THE LAND REPTILES OF THE HAWAIIAN ISLANDS.

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Specimens of all the species of land reptiles known to inhabit the Hawaiian Islands have recently been added to the collection of the U. S. National Museum chiefly through the efforts of the late Mr. V. Knudsen, of Kauai, Mr. R. Meyer, of Molokai, and Mr. H. W. Henshaw, of Hawaii, who have kindly furnished me with a large amount of material. As no collected account of this branch of the Hawaiian fauna has ever been published, I have thought it proper to treat the subject somewhat fully and to add descriptions and figures so that residents, as well as visitors, may be able to identify reptiles they may meet without being obliged to refer to the widely scattered literature. For the sake of completeness I have added the synonyms of each species with citations of the principal herpetological works, as well as other bibliographical references, so far as they relate to specimens from the Hawaiian Islands. These citations have been personally verified by me in all cases in which the page reference is not included in parenthesis or omitted.

List of species occurring in the Hawaiian Islands.

It is quite significant that there are no true land reptiles in the Hawaiian Archipelago other than a few species of lizards, and particularly that all the species known to occur there belong to the cosmopolitan families, the geckos and the skinks. It is further to be observed that all three skinks and three of the four species of geckos belong to species widely distributed over the Indo-Polynesian island world, and,

finally, that the remaining gecko has close relatives in New Caledonia, Java, Sumatra, and Ceylon.

This distribution does not sustain the theory of a once continuous land connection between the various island groups. On the contrary, the limited number and wide range of this fauna go to show that at the time of immigration the Hawaiian Islands, at least, were separated, and probably widely so, from whatever land masses may have connected other islands at that time or earlier.

If the meteorologic and hydrographic conditions at that time were anything like what they are at present, it is not likely that these frail land vertebrates were distributed over thousands of miles of ocean by ordinary means. Currents and wind would have prevented their distribution, and such obstacles which have appeared to some authors so formidable as to make them dubious concerning the western origin of the Polynesian navigators themselves seem insurmountable for small land vertebrates incapable of flight.

It is a well-known fact, however, that these small lizards are easily transported in vessels and among household goods over great distances, and when looking for the means by which these animals may have reached the Hawaiian Islands it is not possible to escape the conclusion that they have been introduced by man's agency. From the circumstances that the true home of these lizards is to the south and west of Hawaii; that nearly all the species were collected there as early as the visit of the United States Exploring Expedition under Wilkes; and that the species are more or less common on the principal islands of the Hawaiian group;[1] from these circumstances it is permissible to conclude that the lizards immigrated to the islands with the ancestors of the Hawaiians.

A greater antiquity in the islands can hardly be assigned to them, for if their immigration was anywhere near concomitant with the first appearance, for instance, of the ancestors of the Drepanidine birds now living there, it is scarcely credible that they would not have become more differentiated. The fact that specimens identical with *Hemiphyllodactylus leucostictus* have thus far not been found outside the Hawaiian Islands does not prove anything to the contrary, partly because it is possible that they may be found in some of the as yet but little explored archipelagoes to the west and south, and partly because the differences which distinguish this gecko from its nearest allies are so slight that it is conceivable that they may have been evolved since the advent of man in the islands.

At the present stage of our knowledge the distribution of these animals throws very little light upon the question by which route they and man—if it be true that they accompanied him—reached the archipelago.

[1] Thus far, specimens have only been collected in Hawaii, Molokai, Oahu, and Kauai; but there is no reason to believe that they are not also to be found on the intervening islands.

It should be added, however, that a better and more detailed knowledge of all the forms inhabiting Polynesia might give better results. Not until specimens from all the groups have been brought together in sufficient numbers will it be possible to affirm with certainty that these widely distributed species have not differentiated into local forms by which, however slight the characters, it might become possible to trace their evolution and incidentally their migrations.

The only point which can be claimed with certainty is that they came from the west. One or two of the species, it is true, have also been found in a few localities in America, but their distribution here is purely local and, no doubt, is due to introduction by man, much in the same way as they reached the Hawaiian Islands, though probably much later. If, then, it be true that these lizards have accompanied the Polynesians in their migrations, the conclusions to be drawn add to the mass of evidence available against any theory of their having originated in America, though this addition may perhaps be superfluous at the present day.

I am not aware of records of any of the marine snakes having been taken at the Hawaiian Islands. Some are known to occur as far east as the Society Islands; but the only surprising feature is that *Hydrus platurus*, which is recorded from Japan, Tahiti, and the west coast of Mexico, has not been found in Hawaiian waters, at least occasionally.

The marine turtles living in the seas surrounding the Hawaiian Archipelago and breeding on some of its outlying islets are, as yet, too imperfectly known to make it profitable to discuss them on the present occasion, hence the limitation of this paper to the terrestrial reptiles of the islands.

There are no indigenous batrachians in the Hawaiian Islands notwithstanding the oft-repeated assertion that a toad, the so-called *Bufo dialophus* Cope, occurs there.[1] Cope himself has acknowledged his double error, both in regard to the specific distinctness of the specimen upon which the description was based and the habitat alleged.[2] It was in fact a specimen of *Bufo quercicus* Holbrook, from eastern North America.

Batrachians have been introduced intentionally, however, during recent years. Frogs and toads are said to have been brought from China and Japan, as well as from America, in order to assist in the fight against the mosquitoes.

[1] The latest author to repeat this statement is Beddard in his Text-book of Zoogeography (1895), p. 147, footnote. On page 77 of the same work he attributes this same species to the Fiji Islands.

[2] "The redescription of the species by myself was due to the omission of its characteristic peculiarities from extant writings. The erroneous locality (Sandwich Islands) is one of several such errors, based on the incorrect labelling" . . . Cope, Man. N. Am. Batr., 1889, p. 292.

Order SQUAMATA.

Suborder SAURI.

The lizards occurring in the Hawaiian Islands belong to two different families, and may be distinguished as follows:

a^1 No large symmetrical shields on top of head; body covered with small granules or minute scales; digits dilated; pupil vertical (fig. 7).....GEKKONIDÆ, p. 786

a^2 Top of head with large symmetrical shields; body scales large, cycloid; digits not dilated; pupil round (fig. 11).....SCINCIDÆ, p. 803

Family GEKKONIDÆ.

THE GECKOS.

Four species, belonging to four genera, are known from the Hawaiian Islands. All are rather closely related and are very much alike in general appearance. In identifying them strict attention must be paid to the structural characters as given below. The four species may be distinguished as follows:

a^1 Compressed distal phalanx of digits adhering to the dilated portion and extending somewhat beyond it, but not rising angularly from within the edge (fig. 1).....*Lepidodactylus lugubris*, p. 788

a^2 Compressed distal phalanx of digits free, rising angularly from within the edge of the dilated portion (fig. 2).

b^1 Inner digits with distal phalanx compressed and clawed (fig. 3).
Hemidactylus garnotii, p. 792

b^2 Inner digits without a distal compressed and clawed phalanx.

c^1 Chin-shields large (fig. 5); a series of transverse plates under the tail.
Peropus mutilatus, p. 796

c^2 Chin-shields not differentiated (fig. 6); no transverse plates under the tail.
Hemiphyllodactylus leucostictus, p. 800

Each of the four species has its own peculiar characteristic, which makes their exact identification comparatively easy, namely:

Hemidactylus garnotii, a well-developed raised terminal joint on the inner digit;

Lepidodactylus lugubris, the terminal joint of the digits adhering to the disk, not raised up from it;

Peropus mutilatus, the peculiar pattern of the chin-shields, shown in fig. 5 (p. 797);

Hemiphyllodactylus leucostictus, the elongated body and short cylindrical tail.

Comparative table of dimensions.

Species.	Total length.	Snout to vent.	Vent to tip of tail.	Snout to ear.	Width of head.	Fore limb.	Hind limb.	Axilla to groin
	mm.	*mm.*	*mm.*	*mm.*	*mm.*	*mm.*	*mm.*	*mm.*
L. lugubris	85	38	47	9.5	8	11	14	18
H. garnotii	114	50	64	13	8	14	21	21
P. mutilatus	95	46	49	12	9	12	16	21
H. leucostictus	67	38	29	8	5.5	8	13	20

The most striking difference in the proportions is shown by *H. leucostictus*, in which the (nonreproduced) tail is considerably shorter than head and body, while in the other species it is longer.

One of the peculiarities of most geckos is the facility with which their tail breaks off and is again reproduced. It is not uncommon for them, if caught by the tail, to wriggle themselves away from that organ, which is thus left in the hands of the captor. A new tail soon grows out again, but of a different shape and more or less different scale covering than in the original, being usually shorter, broader at base, and often devoid of such specialized structures as spines, plates, and denticulations along the edges. In comparing specimens and descriptions it is therefore essential to observe whether the tail is an original or a reproduced one. Duplication of species has often resulted from this rule not having been observed.

The geckos to a great extent are crepuscular and nocturnal in their habits, coming out at night from their hiding places to hunt for insects. They are found not only on trees and among the vegetation generally, but commonly take up their abode in and near human habitations being particularly frequent about verandas and outhouses. All four species occurring in the Hawaiian Islands are thus found in houses though possibly in different proportion. Mr. Knudsen, when collecting them for me, kept those obtained in the same place together in the same bottle, and in the one containing the lizards caught in the house there were 6 *Hemidactylus garnotii*, 3 *Peropus mutilatus*, 2 *Lepidodactylus lugubris*, and 1 *Hemiphyllodactylus leucostictus*. He adds that they are "never found inside good houses," but only in "thatched and open houses." However that may be in Kauai, Mr. E. P. Church, in a letter to Prof. A. A. Wright, of Oberlin College, about the geckos in Honolulu writes expressly as follows:

> The lizards live in the best of houses, and are not seriously objected to by the most excellent housekeepers. They remain behind the mirrors, pictures, etc., in the daytime in the best of parlors. At nightfall they come out from their concealment and call to their fellows with a little chirping noise that can be heard across good-sized rooms. They run about on the walls and ceiling catching flies and mosquitos. This renders them somewhat welcome inmates of human dwellings. It is easy to catch them as their powers of locomotion are not great.

It would be very interesting to know, however, whether the geckos in the Hawaiian houses during the time of their concealment keep apart in different localities like those of India observed by Colonel Tytler, who says:

> As a general rule they keep separate and aloof from each other; for instance, in a house the dark cellars may be the resort of one species, the roof of another, and crevices of the walls may be exclusively occupied by a third species. However, at night they issue forth in quest of insects, and may be found mixed up together in the same spot; but on the slightest disturbance, or when they have done feeding, they return hurriedly to their particular hiding places.

