

Remarks on the Geographical distribution of Reptiles, with descriptions of several species supposed to be new, and corrections of former papers.

By EDWARD HALLOWELL, M. D.

Genus EUPREPIS.

Gen. character.—Nostrils in the posterior part of the nasal plate; two super-nasals; palate with a triangular furrow, more or less profound; scales carinated; pterygoid teeth. (Dum. and Bib.)

EUPREPIS STRIATA, *nob.*

Sp. character.—Nasal plates well developed, two super-nasal contiguous; an internasal; two fronto-nasal wide apart; a frontal broad in front, narrow posteriorly; two fronto-parietal, more or less quadrilateral, contiguous; an inter-parietal very narrow posteriorly, broad with an acute angle in front; two parietals, no occipital; two freno-nasal, and two freno-orbital plates; head brownish above in front, and upon the sides, blackish posteriorly; ground color of body and tail above deep black, the middle of each scale dusky white, the back and tail presenting therefore numerous alternating lines and bands of black and white; upper surface of extremities blackish with white spots; sides of body marked with black and dusky white and brown; chin, throat, abdomen, under surface of extremities and tail silvery white; 21 rows of strongly carinated scales; the greater number of these scales present each five carinæ upon the surface.

Dimensions.—Length of head 13 lines; breadth 8 lines; length of neck and body $3\frac{1}{2}$ inches; of tail $4\frac{1}{2}$ inches; of anterior extremities 1 inch 4 lines; of posterior 1 inch 6 lines; total length 9 inches 4 lines.

Habitat.—Liberia, western coast of Africa. Two specimens in museum, presented by Dr. Henry A. Ford. There is in the Academy another specimen of this genus from the same locality, described by me some years ago as *Plestiodon Harlani*. It is a much larger animal and it differs from the present species greatly in its coloring, being uniformly yellowish brown above with distinct bars of dark brown upon the sides. The scales in *Harlani* are tricarinate. I have not been able to discover pterygoid teeth in either of these animals.

PACHYDACTYLUS TRISTIS, *nob.*

Sp. character.—Color above yellowish, with numerous brownish lines upon the upper surface of the tail; throat, abdomen, under surface of extremities and tail yellowish; body and extremities covered above with granulations; abdomen with smooth scales; granulations upon under surface of the tail larger for the most part than those upon upper; nostril plate quadrangular, two small plates immediately above it; head covered with small granulations.

Dimensions.—Length of head 11 lines; of body to vent 2 inches 5 lines; from vent to extremity of tail 2 inches 4 lines; total length 5 inches 6 lines.

Habitat.—Liberia, west coast of Africa. Specimen in museum presented by Dr. Goheen.

CÆLOPELTIS, *Wagler.*

Gen. character.—Head sub-distinct, ovate, quadrangular; rostrum narrow, acute, furrowed in front of the eyes, supra-orbital plates projecting considerably; eyes oblong, rotund; pupil round; vertical scute long, narrow; scales not densely approximated, lanceolate, concave; abdomen and under part of tail rounded; two posterior oculars, one anterior, one loreal, quadrate. (Europe and Africa.)

CÆLOPELTIS VIRGATA, *nob.*

Sp. character.—Color uniform, brown above, reddish upon the sides, and to a certain extent upon the abdominal scuta; middle portion of abdominal scuta straw color; two narrow yellowish vittæ upon each side of the head, the superior passing immediately over the eye; scales smooth, 23 rows; entire length 1 foot $8\frac{1}{2}$ inches, (Fr.) length of tail $3\frac{1}{2}$ inches; abdom. scuta 192, subcaudal 55.

Habitat.—Liberia, west coast of Africa. Two specimens in museum of Academy, presented by Dr. Ford.

Fam. VIPERIDÆ.

Gen. BRACHYCRANION, *Hallowell*.

