that head. From *E. marginatus* of Okinawa it differs in the fact that the middorsals normally are not wider than those of the other rows, in the increased number of superciliaries, which normally are nine or ten, instead of eight, and in the breadth and position of the upper lateral line, which difference seems to be quite constant.

***Eumeces marginatus kikaigensis* Van Denburgh**

Diagnosis.—One azygous postmental; no patch of much enlarged scales on back of thigh; no postnasal; posterior loreal usually long, usually in contact with three supralabials; sixteen to twenty-one plates under fourth toe; usually twenty-eight (sometimes twenty-six) scales around middle of body; young with one median and two lateral light lines, the latter narrow and separated by not less than the width of two scales, lower lateral line separated from fore limb by less than the distance between the lateral lines, and running at about the level of top of hind limb but below top of ear; scales of first row on each side of middorsal line usually not appreciably wider than those of next dorsal rows; superciliaries not less than eight; upper lateral line broader, on scales of third and fourth rows from middorsal line.

December 13, 1912.

Type.—California Academy of Sciences No. 21628.
Kikaiga shima, Loo Choo Islands, April 30, 1910.

Description of the type.—Nasal small, in contact with rostral, supranasal, anterior loreal, and first labial plates. Anterior loreal forming sutures with supranasal, frontonasal, prefrontal, posterior loreal, and first and second labials. Posterior loreal longer than high, in contact with three labials. Frontal in contact with frontonasal and first to third supraoculars. Parietals large, separated by interparietal. Three pairs of nuchals, first largest. Upper temporal largest. Seven supralabials, seventh largest. One azygous postmental. Scales smooth except one behind each corner of vent; twenty-eight around middle of body; fifty-five in a row from parietal to a line joining backs of thighs; middorsal rows not enlarged. Median subcaudal row broad. No patch of much enlarged scales on back of thigh. Nineteen scutes under fourth toe. Hind limb reaching elbow.

The color above is uniform light yellowish brown. A brick-red band runs across the temporal region and the sides of neck and body. Another red band extends from the seventh labial to the fore limb, and faintly along the side of the body. The lower surfaces are greenish white, clearer yellowish white on the chin, throat, preanal region, and tail.

Length to anus	73 mm.
Length of tail.....	93 "
Snout to ear-opening	16 "
Snout to forelimb	25 "
Fore limb	20 "
Hind limb	30 "
Base of fifth to end of fourth toe.....	12 "

Variation.—We have twenty-two specimens. All have one postmental, no postnasals, upper temporal largest, and frontal in contact with three supraoculars and the frontonasal. The supralabials are 7-7 in all but three, which have 7-8. One specimen has a single pair of nuchals; one has two on one side and three on the other; the others all have three pairs, the first pair being much larger. The posterior loreal touches three labials on both sides in ten, two on one side and three on the other in seven, and two on both sides in five specimens. The scales around the middle of the body are twenty-eight in thirteen specimens, twenty-seven in two, and twenty-six in seven. The number of scales in a row from the parietals to a line joining the backs of thighs varies from fifty-three to fifty-eight:—53 in 2 specimens, 54 in 5, 55 in 10, 56 in 2, 57 in 2, and 58 in 1. The number of plates under the fourth toe is 16-18 in 1 specimen, 17 in 2, 18 in 4, 19 in 11, 20 in 3, and 21 in 1. A few specimens have a few slightly enlarged scales on the back of the thigh. The young have five light lines and blue tails.

Distribution.—This subspecies is confined to Kikaigashima, the easternmost island of the Loo Choo group.

Remarks.—*Eumeces marginatus kikaigensis* is most nearly related to *E. m. amamiensis*. This is what one should expect from the relative positions which their islands occupy. It differs from the Amami subspecies chiefly in the increased number of scales. The snout is probably a little longer, and the posterior loreal is more frequently in contact with only two labials. It differs from the Okinawa form just as *E. m. amamiensis* does, and also in the increased number of scales.

Eumeces ishigakiensis Van Denburgh

Diagnosis.—One azygous postmental; no patch of much enlarged scales on back of thigh; no postnasal; posterior loreal usually rather short, touching either two or three labials; seventeen to twenty-one plates under fourth toe; twenty-six (rarely twenty-four or twenty-eight) scales around middle of body; young with one median and three lateral light lines; latter narrow, and upper two separated by less than width of two scales; middle lateral line separated from fore limb by not less than the distance between the lateral lines, and running above the level of top of hind limb and at level of top of ear.

Type.—California Academy of Sciences No. 21666. **Ishigaki shima, Loo Choo Islands, Japan; May 25-June 2, 1910.**

Description of the type.—Similar to *E. marginatus*, but with an extra pair of lateral light lines. Nasal small, in contact with rostral, supranasal, and first labial plates. Anterior loreal forming sutures with nasal, supranasal, frontonasal, prefrontal, posterior loreal, and first and second labial plates. Posterior loreal little longer than high, in contact with two labials. First labial in contact with rostral, nasal, anterior loreal, and second labial. Frontal in contact with frontonasal, and with three supraoculars on each side. Parietals large, separated by interparietal. Three pairs of rather small nuchals. Upper temporal largest. Seven supralabials, the seventh largest. One azygous postmental. Scales smooth, except one behind each corner of vent; twenty-six around middle of body; fifty-four in a row from parietals to line joining backs of thighs; two middorsal rows not enlarged. Median subcaudal row broad. A patch of slightly enlarged scales on back of thigh. Twenty scutes under fourth toe. Hind limb reaching between wrist and elbow.

The color above is dark brown, lighter on the head, and at the edges of the dorsal, and centers of the lateral and limb scales. A light line extends along the middorsal line of body and basal half of tail, bifurcating at the parietals as in the other members of the group. An upper lateral line starts on the superciliaries and extends to the middle of the tail, being

separated from the middorsal line on the body by about the width of two scales. A second labial line arises on the seventh labial, runs to the upper end of the ear-opening, and extends to the base, or less definitely to the middle, of the tail, passing above the hind limb, and being separated from the fore limb by not less than the distance between the upper and the second lateral lines. This second lateral line is separated from the upper lateral line by only the width of one scale. A third lateral line originates near the lower part of the ear-opening, passes just above the fore limb, and extends to about the middle of the thigh. The tail is bright blue. The lower surfaces are grayish white, clearer on the chin, the gular and preanal regions, and the limbs.

Length to anus.....	57	mm.
Length of tail.....	82	"
Snout to ear	11	"
Snout to fore limb.....	19	"
Fore limb	15	"
Hind limb	22	"
Base of fifth to end of fourth toe.....	9	"

Variation.—Thirty-three specimens are at hand. A few of these have a small group of slightly enlarged scales on the back of the thigh, most have none, and none show any such enlargement as is always found in *E. elegans*. All have one postmental. None has a postnasal. The frontal is in contact with three supraoculars in all, except that in No. 21645 it touches only two on one side of the head. In No. 21663 the third left supraocular is divided. The frontal meets the fronto-nasal in twenty-four, and is separated in nine specimens. The posterior loreal is not much longer than high in twenty-three; it touches 2-2 labials in eleven specimens, 2-3 in eleven, and 3-3 in eleven. The upper temporal is largest. The scales around the body are twenty-six in twenty-eight specimens, twenty-four in three, and twenty-eight in two. In twenty-five specimens examined for the following characters, the scales under the fourth toe vary from seventeen to twenty-one, being 17 in 1 specimen, 18 in 9, 19 in 8, 20 in 5, and 21 in 2. The scales in a row from parietals to a line joining backs of thighs vary from fifty-one to fifty-five:—51 in 4 specimens, 52 in 6, 53 in 6, 54 in 7, 55 in 2. The supralabials are 7-7 in all except No. 21647, which has 6-7.

The youngest specimens all show the three lateral lines. In many of the somewhat larger examples the lower line becomes faint or disappears. Such specimens have two lateral lines, but may readily be distinguished from *E. marginatus* by the position of the lower line. In still larger specimens the

middorsal line becomes paler and disappears. In the largest specimens (snout to anus 64 mm.) the lateral lines have nearly or quite disappeared, and the temporal regions and sides of the body and neck are suffused with brick-red. The ground color is black in the smallest specimens, but becomes gradually paler until, in the largest, it is a light grayish brown.

Distribution.—This seven-lined skink has been found only on Ishigaki shima, where it evidently replaces *E. marginatus* of the northern Loo Choo Islands.

Remarks.—This species evidently is closely related to *E. marginatus*. It differs in the coloration and in the shape and relations of the posterior loreal. From *E. elegans* it may be readily distinguished by the coloration and the absence of the patch of much enlarged scales on the back of the thigh.

***Eumeces elegans* Boulenger**

Diagnosis.—One azygous postmental; a patch of much enlarged scales on back of thigh; no postnasal; posterior loreal short, normally touching two labials; eighteen to twenty-two scutes under fourth toe; twenty-six or twenty-eight scales around middle of body; fifty-three to fifty-five scales from parietal to back of thighs; young with one median and two lateral light lines; latter narrow, and separated by not less than width of two scales; lower lateral line separated from fore limb by less than distance between the lateral lines, and running at level of top of hind limb and usually below top of ear.

Five specimens are at hand from an altitude of 1000 to 1500 feet in Mohkanshan, near Huchou, Chekiang, China, not far from Ningpo, the type locality. These specimens all have twenty-eight scales around the middle of the body, seven supralabials, one azygous postmental, no postnasal, three pairs of nuchals, of which two usually are much smaller, and upper temporal much larger than lower. The posterior loreal touches three labials on one side of the head in one specimen, and two in all others. The frontal is in contact with the frontonasal in two, separated in three. This plate touches three supra-

oculars in all except one specimen, in which it meets only two on each side. The scales under the fourth toe are 18, 18, 18, 22, 22; and those on the back from the parietals to a line joining the backs of the thighs are 53, 54, 55, 55, 55.

