

An Analytical Table of the Genera of Snakes. By E. D. Cope.

(Read before the American Philosophical Society, May 21, 1886.)

The following key was prepared as preliminary to a discussion of the genera and species of North American Snakes to be published by the Smithsonian Institution. As this work will not be ready for publication for some months, I publish the present extract from it by permission of the Secretary, Prof. S. F. Baird. It is to be hoped that it may be useful in clearing up some of the obscurity which has existed with regard to the definitions of some forms; and that it may show that in some instances exact definition requires further separation of such groups, while in others combinations are necessary.

For the definitions of genera which I have not seen, I am especially indebted to my colleagues in this department, Drs. Peters, Günther, Jan, Krefft, and others.

OPHIDIA.

The families of snakes are distinguished by the following osteological characters :*

A. Opisthotic intercalated in the cranial walls (*Angiostomata*).

* No ectopterygoid; palatines bounding choanæ posteriorly; ethmoturbinal forming part of roof of mouth; rudiments of pelvis (*Scolecophidia*).†

I. Maxillary bone fixed to prefrontal and premaxillary; a pubis

CATODONTA.‡

II. Maxillary bone vertical and free from all others; no pubis

EPANODONTA.§

** An ectopterygoid; palatines not bounding choanæ posteriorly.

III. Maxillary bone free, horizontal.....TORTRICINA.

† A coronoid bone.

a. Rudimentary posterior extremities.....*Tortricidæ* Müller.

aa. No rudiments of posterior extremities.....*Uropeltidæ* Müller.

B. Opisthotic attached scale-like to cranial walls, and produced freely. Ectopterygoid present (*Eurystomata*).

IV. Maxillary bone horizontal, in contact with the premaxillary, and furnished with solid teeth. No rudiments of pelvis.....ASINEA.

a. Rudiments of posterior extremities (*Peropoda*).

β. Coronoid bone present.

Supraorbital and postorbital bones, and premaxillary teeth present

Pythonidæ Cope.

No supraorbitals or premaxillary teeth; postorbitals present. *Boidæ* Cope.

* This arrangement was first published by the writer in the Proceedings of the Philadelphia Academy for 1864, p. 230. The definitions of the lower primary divisions were derived from J. Müller.

† The characters of this division as I originally gave them (Proceedings Academy Philada., 1864, p. 230) were derived from J. Müller, which have been shown to be partially erroneous by Duméril and Bibron, and Peters.

‡ Includes only the family *Stenostomidæ*.

§ One family, the *Typhlopidae*.

$\beta\beta$. No coronoid bone.

No supraorbitals nor postorbitals nor premaxillary teeth. *Charinidæ* Cope.

$\alpha\alpha$. No rudiments of posterior extremities (*Colubroidea*.)

β . Coronoid bone present.

No postorbital or supraorbital bones; premaxillary teeth present

Xenopeltidæ Cope.

$\beta\beta$. No coronoid bone.

γ . Postorbital bone produced over the superciliary region.

No gastrosteges. *Acrochordidæ* Cope.

Gastrosteges present. *Nothopidæ* Cope.

$\gamma\gamma$. Post orbital bone not extending over the superciliary region.

δ . Nostril in or between nasal plates. *Colubridæ* Auct.

ϵ . Vertebral hypapophyses confined to the anterior part of the column. *Colubrinæ*.

$\epsilon\epsilon$. Vertebral hypapophyses extending throughout the column
Homalopsinæ Cope.

$\delta\delta$. Nostril in the rostral plate. *Acontiophidæ* Gthr.

V. Os maxillare horizontal, thickened in front, and not reaching the premaxillare anteriorly, and bearing a perforate tooth

PROTEROGLYPHA.

a . Caudal hypapophyses bifid; caudal neural spines and pleurapophyses short.

Postfrontal bones wanting; fang grooved. *Elapidæ* Cope.

Postfrontals present; fang grooved. *Najidæ* Cope.

Postfrontals present; fang not grooved. *Dendraspididæ* Gthr.

$\alpha\alpha$. Caudal hypapophyses simple; caudal neural spines and pleurapophyses elongate.

A postfrontal bone. *Hydrophidæ* Gthr.

VI. Maxillary bone vertical, not reaching premaxillary, articulating with the prefrontal by a ginglymus, and to the ectopterygoid without imbrication, and bearing a perforated tooth. SOLENOGLYPHA.

Maxillary bone not excavated; fang not grooved in front; no postfrontal bone. *Atractaspididæ* Gthr.

Maxillary bone not excavated; fang grooved in front; a postfrontal

Causidæ Cope.

Maxillary bone not excavated; fang not grooved; a postfrontal

Viperidæ Gray.

Maxillary bone excavated by a large chamber; fang not grooved in front; a postfrontal. *Crotalidæ* Gray.

In the following pages I present synoptical diagnoses of the genera of the Ophidia arranged in key form. These are placed under subfamily heads, which are not, with the exception of the Homalopsinæ, defined. It is not certain, therefore, that their contents are in all cases properly limited or distributed. It remains a desideratum to discover the characters of the natural divisions of the Colubridæ, if any there be. The characters presented by Duméril and Bibron, and by Günther, are important but in-

sufficient. For the definition of the genera distinct characters exist, although the subject is one of much difficulty. The object of definition being, as I imagine, precision, and the consequent increased facility of determination, I have employed all structural characters whatever, and only neglected them where it is evident that they are inconstant within the limits of a species. I find of the greatest importance the grooved or non grooved characters of the posterior teeth, and the absence or number of the scale-pits. The division or non-division of the anal scutum is also of much importance, although in a very few genera (*e. g.*, *Xenodon*) it is not constant. Relying, as the system always must, on exact characters, I have not allowed considerations of "physiognomy" to change a result where it conflicts with structure, which is, however, rarely the case. The tendency of some authors to neglect characters and to depend on "physiognomy" destroys precision and explains nothing, besides rendering identification of species most laborious, resting as it must in that case on purely empirical methods. I also do not use as generic characters the number of rows of scales, or of labial scuta, believing that these are only available in the distinction of species.