Gen. char.—Head short and thick, covered with seven plates, exclusive of the rostral, viz., one pair of frontal, a vertical, two supra-orbital, and two occipitals, one ant-orbital and one post-orbital; margin of orbit formed by supra-ocular, posterior and anterior oculars, and superior margin of fourth labial plate. Subcaudal plates single; palatal, but, with the exception of the fangs, no mandibular teeth.

BRACHYCRANION CORPULENTUM.

Sp. char.—Occipitals subquadrangular; four supero-labials; one large temporal plate immediately behind post-ocular; scales smooth, quadrangular, 25 rows; color shining black above, brownish beneath; 182 abdominal scuta; 25 subcaudal.

Dimensions.—Length of head $\frac{1}{2}$ an inch, breadth 5 lines; length of body 1 foot 6 inches; of tail 2 inches; circumference 1 inch 8 lines.

Habitat.—Liberia, W. coast of Africa. Presented by Dr. Ford to the Academy.

Gen. observ.—The vipers among venomous serpents are characterized chiefly by the absence of forsettes behind the nostrils, and the presence of a double row of plates under the tail. In the greater number, the head is covered with scales as upon the body; in others there are also plates of various forms, and irregularly disposed, as in *Vipera berus*, while others have upon the head smooth and regularly formed plates, like those of *Coluber* and the genus *Sepedon* of Merrem. In others the subcaudal plates are bifid toward the anus, and single near the extremity of the tail, or alternately single and bifid as in *Acanthophis*.

Bungarus, a genus of Colubriform venomous serpents inhabiting Asia, has a dorsal row of hexagonal scales larger than the others, with nine plates upon the head and single plates under the tail. *Elaps* has nine plates upon the head, but the plates under the tail are bifid. In the animal under consideration there are, as above stated, but seven plates upon the head exclusive of the rostral, there being but one pair of frontals (two in *Elaps*, *Acanthophis* and *Bungarus*) and single plates under the tail. These characteristics, with the peculiar form of the head and the presence of fangs, are such as to give it a distinct generic character different from those of any of the serpents with which I am acquainted. The appearance of *Brachycranion corpulentum* is very repulsive. Since the above was written, I have observed in the work of Dr. Andrew Smith,* on the Zoology of South Africa, the description and figure of a reptile which resembles the one just described, to which the name *Atractaspis Bibronii* has been given. The body in *Atractaspis Bibronii* is much more slender, is longer, but the tail is shorter. The shape of the head in the figure is very different, giving one the impression of a harmless serpent, as Dr. Smith at first supposed it to be, that of the other induces at once a strong suspicion of its venomous character. There are but twenty rows of scales in *Bibronii*, and the general color of the body and tail is intermediate between blackish green and orange colored brown. The fangs in *Corpulentum* also differ from those of *Bibronii* in their dimensions, being not more than half the length of those in the figure of *Bibronii*. Like them, they do not appear to be capable of complete erection. Upon the upper surface of the tail in *Corpulentum*, along the median line near its middle, is a row of six broad scales and four others near the tail, somewhat similar in appearance to those upon the back in *Dipsas*.

CHAMÆLEO GRACILIS, *Hallowell*, Journal Acad. Nat. Sc. vol. viii. pl. 18. A good species. It differs considerably in its general appearance from *Chamæleo dilepis* of Leach, of which there are three specimens in the collection presented by Dr. Henry A. Ford, of Liberia. One of these on being opened was found to contain more than a dozen eggs. I thought at one time that possibly *Ch. gracilis* might be the female of *Ch. dilepis*.

* Zoology of South Africa, by Andrew Smith, M.D., Reptiles, pl. 71.

EUPREPIS HARLANI, nob.

Syn. *Plestiodon Harlani*, *Proceed. Acad. Nat. Sc.*, vol. ii. p. 170.

BOA LIBERIENSIS, nob. Abdom. scut. 237, subcaud. plates *single*, 53—50; longitudinal rows of scales.

Syn. *Python Liberiensis*, *Proceed. Acad. Nat. Sc.* vol. ii. p. 249.