Since the scale counts are so constant in this series, while Boulenger reports twenty-six rows in his specimens, there can be little doubt that more than one form of this lizard occurs in China.

In addition to these specimens from China we have fifteen from the Pescadores, nine from Koshun, Formosa, and twenty-eight from Maru Yuma, Keelung, San Shi Ka, Taipeh, and Tainan, Formosa. These three sets of specimens show certain tendencies toward differentiation one from another, but these differences are so intangible that it seems best to use but one name for all these and also for the Chinese specimens until the mainland forms are better known. At first, it seemed desirable to describe the Koshun specimens as a new subspecies because the body is longer, the scales seem smoother, the plates under the fourth toe are fewer, and eight of the nine specimens have only twenty-four scales around the middle of the body. But more than half of these specimens are very young and do not show the increase in body-length, and when one counts the scales a short distance in front of the middle of the body, he may find them twenty-six in number. Furthermore the coloration seems exactly like that of the specimens from the other localities.

The following notes show the variation and the amount of difference in some of the more important characters.

<i>Scales around body</i>	24	25	26	28
Koshun	7		2	
Other Formosan stations.....	2		26	
Pescadores	2	1	12	
China.....				5

Scales between parietals and backs of thighs.

Koshun	52 to 57	most frequent number	55	average	54.77
Other Formosan stations....	50 to 55	"	"	53	" 52.68
Pescadores	53 to 55	"	"	53	" 53.73
China	53 to 55	"	"	55	" 54.40

Scutes under fourth toe.

Koshun	15 to 19	most frequent number	15	average	16.44
Other Formosan stations....	17 to 21	"	"	19	" 19.14
Pescadores	15 to 18	"	"	17	" 17.
China	18 to 22	"	"	18	" 19.2

<i>Posterior Loreal touching two labials</i>	<i>Posterior Loreal not much longer than high</i>
Koshun	66.6%
Other Formosan stations..	18. %
Pescadores	80. %
China	60. %
<i>Frontal not touching frontonasal.</i>	
Koshun	33. %
Other Formosan stations.....	43. %
Pescadores	26.6%
China	60. %

All these specimens have one postmental and no postnasal, upper temporal largest, and nuchals in three pairs, of which the first is largest. The supralabials are seven in all except one from Koshun, which has 6-6; one from Maru Yama, which has 8-8; three from Kanshirei, which have 6-7, 7-8, and 8-8; and two from the Pescadores, which have 6-6 and 6-7. The frontal touches three supraoculars in all except two from Koshun with 2-3 and 2-2, one from Kanshirei with 2-2, and one from the Pescadores with 2-3. All have the patch of much enlarged scales on the back of the thigh.

The chief differences between these lizards may be tabulated as follows:

- a.—Usually with more than twenty-six rows of scales around middle of body.
- a².—Usually with not more than twenty-six scales around middle of body.
- b.—Usually with twenty-six scales around middle of body.
- c.—Scales under fourth toe 15 to 18.
- c².—Scales under fourth toe 17 to 21.
- b².—Usually with twenty-four scales around middle of body.

China.

Pescadores.

North Formosa.

Koshun, Formosa.

Eumeces chinensis (Gray)

Diagnosis.—Two azygous postmentals; no patch of much enlarged scales on back of thigh; no postnasal; about fourteen plates under fourth toe; twenty-six or twenty-four scales around middle of body; frontal usually in contact with two supraoculars; nuchals usually in two pairs; interparietal less than twice as long as broad; frontoparietals not much longer than broad; dorsal line covering about half the width of the scales of one row on each side of midline; "middorsal line in young not bifurcating on head."

We have only one specimen, from Shanghai, China, August 3, 1906. The scales around the middle of the body are twenty-six, under the fourth toe fourteen, and on the back from the parietals to a line joining the backs of the thighs are fifty-four. The frontal is in contact with 2-3 supraoculars but does not meet the frontonasal. The supralabials are 6-7, two and three being in contact with the posterior loreals. There are two pairs of nuchals, two postmentals, and no postnasals.

***Eumeces chinensis formosensis* Van Denburgh**

Diagnosis.—Normally with two azygous postmentals; no patch of enlarged scales on back of thigh; often with a postnasal; fourteen to sixteen plates under fourth toe; twenty-four or twenty-six scales around middle of body; frontal usually in contact with three supraoculars; two or three nuchals; interparietal about twice as long as broad; frontoparietals usually not much longer than broad; dorsal light line covering less than half the width of the scales of one row on each side of midline.

Type.—California Academy of Sciences No. 18605, San Shi Ka, Formosa, April 14, 1909.

Description of the type.—Nasal small, in contact with rostral, supranasal, postnasal, and first labial plates. Anterior loreal forming sutures with postnasal, supranasal, frontonasal, prefrontal, posterior loreal, and second labial. Posterior loreal longer than high, in contact with two labials. First labial touching rostral, nasal, postnasal, and second labial. Frontal separated from frontonasal, in contact with two supraoculars of each side. Parietals large, separated by a narrow interparietal. Three pairs of nuchals. Seven supralabials, the seventh largest, fifth entering eye. Two azygous postmentals. Scales smooth, twenty-five around middle of body, fifty-one in a row from parietals to line joining backs of thighs, middorsal rows not larger. Median subcaudal row broad. No patch of enlarged scales on back of thigh. Sixteen scutes under fourth toe. Hind limb reaching fingers.

Color above pale brownish gray, the scales of the back and sides margined with black, except in the positions of the middorsal and dorsolateral light lines. Sides and tail and upper surfaces of limbs similarly reticulated with black. Head gray, most of its plates being margined with black or dark brown along their posterior edges. Sides of neck and all lower surfaces yellowish white.

Length to anus	103	mm.
Length of tail (reproduced)	150	"
Snout to ear	19	"
Snout to forelimb	33	"
Fore limb	26	"
Hind limb	35	"
Base of fifth to end of fourth toe	14	"

Variation.—Four specimens are at hand. The scales around the middle of the body are 24, 26, 25, 24. The azygous postmentals are 1, 2, 2, 2. Scales along back from head to back of thighs are 50, 52, 51, 48. The nuchal scutes are 2-3, 2-3, 3-3, 2-2. The supraoculars in contact with the frontal are 3-2, 3-3, 2-2, 2-3. The scutes under fourth toe are 14, 15, 16, 15. Postnasals are absent in Nos. 18603 and 18604, but are one on each side in Nos. 18605 and 18606. In all, the supralabials are seven, the frontal is not in contact with the frontonasal, and the lower temporal is the larger.

Distribution.—The Academy's specimens were taken at San Shi Ka, Taipeh, and Keelung, Formosa, in April, 1909.

Eumeces kishinouyei Stejneger

Diagnosis.—Normally with two azygous postmentals; no patch of much enlarged scales on back of thigh; usually a postnasal; sixteen or seventeen scales under fourth toe; twenty-four or twenty-six scales around middle of body; frontal usually in contact with three supraoculars; nuchals usually three pairs; interparietal much less than twice as long as broad; frontoparietals often much larger than broad; dorsal light line covering much less than half the width of the scales of one row on each side of midline; middorsal line in young bifurcating on head.

Distribution.—We have received two specimens from Ishigaki shima, and five from the type locality, Miyakoshima, Loo Choo Islands, Japan. The species has been recorded also from Iriomote shima.

Variation.—The specimens at hand seem to be alike except that those from Ishigaki have the frontal in contact with the frontonasal, while in the Miyako lizards these plates are separated. However, at least one of Dr. Stejneger's specimens from Miyako had the frontal touching the frontonasal. All have seven supralabials. The number of plates under the fourth toe is either sixteen or seventeen. The Ishigaki specimens have the frontal touching 2-2 and 2-3 supraoculars, while in all the Miyako examples it is in contact with 3-3. The posterior loreals in the Ishigaki skinks touch 2-3 and 3-3 labials, while in the Miyako skinks they meet 2-3, 2-2, 2-2,

2-3, and 2-2 labials. The number of scales in a row between the parietals and backs of thighs is 45, 47 in the Ishigaki specimens, and 46, 49, 46, 49, 48 in those from Miyako. Including the examples recorded by Stejneger, the scales around the middle of the body are 24, 24, 24, 26 in the Ishigaki specimens; 24, 26, 26, 26, 26, 24, 26, 24 in the Miyako; and 24, 26 in the Iriomote. The nuchals are 3-3, 2-3, 3-3, 2-2 in those from Ishigaki; 2-2, 2-3, 3-3, 2-3, 2-2, 3-3, 2-3 in those from Miyako; and 3-3, 3-2, 3-3 in those from Iriomote. All have two azygous postmentals except Nos. 21722 and 21723 from Miyako, which have only one. All have postnasals except Nos. 21719, 21720 and 21722 from Miyako, and one of Stejneger's from Iriomote, which have none. No. 21719 has the anterior azygous postmental divided. The younger specimens show a distinct bifurcation of the middorsal line on the head, much as in *E. elegans*.

Mabuya longicaudata (Hallowell)

Barbour has called attention to the fact that Fischer's figure of his specimen from "South Formosa" shows dorsal scales with only two keels, while Hallowell's specimen from Siam had three. Barbour examined a specimen from Saigon, Anam, and another from Mt. Wuchi, Hainan, and found that both had dorsal scales with three strong keels. Fischer's specimen has hitherto been the only one known from Formosa.