On each side of the neck behind the ear-opening there may be seen

in many geckos a more or less enlarged oblong swelling which, in large specimens, often assumes great dimensions—equalling one-half the size of the skull. This is a sac filled with calcareous matter, which is connected with the ear by ducts or canals. Professor Wiedersheimer, who was the first to describe this organ in detail, considers it an auxiliary to the auditory apparatus, having as its object the perfecting of the sense of hearing in the animals. These calcareous masses are popularly, but erroneously, believed to be the undeveloped eggs which the females are supposed to carry about in a sort of pouch until they are deposited in some safe place for hatching.

FIG. 1.—TERMINAL JOINT OF TOE OF LEPIDODACTYLUS LUGUBRIS. (ENLARGED.)

The geckos, with very few exceptions, seem to be oviparous, the eggs being spherical and covered with a white, hard shell.

LEPIDODACTYLUS[1] Fitzinger.

1843.—*Lepidodactylus* FITZINGER, Syst. Rept., p. 98 (type, *L. lugubris*).
1845.—*Amydosaurus* GRAY, Cat. Lizards Brit. Mus., p. 162 (same type).

Compressed distal phalanx of digits adhering to the dilated basal portion and extending somewhat beyond it, but not rising angularly from within the edge; subdigital lamellæ divided by a median groove; thumb without claw; no enlarged plates on under side of tail.

The geographical range of the genus does not exceed that of the typical species. A few imperfectly known species, with habitats outside that range, have been assigned to it, but it is doubtful whether they really belong there.

LEPIDODACTYLUS LUGUBRIS (Duméril and Bibron).

MOURNING GECKO.

(Figs. 1, 6.)

1836.—*Platydactylus lugubris* DUMÉRIL and BIBRON, Erpét. Gén., III, p. 304 (type locality, Tahiti).—*Lepidodactylus lugubris* FITZINGER, Syst. Rept. (1843), p. 98.—BOULENGER, Proc. Zool. Soc., London, 1883, p. 120, pl. XXII, fig. 3; Cat., Liz. Brit. Mus., I (1885), p. 165; III (1887), p. 487; Ann. Mag. Nat. Hist., (6) XX, September, 1897, p. 306.—*Peripia lugubris* PETERS and DORIA, Ann. Mus. Civ. St. Nat., Genova, XIII (1878), p. 371.
1857.—*Peropus neglectus* GIRARD, Proc. Phila. Acad., p. 197; extr. p. 5 (type locality, unknown); U. S. Expl. Exp. Herpet. (1858), p. 278.—*Gehyra? neglecta* BOULENGER, Cat. Liz. Brit. Mus. (1885), I, p. 150.
1858.—*Hemidactylus meijeri* BLEEKER, Natuurk. Tijds. Nederl. Ind., XVI, p. 47 (type locality, Bintang).
1864.—*Peripia cantoris* GÜNTHER, Rept. Brit. Ind., p. 110 (type localty, Pinang).
1869.—*Gymnodactylus caudcloti* BAVAY, Mém. Soc. Linn. Normandie, XV, No. 5, p. 13 (type locality, New Caledonia).
1872.—*Peripia meyeri* GÜNTHER, Proc. Zool. Soc. Lond., 1872, p. 594.
1874.—*Peripia mysorensis* MEYER, Sitz. Ber. Berlin Akad., 1874, p. 129 (type locality, Mysore).

[1] From λεπις, -δος, scale; and δάκτύλος, finger.

The type of Girard's *Peropus neglectus* was lost long ago, but there can be no doubt that it belongs here.

As to the identity of the Hawaiian specimens with the present widely distributed species I have only to say that they fit the descriptions exactly, and that I have compared them with specimens believed to have been collected in Samoa, without being able to discover any tangible differences. The Hawaiian specimens seem to be of somewhat stouter build; their eyes are possibly a trifle larger, and there is a slightly greater uniformity of the upper and lower caudal scales, but the differences, if indeed they are real, are too slight to be expressed in a diagnosis. Possibly the anterior chin-shields may average a little smaller, but the individual variation in this respect is too great to offer any basis for a separation. The specimens from the Hawaiian Islands have the subdigital pads colored blackish, but it is doubtful if this character is of any value.

L. lugubris has a wide distribution ranging from the Malay peninsula and archipelago in the west through New Guinea, Solomon Islands, New Hebrides, New Caledonia, Fiji, Rotuma, Samoa, Tonga, Tahiti, Gilbert, and Marshall Islands[1] to the Hawaiian Islands.

From the latter it has first been noted by Peters and Doria, who recorded specimens in the Genoa Museum, collected by D'Albertis in Honolulu. The specimens in the U. S. National Museum show that the mourning gecko besides occurring in Oahu is also found in Kauai and Hawaii. Records from the other islands are lacking.

This species ought not to be easily confounded with any of the other Hawaiian geckos, except *Hemiphyllodactylus leucostictus*. Both are lacking large and well-defined chin-shields and transverse plates under the tail, but apart from the radical differences in the structure of the digits explained elsewhere, the coloration of the fresh specimens seems to be sufficient to distinguish them. In *L. lugubris* the ground color is a more or less light drab with scattered dusky markings, while in *L. leucostictus* it is of a more brownish cast with white markings behind the eyes, on the upper surface of the toes, and at the base of the tail above.

Description.—No. 23456, U.S.N.M. Male adult; Hawaii, Hawaiian Islands; collector, H. W. Henshaw. Rostral rectangular, broader than high in contact with two supranasals and three small scales between the latter; first supralabial in contact with the lower postnasal and reaching nostril; nostril between upper posterior corner of rostral, first supralabial, and three scales behind and above, the upper one, or supranasal, being small and not in contact with the corresponding one of the other side; fourteen supralabials, the last four being small, the tenth located under center of eye; scales on top of head finely granular, somewhat larger on snout; eye equidistant from nostril

[1] In the St. Petersburg Museum, according to Strauch, Mém. Ac. St. Petersb. (7), XXXV, No. 2, 1887, p. 27, there are specimens from Tarowa and Yaluit by Dr. E. Riebeck, 1885.

and ear-opening, the diameter about one-half its distance from ear-opening, which is roundish and smaller than the larger supralabials; mental pentagonal narrow, scarcely as wide as the nearest infralabials; nine larger infralabials; the scale rows adjoining the infralabials considerably larger than the granules covering the throat, and more or less hexagonal, especially the pair behind the mental, but not clearly differentiated as chin-shields, merging by degrees into the granules; body and legs above covered with small uniform granules barely larger than those on head; throat with granules of the same size, but the rest of the underside with imbricate scales two to three times larger than dorsal granules; scales on preanal region somewhat larger, nonimbricate, more or less hexagonal; an angular series of eight of these, the angle pointing backwards, with obscurely developed pores, join a similarly modified series of eight scales on the proximal half of each thigh, together twenty-four obscure pores; fingers and toes free, all except inner ones (which are otherwise well developed) with a compressed clawed joint adhering to the dilated basal portion; the distal part of the latter underneath provided with seven to eight pairs of lamellæ; tail flattened underneath, with a sharpish edge, and covered with small scales, somewhat larger inferiorly (proportion as 10 to 7), which show a slight though perceptible verticillate arrangement every tenth or eleventh scale row above and every sixth or seventh below, being a trifle larger than the others and emphasized on the lateral edge by a slightly enlarged spine-like scale imparting a light denticulation to the edge.

Color above pale drab with a few scattered blackish dots of which a pair at the base of the tail is most conspicuous; head with obscure brownish marblings, the labial sutures being also marked with brown; a band of similar color and white-edged above from snout through eye to above the ear; underside white; the terminal portion of the dilated part of the digits dusky; tail like body, with alternating pale-brownish irregular cross bars above.

Dimensions.—Total length, 85 mm.; snout to vent, 38 mm.; vent to tip of tail, 47 mm.; snout to ear-opening, 9.5 mm.; greatest width of head, 8 mm.; fore leg from axilla, 11 mm.; hind leg from groin, 14 mm.; from axilla to groin, 18 mm.

Variation.—All the specimens examined by me agree very closely in structure with the specimen described above. One specimen (No. 23504, U.S.N.M.) has the tail reproduced. It is much shorter, flatter, and broader at base, the scales rougher and not arranged in regular transverse series. As a curiosity, it may be mentioned that the tip of this tail is bifurcate for a distance of about 3 mm.

The chief variation is in the coloration. In some specimens black spots are nearly absent above, while in others they are more numerous. Thus in a specimen which I collected in Honolulu (No. 23508, U.S.N.M.) there is from the shoulders to the base of the tail a double series of

black spots which form the posterior angles of obscure transverse chevron bands; the band at the base of the tail is entirely black, bordered behind with whitish and continues down the posterior edge of the thigh; the trans-ocular line passes posteriorly to above the arm and there is a distinct dusky interocular band. In some of the specimens the throat is densely speckled with minute brownish dots.

The dusky color of the lamellated digital pads is constant in all the specimens, a character which is not present in the two specimens before me said to have been collected in Samoa (Nos. 15571, 15572, U.S.N.M.).

List of specimens of Lepidodactylus lugubris.

Number.	Collection.	Age.	Locality.	When collected.	From whom received.	Remarks.
23483	U. S. N. M.	Adult.	Kauai, Waiawa..	May —, 1895	V. Knudsen.....	
23484	.....do	...do ..	.....do	.....do	.....do	
23503	.....do	...do ..	.....do	.....do	.....do	
23504	.....do	...do ..	.....do	.....do	.....do	Tail reproduced, forked. See p. 790.
23505	.....do	...do ..	.....do	.....do	.....do	
23506	.....do	...do ..	.....do	.....do	.....do	
23508	.....do	...do ..	Oahu, Honolulu..	Nov. 17, 1896	L. Stejneger	See p. 790.
23453	.....do	...do ..	Hawaii	.....	H. W. Henshaw...	
23454	.....do	...do ..	.....do	.....	.....do	
23455	.....do	...do ..	.....do	.....	.....do	
23456	.....do	...do ..	.....do	.....	.....do	Specimen described, p. 789.
23457	.....do	...do ..	.....do	.....	.....do	
23458	.....do	...do ..	.....do	.....	.....do	
902	Oberlin ...	...do ..	Oahu, Honolulu..	.....	E. P. Church.....	
902	.....do	...do ..	.....do	.....	.....do	

HEMIDACTYLUS[1] Gray.