DIPSAS BLANDINGII, *Hall.*, *Proceed. Acad. Nat. Sc.*, vol. ii. p. 170.

Anterior teeth of lower jaw much larger than the others. Two teeth, one on each side in posterior part of upper maxilla provided, each with a sheath, and channelled anteriorly; four rows of teeth in the upper jaw, two in the lower. Seventeen rows of scales. Two anterior oculars, two posterior; a loral; nostrils between two plates, occipital large. Abdom. scuta 273. Subcaud. 131. Length of head, 1 inch 5 lines; of head and body 4 feet; of tail 1 foot (Fr.) 2½ inches. Schlegel remarks that the mode of dentition in *Dipsas cynodon* is unique in the genus, having one or more teeth much longer than the rest at the posterior part of the upper maxilla, others equally longer being found at the anterior extremity of the inferior maxilla and of the palatal bone. It will be observed that a similar arrangement exists in *Dipsas Blandingii*, although the animals differ greatly from each other. *Triglophodon*? *Dumeril*. *Prodromus*, class. des Ophid.

PSAMMOPHIS PHILLIPSII, nob.

Syn. *Coluber Phillipsii*, *Proceed. Acad. Nat. Sc.*, vol. ii. p. 169.

A very well characterized species of *Psammophis*. Jaws very dilatable, several teeth in the anterior part of the lower jaw longer than the others; in the upper maxilla on each side two long teeth posteriorly, and two near the middle; teeth unequal; four first followed apparently by an interval, then the two anterior long ones; scales lanceolate, smooth, intermediate ones more narrow.

Psammophis Phillipsii differs greatly from *Psammophis moniliger* of the Cape. The two longitudinal rows of black spots are wanting in *Phillipsii*, and the latter is a much larger animal; 15 rows of scales.

CORONELLA TRIANGULARIS, nob.

Syn. *Col. lævis*, *Proceed. Acad. Nat. Sc.*, vol. ii. p. 118.

17 rows of smooth scales, 21 in *Coronella lævis*. This animal has a general resemblance to the *Coronella lævis*, (pl. 12, *Amphibia*, *Fauna Pontica*) but the markings are very different, as is also the number of rows of scales. The tail is also longer. It may be considered as the representative of the *Coronella lævis* in Western Africa.

LEPTOPHIS SMARAGDINA, Boie.

Syn. *Dendrophis smaragdina*, Schlegel. *LEPTOPHIS GRACILIS*, Hall.—*Proc. Acad. Nat. Sci.*, Vol. ii, p. 60. Fifteen rows of strongly carinated scales; anterior frontals rather longer than the posterior; nostrils between two plates; one long and narrow loral on each side; one ant-orbital, two posterior orbitals; eight superior labials on the right side, nine on the left; inferior margin of orbit formed by the 4th and 5th on the right, and by the 5th and 6th on the left side of the head; posterior teeth not channelled. Since the above was read, we have received Vol. vii. part 1, of the *Herpétologie générale, ou histoire naturelle complete des reptiles*, par M. Dumeril, in which I observe that this animal has been placed in the genus *Leptophis* by that eminent herpetologist. This genus, as characterized by him, includes serpents with scales, sometimes carinated and sometimes smooth, a conclusion which we ourselves had also arrived at—the carination of the scales was added by Wagler. *Proc. Acad. Nat. Sci.*, Dec., 1852, p. 203.

LEPTOPHIS VIRIDIS.—*Proc. Acad. Nat. Sci.*, Vol. ii., p. 172. This is the young of *Dinophis Hammondii*. *Journal Acad. Nat. Sci.*, Vol. ii., New Series, Part iv., p. 301, pl. 29.

DRYOPHIS KIRTLANDI, nob.