The California Academy has received one specimen of this lizard captured on Mt. Wuchi, Hainan, by one of Mr. Owston's collectors. This specimen has scales much more strongly keeled than any of the Formosan specimens at hand, and has dorsal scales with three equally developed keels. The fronto-nasal is in contact with the rostral, but is widely separated from the frontal by the prefrontals. The supralabials are seven, the fifth being much the largest. The eyelid is scaly. There is a single azygous postmental and one pair of nuchals. There are thirty scales around the body and forty-three from the parietals to a line joining the backs of the thighs. The ear-openings have three or four small scales projecting from the anterior border. The scales under the fourth toe are only nineteen or twenty in number.

***Mabuya longicaudata ruhstrati* (Fischer)**

With six Formosan specimens at hand for examination it becomes evident that the *Mabuya* of this island should be recognized as a distinct subspecies characterized by the less extensive keeling of its scales. All six of these specimens have smooth scales on the side of the neck between the ear and fore limb, where the scales are strongly keeled in the specimen from Hainan. Five have dorsals with only two strong keels, while one (No. 18609) has them with a third (central) keel not quite so strong as the other two. Of the five with bicarinate scales, two show a weak central keel on some of the scales. All of the keels are much weaker than in the Hainan lizard. The scales under the fourth toe are either twenty-three, twenty-four or twenty-five, as against nineteen or twenty in the Hainan specimen. It appears, therefore, that the differences between the Formosan and the continental forms of this lizard are real, but probably not entirely constant. It therefore seems best to use a trinomial for the smoother, bicarinate form, and since Fischer's *Euprepes ruhstrati* was based on a specimen of this character from "South Formosa," this name is available.

Variation.—The frontonasal does not touch the rostral in any of these specimens, but does in Fischer's figure. It touches the frontal in four specimens, and is separated from this plate in two. The labials are 7-7 in all, the fifth being much the largest. Usually the first and second supraoculars touch the frontal, but in two specimens only the second is in contact with this plate on one side of the head, and in No. 18610 only the second on both sides. All have one azygous postmental. All have two or three small projecting scales on the anterior border of the ear-opening, but in No. 18607 these are very small. Only No. 18612 has thirty scales around the middle of the body (as in the Hainan specimen); No. 18608 has twenty-nine; the other four have twenty-eight. The number of scales from the parietal plates to a line joining the backs of the thighs is forty-four in two specimens, forty-five in three, and forty-six in one. The plates under the fourth toe are twenty-three in one specimen, twenty-four in three, and twenty-five

in two. All have the lower eyelid scaly. No. 18610 has the left prefrontal merged with the frontal and frontonasal.

Nos. 18607 and 18608 are from Tainan, Formosa; the others, from Koshun. All were taken in March, 1909.

***Sphenomorphus indicus* (Gray)**

This species has been recorded as occupying an extensive territory extending from the eastern Himalayas, Assam, and Burma to eastern China and Formosa. Although it has been regarded as a homogeneous species, there can be no doubt that the examination of large series of specimens from various parts of this range will result in the recognition of distinct races or subspecies.

The collection under consideration includes series of nine specimens from Mohkanshan (altitude 1000 to 1500 feet) near Huchow, Che-kiang, China, and eighty-two specimens from Formosa. These series are found to differ in scale counts to an extent which renders desirable their separation as subspecies. It is to be regretted that there are at hand no specimens from India for comparison, but the Chinese specimens agree so well with Boulenger's description that I shall, for the present, regard them as identical with the types from the Himalayas. The Formosan form, therefore, should receive a new name.

These Chinese specimens all have either thirty-six or thirty-eight rows of scales about the middle of the body, the former number being found in only four and the latter in five specimens or 55.5%. In the Formosan series thirty-eight scale rows are found only once (1.2%) while either thirty-six or thirty-eight rows occur in less than 37.5% of the specimens as against 100% of the Chinese. The scale rows are thirty-four in about 60% (49 specimens) of the Formosan examples, while this number does not occur in the Chinese series at hand, although Boulenger has reported this count in specimens from Fokien.

The number of scales in a row from the parietal plates to a line joining the backs of the thighs varies from seventy-three to eighty-one in the Chinese, with an average of 76.6. In the Formosan lizards this count ranges from sixty-four to seventy-eight, with an average for the eighty-two specimens of only 71.

In the nine Chinese lizards the frontal is separated from the frontonasal in three or 33%; while in the eighty-two from Formosa this condition is found in only three or 3.6%.

In the both series three supraoculars normally are in contact with the frontal, but in two of the Chinese and three Formosan examples, only two supraoculars touch the frontal on one side of the head. No specimen has the number reduced to two on both sides.

The supralabials normally are seven in both Chinese and Formosan lizards, but may be 7-8 or 8-8. All have a single unpaired postmental and individual preanal.

***Sphenomorphus indicus formosensis* Van Denburgh**

Diagnosis.—Like *S. indicus* but with fewer scale rows, usually thirty-four or thirty-six about middle of body, and not more than seventy-eight (average 71) between parietal plate and line joining backs of thighs; frontal very rarely separated from frontonasal.

Type.—California Academy of Sciences No. 18622. **Kanshirei, Formosa, March 24, 1909.**

Description of the type.—Snout short and rather blunt. Rostral moderate, in contact with frontonasal. Frontonasal touching anterior loreal, prefrontals, and frontal. No supranasals. Frontal long, very narrow behind, in contact with anterior three large supraoculars. Four large supraoculars. Frontoparietals and interparietal distinct. Parietals short, with a short suture behind small interparietal. No nuchals. Nostril in a single nasal. Three loreals, anterior high, in contact with frontonasal and prefrontal; middle largest. Seven supralabials, fifth and sixth largest. Largest temporal touches parietal. Lower eyelid covered with scales, no single transparent disk. Ear-opening moderate, without lobules. A single azygous postmental. Thirty-four scale rows around middle of body. Seventy scales in a row from parietal to a line joining backs of thighs. Two very large central preanals, with small lateral pair. No patch of enlarged scales on back of thigh. Inferior midcaudal scales enlarged. Twenty-one scales under fourth toe. Longest toe reaches elbow.

The color above is olive brown, lighter on the tail and just above the lateral dark band, with scattered blackish dots. A light brown lateral dark band from nostril to eye and from eye to above hind limb, relieved with many lighter dots. Limbs olive with a few dark and light dots. Lower surfaces greenish white. Labials without distinct dark spots.

Length to anus.....	72 mm.
Length of tail.....	133 "
Snout to ear.....	14 "
Width of head.....	10 "
Fore limb	21 "
Hind limb	33 "
Base of fifth to end of fourth toe.....	12 "

Variation.—The scale rows are thirty-two in two specimens, thirty-four in forty-nine, thirty-six in thirty, and thirty-eight in one. The number of scales between a parietal and a line joining the backs of the thighs ranges from sixty-four to seventy-eight, the average being seventy-one, and the most frequent number seventy-two: 64 in 1 specimen, 65 in 2, 66 in 4, 67 in 1, 68 in 9, 69 in 8, 70 in 10, 71 in 7, 72 in 17, 73 in 6, 74 in 10, 75 in 2, 77 in 3, and 78 in 2. All have one azygous postmental and two large preanals. The frontal is in contact with the frontonasal in all but three of the eighty-two specimens, and with three of the large supraoculars in all except that in three specimens it touches only two on one side of the head.

Distribution.—Mr. Barbour has recorded two specimens from Bankoro, Central Formosa. The Academy has received one from Jenshiko, two from San Shi Ka, and seventy-eight from Kanshirei, Formosa, where they were collected in March and April 1909. The data at hand are insufficient to enable one to judge whether or not the Fokien specimens recorded by Dr. Boulenger¹ belong to this subspecies.

***Sphenomorphus boulengeri* Van Denburgh**

Diagnosis.—Ear-opening without projecting lobules anteriorly; frontonasal broadly in contact with frontal and rostral; four large supraoculars, two or three in contact with frontal; thirty-eight or forty scales around body; snout elongate; first supraocular usually nearly twice as long as second; frontoparietal and interparietal distinct; no supranasal; lower eyelid scaly; a distinct patch of much enlarged scales on back of thigh.

Type.—California Academy of Sciences No. 18700. Koshun, Formosa, March 14, 1909.

Description of the type.—Snout longer than in *S. indicus*. Rostral large, with a considerable flat superior surface, broadly in contact with frontonasal. Frontonasal touching anterior loreal, prefrontals and (broadly) frontal. No supranasals. Frontal long, narrow behind, in contact with anterior two large supraoculars. Four large supraoculars. Frontoparietals and interparietal distinct. Parietals short, with a short suture behind small interparietal. A pair of small lateral nuchals. Nostril in a single nasal or between two nasals. Three loreals; anterior high, in contact with frontonasal and prefrontal; middle largest. Seven supralabials, fifth and sixth

¹ Boulenger, P. Z. S., 1899, p. 162.

largest. Largest temporal touches parietal. Lower eyelid covered with scales, no single transparent disk. Ear-opening moderate, without lobules. A single azygous postmental. Thirty-eight scale rows around middle of body. Seventy scales in a row from parietal to a line joining backs of thighs. Two very large preanals, with small lateral pair. A patch of enlarged scales on lower part of back of thigh. Inferior midcaudal scales slightly enlarged. Twenty-one scales under fourth toe. Longest toe reaches axilla.