In a few instances I have not been able to examine the skeletons of genera of doubtful position, so that their reference to a family division may yet have to be altered. I have, however, studied the fine series in the museums of Paris and Washington, besides a considerable number in my own collection. For the characters of many genera which I have not seen I have had to rely on the descriptions of others, especially of Drs. Peters and Günther.

EPANODONTA.

TYPHLOPIDÆ.

I. Muzzle covered above by rostral and internasal scuta.

a. Two ocular plates and a preocular.

One nasal plate.....*Letheobia* Cope.

aa. One ocular and a preocular.

One nasal plate.....*Typhlops* Schn.

Two nasal plates.....*Helminthophis** Pet.

aaa. One ocular and no preocular.

One nasal plate.....*Typhlina*† Wagl.

Two nasal plates.....*Liotyphlops*‡ Pet.

II. Muzzle and front with five symmetrical scuta.

Two nasals and a preocular.....*Anomalepis* Jan.

CATODONTA.

STENOSTOMIDÆ.

Superciliary scales present.....*Stenostoma* Wagl.

No superciliary scales.....*Rena* B. & G. §

* *Idiotyphlops* Jan.

† *Pilidion* Dum. Bibr. *Typhlinalis* Gray.

‡ *Rhinotyphlops* Pet.

§ *Catodon* D. & B., not of Lacep. *Siagonodon* Peters.

TORTRICINA.**TORTRICIDÆ.**

Intermaxillary bone dentate ; eye covered by a single scute. *Tortrix* Oppel.

Intermaxillary edentulous ; eye surrounded by distinct scales

Cylindrophis Wagl.

RHINOPHIDÆ.**I. Tail terminating in a large shield.**

Rostral plate produced posteriorly, separating the nasals. *Rhinophis* Hemp.

Rostral not produced ; nasals in contact..... *Uropeltis* Cuv.

II. Tail scaly to end.

Tail terminating in a disk of keeled scales ; supraorbitals and postocular confluent..... *Silybura* Gr.

Tail compressed, truncated, terminating in a bicuspid scale, the points superposed ; postocular distinct..... *Plectrurus* D. & B.

Tail tapering, terminal scute ending in a horizontal ridge ; no chin-groove
Platyplectrurus Günth.

Tail tapering, ending in a single point ; no chin groove

Teretrurus Bedd.

Tail with smooth scales, terminating in one or two points ; postocular united with superciliary ; a median chin-groove.. *Melanophidium* Gthr.

ASINEA.**XENOPELTIDÆ.**

Eyes not covered with a plate ; head with normal shields, with an interparietal added ; scales smooth ; anal and subcaudals divided ; teeth equal *Xenopeltis* Reinw.

PYTHONIDÆ.**I. Premaxillary teeth present.****a. Fossæ in labial plates of both jaws.**

Scuta on end of muzzle only..... *Morelia* Gray.

Scuta extending to between orbits..... *Python* Daudin.

Scuta covering vertex and muzzle..... *Liasis** Gray.

aa. Fossæ in inferior labials only.

Muzzle shielded to frontal region..... *Nardoa* Gray.

aaa. No labial fossæ

Head shielded ; tail prehensile..... *Aspidiotes* Krefft.

Head with nine regular shields above ; rostrals plate protuberant ; tail not prehensile..... *Loxocemus* Cope.

II. No premaxillary teeth.†

Labial plates with fossæ ; vertex and front squamous ; nostril in one nasal ; scales smooth *Chondropython* Meyer.

Head covered with large scuta..... *Aspidopython* Meyer.

* *Liopython* Hubrecht.

† *Teste* Boulenger.

BOIDÆ.

I. Tail prehensile.

a. Scales smooth.*β.* Labial fossæ present.Plates on muzzle only.....*Xiphosoma** Wagl.Plates extending over muzzle and front.....*Epicrates*† Wagl.*ββ.* No labial fossæ.Muzzle and front scaled ; nasal plates meeting*Lichanura* Cope.Muzzle and front scaled ; nasal plates widely separated.....*Boa*‡ Linn.Muzzle and front scutate ; nares vertical.....*Eunectes* Wagl.Muzzle and front with scuta divided on the median line ; nares lateral
Chilabothrus§ D. & B.Muzzle and front with median scuta ; nares lateral...*Ungaliophis* Meyer.*αα.* Scales carinate.

Top of head with symmetrical plates ; nares between two

Ungalia|| Gray.

Top of head with symmetrical plates ; nares in a single plate

Bolieria¶ Gray.Plates on muzzle only.....*Casarea*** Gray.Top of head scaly ; rostral plate forming border of mouth.*Enygrus* Wagl.

Top of head scaly ; labial plates meeting below rostral plate

Trachyboa Pet.

II. Tail not prehensile.

a. Palatine teeth well developed.*β.* Rudiments of hind limbs visible.A mental groove*Gonglyophis* Wagl.No mental groove.....*Eryx*†† Daud.*ββ.* No visible rudiments of hind limbs.Scales keeled ; head very distinct*Erebophis* Gthr.*αα.* Palatine teeth none (Peters).

Scales smooth ; top of head with symmetrical plates to between orbits ;

one nasal.....*Calabaria*†† Gray.

CHARINIDÆ.

Head scutate above ; scales smooth ; tail not prehensile ; palatine teeth

Charina‡‡ Gray.* *Corallus* and *Chrysenis* Gray.† *Epicarsius* Fisch.‡ *Acrantophis* Jan.§ Includes *Homalochilus* Fisch. ; *Pelophilus* D. & B. (= *Sanzinia* Gray) ; *Dendrophilus* Jan, and *Piesigaster* Seoane.|| *Tropidophis* D. & B. *Notophis* Hallow.¶ *Platygaster* D. & B.** *Leptoboa* D. & B.†† *Cusoria* Gray.‡‡ *Rhoptrura* Peters ; may belong to the Charinidæ.‡‡ *Wenona* B. & G.

ACROCHORDIDÆ.

- Body compressed, acute below.....*Chersydrus* Cuv.
 Body round, flat below.....*Aerochordus* Hornst.

NOTHOPIDÆ.

- Scales above granular, with rows of tubercular scales; urosteges simple;
 no frontal or parietal plates.....*Xenodermus* Rhdt.
 Scales squamous; urosteges double; head scaly, with frontal and
 parietal plates.....*Nothopsis* Cope.

COLUBRIDÆ.