Syn. *Leptophis Kirtlandi*, *Proc. Acad. Nat. Sci.*, Vol. ii., p. 62. Length of largest specimen 4 feet 2 inches; of tail, 1 foot 7½ inches; scales carinated. In the posterior part of the upper jaw, on each side, is a tooth much longer than

the others, and channelled anteriorly; 13 rows of scales, four upon the back carinated, the marginal row near the abdomen larger than the others. Of this species there are five specimens in the collection of the Academy, three from Dr. Savage, and two fully grown from Dr. Ford. These specimens illustrate very well the inconstancy of certain plates about the head in serpents. In one the loreal plates are entirely absent, the posterior frontal passing down to join the superior labial plates; in a second of the smaller specimens there are two loreals on each side; in a third there are two on one side (the left) and one on the other; in one of the larger specimens there are two on each side, and in the other, two on the left and one on the right.* Wagler, in his definition of the characters of the genus *Dryophis* states that there is *no loreal* plate, the posterior frontals passing down along the side of the head, and coming in contact with the superior labials.

Causus rhombeatus, Wagler. *Natur. System. der Amphib.* p. 172.

Naja rhombeata, Schlegel. *Physiognomie des serpens*, Vol. ii., p. 483, pl. xvii, figs. 12 and 13.

Sepedon rhombeatus, Lichtenstein. Berlin. *Dub. Verz.* 1823, S. 106.

Scheuzer. *Phys. Sacr.* t. 717, p. 1.

Vipera V. nigrum, Cuvier. *Reg. Anim.* T. ii., p. 92, n. 4.

Distichurus maculatus, Hallowell. *Journ. Acad. Nat. Sci.* p. 8, pl. 19 (young).

The genus *Distichurus* was based, very improperly, upon a single specimen; and the characters in that were not of sufficient importance to establish a genus. The plates toward the extremity of the tail are not constantly single. In one out of four specimens which we have, they are bifid. In *Crotalus* the plates toward the extremity of the tail are sometimes bifid, and in *Trigmocephalus* also.

BUFO MACULATUS, nob.

Syn. *Bufo cinereus*. *Proc. Acad. Nat. Sci.*, Vol. ii., p. 169. The name *cinereus* has long been applied by Schneider, Daudin, Merrem and others to the *Bufo vulgaris* of Europe. *Bufo maculatus* resembles somewhat *Bufo pantherinus*, but differs from it, according to the description of Dumeril and Bibron, in the size of its tympanum, the breadth of which is considerably larger than the length of the upper eyelid. The form and arrangement of the markings differ greatly from those in the plate of Rüppel.

The Herpetology of Africa has as yet been but too imperfectly studied to enable us to comprehend the geographical distribution of the reptiles of this vast continent. The labors of Dr. Smith have left but little to be desired for the illustration of the southern part of it, and Rüppell has given good descriptions and drawings of a number of reptiles in N. Africa and Abyssinia. These, with the great work on Egypt, and the late production of M. Bianconi, on the Natural History of Madagascar, constitute the most reliable sources of information appertaining to this subject. Let us hope that our own government will do for the natural history of Western Africa what the English government has done for that of the Southern portion of this great continent.

The reptiles common to both Northern and Western Africa, so far as we know, are *Agama colonorum*, *Chamæleo dilepis* (bilobus) *Kinixys belliana* *Echidna arietans*, *Naja haj.*, var. black, *Vipera* (cerastes) *nasicornis*, the genera

* This inconstancy is observed in other genera. In *Hydrus pelamoides* the frenal shield observed by M. Schlegel was not present in four individuals, examined in the Straits of Malacca: in all *Hydri* the shields of the head are liable to considerable individual varieties of form—(Cantor)*—"Hydrus bicolor—Schneider—a frenal shield has been observed in some individuals, but it was absent in that examined in the Straits of Malacca, nor does it exist in the specimens in the Museum of the Asiatic Society." p. 135. "In *Dryinus prasinus*, Reinwardt, there are two, sometimes three frenals on each side." p. 83.

* Catalogue of Reptiles inhabiting the Malay Peninsula and Islands, collected or observed by Theodore Cantor, Esq., M.D., Bengal Medical Service, 1847.