1825.—*Hemidactylus* Gray, Ann. Philos., (2) X, 1825 (p. 199) (type, *H. verruculatus* Cuvier = *turcicus* Linnæus).

1843.—*Onychopus* Fitzinger, Syst. Rept., p. 104 (type, *H. garnotii*).

1843.—*Hoplopodion* Fitzinger, Syst. Rept., p. 104 (type, *H. coctæi*).

1845.—*Doryura* Gray, Cat. Liz. Brit. Mus., p. 156 (type, *D. bowringii*).

1845.—*Boltalia* Gray, Cat. Liz. Brit. Mus., p. 158 (type, *B. sublævis* = *H. coctæi*).

Fig. 2.—Terminal joints of toe of Hemidactylus garnotii. (Enlarged.)

Compressed distal phalanx of digits free, rising angularly from within the edge of the dilated portion; subdigital lamellæ in two series; inner digit with compressed clawed phalanx; underside of tail with a median series of large transversely dilated plates.

Fig. 3.—Underside of foot of Hemidactylus garnotii. (Enlarged.)

The genus *Hemidactylus* comprises numerous species distributed over nearly all the warmer portions of the globe.

[1] From ἥμι, half; and δάκτυλος, finger.

HEMIDACTYLUS GARNOTII[1] Duméril and Bibron.

THE FOX GECKO.

(Figs. 2–4.)

1836.—*Hemidactylus garnotii* DUMÉRIL and BIBRON, Erpét. Gén., III, p. 368 (type locality, Tahiti).—BOULENGER, Cat. Liz. Brit. Mus., I (1885), p. 141; III (1887), p. 485.—*H. garnotii* BOULENGER, Proc. Zool. Soc. London, 1883, p. 118, pl. XXII, figs. 1, 1*a*.

1857.—*Doryura vulpecula* GIRARD, Proc. Phila. Acad., 1857, p. 197; extr., p. 5 (type locality, "Sandwich Islands"); U. S. Expl. Exp., Herpet. (1858), p. 286, Atlas, pl. XXIV, figs. 17–24.

I have left out of the synonymy of this species all references to specimens from India, Burma, and Sumatra,[2] since Theobald describes his *Doryura guadama* as possessing nineteen femoral pores, while the true *H. garnotii* appears to be entirely destitute of femoral pores. Boulenger, when writing his account of the species, in the Catalogue of Lizards, does not seem to have examined male specimens, and the types in the British Museum are also stated to be females. The negative result from them is consequently not convincing.

There can scarcely be a doubt that Girard's *Doryura vulpecula* is correctly referred to this species. It is true, Girard says that "from *D. garnoti* it differs by a more pointed snout or muzzle, and by the sides of the tail not being denticulated," and in the description of the tail he expressly states that "the sides of that organ are sharp, though not otherwise serrated or denticulated," while in all the specimens before me with unreproduced tail the edge of the latter is most distinctly and obviously denticulated, strongly differentiated spines being placed at equal intervals along the sharp margin. Girard's specimens are lost,[3] but it is almost safe to say that those he examined and described had the tail reproduced, for in such specimens before me I find the new portion destitute of the spinous denticulation. No. 23470, U.S.N.M., is particularly instructive in this respect, as only the terminal two-thirds of the tail are reproduced, with the result that the edge of the basal third of the tail of this individual is strongly denticulated, while the distal two-thirds are "nearly even laterally," as expressed by Girard. An inspection of the figure presented by him[4] bears out this theory, as it certainly has the appearance of a specimen with a reproduced tail.

[1] Named for Prosper Garnot, French traveler and naturalist.

[2] *Hemidactylus ludekingii* BLEEKER, Natuurk. Tijdschr. Nederl. Ind., XVI, 1858, p. 27 (Agam, W. Sumatra). *Hemidactylus* [*Doryura*] *maudellianus* STOLICZKA, Journ. As. Soc. Bengal, XLI, 1872, Pt. 2, p. 101, pl. III, figs. 1, 2 (Sikkim). *Doryura guadama* THEOBALD, Journ. Linn. Soc. London, Zool., X, 1870, p. 30 (Burma). *Hemidactylus blanfordii* BOULENGER, Cat. Liz. Brit. Mus., I (1885), p. 141 (Darjeeling).

[3] Unless No. 11288, U.S.N.M., a small specimen without locality, but recorded as collected by the Exploring Expedition, be one of the cotypes.

[4] U. S. Expl. Exped., Herpet., Atlas, pl. XXIV, fig. 17.

The range of the present species can not be stated with any degree of certainty on account of the doubt attached to the western specimens which may belong to a separate species distinguished by a long series of femoral pores in the male. The distribution in Polynesia and Melanesia is also known but fragmentarily, New Caledonia, Tahiti, and the Hawaiian Islands being the principal localities in which the species has been found hitherto.

The fox gecko, which derives its name from the long fox-like snout, according to Mr. Knudsen's notes is found in thatched and open houses as well as in cocoanut palms and large mango trees. A number of those sent were picked up from under large flat stones and planks. Judging from the numbers sent, this is the most common of the geckos.

It is apparently the largest of the Hawaiian geckos and is easily distinguished from the other species not only by the fifth digit being perfectly formed as the others, but also by its chin-shields and color. In the latter respect it may often resemble some specimens of *Hemiphyllodactylus leucostictus*, but the latter has a cylindric tail with no enlarged plates underneath.

FIG. 4.—CHIN-SHIELDS AND LOWER LABIALS OF HEMIDACTYLUS GARNOTII. (ENLARGED.)

Description.—No. 23510, U.S.N.M. Adult; Kalae, Molokai; November, 1896; collector, R. Meyer. Rostral broader than high, squarish, with a nick in the posterior margin for the anterior angle of the internasal and a median suture, or cleft, extending forward for about one-half the height of the shield; in contact with two supranasals and one hexagonal scale of about equal size between the latter; first supralabial in contact with lower postnasal and reaching nostril; nostril between rostral, first supralabial and three scales behind and above, the upper one, or supranasal, being of about same size as the others and separated from the supranasal of the other side by a hexagonal internasal; fourteen supralabials, including the small posterior ones, the eleventh being under the center of the eye; top of head covered with minute granules considerably larger on snout; eye much nearer the ear-opening than the nostril, the diameter about two-thirds its distance from ear-opening and much less than one-half its distance from tip of snout; ear-opening roundish, small, smaller than largest supralabials; mental triangular large, its free margin twice as wide as nearest infralabials; nine larger infralabials; one pair of large, elongated, irregularly hexagonal chin-shields, their anterior angle fitting into the corner between mental and first infralabials, broadly in contact with each other on the median line and followed behind by another pair of shorter and broader chin-shields, which are separated from each other by granules and from the infralabials by somewhat larger scales; body and legs above covered with small uniform granules about the size of those on snout; those on throat of about same size, but flat and smooth; scales on rest of underside about four times larger, imbricate,

those on preanal region and underside of tibia still larger; on the underside of the thigh the three posterior rows of scales are overlapping considerably sideways so as to appear very much narrowed, there being about eighteen such scales in the last row corresponding to the pore-bearing scales in other species, but apparently without pores; fingers and toes nearly free, all with a long compressed free terminal joint rising angularly from within the dilated basal portion; the underside of the latter with two series of oval lamellæ placed angularly and meeting on the median line, about thirteen pairs under the fourth toe; a distinct but narrow fold between axilla and groin and a similar one along the posterior margin of the thighs; tail flattened, somewhat constricted at base with a sharp denticulated lateral edge; it is covered above with small squarish scales somewhat larger than the dorsal ones and arranged in distinct transverse rows, about every tenth one being slightly larger and marking the end of a distinctly perceptible section or verticil which on the lateral edge of the tail is emphasized by a raised claw-like scale or spine, while the minor denticulation of the edge is caused by four smaller but similar scales between every two spines; underneath the tail has a median series of broad, hexagonal, transverse plates, about two to each verticil, a few series of small imbricate scales filling the space between the plates and the edge, the scale row nearest the plates being considerably larger than the others.

Color above dark grayish drab with numerous irregular whitish spots, no special pattern being observable, except that there is a whitish transocular stripe, and that on the back the spots seem to be arranged in longitudinal series. The tail has ill-defined light crossbars which become gradually more pronounced toward the tip, and the large spines on the edge at the end of each verticil are conspicuously white; whole underside white except the small lateral subcaudals, which are colored like the upper side.

Dimensions.—Total length, 114 mm.; snout to vent, 50 mm.; vent to tip of tail, 64 mm.; snout to ear-opening, 13 mm.; greatest width of head, 8 mm.; fore leg from axilla, 14 mm.; hind leg from groin, 21 mm.; axilla to groin, 21 mm.

Variation.—The chief individual variation noticed in a long series of individuals consists in minor deviations in the size and shape of the chin-shields and the internasals. Occasionally there are two smaller internasals in place of one large, or a minute granule is interposed in the cleft of the rostral.

The reproduced tail does not seem to be different in shape or to be much shorter than the original one (No. 23491, U.S.N.M.; snout to vent, 55 mm.; vent to tip of tail, 55 mm.), but the scutellation is different. The scales on the upper surface are irreguar and not arranged in rows, much less are there any indications of regular verticils, and there are no spines or serrations along the lateral edge; there are well-developed

transverse plates underneath, but the scales bordering these plates are reduced to one row.

The ground color seems to be subject to some slight variation and in the paler specimens there are indications of irregular darker mottlings, a dark stripe through the eye underneath the white one and darkish edges to the white spots.

A very young specimen from Kauai (No. 23495, U.S.N.M.; length from snout to vent, 22 mm.) shows all the characters of the adult, except that the color above seems to be uniform drab. The anterior chin-shields are also separated by two small scales.

List of specimens of Hemidactylus garnotii.