Head conic, not distinct from the body, which is cylindric and rigid

CALAMARINÆ.

Head slightly distinct, short; teeth entire, not enlarged in front

CORONELLINÆ.

Head similar to last; posterior tooth grooved.....SCYTALINÆ.

Head more distinct and elongate, body and tail longer; teeth entire, not
 longer in front.....COLUBRINÆ.

Like the last, but grooved teeth posteriorly.....PHILODRYADINÆ.

Very slender; pupil horizontal; grooved teeth.....DRYOPHIDINÆ.

Less slender, not compressed; middle teeth elongate, posterior teeth
 grooved.....PSAMMOPHIDINÆ.

Anterior maxillary and mandibular teeth enlarged.....LYCODONTINÆ.

Anterior teeth not abruptly enlarged, posterior grooved; head wide, very
 distinct, body compressed.....DIPSADINÆ.

Anterior teeth not abruptly enlarged, the posterior weak and not grooved;
 head very distinct from the body, which is compressed; no œsopha-
 geal teeth.....LEPTOGNATHINÆ.

Maxillary teeth few and rudimental; body slender; hypapophyses pierc-
 ing throat, and capped with enamel.....DASYPELTINÆ.

Hypapophyses spinous to caudal region; anterior teeth not enlarged;
 body not slender; head distinct.....HOMALOPSINÆ.

CALAMARINÆ.

I. Posterior maxillary tooth grooved.

* Subcaudal scuta.

One nasal; anal undivided.....*Uriechis** Pet.

Two nasals; anal divided.....*Cercocalamus* Gthr.

** Subcaudal scutella.

† No internasals.

One nasal, no preocular.....*Amblyodipsas* Pet.

One nasal, a preocular.....*Apostolepis* Cope.

†† Two internasals; prefrontals united together.

One nasal; a preocular.....*Phalotris* Cope.

††† Internasals united with nasals.

Postnasal distinct, anal divided.....*Stenorhina* D. & B.

†††† Two internasals and two prefrontals.

* *Polemon* Jan.

- a.* Nasal plate single.
 No preocular; no loreal..... *Calamelaps** Gthr.
 A preocular; rostral not prominent..... *Elapomorphus*† Wieg.
 A preocular; rostral prominent..... *Ogmilus* Cope.
aa. Two nasal plates.
β. Two anal scuta.
 No preocular; a loreal..... *Enulius*‡ Cope.
 A preocular; no loreal..... *Tantilla*§ B. & G.
 A preocular and loreal, tail smooth..... *Hydrocalamus* Cope.
 A preocular and loreal, tail short, rugose..... *Procinura* Cope.
ββ. One anal scutum.
 A loreal and preocular; tail smooth..... *Scolecophis* Cope.
 II. Posterior maxillary teeth smooth.
 * Subcaudal scuta.
 † Internasals united.
 Scales smooth..... *Aspidura* Wagl.
 Scales keeled..... *Haplocercus* Gthr.
 ††. Internasals and prefrontals distinct.
a. Rostral not produced.
 Postoculars not distinct from temporals; one nasal; loreal joined to preocular..... *Achalinus* Pet.
 Postocular, preocular, and two nasals..... *Elapops*|| Gthr.
aa. Rostral produced.
 Two nasals and a loreal and preocular..... *Rhinophilus* B. & G.
 ** Subcaudal scutella.
 † Nasal scuta well developed.
 ‡ No internasal scuta.
 || Rostral plate produced.
 Prefrontals separated by rostral; nasals and first labial confluent
Ficimia Gray.
 Prefrontals in contact; nasal distinct; rostral little produced
Conopsis Gthr.
 Rostral much produced..... *Rhynchonyx*¶ Pet.
 ||| Rostral not produced.
 Nasal confluent with first labial; preocular and loreal distinct
*Sympholis*** Cope.
 Nasal distinct; loreal and preocular united..... *Geophidium*†† Pet.
 †† One internasal scutum.
 || Prefrontals united.
 Rostral much produced..... *Ligonirostra*‡‡ Cope.
 ||| Two prefrontals (rostral not produced).

* *Micrelaps* Boettg.† *Urobelus* Rhdt.

‡ Not of Bocourt Miss. Sci. Mex.

§ *Homalocranium* D. & B.|| *Pariaspis* Cope.¶ *Xenocalamus* Gthr.** *Chilorhina* Jan.†† *Xylophis* Bedd.‡‡ *Temnorhynchus* Smith.

Scales keeled ; no preocular, two anals. *Haldea** B. & G.
 Scales keeled ; no loreal ; a preocular ; anal double.... *Fulconeria* Theob.
 Scales smooth ; no preocular, two anals. *Farancia* Gray.
 Scales smooth ; no loreal ; a preocular..... *Pseudoeryx*† Fitz.
 Scales smooth ; no loreal nor preocular ; one anal ; (? teeth)
Calamophis Meyer.

‡‡‡ Two internasals ; one prefrontal.

Rostral much produced..... *Prosymna* Gray.
 Rostral not produced, teeth equal..... *Trimetopon* Cope.
 Rostral not produced, teeth diacranterian..... *Colorhogia* Cope.

‡‡‡‡ Two internasals and two prefrontals.

§ Rostral plate reaching frontal.

Nasals and first labial confluent..... *Gyalopium* Cope.

§§ Rostral plate not reaching frontal.

a. Posterior maxillary teeth elongate.

Two nasals well separated from preocular..... *Arrhyton* Gthr.

Two nasals in contact with frenoöcular..... *Leptocalamus* Gthr.

aa. Teeth equal.

β. Superciliary plate absent.

Two nasals and a frenoörbital..... *Colophrys* Cope.

ββ. Superciliary present.

γ. Rostral plate produced.

δ. Nasal plates distinct below.

No loreal ; anal divided ; two nasals..... *Geagras*‡ Cope.

A loreal ; anal entire ; two nasals..... *Cemophora* Cope.

A loreal ; anal divided ; one nasal..... *Chionactis*§ Cope.

δδ. Nasal plates united with first labial.

A preocular and a divided anal..... *Chilomeniscus*|| Cope.

γγ. Rostral plate not produced.

ε. Palatine bones with teeth.

η. One nasal plate ; one anal plate.