Pachydactylus, and *Onychocephalus*, and *Causus rhombeatus*. The genera *Uromastyx* and *Stellio* are found in Northern, but do not appear to exist in S. Africa. The study of the geographical distribution of animals, and especially of reptiles, presents many very remarkable facts. Some species appear to have a very wide distribution, others a very local. The *Cistudo Carolina*, for example, is found in almost every part of the United States, but *Emys Muhlenbergii* and *Testudo polyphemus* have a very limited range, the one being known only in a small portion of the Northern States and the other of the Southern. The species of reptiles of the United States are entirely different from those of Europe, but there are a number of genera common to both; among these are *Testudo*, *Emys*, *Coronella*, *Tropidonotus*, *Psammophis*, *Coluber*, *Rana*, *Bufo*, *Salamandra*.

The genera *Crotalus*, *Trigonocephalus* or *Elaps*, all of which exist in the United States, are not found in Europe, but the venomous serpents are replaced by the viper, of which there are several species—none of which are found with us, the serpent called viper in the U. States being a *Heterodon*, a very harmless animal. The viper is common in England but does not exist in Ireland, neither does the genus *Bufo*. Some genera are very limited in their distribution, being found in certain localities and nowhere else. Thus *Amphiuma* and *Siren* are found in the Southern States; *Menopoma*, in the West and South; *Menobanchus*, in the Western waters of the United States; *Phrynosoma* in New Mexico and Texas; *Anota*, of which but two specimens have yet been discovered, and *Homalosaurus* in the Desert of the Colorado; *Holbrookia* or *Cophosaurus* in Texas; *Platysaurus*, in Southern Africa; *Hypochthoon* in Illyria.

The species on the East and West Coast of South America differ almost entirely from each other. The genus *Proctotretus*, comprising numerous species, is found only in Peru. Other genera have a much wider distribution, but are confined to certain large portions of the globe. Thus the Boas exist for the most part in South America, the Pythons in Africa. According to Schlegel, no species of serpent is found in all parts of the world, the *Tortrix* not an exception, not being known in the United States. *Gerrhosaurus* is found in California, there being but one species known in that State, but there are six species of the same genus in Mexico, and six others, all described by Dr. Smith, exist at the Cape of Good Hope.

My friend, Professor Baird, informs me that he has recently received, from the Western portion of the United States, a specimen of *Dipsas*, a genus of serpents not hitherto known to inhabit the United States. The genera *Chamaeleo*, *Euprepis*, *Eremias*, *Cordylus*, *Gecko*, *Hemidactylus*, *Ptyodactylus*, *Stenodactylus*, *Phyllodactylus*, *Acanthodactylus*, *Zonurus*, *Varanus*, are entirely unknown in the United States, nor are there any true *Lacertæ*. Among fresh water tortoises, the *Emydes* of the United States are very numerous, Prof. Holbrook having figured as many as seventeen species; they occur, also, in great numbers in India, twelve species having been described by Dumeril and Bibron, in their great work on Reptiles. It is very remarkable, however, that but one species of *Emys*, the *Emys spengleri*, of which we have the shell only in the Academy, has been described as existing in the whole continent of Africa, whereas the tortoises in the Southern portion of that country are numerous. Two species of *Sternotherus* are described as belonging to the island of Madagascar, the *niger* and *nigricans*. We have the shell of one from Western Africa, which probably belongs to the latter species. Among serpents the genus *Tropidonotus* has a very wide range, being found more or less abundantly in almost every part of the globe except Africa and Australia. The genus *Trigonocephalus* is not found in Africa, but the vipers in that quarter of the globe are numerous, no less than six species being described by Dr. Smith as inhabiting S. Africa, viz.: *Echidna arietans*, *atropos*, *atropoides*, *inornata*, and *Cerastes cornutus* and *ocellatus*. To these may be added the *Vipera nasicornis*, or Natter Jack, which is found both in Southern and Western Africa. Among the most remarkable of serpents are those comprised in the genus *Hydrophis*. They are sea serpents, and "inhabit exclusively the inter-tropical latitudes of the Indian seas and of the great Pacific Ocean."