The color above is dark olive brown on head, limbs, back, and tail. The back has scattered blackish brown dots near the midline, and along the pale yellowish brown dorsolateral line which extends from the temporal region more or less indefinitely to the base of the tail. A blackish-brown band, relieved with numerous scattered light dots on the sides, extends from the nostril to and below the eye, and from the eye to the base of the tail, being bordered below by a definite light lateral line. Below this line, starting as brown spots on the labials, is a dark band more or less indefinite on the body. The limbs are reticulated with dark brown. The lower surfaces are pinkish white.

Length to anus.....	78 mm.
Length of tail (tip reproduced).....	111 "
Snout to ear	16 "
Width of head.....	12 "
Fore limb	24 "
Hind limb	37 "
Base of fifth to end of fourth toe.....	15 "

Variation.—Of twelve specimens at hand, eight have scales in thirty-eight rows, and four in forty rows. The scales between the parietal and back of thighs are sixty-seven in one specimen, seventy in three, seventy-two in two, seventy-three in one, seventy-four in three, seventy-six in one, and seventy-eight in one. All have the patch of enlarged scales on the back of the thigh. All have a single azygous postmental; frontal in contact with frontonasal, and two large preanals. Five have the frontal touching only two large supraoculars on both sides, five have this plate touching three supraoculars, and two have it in contact with two on one side and three on the other. All are darker than *S. indicus* and show more definite dark and light lateral bands than appear in any of the specimens of that species at hand.

Two specimens from Botel Tobago, (Nos. 25110, 25111) purchased of Mr. Kukuchi, collector for the Taihoku Museum, seem to differ from the Formosan ones only in their general darker coloration and the presence of more numerous dark spots on the back. The scale rows are thirty-eight and forty; scales between parietal and back of thigh seventy-seven and eighty-two; supraoculars in contact with frontal 2-2 and 3-3;

scales under fourth toe twenty-two and twenty-three; frontal touching frontonasal; two large preanals; one postmental; patch of enlarged scales on back of thigh, as in *Eumeces elegans*.

Remarks.—Although this is a perfectly distinct species, readily distinguished by the enlarged scales on the back of the thigh, the longer snout, the coloration, and the larger number of scale rows, its general appearance is so like that of *S. indicus* that it was at first confused with that form. I believe that the specimen described by Dr. Stejneger in his *Herpetology of Japan*, p. 216, really is this species, although Barbour's two specimens are undoubtedly *S. indicus formosensis*. Although the proportions of the first and second supracoculars, and the relation of these plates to the frontal, and the patch of enlarged scales on the back of the thigh, indicate relationship with *S. jagorii* of the Philippine Islands, the present species differs from that species in many respects. Thus, in *S. jagorii* the snout is shorter, the parietals are much larger, the scales around the body usually are thirty-six, the frontonasal is convex instead of nearly flat, and the coloration is quite different.

The occurrence in Formosa of two similar species of *Sphenomorphus* is quite as unexpected and remarkable as the presence there of *Takydromus formosanus* and *T. stejnegeri*.

Distribution.—We have received five specimens from Kosempo, and seven from Koshun, Formosa, where they were secured in March, 1909; also two from Botel Tobago. The specimen, in the British Museum, described by Stejneger, was collected by La Touche at Bangkimtsing, Formosa.

***Emoia atrocostata* (Lesson)**

This genus has not been recorded from either Formosa or the Loo Choo Islands. We now have five specimens (Nos. 21714-21718) from Miyakoshima and ten from Formosa. These agree so well with Boulenger's description of *E. atrocostata* that they must be regarded as representing this species, at least until direct comparison shows them to be distinct. Specimens from near the type locality not being at hand, such comparison cannot now be made.

I have been unable to detect any points of difference in the two series, from Formosa and the Loo Choos. The scale rows around the body vary from thirty-four to thirty-eight in the Formosan, from thirty-six to thirty-nine in the Miyako specimens. All have a supranasal plate on each side, and one azygous postmental. One specimen from Formosa has the left parietal united with the frontoparietal, another has the frontal united with the right prefrontal. The frontal is in contact with the frontonasal in four specimens from Formosa and three from Miyako shima, separated in the others. The scales under the fourth toe vary from thirty-two to thirty-seven in those from Miyako, and from thirty-one to thirty-five in those from Formosa. The scales in a row from the parietals to a line joining the backs of the thighs range from sixty-six to sixty-nine in the Loo Choo lizards, and from sixty-two to seventy-one in the Formosan.

One of the Formosan specimens was taken at Nanto, east of Taichu, March 9, 1909. The others were secured at Koshun, March 14, 1909. One of the latter contains eggs nearly ready for laying.

In the Taiwan Museum are specimens said to have been collected on Pratas Island and Botel Tobago.

A specimen from the Philippine Islands has forty-four scales around the body, sixty-three on the back, thirty-seven or thirty-eight under the fourth toe, and eight supralabials. There can be little doubt that careful examination of large series would show that this is not a homogeneous species.

***Emoia cyanura* (Lesson)**

One specimen (No. 14958) of this widely distributed lizard was secured from Mr. Owston. It is labeled as having been collected on Wake Island in October, 1903. There are thirty scales around the middle of the body.

***Leiolopisma laterale* (Say)**

This lizard has long been known from China, and Dr. Boulenger upon direct comparison of Chinese and American specimens was unable to find any character distinguishing them. It has more recently been recorded from Okinawa and

December 13, 1912.

Miyako shima in the middle and southern Loo Choo groups. Dr. Stejneger has carefully compared the specimen from Miyako with the American lizards and agrees with Dr. Boulenger as to their identity. However, both were compelled to work with very limited material and it is possible that the examination of good series of specimens would change their conclusion. It is much to be regretted that we have not now at hand enough Chinese specimens to give trustworthy results upon comparison with the other series in the Academy's collection.

We have received no specimens of this lizard from either Okinawa or Miyakoshima, and have none from China, but have one from Tsushima and good series from Ishigaki, Formosa, and the United States.

While lack of Chinese specimens prevents any direct comparison with the form found on the Asiatic mainland, the records in the literature make it evident that this Asiatic form usually has a greater number of scales around the middle of the body than is found in American specimens. The specimen from Tsushima agrees in every respect with the descriptions of the Chinese lizards. The American lizards also differ from all Asiatic specimens in coloration. Since the scale counts overlap, the two forms cannot be regarded as distinct species, but are certainly entitled to stand as separate subspecies.

When we consider the specimens from Formosa and Ishigaki we find that they differ from those from America and the Asiatic mainland in having fewer scales in a longitudinal dorsal row. The Ishigaki lizards differ from the American and Formosan forms in the greater number of scales around the middle of the body, and differ from these last and from the Chinese in having the frontal nearly always separated from the frontonasal. These differences also are not constant, but occur in so large a percentage of individuals as to make their recognition as subspecies desirable.

These principal differences are set forth in the following

KEY.

- a.—Scales on back more numerous, average more than 65 in a row between parietals and backs of thighs, average more than forty on back between insertions of limbs;

b.—Scales around middle of body usually 26, often 28; dark lateral band with very definite lower border; frontal in contact with frontonasal; North America.

L. laterale laterale.

b².—Scales round middle of body 28 to 34, rarely 26; dark lateral band usually without definite lower border; frontal usually in contact with frontonasal; China and Tsushima.

L. laterale reevesii.

a².—Scales on back fewer, average fewer than 65 in a row between parietals and backs of thighs, average fewer than 40 on back between insertions of limbs;

bb.—Frontal usually in contact with frontonasal; scales around middle of body usually 28, often 26, rarely 30; scales in a row between parietals and backs of thighs 53 to 65, average 57.6; most frequent number 65; Formosa.

L. laterale formosensis.

bb².—Frontal usually not in contact with frontonasal; scales around middle of body usually 30, often 28, rarely 32; scales in a row between parietals and backs of thighs 59 to 66, average 62.6, most frequent number 61; Ishigaki.

L. laterale boettgeri.

***Leiolopisma laterale laterale* (Say)**

A few notes on the series of twenty-three specimens before me may be of interest for comparison with the Asiatic forms. These specimens are from Texas, North Carolina and Florida.

All have two large preanals, one azygous postmental, and the frontal in contact with two large supraoculars of each side, and also with the frontonasal. In six specimens examined the lamellae under the fourth toe are fifteen in four, and sixteen in two. The number of scales in a row from the parietals to a line joining the backs of the thighs ranges from sixty-one to seventy-two, the most frequent number being sixty-five and the average sixty-seven and eight-tenths. The scales around the middle of the body are twenty-six in sixteen instances, and twenty-eight in seven. The supralabials normally are seven, but may be six or eight.

***Leiolopisma laterale reevesii* (Günther)**

The single specimen (No. 26134) from Tsushima was caught in a thicket October 5-15, 1910. It has twenty-eight scales around the middle of the body, sixty-nine on the back between the parietals and a line joining the backs of the thighs, and forty-seven on the back between the insertions of the limbs.

The frontal does not touch the frontonasal. There is one azygous postmental. The frontal is in contact with two supraoculars on each side. There are only twelve scutes under each fourth toe.

It is interesting to be able to confirm Boettger's original record of the presence of this lizard on Tsushima.

***Leilopisma laterale formosensis* Van Denburgh**

Diagnosis.—Similar to *L. laterale* but with fewer (53 to 65) scales in a row on back between parietals and a line joining backs of thighs; scales around middle of body usually 28, often 26, sometimes 30; dark lateral band without very definite lower border; limbs usually overlapping when adpressed; frontal usually in contact with frontonasal.