Scales smooth..... *Homalosoma*¶ Wagl.

ηη. One nasal and two anal plates.

Loreal and preocular present..... *Contia*** B. & G.

Loreal present, no preocular *Abastor*†† Gray.

Neither loreal nor preocular..... *Oxyorhinos* Fischer.‡‡

ηηη. Two nasal, one anal plate.

Maxillary bone very slender ; scales smooth ; a frenoörbital plate

Stenognathus§§ D. & B.

* *Conocephalus* D. & B.

† *Dimades* Gray. *Calopisma* D. & B. *Hydrops* Wagl.

‡ *Enulius* Boc. *Sphenocalamus* Fisch. *Pseudoscimia* Boc.

§ *Lamprosoma* Hallow.

|| *Bergenia* Steindachner.

¶ *Rhabdium* D. & B.

** *Cryptodacus* Peters. *Eirenis* Jan.

†† *Carphocphiops* Gerv. *Carphophis* D. & B. *Celut* B. & G.

‡‡ 1879 ; *Atractocephalus* Sauv. ? 1880.

§§ *Platypteryx* D. & B.

Maxillary more robust ; scales smooth ; a frenoörbital plate

*Rhabdosoma** D. & B.

Maxillary more robust ; scales keeled ; a frenoörbital plate

Elapoides† Boie.

γγγγ. Two nasal and two anal scuta.

A loreal ; no preocular ; two pairs geneials..... *Virginia* B. & G.

A loreal ; no preocular ; one pair geneials..... *Adelphicus*‡ Jan.

A loreal and a preocular ; two pairs geneials..... *Sonora* B. & G.

No loreal ; a preocular ; jaws weak..... *Brachyorrhos* Kuhl.

εε. Palatine bones without teeth.

Two anals and nasals ; a loreal and a preocular..... *Oligodon* Boie.

Two anals and nasals ; a loreal and no preocular..... *Colobognathus* Pet.

††. Nasal scutum minute.

No internasals ; preoculars present..... *Calamaria* Boie.

Two internasals ; a preocular..... *Pseudorhabdium* Jan.

Two internasals ; no preocular..... *Oxycalamus* Cant.

†††. No nasal scutum.

No loreal, nor pre- nor postocular..... *Typhlogeophis* Günth.

CORONELLINÆ.

I. No palatine teeth.

Anals two ; one internasal ; scales smooth..... *Tripeltis*§ Cope.

Anal plate divided ; two internasals ; scales smooth..... *Oligodon*|| Boie.

II. Palatine teeth present.

α. Dentition isodont or syncranterian.

β. Anal plate divided.

γ. Angular bone enclosed by the dentary.

ε. Teeth equal.

One scale-pit, rostral not produced..... *Diadophis* B. & G.

No scale-pits, rostral not produced..... *Rhadinæa*¶ Cope.

Rostral large, produced, with acute edge in front ; two nasals ; loreal present..... *Scaphiophis* Pet.

εε. Teeth longer posteriorly.

Tail short ; rostral produced..... *Simotes* D. & B.

Tail short ; rostral not prominent ; one scale-pit..... *Coronella*** Laur.

Tail very long ; rostral not prominent..... *Pliocercus*†† Cope.

γγ. Dentary bone attached loosely to the apex of the angular.

Teeth equal ; no scale-pits..... *Henicognathus* D. & B.

ββ. Anal plate undivided.

* *Rhabdium*, D. & B.

† *Geophis* Wagl. *Catastoma* Wagl.

‡ *Rhabdosoma* Boc. not D. & B. *Rhegnops* Cope.

§ Gen. nov. type *Oligodon brevicauda* Gthr.

|| ? *Rhynchocalamus* Gthr.

¶ *Ablabes* Günth. not D. & B. *Enicognathus* Jan.

** *Mizodon* Fisch.

†† *Elapochrus* Pet. *Cosmiosophis* Jan.

- Rostral plate produced both anteriorly and posteriorly. *Holarchus** Cope.
 No scale-pits; rostral plate not produced. *Megablades* Gthr.
 Two scale-pits. *Ophibolus*† B. & G.
 αα. Dentition diacranterian.
 β. Rostral plate normal.
 γ. Anal plate entire.
 Eye bounded by scales below; lores plane. *Cyclagras*‡ Cope.
 Eye resting on labial plates; lores plane. *Xenodon*§ Boie.
 Eye on labials; lores grooved; two scale-pits. *Teleolepis* Cope.
 γγ. Anal plate divided.||
 δδ. Scale-pits present (one).
 Head very distinct; robust. *Xenodon* Boie.
 Head little distinct; slender. *Liophis* Wagl.
 δδ. No scale-pits.
 ε. Rostral plate normal.
 Tail short; pupil erect; lores flat. *Hypsiglena*¶ Cope.
 Tail short; pupil round; body robust. *Opheomorphus* Cope.
 Tail short; pupil round; body slender. *Aporophis* Cope.
 Tail very long; pupil round; slender. *Dromicus* Bibr.
 εε. Rostral plate produced backwards and laterally, not forwards.
 Anal divided; loreal present. *Lytorhynchus*** Pet.
 ββ. Rostral trihedral and produced.
 Anal divided; scales keeled. *Heterodon* Beauv.
 Anal divided; scales smooth. *Lystrophis*†† Cope.
 Anal entire; scales smooth. *Lioheterodon* Dum.

SCYTALINÆ.

- α*. Anterior teeth elongate.
 Scales smooth; rostral plate obtuse. *Macroprotodon* Guich.
 αα. Anterior teeth short.
 β. Rostral plate not protuberant.
 γ. Two rows of subcaudal scutella.
 δ. Anal plate entire.
 ε. Vertebrae with expanded neural spines.
 Prefrontals united; a loreal; scales smooth. *Gerrhosteus* Cope.

* Gen. nov., embracing all species with entire anal plate hitherto referred to Simotes.

† *Lampropeltis* Fitz., Cope, *Bellophis* Lockingt.

‡ *Lejosophis* Jan.

§ *Xenodon suspectus* Cope; *X. colubrinus* Gthr.; *X. angustirostris* Pet.; and *X. bipræocularis* Cope; and double or single in *X. rhabdocephalus* Wied.

|| *Pseudoxyrhophus* Günthr. (? *Homalocephalus* Jan.) is probably identical with one of the genera of sect. *γγ*, but the character of the scale-pits is unknown.