It has been a matter of doubt whether these animals are poisonous or not; but

Dr. Cantor, in a paper published in the Zoological Transactions of London, asserts positively that they are, and recent observations made by Dr. Burnet of Boston, have confirmed his statements. The tree snakes are not found in Europe, neither are the Calamars, nor Lycodons and Heterodons. The Bungari inhabit Ceylon, India, Bengal and Java. The Basilisk is found in Celebes, Amboina and the Phillipine Isles; Dilophyrus in India and the Malayan Peninsula.* No species of Coronella is said to exist in New Holland (Schlegel.) Eryx is found only in the East.

"Only one species of mammal is indigenous to the Gallapagos Islands, viz., a large and peculiar kind of mouse; but the number of lizards, tortoises and snakes is so great that it may be called a land of reptiles. The variety indeed of species is small, but the individuals of each are in great abundance. There is a turtle, a large tortoise, (*Testudo indicus*), four lizards, and about the same number of snakes, but no frogs or toads. Belonging to the family Iguanidæ, Bell, are two species of *Amblyrhynchus*, one terrestrial, the other marine; the marine species is extremely common on all the islands throughout the Archipelago. It lives exclusively on the rocky sea beaches, and is never seen even ten yards inland. The usual length is about a yard, but there are some even four feet long. It is of a dirty black color, sluggish in its movements on the land, but when in the water it swims with perfect ease and quickness by a serpentine movement of its body and flattened tail, the legs during this time being motionless and collapsed on its sides. Its limbs and strong claws are admirably adapted for climbing over the rugged and fissured masses of lava which everywhere form the coast. In such situations a group of six or seven of these hideous reptiles may oftentimes be seen on the black rocks, a few feet above the sea, basking in the sun with outstretched legs. Their stomachs, on being opened, are found to be largely distended with minced seaweed, of a kind which grows at the bottom of the sea, at some little distance from the coast. To obtain this the lizards go out to sea in shoals. One of these animals was sunk in salt water from the ship, with a heavy weight attached to it, and on being drawn up again, after an hour, it was quite active and unharmed. It is not known by the inhabitants where this animal lays its eggs; a singular fact, considering its abundance, and that the natives are well acquainted with the eggs of the terrestrial *Amblyrhynchus*, which is also herbivorous." Lyell's *Geology*, p. 280; Darwin's *Journal*, ch. xix. The *Amblyrhynchus* inhabits also S. America.

In the Island of Cuba are found the following genera: *Emys* (*decussata* and *rugosa*, Shaw) *Crocodylus* (*rhombifer* and *acutus*), *Holotropis*, *Cyclura*, *Anolis*, *Acanthophis*, *Chamæleolis*, *Hemidactylus*, *Sphæriodactylus*, *Gymnodactylus*, *Amphisbæna*, *Typhlops*, *Tropidophis*, *Leionotus*, *Epicrates*, *Calamaria*, *Coluber*, *Phyllobates*, *Trachycephalus*, *Bufo*. The greater part of these genera are unknown in the United States.

In Mexico there exist a number of very remarkable types, differing entirely from those of our own country, viz., the genus *Heloderma* (*horridum*), *Cyclura* (*denticulata* and *punctata*), *Corythæolus* (*vittatus*), *Chamæleopsis* (*Hernandesii*); besides these are several species of genera belonging to our fauna, viz., *Sceloporus* (*torquatus*, *formosus*, *spinosus*, and others), and six species of *Gerrhonotus*.†

The following remarks are made by Prof. Agassiz: "It has been already stated that the present distribution of animals agrees with the distribution of extinct types belonging to earlier geological periods, so that the laws which regulate the geographical distribution of animals seem to have been the same at all times, though modified in accordance with the successive changes which the animal kingdom has undergone, from the earliest period of its creation to the present day. The universal law is that all animals are circumscribed within definite limits. There is not one species which is uniformly spread all over the globe, either among the aquatic races or among the terrestrial ones. The special

* For plate of *Dilophyrus grandis* (Gray) see Cantor, pl. xx. p. 34.