Number.	Collection.	Age.	Locality.	When collected.	From whom received.	Remarks.
23466	U.S.N.M	Adult	Kauai, Waiawa	May, 1895	V. Knudsen	
23467	do	do	do	do	do	
23468	do	do	do	do	do	
23469	do	do	do	do	do	
23470	do	do	do	do	do	See p. 792.
23471	do	do	do	do	do	
23472	do	do	do	do	do	
23473	do	do	do	do	do	
23474	do	do	do	do	do	
23475	do	do	do	do	do	
23476	do	do	do	do	do	
23477	do	do	do	do	do	
23478	do	do	do	do	do	
23479	do	do	do	do	do	
23486	do	do	do	do	do	
23487	do	do	do	do	do	
23488	do	do	do	do	do	
23489	do	do	do	do	do	
23490	do	do	do	do	do	
23491	do	do	do	do	do	See p. 794.
23492	do	do	do	do	do	
23493	do	do	do	do	do	
23494	do	do	do	do	do	
23495	do	Young	do	do	do	See p. 795.
23510	do	Adult	Molokai, Kalae	Nov., 1896	R. Meyer	See p. 793.
23511	do	do	do	do	do	
23512	do	do	do	do	do	
23513	do	do	do	do	do	
23514	do	do	do	do	do	
23515	do	do	do	do	do	
23461	do	do	Hawaii		H. W. Henshaw	
23462	do	do	do		do	
23463	do	do	do		do	
23464	do	do	do		do	
23465	do	do	do		do	
902	Oberlin	do	Oahu, Honolulu		E. P. Church	

PEROPUS[1] Wiegmann.

1835.—*Peropus* WIEGMANN, Nova Acta Acad. Cæs. Leop.-Carol., XVII, i, p. 238 (type, *H. mutilatus*).

1843.—*Dactyloperus* FITZINGER, Syst. Rept., p. 103 (type, *H. variegatus*).

1845.—*Peripia* GRAY, Cat. Lizards Brit. Mus., p. 158 (type, *H. peronii* = *mutilatus*).

1883.—*Chalinocnemis* DUGÉS, La Naturaleza (Mex.), VI, p. 312 (type, *H. navarri* = *mutilatus*).

1883.—*Spasmocnemis* DUGÉS, La Naturaleza (Mex.), VI, p. 312 (same type).

Compressed distal phalanx of digits free rising angularly from within the edge of the dilated portion; subdigital lamellæ confined to the distal end of the dilatation and divided by a median groove; inner digits

[1] From πηρος, mutilated, and πούς, foot.

without a free distal phalanx, clawless; underside of tail with a median series of large transversely dilated plates.

Only the typical species has a very wide distribution, the others being much more local, except one which occurs in Australia.

Peropus has lately been put aside for *Dactyloperus* (and *Gehyra* by those who regard the two as identical) on the ground that it was preoccupied by a genus of fishes, the *Peropus* of Lay and Bennett,[1] the date being given as 1831, while Wiegmann's *Peropus* only dates from 1835. But there is ample proof[2] that the Zoology of the *Blossom* was not *published* until 1839 or 1840, although printed many years before.

PEROPUS MUTILATUS[3] (Wiegmann).

STUMP-TOED GECKO.

(Fig. 5.)

1831.—*Hemidactylus mutilatus* WIEGMANN, Herpet. Mex., I, p. 54 (corrected for *H. pristiurus*, p. 20; type locality, Manila).—*Hemidactylus* (*Peropus*) *mutilatus* WIEGMANN, Nova Acta Acad. Cæs. Leop.-Carol., XVII, i (1835), p. 238.—*Peripia mutilata* PETERS and DORIA, Ann. Mus. Civ. St. Nat. Geneva, XIII, 1878, p. 370.—*Gehyra mutilata* BOULENGER, Cat. Liz. Brit. Mus., I (1885), p. 148.

1857.—*Dactyloperus insulensis* GIRARD, Proc. Phila. Acad., 1857, p. 197; extr. p. 5 (type locality, "Sandwich Islands"); U. S. Expl. Exp., Herpet. (1858), p. 280.—*Gehyra insulensis* BOULENGER, Cat. Liz. Brit. Mus., I (1885), p. 150.

1836.—*Hemidactylus peronii* DUMÉRIL and BIBRON, Erpét. Gén., III, p. 352, pl. XXX, fig. 1 (type locality, Mauritius).

1858.—*Hemidactylus platurus* BLEEKER, Natuurk. Tijdschr. Nederl. Ind., XVI, p. 31 (type localities, Java, Sumatra, Nias, Banka).

1864.—*Gecko pardus* TYTLER, Journ. As. Soc. Bengal, XXXIII, ii (p. 47).

1868.—*Peropus packardii* COPE, Proc. Phila. Acad., 1868, p. 319 (type locality, Penang, Malacca).

1883.—*Hemidactylus navarri* DUGÉS, La Naturaleza, VI, p. 311, pl. VII *a* (type locality, Tangancicuara, Michoacan, Mexico).

In Boulenger's Catalogue of Lizards Girard's *D. insulensis* is separated as possessing no post-femoral fold, a proceeding warranted by the fact that Girard in the description fails to mention the fold. In the only one of Girard's specimens preserved (No. 21219, U.S.N.M.) the fold is well developed, and the distinction falls to the ground. This specimen agrees closely with ten others from Kauai and Oahu before me, which in turn prove themselves indistinguishable from the well-known and widely distributed *P. mutilatus*.

I have compared the Hawaiian specimens with a topotype of *H. peronii* from Mauritius (No. 16308, U.S.N.M.) and find no tangible differences. Manila specimens are not at hand, but I have no doubt that the result would be the same if they were. I may add that Professor

[1] Zoology of the Voyage of the *Blossom*, p. 59.

[2] "The long looked-for and long despaired-of Zoology of Beechey's Voyage is at last before us." Mag. Nat. Hist., March, 1840.

[3] Mutilated.

Peters has likewise identified Honolulu specimens as belonging to this species.[1]

Peropus mutilatus has a distribution nearly as extensive as *Ablepharus pœcilopleurus*, occurring, as it does, from Mauritius and the Seychelles to the west coast of Mexico. It has been found in Ceylon, the Malay archipelago and peninsula, Philippines, and New Guinea, but, curiously enough, not as yet in any part of Polynesia, New Caledonia, or Solomon Islands.

It was first collected in the Hawaiian Islands by the Wilkes Exploring Expedition, specimens being obtained in Hawaii, Oahu, and Kauai (Nos. 5676, 5677, U.S.N.M. record book, division of reptiles). It has since been collected by D'Albertis, at Honolulu, as recorded by Peters and Doria, and also by Mr. E. P. Church. Knudsen sent a number of specimens from Kauai, but it was not in the collections made by Meyer in Molokai or by Henshaw in Hawaii.

Description.—No. 23498, U.S.N.M. Female adult; Waiawa, Kauai; May, 1895; collector, V. Knudsen. Rostral broader than high, with a median cleft above, in contact with two supranasals; first supralabial in contact with the lower postnasal and reaching nostril; nostril between rostral, first supralabial, and three scales behind and above, the upper one of which is large, squarish, and broadly in contact behind the rostral with the corresponding scale of the other side; nine supralabials, seventh under center of eye, last two very small; scales on top of head finely granular, slightly larger on snout; eye equidistant from nostril and ear-opening, large, its diameter more than two-thirds the distance from ear-opening, which is moderate, being about the size of the large supralabials; mental shield moderate, triangular, its labial border about twice the width of nearest infralabials; it is followed by six chin-shields in one transverse series, their posterior outline forming together a slightly curved line, the median pair large, elongate, pentagonal, the others gradually smaller toward the sides; outer pair separated from labials by smaller scales, the others in contact with first and second infralabials anteriorly; nine infralabials, gradually decreasing in size backward; body and legs above covered with small uniform granules like those on head and gradually increasing in size on the sides to those of the scales of the lower surface, which are considerably larger and imbricate, except those on the throat, which are like the dorsal ones, but flat; a distinct dermal fold along the posterior edge of thigh and tibia; toes slightly webbed at base; eight pairs of oblique lamellæ under longest toe, the lamellæ on all the digits being restricted to the distal half of the digital dilatation; tail flattened, with sharp, finely serrated edge, with a very distinct lateral constriction at base; it is covered with small scales above

FIG. 5.—CHIN-SHIELDS AND LOWER LABIALS OF PEROPUS MUTILATUS. (ENLARGED.)

[1] Peters and Doria, Ann. Mus. Civ. Genova, XIII, 1878, p. 370.

arranged in regular transverse series and with a median series of wide plates below, the space between them and the lateral edge being occupied by several series of imbricate rounded scales near the base, forming as many as five rows. No femoral pores (female).

Color above nearly uniform drab with faint indications of darker brownish markings on the head, as well as of a white transocular stripe bordered above and below with dusky; underside whitish, but dusted over with minute specks of blackish; these minute specks are also present all over the upper surface, only much denser.

Dimensions.—Total length, 95 mm.; snout to vent, 46 mm.; vent to tip of tail, 49 mm.; snout to ear-opening, 12 mm.; greatest width of head, 9 mm.; fore limb, 12 mm.; hind limb, 16 mm.; from axilla to groin, 21 mm.

Variation.—A not uncommon deviation from the above description consists in the presence of a small granule at the juncture of the rostral cleft with the sutures of the supernasals, to which is sometimes added one or more granules in the suture between these two shields, which may then become entirely separated, as in one of Knudsen's specimens from Kauai (No. 23482, U.S.N.M.). The size of the exterior pair of chin-shields is also somewhat variable, the extreme being No. 23481, U.S.N.M., in which it has entirely been broken up into small scales like those adjoining the infralabials.

The regenerated tail resembles the original one very much and has well-developed subcaudal plates, but it seems to be broader at the base, and shorter, while the scales are more irregular and more pointed.

The color markings vary also to some extent, being more pronounced and definite in some examples than in others. Thus in No. 23501, U.S.N.M., there are three distinct series of brownish spots, one median and two lateral, with pale markings between, the median series extending to the neck and occiput where it forms a distinct line. In this specimen the white, dusky-edged line from nostril through eye to above ear is very strongly marked.

An immature male (No. 902, Oberlin College collection) has about seventeen obscure femoral pores on each side meeting at an angle, directed forward, on the preanal region, the scales behind the angle being larger and more differentiated than in the female.

List of specimens of Peropus mutilatus.

Number.	Collection.	Age.	Locality.	When collected.	From whom received.	Remarks.
21219	U.S.N.M ...	Adult ..	"Sandwich Islands"	.....	U. S. Exploring Expedition.	Type (?) of *D. insulensis* Girard.
23480	.....do	....do ...	Kauai, Waiawa.....	May, 1895	V. Knudsen...	
23481	.....do	....do ...	.....do	.....do	.....do	See p. 798.
23482	.....do	....do ...	.....do	.....do	.....do	See p. 798.
23496	.....do	....do ...	.....do	.....do	.....do	
23497	.....do	....do ...	.....do	.....do	.....do	
23498	.....do	....do ...	.....do	.....do	.....do	See p. 797.
23501	.....do	....do ...	.....do	.....do	.....do	See p. 798.
23502	.....do	....do ...	.....do	.....do	.....do	
902	Oberlin	....do ...	Oahu, Honolulu	.....	E. P. Church..	
902	.....do	Immature.	.....do	.....	.....do	See p. 798.