¶ *Pseudodipsas* Pet. *Comastes* Jan.

** *Catachleia* Jan, *Ophirhina* Bocage.

†† Type *Heterodon dorbignyi*.

εε. Vertebrae with narrow compressed neural spines.

Scale-pits double; pupil erect; rostral plate normal; two prefrontals.

*Oxyrrhopus** Wagl.

Rostral plate normal; one nasal plate; two prefrontals

Tomodon D. & B.

Rostral plate separating internasals; scale pores single; two prefrontals.

Trimerorhinus† Smith.

δδ. Anal plate double.

ε. Scales smooth.

No scale-pits; tail short; rostral obtuse; nasals two; pupil round

Erythrolamprus‡ Boie.

One scale-pit; loreal not in orbit; rostral obtuse; nasals two; pupil round.....

Tachymenis Wiegem.

Loreal entering orbit; pupil erect; rostral obtuse; nasals two

Tarbophis§ Fleisch.

One nasal plate; no scale-pits; rostral truncate; pupil erect

Manolepis|| Cope.

εε. Scales keeled.

Pupil erect; anal double.....

Dryophylax Wagl.

γγ. One row of subcaudal scuta.

Two preoculars; head distinct; body compressed.....

Dityophis Gthr.

Two preoculars; body round; head not distinct....

Hologerrhum Günth.

One preocular; body round.....

Scytale¶ Boie.

ββ. Rostral plate protuberant.

γ. Rostral not recurved.

Loreal not entering orbit; pupil round; two nasal plates; rostral moderate.....

Conophis Pet.

Scales not grooved; rostral very prominent.....

Rhamphiophis Pet.

Scales grooved; rostral prominent

Rhagerhis Pet.

γγ. Rostral plate recurved.

One row of subcaudal scuta.....

*Phimophis*** Cope.

Two rows of subcaudal scutella.....

Rhinostoma Wagl.

COLUBRINÆ.

A. Posterior maxillary teeth not abruptly longer than those that precede them.

1. Rostral plate expanded transversely and with free lateral borders.

Several preoculars; scales smooth, anal and subcaudals double

Salvadora†† B. & G.

2. Rostral plate not expanded and free laterally.

* Two median dorsal row of scales.

One preocular plate.....

Herpetodryas†† Boie.

* Includes *Brachyrhynchum* D. & B.

¶ *Olisthenes* Cope.

† *Psammophylax* (Fitz) Günther.

** *Rhinosimus* D. & B. preoccupied.

‡ *Coniophanes* Hallow.

†† Preoccupied in botany, hence *Phimothya* Cope.

§ Günther says (Catal. Brit. Mus. p. 33) "anal bifid."

‡† *Phyllotisira* Cope.

|| Type *Tomodon nasutus* Cope.

Two preocular plates.....*Zaöcys* Cope.

** One median dorsal row of scales.

† Body little or not compressed.

‡ Internasals not confluent with nasals.

a. Several loreal plates.

Two or more preoculars.....*Ptyas* Cope.

aa. One loreal (rarely two).

β. Four or more prefrontals.

Anal entire ; scales keeled.....*Pityophis* Holbr.

ββ. Two prefrontals only.

γ. Two nasal plates.

δ. Anal entire.

Scales smooth ; rostral produced.....*Rhinechis** Mich.

One preocular : rostral not produced.....*Spilotes*† Wagl.

δδ. Anal-double.

ε. One preocular.

Form robust ; tail moderate.....*Coluber*‡ L.

Form elongate ; tail long.....*Drymobius*§ Cope.

Form very slender ; tail very long.....*Dendrophis* Boie.

εε. Two preoculars.

Scales keeled.....*Elaphis* Aldv.

Scales smooth.....*Bascanium*|| B. & G.

γγ. One nasal plate.

Scales keeled ; a loreal plate.....*Cyclophis*¶ Gthr.

Scales smooth ; a loreal plate.....*Liopeltis* Cope.

Scales smooth ; no loreal.....*Phragmitophis* Gthr.

‡‡ Internasals confluent with nasals.

Scales smooth with one pit ; anal divided.....*Symphimus* Cope.

†† Body much compressed.

One nasal plate ; a frenoörbital.....*Dryocalamus* Gthr.

Two nasals ; a frenoörbital ; teeth equal.....*Odontomus*** D. & B.

Two nasals ; loreal and preocular distinct.....*Gonyosoma* Wagl.

One nasal ; a loreal ; scales keeled ; teeth equal.....*Phyllophis* Gthr.

AA. Posterior maxillary tooth abruptly longer than those which precede it.

a. Maxillary tooth series uninterrupted (one preocular).

β. Moderately elongate.

Scales smooth ; two nasals ; a frenoörbital.....*Nymphophidium* Gthr.

Scales keeled ; one loreal ; one preocular.....*Herpetoreas* Gthr.

ββ. Very slender.

* *Arizona* Kenn.

† *Cynophis* Gray. *Compsosoma* D. & B. *Cælognathus* Fitz. *Geoptyas* Steind.

‡ *Calopeltis* Bp. *Grayia* Gthr. *Heteronotus* Hallow, nom. praeocc. hinc *Glaniolestes* Cope. *Lejonotus* Jan.

§ *Dendrophidium* Cope.

|| *Masticophis* B. & G.

¶ *Opheodrys* Fitz., Cope. *Philophyllophis* Garm.

** *Hydrophobus* Gthr.

DRYOPHIDINÆ.

I. Middle maxillaries not elongate, posteriors grooved.

a. An elongate nasal appendage.Nasal and anal scuta undivided; scales keeled.....*Langaha* Brug.*aa.* No nasal appendage.Scales keeled.....*Dryophis** Boie.Scales smooth.....*Dryinus* Wagl.

II. Middle maxillaries elongate; posteriors grooved.

a. An elongate nasal appendage.Pupil horizontal.....*Passerita* Gray.*aa.* No elongate nasal appendage.A loreal plate; prenasals joined on the middle line.....*Gephyrinus*† Cope.A loreal plate; nasals not joined.....*Tragops* Wagl.No loreal plate; nasals separate.....*Tropidococcyx* Gthr.