† The most important facts in regard to the geographical distribution of reptiles are contained in the great work of Dumeril and Bibron, by far the most complete and useful on general herpetology that has yet been published.

adaptation of animals to certain districts is not merely limited to the individual species. We observe a similar adaptation among genera, entire families, and even whole classes. For instance, all Polypi, Medusæ and Echinoderms, that is to say, all Radiata, without exception, are aquatic. That large group of animals has not a single representative upon any part of the surface of the globe, and during all periods of the existence of our earth we find that they have been limited to that liquid element. And they are not only aquatic, they are chiefly marine; but exceedingly few of them are found in fresh waters. Among mollusca we find almost the same adaptation; their element also is the sea. The number of fresh water species is small, compared with that of marine types; and we find terrestrial species in only one of these classes. In former periods also mollusca were chiefly marine; fluviatile and terrestrial types occurring only in more recent periods." p. 195. The number of "marine species of fishes is far greater than of the fresh water kinds. Among reptiles there are many which are aquatic, either throughout life, or through the earlier period of their existence. But as if animal life rose to higher organization as it leaves the ocean to inhabit dry land or fresh waters, we find that the greater number of the aquatic reptiles are fluviatile and but a few marine." The four great types, Radiata, Mollusca, Articulata and Vertebrata were introduced at the beginning simultaneously. However, the earliest representatives of all these great types were aquatic. We find in the lowest beds which contain fossils, polypi, together with star fishes, bivalve shells, univalve chambered shells, cases of worms and crustacea, being at least representatives of seven of nine classes of invertebrate animals, if we are not allowed to suppose that medusæ existed also, and if insects were still wanting for a time. But in addition to these, fishes among vertebrata are introduced, but fishes only, all of which are exclusively marine. At a somewhat later period insects come in. We find next reptiles in addition to fishes, the lower classes or invertebrates, continuing to be represented through all subsequent epochs, but by species changing gradually at each period, as all classes do after they have been once introduced. The first representatives among reptiles are marine, next huge terrestrial ones, some perhaps flying types, and with them, and perhaps even before, the birds, allied to the wading tribes. Still later mammalia, beginning again with marine and huge terrestrial types, followed by the higher quadrupeds. And lastly, man, at the head of the creation in time as well as in eminence, by structure, intelligence, and moral endowments."—*Geographical Distribution of Animals*, p. 197.

For reliable plates illustrating genera and species of reptiles, vide among other works,—

Cuvier, *Règne Animal*. 4to edit. Paris.

Griffith's *Animal Kingdom*. Reptilia. London, 1832.

Duméril et Bibron. *Herpétologie générale, ou Histoire Naturelle complete des Reptiles*. Paris, 1834.

Holbrook, *North American Herpetology*. 5 vols. 4to. Philad., 1842.

Bonaparte, *Iconographia Fauna Italica*, Roma. 1832—41.

Illustrations of Zoology of Southern Africa, by Andrew Smith, M.D. Reptilia. London, 1849.

Voyage dans la Russie Meridionale et la Crimée, executé sous la direction de M. Anatole de Demidoff. (Fauna Pontica.) Paris, 1842.

Voyage dans l'Amerique Meridionale, par Alcide D'Orbigny. Reptiles. Paris, 1847.

De La Sagra, *Histoire Naturelle de l'île de Cuba*. Fol. Paris.

Atlas zu der Reise im Nordlichen Africa, par Edward Rüppell. Frankfort am Main, 1826.

Neue wirbelthiere zu der Fauna von Abyssinien gehörig entdeckt und beschrieben von Dr. Edward Rüppell. Frankfurt am Main. 1835—40.