Type.—California Academy of Sciences No. 25,027. **Kanshirei, Formosa, Japan, March 20, 1909.**

The nineteen Formosan specimens all have two large preanals, one azygous postmental, and the frontal in contact with two large supraoculars. Two specimens have a small plate between the frontal, prefrontals and frontonasal. Three have prefrontals meeting between the frontal and frontonasal. In the other fourteen the frontal is in contact with the frontonasal. In four specimens examined the lamellae under the fourth toe vary from fourteen to seventeen. The number of scales in a row from the parietals to a line joining the backs of the thighs ranges from fifty-three to sixty-five, the most frequent number being fifty-six and the average fifty-seven and six-tenths. The scales around the middle of the body are twenty-six in seven specimens, twenty-eight in eleven, and thirty in one. The adpressed limbs in the Formosan specimens usually overlap, and when they fail to meet, the distance between them never is as great as that between the snout and ear. In the other forms the limbs rarely meet.

From Formosa we have nineteen specimens, one from Jen-shiko and the others from Kanshirei. All were collected in March, 1909, and some contain eggs which seem ready for expulsion.

***Leiolopisma laterale boettgeri* Van Denburgh**

Diagnosis.—Similar to *L. laterale* but with frontal usually separated from the frontonasal by prefrontals; scales around body more numerous, twenty-eight to thirty-two rows around middle of body; fewer scales in a longitudinal row on back. Dark lateral band broader and with less definite lower border.

Type.—California Academy of Sciences No. 21,678. Ishigaki shima, Loo Choo Islands, Japan, May 25 to June 2, 1910.

This subspecies seems to differ from the Formosan series in the separation of the prefrontal and frontal plates, the greater number of scales, the less slender habit, and the coloration. The prefrontals separate the frontal from the frontonasal in all but two of the thirty-seven specimens (94.6%), while this condition is found only in three (15.8%) of the nineteen specimens from Formosa. Many of the Ishigaki specimens are very young. For this reason, the scales have been counted in only twenty-six from this island. The number around the body is twenty-eight in ten specimens, twenty-nine in one, thirty in fourteen, and thirty-two in one. This is two scales more than in the Formosan lizards. 61.5% have more than twenty-eight scale rows as against 5.2% of the Formosan; or, in other words, only 38.5% have not more than twenty-eight scale-rows, as against 94.7% of the Formosan. The number of scales in a series from the parietal to a line joining the backs of the thighs varies from fifty-nine to sixty-six, the most frequent number being sixty-one, and the average sixty-two and six-tenths as against the Formosan average of fifty-seven and six-tenths—a difference of five scales. All have a much broader dark lateral band than is found in the Formosan lizards.

It is a pleasure to associate with this lizard the name of the well-known herpetologist, the late Dr. Oskar Boettger.

All our specimens are from Ishigaki. *Leiolopisma laterale* has been recorded from two other islands of the Loo Choo group—Okinawa and Miyako—but we are unable to say whether or not they are identical with the Ishigaki examples.

Lygosaurus pellopleurus Hallowell

This lizard must be rather rare on Okinawa, for only four specimens were secured there. They were taken between May 5 and 11, 1910. Three have scales in twenty-six rows, and one in twenty-eight. Their scales are strongly carinate, the keels varying from three to five in number. The frontal is entire in three specimens, divided in one. If one may judge from so small a series and the few specimens recorded by authors, it seems probable that larger series may establish the fact that the frontal is much less frequently divided in the Okinawa than in the Amami specimens, and perhaps that the scale rows are on the average more numerous in the Okinawa form.

Lygosaurus pellopleurus browni Van Denburgh

When one compares directly the lizards of Okinawa with those of Amami Ōshima he is at once struck by the much stronger keeling of the scales in the specimens from the former island. The Amami Ōshima specimens appear much smoother, and, upon examination, many specimens are found in which the laterals and the nuchals are without keels, while the majority have at most only the two central rows of nuchals keeled. Unfortunately we have only four specimens from Okinawa, but upon carefully selecting the most strongly keeled specimens (Nos. 21386, 21419, 21509 and 21522) from a series of more than one hundred and fifty from Amami it appears that even these are somewhat less strongly keeled than the Okinawa examples. There seems, therefore, to be no doubt that the lizards of these two islands should be regarded as distinct subspecies.

Hallowell, in describing *Lygosaurus pellopleurus* mentioned specimens from both islands without indicating either as the type locality, but, since nearly all later definite records refer to Okinawa, it seems best to restrict Hallowell's name to the lizards of that island and to make Amami Ōshima the type locality of the new subspecies. It is a pleasure to associate with this new lizard the name of the late Arthur E. Brown of Philadelphia.

Diagnosis.—Like *Lygosaurus pellopleurus* but with scales less strongly keeled; the lateral nuchals usually smooth; the laterals smooth or weakly keeled.

Type.—California Academy of Sciences No. 21408, Amami Ōshima, Loo Choo Islands, Japan, April 26 to May 1, 1910.

Description.—The description of Hallowell's species given by Stejneger applies so completely to this subspecies that no detailed description is needed here.

Length to anus.....	61 mm.
Length of tail.....	76 "
Snout to ear	10 "
Fore limb	10 "
Hind limb	17 "
Base of fifth to end of fourth toe.....	5 "

Variation.—There is considerable variation as regards the keeling of the scales in different specimens. As stated above, a few approach the condition found in the Okinawa examples. One, No. 21445, has all scales smooth except on the posterior part of the back and the base of the tail, where they are very weakly keeled. A considerable number have the laterals and a few (usually two) of the central rows of nuchals weakly keeled. A very large number have the laterals and nuchals smooth. The number of keels on a scale is usually three, but may be five.

Fifty specimens, taken at random from the series have been examined as to the number of scale-rows and the condition of the frontal. One has twenty-eight rows, twenty-nine have twenty-six rows, and twenty have twenty-four rows. The frontal is transversely divided in thirty-five specimens, and entire in fifteen.

Cryptoblepharus boutonii nigropunctatus (Hallowell)

Two specimens (Nos. 14959 and 14960), secured from Mr. Owston, are from Haha shima, Bonin Islands. One has twenty-six, and the other only twenty-four scales around the middle of the body, the numbers found by Stejneger in ten specimens examined by him (six 24, four 26). Both have distinct postnasals.

Takydromus dorsalis Stejneger

The collection includes thirty-one specimens of this very distinct species. All are from the type locality, Ishigaki shima, in the southern Loo Choo group, to which island this lizard seems to be confined.

These specimens agree so well with Dr. Stejneger's description that only a few remarks on variation are necessary. The ventrals are in six longitudinal rows in all the specimens, the scales of the outer rows being strongly keeled, while those of the central rows are smooth in twenty-three specimens, and weakly or moderately keeled in eight. All have one large smooth preanal. All have four pairs of large chin-shields, except one (No. 21183) which has four on one side and five on the other. The first pair of chin-shields are partially united in No. 21206. The inguinal pores are 2-2 in sixteen specimens, 2-3 in six, and 3-3 in nine. The superior labials normally are six; but ten specimens have them 6-7, one (No. 21187) 5-6, and one (No. 21192) 7-7. The rostral is in contact with the internasal only in Nos. 21180, 21181, 21200. The color above is a bright grass green. The lower surfaces of the limbs and tail are yellowish. The other lower surfaces are greenish or yellowish white. There are no longitudinal lines except on the sides of the head, where there usually is a white or yellowish band edged above with black.

This is one of the elongate species of the genus. The largest specimens measure 63 *mm.* from snout to vent with tails 241 and 232 *mm.* long. The tails are usually from three to three and one-half times the length of the head and body.

Takydromus septentrionalis Günther

Twelve specimens from Mohkansan (altitude 1000 to 1500 feet) and Hu-chau, Che-kiang, China, are doubtless identical with Günther's original specimens from Ningpo. They differ from the Formosan lizard as stated in discussing *T. stejnegeri*. The principal difference in color is that in Chinese specimens the greenish blue of the belly often extends up on the sides leaving spots of the original brownish ground-color.

These twelve Chinese specimens all have three postmentals and one inguinal pore on each side. All have two rows of

large dorsals on each side, except one which has two on one side while a third row may be made out on the other side. The small dorsal rows may be 3-2, 3-2-1, 2-2, or most frequently 2-1. The ventrals are in eight rows, keeled, with two or three rows of smaller keeled laterals above them on each side. Eleven have a single, large, smooth preanal, while one has two keeled scales. The labials usually are 6-6, but may be 6-7 or 5-6. The rostral touches the internasal in eight and is separated in four. All twelve have the first large supraocular separated from the loreal by a small plate, except No. 16499. This supraocular is in contact with the first superciliary in ten specimens, while in the other two it is separated by a row of small granules.

Takydromus stejnegeri Van Denburgh

This is the Formosan lizard now known as *Takydromus septentrionalis*, the one-pored species which has just been compared with *T. formosanus* under the latter heading.

Takydromus septentrionalis originally was described by Dr. Günther from specimens from Ningpo, Che-kiang, China. In the Academy's collection are twelve specimens from the vicinity of Hu-chau, in the same province as the type locality, which show that the Formosan species is quite distinct from that found on the mainland. The principal points of difference are: that the large dorsal rows are only two on each side in the mainland specimens, while they always are three in those from Formosa; the rostral usually touches the internasal in the Hu-chau specimens, but usually is separated in the Formosan; the mainland species is larger and differs in coloration.