HEMIPHYLLODACTYLUS[1] Bleeker.

(Fig. 9.)

1860.—*Hemiphyllodactylus* BLEEKER, Natuurk. Tijds. Nederl. Ind., XX, p. — (type, *H. typus*).

1872.—*Spathodactylus* GÜNTHER, Proc. Zool. Soc. Lond., p. 594 (type, *S. mutilatus* = *H. typus*) (not of Pictet, 1858).

1885.—*Spathoscalabotes* BOULENGER, Cat. Liz. Brit. Mus., I, p. 156 (substitute name).

Compressed distal phalanx of digits free, rising angularly from within the edge of the dilated portion; subdigital lamellæ confined to the distal end of the dilatation and divided by a median groove; inner digits rudimentary, without distal free phalanges, clawless; tail narrow, cylindric, without median transverse plates underneath; no enlarged chin-shields.

Not having any specimen of Bleeker's type of this species I have had to rely on Günther's and Boulenger's descriptions and figures. The only differences which I can make out from these seem to be the greater slenderness of the digits at the base and the greater length of the raised distal phalanx, differences of degree which would hardly justify a generic separation. Günther's figures of the underside of the digits[2] seem to have a few granules separating the posterior lamellæ from each other and also to be lacking lamellæ under the inner digits, but the differences, if they really exist, are immaterial.

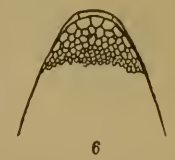

FIG. 6.—UNDERSIDE OF CHIN OF LEPIDODACTYLUS LUGUBRIS. (ENLARGED.)

Boulenger's *Lepidodactylus crepuscularis* and *L. ceylonensis* belong apparently to this genus, and possibly also his *L. aurantiacus*. The structure of their toes differs very materially, however, from that of *Lepidodactylus*, as typified by *L. lugubris*, being in fact more nearly related to *Peropus* and *Gehyra* in this respect. In *Lepidodactylus* the compressed distal phalanx adheres to the dilatation underneath it, only its extreme end extending beyond the edge of the pad without being raised or bent angularly to its plane. In the species included by me in *Hemiphyllodactylus*, on the other hand, although the terminal phalanges are rather short in all, except the typical species, the compressed joint rises angularly out of the surface of the dilatation, not from the edge, but from within it, exactly as in *Hemidactylus*, *Gehyra*, and *Peropus*. In the absence of chin-shields and enlarged transverse subcaudal plates they show some resemblance to *Lepidodactylus*, but that is offset by the different shape of the tail and the greater reduction of the inner digits. The true relations, however, lie with *Peropus*, I have no doubt.

The species here included under Bleeker's generic name seem to form

[1] From ἡμι, half; φύλλον, leaf; δάκτύλος, finger.

[2] Proc. Zool. Soc., 1872, p. 594.

a very natural and compact little group with a somewhat disconnected distribution, though it is probable that future explorations may bridge the gaps. One species, *H. ceylonensis*, is said to occur in Ceylon and Java; another, *H. typus*, is from Sumatra; a third, *H. crepuscularis*, occurs in the New Caledonian Islands, and the fourth, the one here described, has thus far only been found in the Hawaiian archipelago.

HEMIPHYLLODACTYLUS LEUCOSTICTUS,[1] new species.

HAWAIIAN GECKO.

(Figs. 7–9.)

Diagnosis.—Five divided lamellæ under the fourth toe, which is longer than the third; distal free phalanx short; snout slightly shorter than distance of eye from ear-opening; male with eleven preanal and seven to eight femoral pores.

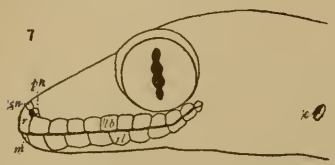

FIG. 7.—SIDE OF HEAD OF HEMIPHYLLODACTYLUS LEUCOSTICTUS, TO SHOW NOSTRIL, LABIALS, EYE, AND EAR-OPENING. (ENLARGED.) *e*, EAR-OPENING; *il*, LOWER LABIALS; *lb*, UPPER LABIALS; *m*, MENTAL; *pn*, UPPER AND LOWER POSTNASAL; *r*, ROSTRAL; *sn*, SUPRANASAL.

Type.—No. 23500, U.S.N.M. Kauai, Hawaiian Islands; collector, V. Knudsen.

Habitat.—Hawaiian Islands.

Description of type specimen.—Male adult; Waiawa, Kauai. Rostral broader than high, nicked behind, in contact with two supranasals and a small scale between them; first supralabial in contact with the lower postnasal and reaching nostril; nostril between rostral, first supralabial, two postnasals, and a larger supranasal which is separated from the one of the other side by a small scale; ten supralabials, last small, eighth under center of eye; scales on top of head finely granular, considerably larger on snout; eye slightly nearer the tip of snout than the ear-opening, large, its diameter being more than two-thirds the distance from ear-opening which is quite small being smaller than the larger supralabials; mental small, polygonal, narrowed behind with almost parallel sides; ten infralabials gradually decreasing in size posteriorly; no distinctly differentiated chin-shields, but the granules or scales nearest the infralabials and mental being larger than the others, especially the three immediately behind the mental; body and legs above, as well as throat, covered with uniform minute granules

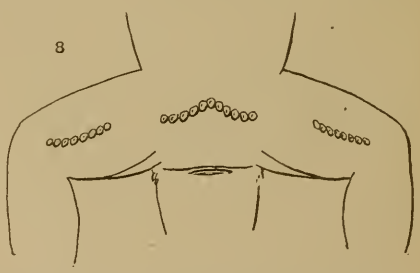

FIG. 8.—THIGHS AND ANAL REGION OF MALE HEMIPHYLLODACTYLUS LEUCOSTRICTUS SHOWING PREANAL AND FEMORAL PORES. (ENLARGED.)

[1] *Λευκοστίκτος*, flecked with white.

like those on top of head; rest of under surface with somewhat larger imbricate scales; digits free, with short but perfectly formed and free distal joints rising angularly from within the basal dilatation, except on the inner digits, which are quite rudimentary; fourth toe longer than third; subdigital lamellæ few and confined to the terminal portion of the dilatation, three and four pairs under the fingers, four and five under the toes, arranged nearly fan like; borders of digital dilatation not unusually denticulated; tail narrow, rather short, subcylindric, without lateral edge, covered by small imbricate scales slightly larger than those on the snout, the lateral ones somewhat more pointed and raised, those on the underside somewhat larger but otherwise similar; an angular series of eleven preanal pores, the angle turned forward, and about eight femoral pores under the distal half of the thigh, all rather obscure (male).

Color above dull chestnut brown, with obscure, irregular darker marblings and several series of small whitish spots on each side of back and similar ones irregularly scattered all over; a pale dark-edged band from snout through eye to shoulder, in which, behind eye, three well-defined roundish white spots with dusky margins; a well-defined white dark-edged spot on the basal half of each digit above; a well-defined transverse spot of white across the base of tail above; throat white, unspotted; rest of underside of body pale, with indefinite marblings of same brown color as back; tail above of color of body, with ill-defined pale cross bands, white spots on sides, below whitish, with a median continuous marbling of brown.

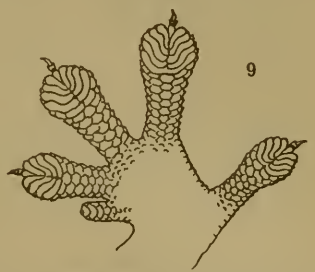

FIG. 9.—UNDERSIDE OF FOOT OF HEMIPHYLLODACTYLUS LEUCOSTICTUS. (ENLARGED.)

Dimensions.—Total length, 67 mm.; snout to vent, 38 mm.; vent to tip of tail, 29 mm.; snout to ear-opening, 8 mm.; greatest width of head, 5.5 mm.; fore limb, 8 mm.; hind limb, 13 mm.; from axilla to groin, 20 mm.

Variation.—Preanal and femoral pores are of course wanting in the female.

There is not much structural difference in the various specimens, it being mostly confined to the usual slight deviations in the number of internasal scales, postmental scales, labials, pores, and subdigital lamellæ. The reproduced tail is exceedingly short, the scales are rougher and more irregularly placed, those on the sides being neither more pointed nor raised, but does not differ otherwise.

The color is also fairly uniform in all the specimens examined by me, except that in Nos. 23509, 23460, U.S.N.M., the throat is nearly as much marbled with brown as the rest of the under surface.

Remarks.—This addition to the Hawaiian fauna is very closely allied

to *Hemiphyllodactylus crepuscularis*,[1] hitherto only found in New Caledonia, and *H. ceylonensis*,[2] of which we only have records from Ceylon and Java, resembling both in structure, proportions, and coloration. Not having specimens of either of these species, I have to rely upon Boulenger's descriptions and figures. The differences from *H. crepuscularis* seem to consist in the slightly shorter snout, the distance of the tip of snout from the eye being shorter than the distance of the ear-opening from the eye; in a slightly greater number of lamellæ under the digits; in a less strong denticulation along the borders of the digits, none being visible outside the lamellæ; in the greater angular obliquity of the latter; in the absence of any marked denticulation along the side of the tail. It differs, furthermore, by the males having a short series of femoral pores on the distal half of the thigh, in addition to the angular preanal series, the femoral pores probably lacking in *H. crepuscularis*, as they are not mentioned by Boulenger. Our present species seems to agree with *H. ceylonensis* in the lesser asperity of the digital border; but the toes do not appear to be slenderer or less dilated at the base. If the figure given by Boulenger (fig. 6*a*) is correct, the inner toe is also more rudimentary in *H. leucostictus* than in *H. crepuscularis*.

Slight as these distinctions are, they seem to indicate real differences between the forms inhabiting the Hawaiian Islands and New Caledonia, and are apparently more marked than those which distinguish the latter from the Ceylonese and Javanese form.

The typical species of the genus, the *H. typus*,[3] seems to differ chiefly in having the toes slenderer at the base, less uniform in length, possibly more abrupt dilatation anteriorly, and the distal free, raised joint longer. In slenderness of body, shortness of limb, cylindric and slender tail, absence of chin-shields, and subcaudal plates, it agrees with the other members of the genus.

List of specimens of Hemiphyllodactylus leucostictus.