PSAMMOPHIDINÆ.

Anal entire; a loreal.....*Psammodynastes* Gthr.Anal divided; a loreal.....*Psammophis* Wagl.Nostril in prenasal; no loreal.....*Mimophis* Gthr.

LYCODONTINÆ.

I. Anterior maxillaries not isolated.

a. Subcaudal scuta double.*β.* Dorsal scales of equal size.

Two nasals; nostril in the anterior; a loreal; body much compressed

Lycodryas Gthr.

Two nasals; nostril between; body not compressed; lores plane

Boödon‡ D. & B.

Two nasals; body not compressed; lores longitudinally grooved

Bothrophthalmus§ Schl.Two nasals; nostril in the anterior.....*Lycophidium*|| Fitz.One nasal; a loreal.....*Metoporphina* Gthr.*ββ.* Dorsal scales of unequal size.Vertebral series smooth; body compressed.....*Hormonotus* Hallow.Vertebral series smooth; body round.....*Lamprophis* Fitz.Vertebral series bicarinate; body round.....*Simocephalus*¶ Gray.*aa.* Subcaudal scutella entire.Two nasals; scales equal, smooth.....*Holuropholis* Dum.**Thelotornis* Smith. *Cladophis* Dum.†Type *Dryophis fronticincta* Gthr.‡*Eugnathus* D. & B.

§Belongs perhaps to Colubrinæ.

|| *Alopecium* D. & B.¶ *Heterolepis* Sm. *Diaphorolepis* Jan.

II. Anterior maxillaries isolated.

α. Subcaudals in two rows.*β.* Nareal region with a pit.Scales smooth; anal entire..... *Bothrolycus* Gthr.*β.* No nareal pit.*γ.* Longest teeth at middle and posterior end of maxillary bone.Two nasals; body round..... *Dinodon** D. & B.*γγ.* Longest teeth at front of maxillary.Scales keeled; two nasals; a loreal..... *Ophites* Wagl.Scales smooth; two nasals; a loreal..... *Lycodon* Boie.Scales smooth; two nasals; no loreal..... *Tetragonosoma* Gthr.Scales smooth; one nasal; a loreal..... *Leptorhiza* Gthr.*αα.* Subcaudal plates in one row.Scales keeled..... *Cercaspis* Wagl.Scales smooth..... *Cyclocorus* D. & B.

LEPTOGNATHINÆ.

α. Subcaudal scuta entire.Teeth of equal lengths..... *Anoplodipsas* Pet.Teeth elongate posteriorly..... *Dipsadoboa* Gthr.Teeth longer anteriorly..... *Amblycephalus* Kuhl.*αα.* Subcaudal scuta in two rows.*β.* A median genic plate.Maxillary bone very short; one nasal plate..... *Asthenodipsas* Pet.Maxillary bone long; two nasal plates..... *Mesopeltis*† Cope.*ββ.* No median genic plate.Teeth weak; equal; two nasals..... *Leptognathus* D. & B.Teeth longer in front; one nasal..... *Pareas* Wagl.

DIPSADINÆ.

I. Subcaudal scuta.

Parietal plates replaced by scales; other plates normal. *Pythonodipsas* Gthr.

II. Subcaudal scuteila.

α. No teeth anterior to the grooved maxillary.Scales smooth..... *Opisthoplus* Pet.*αα.* Median maxillary teeth not much shortened.Nostril large, between two nasals and the internasal; vertebral scales larger..... *Rhinobothryum* Wagl.Two nasals enclosing nostril; body elongate, compressed, anal entire; vertebrals generally larger..... *Dipsas*‡ Laur.Two nasals enclosing nostril; body less compressed; anal double; vertebral row not larger; one loreal..... *Sibon*§ Fitz.* *Eumesodon* Cope.† *Asthenognathus* Boc.‡ *Boiga* Fitz. *Triglyphodon* et *Himantodes* D. & B. *Eudipsas* Gthr. *Toxicodryas* Hallow.§ *Crotaphopeltis* Fitz. *Leptodira* Gthr.

No nasal ; vertebrals equal..... *Hemidipsas** Gthr.

aaa. Median maxillary teeth shortened.

Two nasals and two or more loreals ; anal double ; vertebrals equal.

Trimorphodon Cope.

DASYPELTINÆ.

No grooved maxillary tooth ; no loreal plate ; scales keeled ; head very distinct..... *Dasyveltis*† Wagl.

A grooved maxillary tooth ; a loreal plate ; scales smooth ; head little distinct..... *Elachistodon* Rhdt.

HOMALOPSINÆ.‡

I. A grooved posterior maxillary tooth.

* Muzzle with a pair of tentacular processes.

One internasal plate ; parietals undivided..... *Herpeton* Lac.

** No tentacular processes.

a. Scales keeled.

β. One internasal plate.

Parietal plates undivided..... *Homalopsis* Kuhl.

ββ. Two internasal plates.

Parietal plates subdivided. *Cerberus* Cuv.

aa. Scales smooth.

β. One internasal plate.

γ. Gastrosteges with two keels.

Parietal plates subdivided..... *Hipistes*§ Gray.

γγ. Gastrosteges not keeled.

Nasal plates in contact behind rostral ; eye resting on labial plates

Hypsirhina|| Wagl.

Nasal plates in contact ; eye bounded below by scales.. *Tachyplotus* Rhdt.

Nasal plates separate ; eye on labials..... *Fordonia*¶ Gray.

Nasal plates separate ; eye bounded with scales below.. *Cantoria*** Gird.

ββ. Two internasal plates.

Supraorbital and posterior labial plates subdivided ; two anals

Homalophis Pet.

Nasals in contact behind rostral ; parietals entire..... *Ferania*†† Gray.

Two pairs of prefrontals ; nasal plates separate, undivided ; eye on labials ; anal double..... *Heleophis* Müller.

II. Posterior maxillary teeth not grooved.

* Scales keeled.

† Dentition diacranterian.

* *Chamærotus* Gthr.

† *Rhachiodon* Jour. *Diodon* Owen. *Anodon* Smith.

‡ Cope, Proceedings Academy Philadelphia, 1861, p. 167.