Diagnosis.—General form not much elongate; chin-shields in three pairs; a single inguinal pore; large ventrals in eight rows, keeled; anterior supraocular usually not separated from superciliary by granules; enlarged lateral scales above the ventrals; rostral usually not touching internasal; general color olive or brownish with or without lateral and dorsolateral light lines.

Type.—California Academy of Sciences, No. 18417. **Taipeh, Formosa**, March 10, 1909.

Description.—Rostral separated from internasal by anterior nasals; nostril between anterior and posterior nasals; two loreals, posterior larger, separated from the anterior large supraocular by a small plate; two large supraoculars, in contact with frontal, anterior in contact with first superciliary, other superciliaries separated by a row of granules; six supralabials, fifth very large, under eye; temporals moderate, keeled; three pairs of postmentals; back with three rows of large keeled scales on each side, separated by smaller keeled scales, which are in two rows anteriorly—one row on the middle of the back—and none posteriorly; laterals granular except three rows of keeled scales above the ventrals; ventrals strongly keeled, in eight longitudinal and twenty-eight transverse rows; preanal single, large, smooth, with two smaller plates on each side; one inguinal pore on each side; limbs moderate, the hind leg carried forward reaches the shoulder; tail about three and two-thirds times as long as head and body, covered with strongly carinate scales.

The color above is brownish olive becoming lighter yellowish brown on the head, tail, and limbs. The large dorsals are marked with dark brown, which in places forms narrow dark lines along the keels of the scales. A light greenish white line starts at the superciliaries, runs along the upper half of the outer and lower half of the second row of large dorsal scales to the base of the tail. A second light streak starts at the nostril, crosses the loreals, the lower eyelid, the lower part of the ear-opening, and the side of the body, partly on and partly above the upper row of enlarged laterals. It is bordered above by a narrow black line from the nostril to a point above the axilla. It passes, in part, below the ear-opening. There are black lines on the posterior surfaces of the limbs. The lower surfaces are greenish white, becoming yellowish on the tail.

Length to anus	51 mm.
Length of tail.....	184 "
Snout to ear-opening	12.5 "
Width of head	7 "
Fore leg	20 "
Hind leg	28 "
Base of fifth to end of fourth toe.....	12 "

Variation.—What has been said in connection with *T. formosanus* need not be repeated here. In the one hundred and five specimens at hand the postmentals are in three pairs, except in two specimens (Nos. 18488, 18547) in which they are 3-4. The inguinal pores are 1-1, except in No. 18360 which has 1-2. The anterior supraocular is in contact with the superciliaries on both sides in ninety-five specimens, on one side only in one specimen, and separated on both sides in nine specimens, including one (No. 25046) of ten specimens from the Pescadores, where *T. formosanus* has not been found. The large ventrals are in eight keeled rows, with two or three rows of smaller enlarged laterals above them. The large dorsals always are in three rows on each side. The small dorsal rows are almost always two anteriorly, but almost never more than one, and often none, posteriorly. There may be only one small row anteriorly. The rostral is separated from the internasal in

ninety-eight specimens, in contact in seven. The large preanal is a single smooth plate in seventy-seven specimens, a large plate with two keels in twenty-four, two keeled scales in three, and two smooth scales in one. Of forty-seven specimens from Formosa examined, the loreal meets the large anterior supraocular on both sides in two, on one side in three, and not at all in forty-one. The supralabials normally are six, but show a very strong tendency toward reduction to five.

The collection contains specimens from Taipeh, San Shi Ka, Taihoku, Polisia, Koshun, Tainan, and Takao, Formosa, and the Pescadores. Those recorded formerly by mistake from Keelung are really *T. formosanus*.

It is with much pleasure that this lizard is named for Dr. Stejneger, who first recorded it from Formosa, and has given an excellent description in his Herpetology of Japan (p. 232).

***Takydromus formosanus* Boulenger**

This lizard was first described by Boulenger, in 1894, from several specimens collected by Mr. Holst at Taiwan, Formosa. Dr. Stejneger was inclined to question its distinctness from a series of nine lizards from Taipe, Formosa, which he records as *Takydromus septentrionalis* Günther, although he thought it best to regard them as distinct until further evidence came to hand. This view of Dr. Stejneger was certainly a very natural one, and Dr. Boulenger deserves much credit for recognizing the two forms as distinct, with the limited material which he had for study.

Alcoholic specimens of the two species resemble each other so closely in squamation and coloring that, even with more than two hundred and eighty specimens, I at first regarded them as representing a single species with pores varying from one to two in number. It was only upon more critical study that the fact that there were two quite distinct species became evident.

There seem to be only three points of value in distinguishing the two forms. These are the number of pores, the separation by granules of the large anterior supraocular and the superciliary scales, and the position of the dark and light lines where they cross the ear-opening. In all other respects the two species seem to be alike except that *T. formosanus* seems

to be a little smaller and to have the dorsal scales usually a little more regular in arrangement.

Unfortunately no one of these distinctive characters is absolutely constant in all specimens. Thus No. 18441, a female from Kanshirei, has only one pore on each side although it is undoubtedly a *T. formosanus*, as shown by the separation of the supraocular and superciliary, the position of the ear-stripe and the presence of the merest trace of a second pore on each side. Nos. 18440, 18250, and 18238, all from Kanshirei, are quite similar except that the second pores are a little more evident. In the whole series of two hundred and eighty-four specimens there are eight which show two pores on one side and only one on the other. (Nos. 18274, 18275, 18317, 18330, 18356, 18360, 18376, 18378). Of these, all but two have the supraocular separated (Nos. 18356 and 18360), and all but one (18360) have the ear-stripe high. This last specimen (No. 18360) is the only one which may occasion any doubt; all the others are *T. formosanus*, as are one hundred and seventy specimens with two pores on each side.

If now we examine the one hundred and seventy-eight examples of *T. formosanus*, the two-pored species, as regards the separation of the supraocular from the superciliary by granules and contrast our findings with the results of a similar examination of one hundred and five specimens of the one-pored form, the value of this second character is strongly brought out. In the two-pored species the first large supraoculars are completely separated from the superciliaries by granules in one hundred and sixty-three specimens or 91.6%, while in the one-pored species this condition is found in only nine specimens or 8.6%. Of the fourteen specimens of *T. formosanus* having supraoculars not completely separated, three show this condition only on one side of the head, three have them nearly separated on both sides, leaving less than 4.5% with complete contact as against 90.5% in the one-pored species.

The difference in position of the color-bands near the ear is very slight but none the less real. In *T. formosanus* these markings are placed a little higher than in the other species, so that the lower edge of the light stripe does not extend below the lower margin of the ear-opening, as it does in the one-pored

species. This difference is not quite constant, but nevertheless it is of considerable aid in separating specimens of the two kinds.

Both species occur in western Formosa from the northern part of the island southward at least to Tainan. It certainly is most unusual to find in the same area two species so closely related yet so constantly distinct*; and I suspect that it will be found that their local distribution is different, either as regards altitude or the character of the country. This is indicated by the fact that the two were not collected on the same dates even where, as at Tainan, both are labeled as from the same locality. Otherwise, it is difficult to understand how the two species could remain distinct, unless they breed at different seasons.

Takydromus formosanus always (178 specimens) has three postmentals on each side. The ventral rows are never less than eight, and may be ten when one of the lateral rows is more than usually enlarged. They are strongly keeled. There normally are three rows of enlarged laterals, of which the upper corresponds to the lateral row in *T. smaragdinus*. The large dorsals always are in three rows on each side. The small rows between these often are two throughout, but frequently are reduced to one row posteriorly. Rarely there is only one small row anteriorly, and one or none posteriorly. The posterior reduction is much less constant than in the one-pored species. The rostral is separated from the internasal in one hundred and fifty-eight specimens, and in contact with this plate in twenty. The large preanal is a single smooth plate in one hundred and fifty-seven specimens, a single plate with two keels in five, two keeled scales in four, and two smooth scales in twelve. The supralabials normally are six, but may be five or seven. The loreal is, of course, separated from the large anterior supra-ocular.

The collection includes specimens from Keelung, Jenschiko, Polisia, Kanshirei and Tainan, Formosa.

***Takydromus smaragdinus* Boulenger**

This lizard was first described from specimens labeled merely, Loo Choo Islands. It has since been definitely recorded from

* The overlapping of characters found seems to be pure individual variation.

Okinawa and Miyakoshima. We are now able to add to these localities Amami Ō shima and Kikaiga the easternmost island of the group.

Our collection contains one hundred and fifty-one specimens, as follows: 89 from Kikaiga, 42 from Amami Ō shima, 18 from Okinawa, and 2 from Miyako. The species was not found in either Ishigaki or Iriomote shima, so that it would seem that Miyako shima is the southernmost point of its distribution.

Throughout this extensive range the species shows but little variation. Thus, all the specimens have one inguinal pore on each side. Nevertheless, certain tendencies toward differentiation appear when one critically examines large series from the various islands. It is unfortunate that there are at hand only two specimens from Miyako, for these seem to differ most.

The two specimens from Miyako each have eight rows of large ventrals (the outer being a little smaller) with two more rows of smaller keeled scales on each side just above them. None of the lizards from the more northern islands show more than six rows of full-sized ventrals, although a very few from each island (nine in all) have a row of much smaller keeled scales just above. All of the ventrals are keeled in all specimens.