Number.	Collection.	Age.	Locality.	When collected.	From whom received.	Remarks.
23485	U. S. N. M ..	Adult ..	Kauai, Waiawa....	May —, 1895	V. Knudsen	
23499	.....do	....do ...	.....do	.....do	.....do	
23500	.....do	....do ...	.....do	.....do	.....do	Type.
23509	.....do	....do ...	Oahu, Honolulu ...	Nov. 17, 1896	L. Stejneger	
23459	.....do	...do ...	Hawaii	.....	H. W. Henshaw	
23460	.....do	....do ...	.....do	.....	.....do	
21220	.....do	....do ...	No record	.....	No record.....	

[1] *Platydactylus crepuscularis* BAVAY, Mém. Soc. Linn. Normand., XV, No. 5, 1869, p. 8 (type locality, New Caledonia). *Lepidodactylus crepuscularis* BOULENGER, Proc. Zool. Soc., London, 1883, p. 122, pl. XXII, fig. 6; Cat. Liz. Brit. Mus., I (1885), p. 163; III (1887), p. 486.

[2] *Lepidodactylus ceylonensis* BOULENGER, Cat. Liz. Brit. Mus., I (1885), p. 164, pl. XIII, fig. 3; III (1887), p. 487 (type locality, Ceylon).

[3] *Hemiphyllodactylus typus* BLEEKER, Natuurk. Tijds. Nederl. Ind., XX, 1860, p. — (type locality, Agam, West Sumatra).

Family SCINCIDÆ.

THE SKINKS.

Only three widely distributed species, each belonging to a distinct genus, have been found in the Hawaiian Islands. The chief characters by which they may be distinguished from each other are as follows:

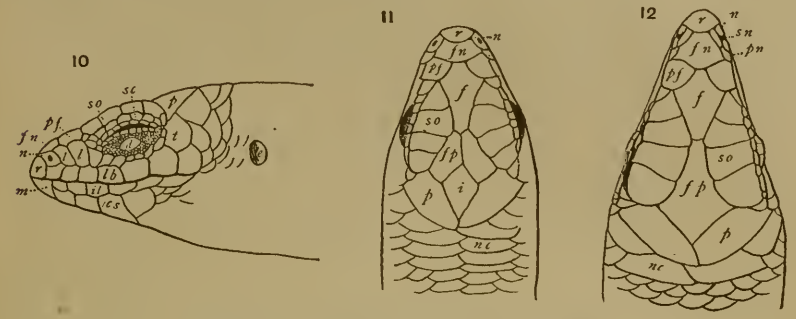

FIG. 10.—SIDE VIEW OF HEAD OF LEIOLOPISMA.
FIG. 11.—UPPER VIEW OF HEAD OF LEIOLOPISMA.
FIG. 12.—UPPER VIEW OF HEAD OF EMOIA.

cs, CHIN-SHIELDS; *d*, DISK ON LOWER EYELID; *e*, EAR-OPENING; *f*, FRONTAL; *fn*, FRONTONASAL; *fp*, FRONTOPARIETAL; *i*, INTERPARIETAL; *il*, LOWER LABIALS; *l*, LOREALS; *lb*, UPPER LABIALS; *m*, MENTAL; *n*, NASAL; *nc*, NUCHALS; *p*, PARIETALS; *pf*, PREFRONTAL; *pn*, POSTNASAL; *r*, ROSTRAL; *sc*, SUPRACILIARIES; *sn*, SUPRANASAL; *so*, SUPRAOCULAR; *t*, TEMPORAL. (ALL FIGURES ENLARGED.)

a[1] Eyelids well developed, movable (fig. 10).

b[1] Nostril pierced in the nasal; no supranasal (fig. 10); frontoparietals and interparietal distinct (fig. 11); two or three pairs of nuchals (fig. 11).

Leiolopisma noctua, p. 805

b[2] Nostril pierced between three small shields, a nasal, a postnasal, and a supranasal (fig. 12); frontoparietals and interparietal fused into a single large shield (fig. 12); a pair of nuchals (fig. 12)..... *Emoia cyanura*, p. 807

a[2] Eyelids rudimentary, not movable (fig. 13).

Ablepharus boutonii pœcilopleurus, p. 811

The Hawaiian skinks are small, smooth, and shiny lizards of a more or less bronzy or brownish-olive color, and with more or less conspicuous longitudinal lighter stripes. They are consequently very much alike in general appearance, but a close attention to the structural characters tabulated above will insure their correct identification.

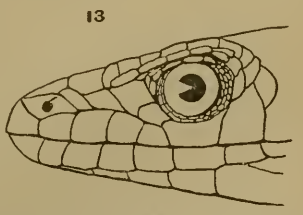

FIG. 13.—SIDE VIEW OF SNOUT AND EYE OF ABLEPHARUS PŒCILOPLEURUS. (ENLARGED.)

The difference between the rudimentary, nonmovable eyelids in *Ablepharus pœcilopleurus* and the well-developed conniving lids in the two other species is well shown in the two figures, Nos. 13 and 10, respectively, the eyelids being represented nearly closed in fig. 10. In the former the eye is large, staring, and uncovered, like that of a snake, only surrounded by several narrow rings of granules,

while in the latter there is a movable covering, which shuts over the eye and protects it.

The three species can not well be confounded if it be remembered that the *Ablepharus* has no eyelid; that the *Leiolopisma* has the plate between the frontal and the parietal split up into three separate plates, namely, two frontoparietals and one interparietal (compare figs. 8 and 9); and that the *Emoia* has the nasal shield split up into a small nasal proper, an elongated horizontal supranasal above it, and a small postnasal behind it. This character is not always exclusive, however, as it may be seen occasionally in specimens of *Ablepharus*, in which case the character of the eyelid must decide.

Comparative table of dimensions.

Species.	Total length.	Snout to vent.	Vent to tip of tail.	Snout to ear.	Width of head.	Fore limb.	Hind limb.	Axilla to groin.
	mm.	*mm.*	*mm.*	*mm.*	*mm.*	*mm.*	*mm.*	*mm.*
L. noctua	80	38	42	9	5.5	12	15	19
E. cyanura	126	43	83	11	7	15	21	22
A. pœcilopleurus	106	47	59	10	6	15	19	22

This table demonstrates the greater proportionate length of the tail in *E. cyanura* and the more foreward position of the ear-opening in *A. pœcilopleurus*.

The tail of a skink is liable to be broken off, though not quite so fragile as that of our geckos, and is reproduced with equal ease. The new tail is not quite so long or so perfect as the old one, the scales are not arranged with the same symmetry, but otherwise there is less difference than usual in the geckos, though the often abrupt change in coloration will in most cases reveal the reproduced part. Two-pronged caudal appendages of the second growth are also sometimes met with.

LEIOLOPISMA[1] Duméril and Bibron.

(Figs. 10, 11.)

1839.—*Leiolopisma* Duméril and Bibron, Erpét. Gén., V, p. 742 (type, *L. telfairii*).
1843.—*Leiolepisma* Fitzinger, Syst. Rept., p. 22 (emend.).
1843.—*Lampropholis* Fitzinger, Syst. Rept., p. 22 (type, *M. guichenoti*).
1845.—*Mocoa* Gray, Cat. Liz. Brit. Mus., p. 80, (type, *M. guichenoti*).
1857.—*Oligosoma* Girard, Proc. Phila. Acad., 1857, p. 196 extr., p. 4 (type, *M. zelandica* = *O. mocoa*).
1864.—*Liolepisma* Peters, Mon. Ber. Berlin Akad. Wiss., 1864, p. 387 (emend.).

Eyelids well developed, movable, the lower with an undivided transparent disk; no supranasals; interparietal distinct.

The genus which is here regarded as more restricted than Boulenger's section of the genus *Lygosoma* of the same name, contains a large num-

[1] From λειος, smooth; λόπιόμα, envelope.

ber of species mostly confined to the Indian and Australian regions, but with a few species of wider range, as, for instance, *Leiolopisma laterale*, which occurs in southern North America.

LEIOLOPISMA NOCTUA[1] (Lesson).

MOTH SKINK.

1830.—*Scincus noctua* LESSON, Zool. Voy. *Coquille*, II, i, p. 48, pl. III, fig. 4 (type locality, Ualan, Caroline Islands).—*Oligosoma noctuum* GIRARD, U. S. Expl. Exp., Herpet. (1858), p. 249.—*Lygosoma noctua* BOULENGER, Cat. Liz. Brit. Mus., III (1887), p. 256.

1860.—*Lygosoma vertebrale* HALLOWELL, Proc. Phila. Acad., 1860, p. 487 (type locality, "Sandwich Islands").

1861.—*Lampropholis novaræ* FITZINGER, Sitz. Ber. Akad. Wiss. Wien, XLII, p. 103 (nomen nudum).—*Euprepes novaræ* STEINDACHNER, Reise Freg. *Novara*, Zool. I, Rept., 1869, p. 47, pl. II, fig. 4 (type localities, Tahiti and Samoa).

1874.—*Lygosoma* (*Lipinia*) *aurea* MEYER, Mon. Ber. Akad. Wiss. Berlin, 1874, p. 132 (type locality, Jobi Island, New Guinea).

This skink, to which Lesson gave the name *noctua* on account of its displaying "the soft and harmonious tints of certain moths," has a distribution only less extensive than that of the azure-tailed skink. Originally described from a specimen captured near a hut in a sugar-cane field in Ualan, the largest eastern island of the Carolines, it was found by the U. S. Exploring Expedition in Tahiti, Eimeo, Samoa, Raraka, and the "Sandwich Islands." Specimens from the latter were entered in the record book in the U. S. National Museum as from Oahu and Kauai (No. 5648, U. S. N. M.) and from Hawaii (No. 5885, U.S.N.M.) but none of these have been preserved. The Rogers North Pacific Exploring Expedition also obtained it in the Sandwich Islands, and Hallowell redescribed it as *L. vertebrale*, but his type seems to have had the same fate as the Hawaiian specimens of the Wilkes Expedition. The British Museum, according to Boulenger, has specimens from Solomon Islands, Fiji, Tongatabu, and Samoa, while Dr. Finch sent specimens to Dr. Peters in Berlin from Tarova (Gilbert Islands). Boulenger, who examined Meyer's type in the Dresden Museum, also regards *L. aurea* as being this species, which extends its range to the western end of New Guinea, while, according to the same author, it occurs even as far west as Celebes.