§ *Bitia* Gray.

|| *Eurostus* D. & B. Pt. ? *Phytolopsis* Gray.

¶ *Gerarda* Gray. *Campylodon* D. & B.

** *Hydrodipsas* Peters.

†† *Trigonurus* D. & B. *Feranoides* Carlleyle.

- One internasal plate ; no scale-pits. *Helicops* Wagl.
 Two internasals ; no scale-pits. *Amphiëasma* D. & B.
 Two internasals ; two scale-pits *Bothrodytes** Cope.
 †† Dentition syncranterian or longer behind.
 a. One internasal plate.
 No scale-pits *Atretium*† Cope.
 aa. Two internasal plates.
 β. Two nasal plates.
 Anal plate divided ; two scale-pits *Tropidonotus*‡ Kuhl
 Anal plate single ; no scale-pits. *Eutænia* B. & G
 ββ. One nasal plate.
 Anal plate single ; rostral produced laterally *Stypocemus*§ Cope.
 Anal plate divided ; rostral normal. *Amastridium* Cope.
 ††† Dentition isodont, or shorter behind.
 a. Anal plate divided.
 A loreal plate *Regina*|| B. & G.
 No loreal plate. *Storeria*¶ B. & G.
 aa. Anal plate entire.
 β. Two internasals.
 Head well distinguished ; a loreal and preocular plates. *Atomarchus* Cope.
 Head not distinct ; a loreal and a preocular plate. *Tropidoclonium* Cope.
 Head not distinct ; a preocular ; no loreal plate. *Adelophis* Dugés.
 A loreal ; no preocular plate. *Ninia*** B. & G.
 A loreal and preoculars ; teeth longer anteriorly. *Prymniodon* Cope.
 ββ. One internasal plate.
 Scales keeled ; two nasals and a loreal.

Haldea†† B. & G.

** Scales smooth.

a. Dentition diacranterian.

One internasal *Liodytes*‡† Cope.

aa. Dentition syncranterian.

One internasal plate ; anals two. *Limnophis* Gthr.

Two internasal plates ; anals two. *Pseudaspis*§§ Cope.

aaa. Dentition isodont.

Two internasals ; anal entire. *Ablabes*||| D. & B.

* Gen. nov.; type *Amphiëasma subminiatus* Reinwt; second species *B. tigrinus* = *A. tigrinum* Boie.

† *Tachynectes* Fitz. Cope, Proc. Acad. Phila., 1864, p. 167. *Hydræthiops* Günth. (nares superior).

‡ *Nerodia* B. & G.

§ *Chilopoma* Cope, preoccupied.

|| *Tretanorhinus* D. & B.

¶ *Ischnognathus* D. & B.

** *Streptophorus* D. & B.

†† *Conocephalus* D. & B.

‡† Type *Helicops alleni* Garman.

§§ Type *Coronella cana* L. ; D. & B.

||| *Natrix* Gthr. *Neusterophis* Gthr. *Lycodonormorphus* Fitz. sine diagnosi; nec *Ablabes* Gthr. et auct., = *Rhadinæa*, etc.

ACONTIOPHIDÆ.

Rostral plate deeply grooved below ; nasal single ; cephalic plates normal ; scales smooth ; body round ; teeth, the posterior longest, not grooved.....*Acontiophis* Gthr.

PROTEROGLYPHA.

HYDROPHIDÆ.*

I. Gastrosteges wide, flat.

Two pairs of frontal shields.....*Platurus* Latr

II. Gastrosteges wide, with two keels.

Scales imbricate ; one nasal.....*Aepysurus* Lacep.

Top of head scaly ; two nasals.....*Pelagophis* Pet. & Dor

III. Gastrosteges narrow, rudimentary, or absent.

* Nasals separated by frontals.

Gastrosteges distinct to vent.....*Distira* Lacep

** Nasals contiguous.

Head covered with scales behind.....*Acalyptus* D. & B.

Head short, entirely shielded ; no symphyseal notch....*Hydrophis* Daud.

Head moderate, entirely shielded ; a deep symphyseal notch

Enhydryna Gray.

Snout long, spatulate.....*Pelamis* Daud.

NAJIDÆ.

I. Grooved teeth behind two perforated teeth on the os maxillare.

Head-shields normal ; no loreal ; scales smooth ; form fusiform

Ogmodon† Pet.

II. Solid teeth behind the fang on the os maxillare.

A. Loreal plate present.

Subcaudals entire ; scales smooth.....*Denisonia* Krefft.

AA. Loreal plate absent.

a. The neck with few scales, not extensible.

β. Subcaudal scuta one-rowed.

γ. Scales of vertebral row equal to others.

Nasals two ; scales smooth ; anal bifid.....*Pseudechis* Wagl.

One nasal ; scales smooth ; anal single.....*Hoplocephalus*‡ Cuv.

One nasal ; scales keeled ; anal single.....*Tropidechis* Gthr.

aa. Scales of vertebral line enlarged.

Scales smooth ; two nasals ; anal entire.....*Bungarus* Daud.

ββ. Subcaudal scuta two-rowed.

* This table is mostly from Günther, Reptiles Brit. India, 355.

† *Labionaris* Brocchi.

‡ *Alecto* Wagl.

γ. Scales of vertebral row equal.

Rostral plate normal ; two nasals.....*Diemenia** Gray.

Rostral plate narrow ; produced backwards above ; two nasals

Pseudonaja Gthr.

Rostral wide, prominent, depressed ; one nasal.....*Furina*† D. & B.

Rostral normal ; one nasal ; anal double.....*Cacophis*‡ Gthr.

γγ. Scales of vertebral line enlarged.

Scales smooth.....*Megærophis*§ Gray.

αα. Neck extensible, covered with more numerous scales.

β. Anal entire ; subcaudals two-rowed.

No postparietal plates.....*Naja*|| Laur.

Postparietals present.....*Ophiophagus* Gthr.

III. No solid maxillary teeth.

α. Subcaudal scuta in two rows.

β. Rostral plate much developed.

Rostral free at the sides ; scales keeled.....*Cyrtophis* Sund.

Rostral not free ; scales smooth ; anal entire*Aspidelaps* Fitz.

Rostral not free ; anal entire ; two nasals*Rhinelaps* Gthr.