The dorsal rows, both large and small scales, usually are more numerous on the anterior part of the back than posteriorly. Thus, in the Kikaiga, Amami and Okinawa specimens, the count most often is of large scales four rows anteriorly and three posteriorly, and of small scales two rows anteriorly and one posteriorly. The large rows vary from three to five, and the small from two to none. A few specimens from Amami and Kikaiga (as Nos. 21089, 21031, and 21131) have dorsals all nearly equal in size, so that one counts eight or ten rows. In the two specimens from Miyako, on the other hand, there appears a tendency toward reduction in the number of dorsal rows; so that we find in one example three large rows on each side, separated anteriorly by two, and posteriorly by one small row; while in the other example the arrangement is the same, except that the large rows are reduced to two posteriorly.

The large chin-shields are as follows:—

NUMBER OF CHIN-SHIELDS	3-3	3-4	4-4
Kikaiga specimens	70	11	8
Amami Ō shima specimens....	36	5	3
Okinawa "	18	0	0
Miyako "	1	0	1

The supralabials normally are six, but may be either five or seven. Both specimens from Miyako have seven.

The large preanals may be two separate keeled scales, or two keeled scales partially united, or a single large plate with two keels. The last is the usual condition except on Okinawa, where two is the more frequent number. These conditions are shown in the following table*:

PREANALS	Two Separate	Two United	One 2 Keels	One Smooth
Kikaiga shima	28	3	58	0
Amami Ō shima.....	15	0	26	1
Okinawa shima	11	1	6	0
Miyako shima	1	0	1	0

The rostral is in contact with the internasal in about sixty-nine per cent of the specimens from Amami, about ten per cent of those from Kikaiga, and about five per cent of those from Okinawa. It is not in contact in either specimen from Miyako.

ROSTRAL AND INTERNASAL	In contact	Separated
Kikaiga (38 examined).....	4	34
Amami Ō shima	29	13
Okinawa	1	17
Miyako	0	2

Neither of the specimens from Miyako shows any trace of the light lateral lines, even on the head. They are bright green above, and greenish white below and on the sides of the head. All of the other specimens from all the islands have very definite yellow lateral lines on the row of enlarged lateral scales, and this line extends the whole length of the body except in four specimens from Kikaiga (Nos. 21055, 21084, 21099, 21101) in which it covers only one-third or one-half the distance between the limbs, being absent posteriorly. There is considerable variation in the coloration of individual specimens from the northern islands. The entire area above the yellow lateral line may be bright green (turning in alcohol to blue and then to brownish or grayish slate); or the back may

be green, while the sides and tail are a beautiful bronze or yellowish brown. In some young specimens this bronze extends over the entire back. A few specimens have a second definite light line on the two outer rows of large dorsal scales. These lines may be yellow, a beautiful light green, or bronze. The lower surfaces are greenish white often becoming yellow on the limbs and tail.

The differences between the lizards of the various islands may be summarized as follows:

- a.—Ventrals increased in number to more than six rows. No lateral light line. Dorsals tending toward reduction in number.
" Miyako shima.
- a².—Ventral rows of large scales not more than six. A light lateral line. Dorsals tending toward an increase in number.
- b.—Usually two preanals.
Okinawa shima.
- b².—Usually one preanal.
- c.—Rostral usually in contact with internasal.
Amami Ō shima.
- c².—Rostral usually not in contact with internasal.
Kikaiga shima.

Dr. Boulenger described the species from numerous specimens labeled merely Loo Choo Islands, but his statement that there are eight rows of large ventrals would incline one to believe that he must have had lizards from Miyako. He describes them, however, as having the pale yellow lateral lines. On the other hand Dr. Stejneger had a specimen from Miyako which he states has only six rows of ventrals.

It seems, therefore, that we have here a single species occupying an extensive group of islands, and that upon each of these islands differentiation has begun but is still so slight as to be recognizable as an average difference only when large series are examined—the earliest tangible stage in the evolution of new species. Corresponding with its greater geographical separation, the lizards of Miyako seem to differ more from the lizards of the more northern islands than the latter do one from another. This probably indicates that Kikaiga shima, Amami Ō shima and Okinawa shima were united for some considerable time after their separation from Miyako shima.

The question arises whether or not it is advisable to recognize in nomenclature such slight differences as occur in these lizards. Doubtless there is room for difference of opinion,

but, if a name be merely a convenient handle for certain facts, it would seem that convenience might best be subserved by regarding the lizard of Miyako as the typical form and the northern lizards as subspecies designated by trinomials. I think, however, that such separation should await confirmation of the foregoing results by larger series from Miyako.

Takydromus sauteri Van Denburgh

This very distinct species is represented in the collection by more than fifty specimens from Koshun, Takao, and Kosempo, Formosa. The original description (Proc. Cal. Acad. Sci. (4), III, 1909, p. 50) was based upon a specimen from Koshun.

Diagnosis.—Dorsals large, in regular series; more than three pairs of postmentals; one inguinal pore on each side; ventrals keeled, in six longitudinal rows; head and tail elongate; color above bright green; lateral line on outer row of ventrals; lower surfaces white.

Type.—California Academy of Sciences, No. 18001. Koshun, Formosa.

Description of the type.—Rostral separated from the internasal by anterior nasals; nostril between anterior and posterior nasals, first labial, and rostral; two loreals, posterior larger, separated from the anterior large supraocular by a small plate; two large supraoculars in contact with frontal, separated from superciliaries by a row of granules; seven supralabials, the sixth largest, under eye; temporals moderate, keeled; the internasal, prefrontals, frontal, loreals, and supraoculars have along their posterior, and—in the case of the frontal and prefrontals—their lateral edges, a row of small tubercles which look like the heads of rivets; four pairs of postmentals; back with three or four rows of large keeled scales on each side, separated by two pairs of small keeled scales; laterals granular, except three rows of small keeled scales just above ventrals; ventrals strongly keeled, in six longitudinal and twenty-eight transverse rows; preanal single, large, with two keels, and with a much smaller keeled scale on each side; one inguinal pore on each side; limbs moderate, the hind limb carried forward reaches the elbow; tail about three and four-fifths times length of head and body, covered with carinate scales.

The color above is uniform bright green in fresh specimens, becoming blue or brown or slate in alcohol. A white line runs along the upper lip, passes through the lower corner of the ear-opening and is continued along the upper half of the outer row of large ventral plates to the base of the tail. The lower surfaces are white, without markings. The limbs are yellowish, unicolor.

Length to anus	53 mm.
Length of tail	202 "
Snout to ear-opening	12 "
Width of head	7 "
Fore limb	20 "
Hind limb	24 "
Base of fifth to end of fourth toe.....	11 "

December 13, 1912.

Variation.—Fifty specimens have four pairs of postmentals. No. 18546 has three on one side and four on the other. No. 18550 has five pairs. All have but one inguinal pore on each side. All have six rows of large, keeled ventrals; usually (44 specimens) with two, rarely with no, one, or three, rows of lateral scales between the ventrals and the lateral granules. Fifty-one specimens have three rows of large dorsals on each side, separated usually by two rows anteriorly and one row posteriorly of smaller dorsals. These small dorsals may be 2-1-0, 3-2-1, one throughout, or 1-0. One specimen has the dorsal scales irregularly arranged, there being about one row of large scales on each side, separated by about seven rows of smaller scales. The supralabials may be either six or seven in number. Forty-one specimens have a single large preanal with two keels, three have this plate partially divided, six have it completely divided into two keeled scales, one has a single plate with four keels. The rostral is separated from the internasal in forty-nine specimens, and in contact with this plate in two. The tail varies from about three and one-half to nearly four times the length from snout to anus.

The coloring shows very little variation; but one specimen from Koshun (No. 18553) has a dark red-brown band along the side from the eye, just above the white line, to the tail, where it spreads over the upper surface. The white lateral line is quite constantly present.

This species is named for Mr. H. Sauter. It is very distinct from any of the known species of *Takydromus*, but probably is most closely related to *T. dorsalis*.

***Takydromus kuehnei* Van Denburgh**

Diagnosis.—Dorsals large, in regular series; four pairs of postmentals; four or five inguinal pores on each side; ventrals in six longitudinal rows, the central four rows smooth; head elongate; color olive or olive brown above, with dark olive brown lateral band; lower surfaces white.

Type.—California Academy of Sciences, No. 18002. **Kanshirei, Formosa.**

Description of the type.—Rostral separated from the internasal by anterior nasals; nostril between anterior and posterior nasals (and some-

times first labial); two loreals, posterior much larger, separated from the anterior large supraocular by a small plate; two large supraoculars, in contact with frontal, anterior in contact with first superciliary, posterior separated from superciliaries by a row of granules; seven supralabials, sixth very large, under eye; temporals moderate, keeled; four pairs of postmentals; back with three rows of large, keeled scales, on each side, those of inner row largest, separated anteriorly by one row of smaller keeled scales. Behind the level of the elbows this row is wanting, or is represented only by an occasional scale, the large rows of the two sides being in contact; a few of the upper and lower series of lateral granules are enlarged and keeled, and close to the large dorsals, and also adjoining the ventrals, are small keeled scales; ventrals in six longitudinal series of which all but the outer one on each side are smooth; preanal single, large, smooth, with a much smaller plate on each side; five inguinal pores on each side; limbs moderate, the hind leg carried forward reaches the elbow; tail covered with strongly carinate scales.

The color above is greenish olive, becoming lighter yellowish olive on the limbs and tail. The sides are dark olive brown. A light line, edged above with dark brown, starts at the nostril, crosses the lower eyelid, the lower part of the ear-opening and fades away above the axilla. The upper labials, dorsals, limbs and tail are dotted or spotted with dark brown. The lower surfaces are greenish white, tinged with orange on the tail.