This species is only represented among Mr. Henshaw's specimens, three of which he secured on the porch of his house in Hilo, where, according to him, they are scarce. The records of the exploring expedition specimens show, however, that it occurs both in Oahu and Kauai, and the probability is that it is not lacking on the other islands either, though its unobtrusive habits render it difficult to observe and collect.

Description.—No. 23446, U.S.N.M. Adult, Hawaii; collector, H. W. Henshaw. Rostral wide, low, broadly in contact with nasals and

[1] A moth.

frontonasal; nasal large, lozenge shaped, undivided, and pierced about the middle by the nostril; frontonasal rather large, pentagonal, in contact with rostral, nasals, first loreals prefrontals and frontal; prefrontals not in contact; frontal long, very narrow behind, in contact with frontonasal and with first and second supraoculars; four supraoculars, second, third, and fourth in contact with frontoparietal; eight supraciliaries; frontoparietals separate, and also separated (on one side only in this individual) from interparietal, the length of the latter and frontoparietals together being slightly less than that of the frontal; parietals large, broadly in contact behind interparietal; three pairs of transversely enlarged nuchals; two loreals, one behind the other, second slightly larger than first, and followed by two preoculars one above the other; seven supralabials, fifth under center of eye and entering orbit, fifth and sixth largest; lower eyelid with a large transparent disk; ear-opening nearly as large as eye, the borders without projecting knobs or lobules; mental followed by a single unpaired postmental; six narrow infralabials; twenty-six smooth scale-rows around middle of body, those on back gradually increasing in size toward the median line; the two scales bordering anal opening anteriorly greatly enlarged; toes underneath with regular scales like those on top; a few of the scales under the tail transversely enlarged but no regular series of such scales.

Color above glossy clay-colored, paler on tail, and with a paler band on the two median scale rows extending down the back; this pale median band is bordered on either side by an almost continuous line of dark brown spots; sides of head dark brown, which color is continued over the ear and forelegs down the sides of the body and tail as a dark band irregularly dotted with pale spots; similar pale spots on each of the labials; on the occiput a very conspicuous white spot covering the posterior angle of the interparietal, the parietal and first nuchal sutures, posteriorly continuous with the pale median dorsal band and, like the latter, broadly bordered with dark brown; legs above brown densely dotted with whitish spots; lower surface whitish with irregular dull brownish marblings mostly confined to the edges of the scales, and hence with a tendency to form longitudinal lines.

Dimensions.—Total length, 80 mm.; snout to vent, 38 mm.; vent to tip of tail, 42 mm.; snout to ear-opening, 9 mm.; greatest width of head, 5.5 mm.; axilla to groin, 19 mm.; fore limb, 12 mm.; hind limb, 15 mm.

Variation.—The other specimens from Hawaii show but little deviation from the above description. In No. 23447, U.S.N.M., the interparietal is entirely separated from both frontoparietals; ear-opening is somewhat larger; and there is a decided tendency toward a regular median series of transversely enlarged scales under the tail; the coloration is more decided and better contrasted but otherwise identical.

List of specimens of Leiolopisma noctua.

Number.	Collection.	Age.	Locality.	When collected.	From whom received.	Remarks.
23446	U. S. N. M ..	Adult ..	Hawaii	.....	H. W. Henshaw.....	See p. 805.
23447	.....do	....do ...	.....do	.....	.....do	See p. 806.
25442	.....do	....do ...	Hawaii, Hilo.....	Jan., 1899	.....do	
25443	.....do	....do ...	.....do	.....do	.....do	
25444	.....do	....do ...	.....do	.....do	.....do	

EMOIA[1] Gray.

(Fig. 12.)

1845.—*Emoia* GRAY, Cat. Liz. Brit. Mus., p. 95 (type, *Mabouya atrocostatus*).

1857.—*Emoa* GIRARD, Proc. Phila. Acad., 1857, p. 197; extr., p. 5 (type, *E. nigrita*).

1862.—*Emoa* COPE, Proc. Phila. Acad., 1862, p. 185 (emend.).

Eyelids well developed, movable, the lower one with an undivided transparent disk; supranasals present; interparietal fused with frontoparietals into a large shield.

The geographical range of this genus which corresponds nearly to Boulenger's section *Emoa* of his *Lygosoma* is covered by that of its most widely distributed species, namely, *E. cyanura*.

EMOIA CYANURA[2] (Lesson).

AZURE-TAILED SKINK.

1830.—*Scincus cyanurus* LESSON, Zool. Voy. *Coquille*, II, i, p. 49, pl. IV, fig. 2 (type locality, Tahiti).—*Emoa cyanura* GIRARD, U. S. Expl. Exp., Herpet. (1858), p. 270.—*Lygosoma cyanurum* BOULENGER, Cat. Liz. Brit. Mus., III (1887), p. 290.

1839.—*Eumeces lessonii* DUMÉRIL and BIBRON, Erpét. Gén., V, p. 654 (substitute name).—DUMÉRIL, Cat. Méth. Rept. Mus. Paris (1851), p. 157.

The azure-tailed skink has a very extensive range. It was first discovered in many of the Oceanian islands during the circumnavigation of the world by the French corvette *La Coquille*, and described by Lesson from Tahitian specimens. The U. S. Exploring Expedition added numerous other islands to the habitat of this species. Girard mentions it from Kings Island, Peacock's Island, Tahiti, Navigator and Fiji groups, Tongatabu, and the Philippine Archipelago; also from the "Sandwich Islands." According to the record book of the U. S. National Museum the exploring expedition obtained specimens on Mangsi Island, in the Balabac Passage, and in the Hawaiian Islands at Hilo (No. 5635, U.S.N.M.) and Mauna Kea, Hawaii (No. 5629, U.S.N.M.), but these have long since been lost. It seems that it was also obtained by Quoy and Gaimard in the Hawaiian Archipelago,[3] specimens from these being

[1] From Emo, the alleged native name of one of the species in Tahiti.

[2] From κυάνεος, glossy-blue; οὐρα, tail.

[3] Lesson, Voy. *Coquille*, Zool., II, i (1830), p. 21.

in the Paris Museum, according to Duméril. Dr. Otto Finsch collected it on Yaluit Island and on Ebon Island (Marshall Islands), Kushai (Carolines), and in Tarova (Gilbert Archipelago), according to Peters.[1] Boulenger records it from Celebes, the Moluccas, New Guinea, Admiralty Islands, Solomon Islands, New Hebrides, and many others. Curiously enough it seems to be absent in New Caledonia.

The name *E. lessonii* was afterwards bestowed upon the species, as *cyanurus* was believed to lead to confusion, there being a number of species which all have a blue tail.

Lesson says that the natives on Tahiti, where it lives in the habitations, call the species *Emo*, a name which he also attributes to a gecko, *Gehyra oceanica*.

The coloration of the Hawaiian specimens, whether from Oahu, Molokai, or Hawaii, is fairly uniform, with such variations as are mainly due to age, differing, however, to some extent from that of typical *E. cyanura* as described by Duméril and Bibron. According to them, and in conformity with the original figure,[2] in the latter a golden-yellow stripe follows the median line of the head, neck, and body to the tail; two lateral stripes united on the snout with the median line soon separate from it, passing over the superior border of the orbit and the sides of the body to the origin of the tail. All the Hawaiian specimens before me differ from this description. In only one of them does the median light stripe start from the snout, namely, in the youngest, the specimen from Molokai (No. 23517, U.S.N.M.). In the largest specimen (No. 23448, U.S.N.M.) from Hawaii there are no light stripes. The stripes start in all the others on the frontoparietal, leaving a dark-brown spot in the middle of this plate, and then separating on the parietals into the median and the two lateral light stripes. Moreover, the stripes do not extend to the base of the tail, but disappear gradually about the middle of the body, except in the very young specimen mentioned above, in which the median stripe only is clearly defined to the tail. Whether we have to do in this case with a distinct color variety, or whether age may account for the difference, can only be decided by comparison with large series of individuals from the other Polynesian islands.

Description.—No. 23448, U.S.N.M. Adult; Hawaii; collector, H. W. Henshaw. Rostral extending some little distance on the snout above in contact with nasals, supranasals, and the frontonasal; nasal small, consisting chiefly of a somewhat raised semilunar rim bordering the anterior half of the comparatively large nostril; behind nostril a triangular postnasal in contact with first supralabial, first loreal, and above with a very narrow supranasal, which borders the frontonasal and entirely shuts it out from contact with nasal and postnasal; frontonasal rather large, broadly in contact with rostral, supranasals, prefrontals, and also, but more narrowly, with first loreals and frontal;

[1] Sitz. Ber. Berlin Naturf. Fr., 1881, p. 72.

[2] Zodl. Voy. *Coquille*, Rept., pl. IV, fig. 2.

frontal long, in contact with two anterior supraoculars; four large supraoculars; eight supraciliaries; frontoparietals and interparietal fused into a large shield in contact with frontal, second, third, and fourth supraoculars, though only very narrowly with the second, somewhat longer than frontal; parietal broadly contiguous behind frontoparietal (abnormally fused together in the present specimen), followed by a single large pair of nuchals in contact; first loreal in contact with postnasal, supranasal, frontonasal, prefrontal, second loreal, and second supralabial, higher than wide; second loreal larger, wider than high, in contact with second and third supralabials, and behind with two preoculars, of which the lower is the larger; eight supralabials, sixth and seventh much higher than the others, fifth very wide, twice the width of the anterior ones, bordering the whole lower edge of the orbit (abnormally divided in two on the right side of the present specimen); lower eyelid with a large transparent disk; ear-opening oval, small, about the size of the anterior supralabials; mental nearly straight behind, followed by a single unpaired postmental; eight narrow infralabials, of which the first is very small, triangular, and barely touching the postmental; thirty rows of smooth scales around the middle of the body, those on back and underside of uniform size and larger than those on the sides; scales in front of anal opening somewhat enlarged; toes underneath not covered with regular scales like those on top except under the more compressed portion near the tip, but with a regular series of very numerous transverse corrugations; tail underneath, with a regular median series of transversely enlarged scales.

Color.—Scales on upper parts narrowly edged with dark brown forming a regular network, the six median dorsal rows of a bronzed tawny olive, those on the sides more dark brown forming a broad dark band from behind the eyes to the root of the tail; top of head like back, interparietal and parietals each with a large ill-defined brown spot occupying most of the shield except the margins; underside of body paler than the back and more greenish, the throat with dusky margins to the scales; tail like upper surface becoming dull dark bluish on the posterior half.