Fauna Caspio-Caucasia, nonnullis observationibus novis, illustravit Edouardus Eichwald. Petropoli, 1841.

Untersuchungen über die Fauna Peruana von J. J. M. Tschudi. St. Gallen. 1844—46.

Zoologischer Atlas enthaltend Abbildungen und Beschreibungen neuer Thierarten, beobachtet von Dr. Fried. Escholtz. Berlin, 1829.

Voyage dans l'Inde par Victor Jacquemont. Atlas. Paris, 1844. (Sitane, Calotes, Chamæleo vulgaris.)

The Zoology of the Voyage of H. M. S. Beagle; edited and superintended by Charles Darwin, Esq., M.A., F.R.S., F.G.S.C., &c. London, 1842.

The Zoology of Capt. Beechy's Voyage. London, 1839.

Guerin. Iconographie du règne animal. Paris, 1829—44.

Faune Française. 3 v. 4to. Paris.

Description of four new species of Viviparous Fishes from Sacramento River, and the Bay of San Francisco. Read before the California Academy of Natural Sciences, May 15th, 1854. By W. P. GIBBONS, M.D.

Hysterocarpus Traskii, Gibbons.

Body ovate, sub-compressed. Jaws with a single row of conical teeth. Opercle and preopercle with scales, and with a membrane round the edge. Dorsal fin commences opposite the pectoral, has seventeen strong curved spines, the first short, the succeeding ones increasing regularly in length to the sixth, which is the longest, and eleven articulated rays. The spinous rays lie in a groove, which conceals the first two; the remainder project an inch and a quarter above the scales, and lapping by each other alternately form, in this position, a double row.

Pectoral subquadrangular, with the lower edge rounded, and the first ray short and subspinous. First ray of the ventrals shorter than the others, spinous and curved.

First three rays of the anal fin with short, thick and curved spines, the middle one largest.

Body arched, the radius of curvature being least along the anterior half of the dorsum. Facial line about 45° : profile slightly incurved along the line of the interparietal and frontal bones. Snout protractile, lips thick, lower jaw longest. Eyes rather large and near the facial outline. Nostrils double, covered with a valve half way between the anterior edge of the orbit and the upper lip.

Lateral line nearly concurrent with the back. Scales large, deciduous. Smaller on the summit of the head, and on the opercle, at the base of the tail, anal and ventral fins, and on the space bounded anteriorly by the ventrals and pectorals.

Extreme length 6.5 in., width 3 in., weight 2 oz.

Color. Back varying from ash color to dark brown; irregular black patches, approximating somewhat to bands, across the sides. Belly lemon yellow, becoming lighter and blending with the ash color up the sides. Sides, in some, punctated with black. Dark and yellow patches on the fins. D. 28, P. 18, V. 6, A. 25 to 28, C. 20.

Var. B. Facial line not so angular as the other, head deeper, and less dorsal curvature.

The anatomy of these fishes is similar to that of the viviparous species which I have already described, except that the uterus, instead of being bipartite, is ovoid, having but a single umbilical cord, which returns its venous blood into the portal system. Intestinal canal 6 in. long, enlarged at each extremity. The specimens of this fish were presented to me for description by my friend, Dr. J. B. Trask, who obtained them through the kindness of Mr. Morris, from the lagoons of the Sacramento river, and from the river itself, where they are found as high up as the fishermen have yet been. They are the first specimens of the fresh water vivipara that have come to hand.

Hyperprosopon argenteum, Gibbons.

Body compressed, oval. Jaws with a double row of teeth, inner row imperfectly developed. Cheeks and opercle scaly, membranous round the edges.



Hallowell, Edward. 1854. "Remarks on the geographical distribution of reptiles, with descriptions of several species supposed to be new, and corrections of former papers." *Proceedings of the Academy of Natural Sciences of Philadelphia* 1854, 98–105.

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