Length to anus	59 mm.
Length of tail (reproduced)	130 "
Snout to ear-opening	14 "
Width of head	8 "
Fore limb	22 "
Hind limb	30 "
Base of fifth to end of fourth toe	13 "

Variation.—The thirteen specimens all have four pairs of postmentals. Eight have four inguinal pores on each side; one (No. 18564) has four on one side and five on the other; and four have five on each side. The large dorsals are in three rows on each side in all but No. 18436, which has four. The large dorsals of the two sides are separated anteriorly by one row of small scales, but in nine specimens this is lacking on the posterior part of the back. The supralabials usually are six, but may be 6-7 or 7-7. The ventrals are in six rows in all the specimens. The outer ventral row on each side is keeled in all except No. 18565, in which all are smooth. There sometimes is one row of enlarged laterals above the ventrals. The rostral is separated from the internasal in all. The preanal is smooth in all, and is single except in No. 18565, which has two smooth scales. The anterior supraocular may be in contact with the superciliary, or may be partially or completely separated by granules. The large dorsals of the inner rows are often marked centrally with very dark brown or black, and

these spots are sometimes continued on the tail as a single row of black spots along the mid-dorsal line on each alternate whorl of caudal scales.

This seems to be the rarest species of grass lizard in Formosa. It has been taken only at Kanshirei and Taipeh.

Achalinus werneri Van Denburgh

Diagnosis.—Similar to *Achalinus spinalis*, but with more numerous urosteges (88 to 96).

Type.—California Academy of Sciences, No. 22064. Nase, Amami Ōshima, Loo Choo Islands, Japan.

Description.—In general similar to *A. spinalis*. The internasal suture is about equal to that of the prefrontals. Loreals are absent. There is one preocular on each side. Temporals are 2+2+3 on each side. The supralabials are 6-6, the fourth and fifth reaching eye, the sixth largest. The sixth supralabial is semi-divided on one side. Infralabials are 6-6, the first in contact with its fellow of the opposite side, the first to fourth in contact with the anterior genials, the fifth and sixth largest. There are two pairs of genials, the posterior smaller. The scales are in twenty-three rows, with one keel except in the outer row, the scales of which are smooth and about twice the size of those above. The gastrosteges are one hundred and fifty-seven in number. The anal is entire. There are ninety-three undivided urosteges.

The back is nearly uniform dark brown, without definite dark lines. The lower surface of the tail is uniform dark brown like the back.

Length to anus235 mm.
Length of tail102 "

Variation.—A second specimen, No. 22091, agrees with the type in essential characters. It has scales in twenty-three rows, gastrosteges one hundred and seventy-two, anal entire, urosteges eighty-nine. The genials are two on one side and three on the other. The internasal suture is longer than the prefrontal. The temporals are 2+2+3 and 2+2+4. There is a dark mid-dorsal line, and an indefinite dark subcaudal streak. The ventral surfaces are grayish white. The length to anus is 296 mm., of tail, 96 mm.

A tail 110 mm. long, taken from the stomach of a *Hemibungarus japonicus* (No. 22063) is now No. 22065 of the Academy's collection. It has ninety-six undivided urosteges.

Distribution.—This species has been taken only at Nase, Amami Ōshima, Loo Choo Islands, Japan.

Remarks.—This interesting new species differs from all other known species of the genus in having a greater number of gastrosteges. No *Achalinus* has heretofore been taken on any of the Loo Choo Islands, although species have been described from China, Formosa and Japan proper. I take pleasure in naming this snake for Dr. Franz Werner of Vienna.

Calliophis swinhoei Van Denburgh

Diagnosis.—Similar to *Calliophis maccllellandii* but with more numerous gastrosteges and urosteges; the sum of the gastrosteges and urosteges always more than 256.

Type.—California Academy of Sciences, No. 14978. Suishako, Central Formosa, October 5, 1907.

Description of the type.—Eye about as long as distance from edge of lip. Rostral nearly as high as broad. Frontal as long as its distance from rostral, shorter than parietals. One pre- and two postoculars. Temporals 1+1. Supralabials seven, third and fourth reaching the eye, sixth and seventh largest. Infralabials six, first pair meeting behind the mental,* first four in contact with anterior genial, third and fourth largest. Anterior genials slightly larger than posterior. Scales in thirteen rows. Gastrosteges two hundred and thirty. Anal divided. Urosteges thirty-four, divided.

The color above is reddish brown, more grayish on the sides, crossed by thirty regular, narrow, light-edged black bars on the body and four on the tail. Many of the spaces between these bars show a small black spot on the third or fourth scale-row of each side. The black dorsal rings widen into blotches on the belly, and midway between these blotches are similar ventral blotches not connected with dorsal rings, but corresponding to the small lateral spots. The ground color of the belly is yellowish white. The snout, as far back as the anterior portions of the third supralabials, the preoculars, and the prefrontals, is gray. Behind this the head is black, crossed by a broad white band on the fifth, sixth, and seventh labials, the temporals, the posterior portions of the postoculars, supraocular, and frontal, and all but the extreme tip of the parietal plates.

Length to anus.....204 mm.
Length of tail.....20 "

Variation.—A second specimen in the Academy's collection No. 18864, has 219 gastrosteges, 41 urosteges, $29\frac{2}{3}$ dark dorsal rings on the body and 6 on the tail. In other respects it agrees with the type. In all, five specimens from Formosa are known. All have scales in thirteen rows, seven supra-

* This is not the case in the single Indian specimen at hand.

labials, and one pre- and two postoculars, anal divided, and temporals 1+1. The gastrosteges and urosteges counts are:

MUSEUM	GASTROS- TEGES	UROS- TEGES	SUM	AUTHORITY	LOCALITY
British	240	34	274	Boulenger	Formosa
Bureau Sci. Res	234	34	268	Oshima	Formosa
Taihoku Med. School	234	32	266	Oshima	Schinchiku, Formosa
Cal. Acad. Sci.	230	34	264		Suishako, Formosa
Cal. Acad. Sci.	219	41	260		Kosempo, Formosa

Twelve specimens of *C. maccllellandii* from Continental Asia have counts as follows:

British	212	28	240	Boulenger	Assam
"	219	28	247	"	Pegu
"	215	26	241	"	Mts. N. Kiu Kiang
"	212	32	244	"	S. China
"	214	28	242	"	Nepal
"	231	25	256	"	Nepal
"	210	30	240	"	Darjeeling
"	210	30	240	"	Darjeeling
"	182	28	210	"	Darjeeling
"	193	36	229	"	Fokien, China
"	208	33	241	Günther	India
Cal. Acad. Sci.					Sikkim, India

Distribution.—This snake seems to be restricted to the island of Formosa, where it has been taken at Shinchiku, Suishako and Kosempo. The continental species, *C. maccllellandii*, has been found from India to Fokien, China.

This species is named for Robert Swinhoe who sent the first specimen to the British Museum.

Hemibungarus japonicus (Günther)

We have received four specimens of *Hemibungarus* from Amami Ō shima. Numbers 22063 and 22089 have only the middorsal black line without any indication of lateral lines. No. 22090 has, in addition to the central dorsal line which ends on the basal third of the tail, a few blackish dots along the adjacent borders of the third and fourth rows of scales. No. 14987 shows the midline and a narrow, though very distinct, trace of a lateral line on the third and fourth rows of scales. The blackish rings on the body are fourteen in two specimens, and thirteen in two; and two and three on the tail. No. 22063 has only twenty-seven urosteges; otherwise the scale-counts are within the known range of this form.

CAL. AC. SCI. No.	SCALES	GASTROS- TEGES	UROS- TEGES	SUPRA- LABIALS	PRE-POST OCULARS	TEMP- ORALS
14987	13	215	31	7-7	1-2	1+1
22063	13	202	27	7-7	1-2	1+1
22089	13	206	30	7-7	1-2	1+1
22090	13	205	30	7-7	1-2	1+1

Including those mentioned above, twelve specimens are known to have been taken on Amami Ō shima. Of these, six have only the median dorsal black line; five have a lateral line on the third and fourth row of scales of each side, more or less clearly indicated; one, examined by Dr. Wall, had indications of another line on each side, making five lines as in *H. boettgeri*, but much narrower and less intense.

No. 22063 contained the remains of an *Achalinus* (No. 22065) which it had eaten.

Hemibungarus boettgeri (Fritze)

We have received two specimens of this snake, but, unfortunately, neither bears an exact locality-label. Both were purchased in Kyoto, Japan, and one is labeled "Formosa?" while the other is from the Loo Choo Islands. The latter, No. 16470, has 221 gastrosteges, and eighteen dorsally complete black rings on the body with two on the tail. There can be no doubt that the specimen labeled "Formosa?" also came from the Loo Choos. It has two small maxillary teeth, 207 gastrosteges, 29 urosteges, 13 scale rows, and 13 body rings. The only difference between *Hemibungarus boettgeri* and *H. japonicus* is found in the number and character of the longitudinal black lines. Although it has been shown that *H. japonicus* may have either one, three or five lines, these lines seem always to be much narrower and less intense than in *H. boettgeri*. Thus far, all (ten) specimens of the *H. boettgeri* type of coloration which have any definite locality assigned, have been secured in Okinawa, while all the (twelve) definitely labeled *H. japonicus* have come from Amami Ō shima. It would seem, therefore, that the *Hemibungarus* of Okinawa is different from that of Amami Ō shima, and that they must be recognized as distinct species until more definitely intermediate specimens are discovered.



Van Denburgh, John. 1912. "Concerning certain species of reptiles and amphibians from China, Japan, the Loo Choo Islands, and Formosa." *Proceedings of the California Academy of Sciences, 4th series* 3, 187–258.

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