Dimensions.—Total length, 126 mm.; snout to vent, 43 mm.; vent to tip of tail, 83 mm.; snout to ear-opening, 11 mm.; greatest width of head, 7 mm.; axilla to groin, 22 mm.; fore limb, 15 mm.; hind limb, 21 mm.

Variation.—The arrangement of the head shields offers but few variations in the specimens before me; the number of scale rows around the body is somewhat varying, however, as in Nos. 23449, 23152, U.S.N.M., for instance, I count twenty-eight rows. In most of the specimens there are a couple of minute knobs or lobes in the anterior border of the ear opening, but these are indistinguishable in the specimen described.

As to coloration there seems to be three distinct stages according to

age. First, the fully adult animal as described above. Next, the intermediate age which is somewhat similar, but in which the contrasts of the colors are stronger, the light tints of the back being lighter, more brassy, and the browns darker, nearly blackish; in this stage the dark spot on the parietals is very dark, each continued backward down the back in a dark longitudinal line which occupies the margins of the first and second scale rows on each side of the median line; with increasing age these two lines disappear in the direction from the tail toward the head; in this stage the supraoculars are also marked with dark irregular blotches, the underside, except throat, and the tail is decidedly bluish.

The third stage is that of the young represented in our series by No. 23517, U.S.N.M., from Molokai; in this the dorsal dark stripes are much wider and better defined, occupying more than one-half of the two scale rows; the spot on the parietal has a pale center; the lateral, blackish stripe extends less down on the sides but encroaches more on the dorsal space, the bronze color of the latter being reduced to a narrow lateral light stripe which extends anteriorly to the supraoculars; the entire median line from the tip of the snout to the root of the tail is occupied by a sharply defined whitish (in alcohol) stripe bordered on each side by the black lateral stripe; underside whitish; tail lighter blue, especially underneath.

List of specimens of Emoia cyanura.

Number.	Collection.	Age.	Locality.	When collected.	From whom received.	Remarks.
23448	U.S.N.M	Adult	Hawaii		H. W. Henshaw	See p. 808.
23449	do	do	do		do	See p. 809.
23450	do	do	do		do	
23451	do	do	do		do	
23452	do	do	do		do	See p. 809.
23517	do	Juvenile	Molokai, Kalae	Nov. 28, 1896	R. Meyer	See p. 808.
22604	do	Adult	Oahu, Honolulu		Fish Commission steamer *Albatross*.	
22605	do	do	do		do	
22606	do	do	do		do	
22607	do	do	do		do	

ABLEPHARUS[1] Fitzinger.

(Fig. 13.)

1824.—*Ablepharus* FITZINGER, Verhandl. Ges. Naturf. Fr. Berlin, I (p. 297) (type, *A. pannonicus* Fitzinger).

1834.—*Cryptoblepharus* WIEGMANN, Herpet. Mex., p. 12 (type, *A. pœcilopleurus*).

Eyelids rudimentary, not movable.

The genus as here understood is represented all over the warmer portions of the globe by the type of the subgenus *Cryptoblepharus*, which it would possibly have been better to accord generic rank. Not having access at present to the type species of *Ablepharus*, I have left the matter as presented by Boulenger.

[1] From α, without; and $\beta\lambda\acute{\epsilon}\phi\alpha\rho o\nu$, eyelid.

ABLEPHARUS BOUTONII[1] PŒCILOPLEURUS[2] (Wiegmann).

SNAKE-EYED SKINK.

1835.—*Ablepharus pœcilopleurus* WIEGMANN, Nova Acta Acad. Cæs. Leop.-Carol., XVII, i, p. 202, pl. XVIII, figs. 1-1*a* (type locality, islands at Pisacoma, Peru).

1851.—*Scincus plagiocephalus* PERON, in Duméril's Cat. Méth. Rept. Mus. Paris, p. 191 (type locality, Van Diemen Land).—*Cryptoblepharus plagiocephalus* GIRARD, U. S. Expl. Exp., Herpet. (1858), p. 220, pl. XXVI, figs. 17-24 ("Otaheite and Sandwich Islands").

1860.—*Ablepharus nigropunctatus* HALLOWELL, Proc. Phila. Acad., 1860, p. 487 (type locality, Bonin Islands).

1887.—*Ablepharus boutonii* var. *pœcilopleurus* BOULENGER, Cat. Liz. Brit. Mus., III, p. 347.

Various closely related forms, the status and geographical distribution of which have not as yet been definitely ascertained, have been relegated as varieties, or subspecies, under *Ablepharus boutonii*, and there I am willing to leave them for the present. The Hawaiian specimens seem to agree best with the form described by Wiegmann, and are named accordingly.

De Freycinet collected this species in the Hawaiian Islands, his specimens being in the Museum at Paris,[3] and the U. S. Exploration Expedition brought specimens from Oahu, Kauai (No. 5706, U.S.N.M.), and Hawaii (No. 5674, U.S.N.M.).

The frontal is separated from the frontonasal in all the Hawaiian specimens before me, the prefrontals in most cases forming a long suture between the shields mentioned, except in one of No. 5706, U.S.N.M., in which a small azygos shield is interposed between the others, being in fact the detached anterior angle of the frontal.

A much more interesting aberration is shown by No. 23507, U.S.N.M., from Kauai, in which there are very distinct and regular supranasals and postnasals, while in all the other specimens the nostril is pierced in an undivided nasal. There is, however, in many of them a distinct tendency to a suture back of the nostril, the first beginning of a separation of a postnasal, or the last trace of it. It is hardly to be expected that the individuals inhabiting Kauai will show a similar condition, which is probably only an individual (atavistic ?) variation. The specimen agrees in all other respects with those from the other islands.

In sending a single specimen of this species from Waiawa, Kauai the late Mr. V. Knudsen wrote me as follows:

> The skinks are as common here as leaves on a tree; go along a cliff and you can see them all over it. But catch one! That is a difficult thing, for they are as quick as a flash of light and do not go far away from a hole or crack in the rocks, out of which nobody can get them. I have had six smart men with me for three days promising them a dollar apiece, and all I can send is one glossy, smooth, greenish thing with tiny spots.

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[1] Named for Louis Bouton, a French botanist.

[2] From *ποικίλος*, mottled, and *πλευρά*, side.

[3] Duméril, Cat. Méth. Rept. Mus. Paris, 1851, p. 191.

Description.—No. 5706*a*, U.S.N.M. Adult; Oahu or Kauai; collection U. S. Exploring Expedition. Rostral broadly in contact with nasals and frontonasal; nasal long, lozenge-shaped, pierced in the middle by the round nostril and with a groove, or suture, near the upper posterior corner from nostril to loreal suture; frontonasal large in contact with nasals, first loreals and prefrontals, not in contact with frontal; frontal small, considerably smaller than frontoparietal, in contact with two supraoculars; four supraoculars, second, third, and fourth in contact with frontoparietal; four supraciliaries (or five on the right side of the present specimen); frontoparietal large, nearly rectangular, narrowly in touch with frontal, and composed of the fusion of the two frontoparietals and interparietal; parietals large, broadly in contact behind frontoparietal; one pair of large nuchals scarcely in touch behind parietals, and followed by a double series of short very wide plates or scales which gradually decrease in width backward, emerging into the two median dorsal scale rows; first loreal high and narrow separating nasal from prefrontal; second loreal which is considerably lower and wider in contact behind, with only the upper preocular which is considerably larger than the lower one; the upper suture of the supralabials from the rostral to the anterior side of the subocular supralabial deeply depressed, forming a slightly arched groove which even indents the anterior portion of the subocular supralabial; seven supralabials, sixth largest, fifth forming a long low subocular (eight on left side, sixth entering orbit, in present specimen); ear-opening round, nearly the size of the anterior supralabials, with smooth margins without anterior knobs or lobules; mental rather short, followed by a single unpaired postmental; six narrow infralabials, fourth and fifth very elongate; twenty-eight rows of scales, more or less longitudinally rugose, those on back larger, nearly twice the size of those on sides and belly, their rugosities forming about five very blunt keels; those bordering anal opening in front scarcely enlarged; a median series of moderately widened scales under tail; covering under toes consisting of smooth scales like those on top.

Ground color above a light brownish bronze with numerous irregular dark brownish dots all over and a distinct pale band on each side from superciliaries to base of tail, and even fairly indicated on basal half of the latter; this pale band has very ragged edges, being intruded upon by blackish spots which form an irregular dark border on each side; sutures on the head with dark edges; sides and upper side of legs darker brownish with numerous whitish dots scattered all over; underside whitish; terminal third of tail becoming gradually pale brownish flesh color.

Dimensions.—Total length, 106 mm.; from snout to vent, 47 mm.; from vent to tip of tail, 59 mm.; from snout to ear-opening, 10 mm.; greatest width of head, 6 mm.; from axilla to groin, 22 mm.; fore legs, 15 mm.; hind legs, 19 mm.

Variation.—There is considerable variation in the shape and disposition of the head shields of this species. Allusion has already been made (p. 811) to the distinct separation of a supranasal and postnasal in the specimen received from Mr. Knudsen, from Kauai (No. 23507, U.S.N.M.). This specimen shows another marked anomaly, inasmuch as the second loreal is in contact behind with two preoculars, the upper one being divided horizontally. The relations between the frontonasal, prefrontals, and frontal are also subject to some variation, though all the Hawaiian specimens before me agree in having the prefrontals broadly in contact behind the frontonasal, thus separating this shield widely from the frontal, except in the specimen above described, in which they are separated by a small median unpaired shield which barely touches the frontonasal with its anterior angle, being in fact only the detached anterior portion of the frontal.

The ground color varies greatly, it being quite pale bronze green in some specimens. The specimens from Molokai are considerably darker above and decidedly bluish below, but this difference is probably due to the different preserving fluid.

The reproduced tail is dull flesh color freckled with brown.

List of specimens of Ablepharus boutonii poecilopleurus.

Number.	Collection.	Age.	Locality.	When collected.	From whom received.	Remarks.
5706 *a*	U. S. N. M.	Adult.	Oahu and Kauai		U. S. Exploring Expedition.	Described, p. 812.
5706 *b*	do	do	do		do	Tail reproduced.
5706 *c*	do	do	do		do	
12260	do	do	do		do	
23507	do	do	Kauai, Waiawa.	May —, 1895	V. Knudsen	See p. 813.
23516	do	do	Molokai, Kalea	Nov. 26–28, 1896	R. Meyer	
23518	do	do	do	do	do	
23519	do	do	do	do	do	
23520	do	do	do	do	do	Tail reproduced.