ββ. Rostral not enlarged.

Scales keeled.....*Sepedon* Merr.

Scales smooth.....*Callophis* Gr.

αα. Subcaudal scutella in one row.

One nasal ; a spine at end of tail.....*Acanthophis* Daud.

ELAPIDÆ.

α. Internasal plate touching the nasal laterally.

One nasal plate*Vermicella*¶ Gray.

Two nasal plates*Elaps* Schn.

αα. Internasal reaching first labial plate.

One nasal ; no loreal.....*Microsoma* Jan.

DENDRASPIDIDÆ.

No solid teeth behind fang ; anal and subcaudal plates divided ; scales smooth.....*Dendraspis*** Schl.

SOLENOGLYPHA.

CAUSIDÆ.

Subcaudals double, anal entire ; scales keeled ; rostral prominent, with recurved border*Heterophis* Pet.

**Pseudoelaps* D. & B. *Elapsoidea* Bocage. *Hemibungarus* Pet.; includes *Brachysoma triste* Gthr.

† *Brachyuropsis* Gthr.

‡ *Brachysoma* Gthr. *Boulengerina* Dollo.

§ *Xenurelaps* Gthr.

|| *Tomyris* Eichw.

¶ *Hemorelaps* Jan. *Poecilophis* Gthr.

** *Dinophis* Hallow.

Subcaudal and anal plates double ; scales keeled ; rostral normal

Causus Wagl.

Subcaudals and anal entire ; scales smooth ; rostral normal ; a loreal

Dinodipsas Pet.

ATRACTASPIDIDÆ.

Head not distinct ; two nasals ; a loreal ; scales smooth ; subcaudals entire

Atractaspis Smith.

VIPERIDÆ.

I. Urosteges two-rowed.

Nostril between two plates..... *Vipera** Laur.

“Nostril between three plates” (Gthr.)..... *Daboia* Gray.

Nostril surrounded by scales and a nasal ; horn-like supraocular scales

Cerastes Wagl.

Nostril surrounded by scales and a supranasal ; no supraocular nor nasal horns..... *Bitis*† Gray.

Nostril surrounded by scales and a supranasal ; horn-like scales above latter ; no supraocular horns *Clotho* Gray.

II. Urosteges one-rowed.

Body and tail cylindric..... *Echis*‡ Merr.

Body and tail compressed and prehensile..... *Atheris*§ Cope.

CROTALIDÆ.

I. No rattle.

β. Urosteges two-rowed.

Top of head scaled ; urosteges four-rowed at end ; a caudal spine

Lachesis Wagl.

Top of head with small scales ; tail normal..... *Bothrops*|| Wagl.

Top of head with large imbricate shield-like scales..... *Peltopelorus* Gthr.

Top of muzzle scaled ; rest of head shielded..... *Hypnale* Cope.

Top of head with nine shields ; scales carinate.... *Trionocephalus* Oppel.

Top of head with nine shields ; scales smooth..... *Calloselasma*¶ Cope.

ββ. Urosteges one-rowed.

Body and tail cylindric, not prehensile ; head scaly..... *Bothriopsis* Pet.

Body and tail compressed, prehensile ; head scaly, scales normal

Bothriöchis Pet.

Body and tail compressed, prehensile ; head scaly ; a row of scales outside the superciliary shield..... *Teleuraspis* Cope.

**Pelias* Wagl.

†*Echidna* Wagl. not Forster.

‡*Toxicoa* Gray.

§*Pæcilostolus* Gthr.

|| *Trimesurus* Gray, Gthr., Peters. *Tropidolæmus* Wagler. *Megæra* Gray.

Atropos Wagl.

¶ *Leiolepis* D. & B. nec Cuy.

Body and tail not prehensile; nine normal head-shields.

*Ancistrodon** Beauv.

II. A rattle.

Head with nine scuta above. *Crotalophorus*† Gray.

Head with scales above. *Crotalus*‡ Linn.

SYNOPSIS OF THE GENERA.

Typhlopidae	6	Colubridæ (<i>continued</i>)—	
Stenostomidae.....	2	Psammophidae	3
Tortricidae.....	2	Lycodontinae	17
Rhinophidae.....	7	Leptognathinae	7
Xenopeltidae.....	1	Dipsadinae	7
Pythonidae	8	Dasypeltinae.....	2
Boidæ	16	Homalopsinae.....	30
Charinidae.....	1	Acontiophidae.....	1
Acrochordidae.....	2	Hydrophidae.....	8
Nothopidae.....	2	Najidae	19
Colubridæ—		Elapidae.....	3
Calamarinae	58	Dendraspididae	1
Coronellinae	23	Causidae.....	3
Scytalinae.....	18	Atractaspididae	1
Colubrinae	36	Viperidae.....	7
Philodryadinae.....	9	Crotalidae.....	12
Dryophidinae.....	7		
		Total.....	317

A number of generic names have been given by authors with definitions which do not refer to the dentition. On this account I have been unable to include them in the above tables. I have credited generic names to authors who have published the first description, and not to those who have given them as *nomina nuda*.

ERRATA AND ADDENDA.

Page 486, middle, line δ , omit word "below."

Page 486, below middle, line $\delta\delta$, for "first labial" read "internasals."

Page 487, under CORONELLINÆ, immediately below line ϵ , insert a line, viz: Two scale-pits; rostral not produced..... *Proterodon* Hallow.

Page 489, in character of genus *Trimerorhinus*, for "scale pores" read "scale-pits."

Page 490, above middle, immediately below line ϵ , insert a line, viz: Form robust; tail moderate; no scale-pits..... *Grayia* Gthr.; also add the words "two scale-pits" to the characters of the following genera—*Coluber* and *Drymobius*; also remove synonymy of *Coluber* in note ‡, excepting "*Calopeltis* Bp.," and place it to the synonymy of *Grayia*.

* *Cenchris* Daud.

† *Caudisona* Fitz, Wagl. *Systrurus* Garman.

‡ *Caudisona* Laur. *Crotalophorus* Linn., pt., *Uropsophus* Wagl.



Cope, E. D. 1886. "An Analytical Table of the Genera of Snakes." *Proceedings of the American Philosophical Society held at Philadelphia for promoting useful knowledge* 23(124), 479–499.

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