

SYNOPSIS OF THE PLECTOGNATH FISHES.

By THEODORE GILL.

By common consent the fishes combined by Cuvier in 1817 under the ordinal designation Plectognathes have been retained as an order. Nevertheless, objection has been made against it by several ichthyologists, and it may be regarded as still an open question whether the group is entitled to ordinal distinction. In the latest general work on systematic ichthyology,* the "sixth order, Plectognathi," is thus characterized:

"Teleosteous fishes, with rough scales, or with ossifications of the cutis in the form of scutes or spines; skin sometimes entirely naked. Skeleton incompletely ossified, with the vertebræ in small number. Gills pectinate; a narrow gill opening in front of the pectoral fins. Mouth narrow; the bones of the upper jaw generally firmly united. A soft dorsal, belonging to the caudal portion of the vertebral column, opposite to the anal; sometimes elements of a spinous dorsal besides. Ventral fins, none, or reduced to spines. Air-bladder without pneumatic duct."

None of these features are exclusive to the Plectognathi or diagnostic of the group. The scales would not remove the representatives from the Acanthopterygious fishes; the vertebræ of *Psilocephalus* (*Anacanthus* Gthr.) and *Chonerhinus* (*Xenopterus* Gthr.) are more numerous than in a large proportion of the Acanthopterygians; the pectinate gills are shared with fishes generally; a "narrow gill opening" is found in fishes belonging to the same families (*e. g.*, Cottidæ and Bleenniidæ) as those having wide gill openings; the mouth can scarcely be said to be narrow when it is coequal with the width of the wide-headed species, and, on the other hand, very many Acanthopterygious fishes have the mouth narrow; the bones of the upper jaw are at least as firmly united in various Acanthopterygians (*e. g.*, Teuthididæ, Siganidæ, Nemophididæ, &c.) and Malacopterygians (*e. g.*, some Characinidæ, Dalliidæ, &c.), as in the Plectognath Triacanthids and Balistids. The other characters are still less exclusive and more general.

Were such the only characters assignable to the "order Plectognathi," the group could not be retained. Nevertheless, most of the characters above given do really belong to the group in question, and they can be supplemented by characters of much more importance than those rehearsed, and are embodied in the following diagnosis:

* Günther's "Introduction to the Study of Fishes," p. 683. 1880.

PLECTOGNATHI.*

SYNONYMS AS ORDINAL NAMES.

- = Les Plectognathes, *Cuvier*, Règne Animal, Ire éd., t. 1, p. 144, 1817.
- < Plectognathi, *Swainson*, Nat. Hist. and Class. Fishes, etc., v. 2, pp. 193-195, 323-333, 1839. (Includes Plectognathi + Pediculati + Lophobranchii + Pegasus.)
- > Gymnodontes (Pelvopteri), *Bonaparte*, Giorn. Arcad. di Scienze, v. 52 (Saggio Distrib. Metod. Animal. Vertebr. a Sangue Freddo, p. 39), 1832; Nuovi Annali delle Sci. Nat., t. 2, p. 131, 1838; t. 4, p. 186, 1840. †
- > Sclerodermi (Acanthopteri), *Bonaparte*, Giorn. Arcad. di Scienze, v. 52 (Saggio Distrib. Metod. Animal. Vertebr. a Sangue Freddo, p. 39), 1832; Nuovi Annali delle Sci. Nat., t. 2, p. 131, 1838; t. 4, p. 186, 1840. †
- = Plectognathes ou Echinoides, *Hollard*, Annales des Sc. Nat. (4), v. 13, pp. 5, 40, 46 1860. ‡
- > Balistidi, *Bleeker*, Nederl. Tijdschr. Dierk., v. 3, p. 8, 1866; § Atlas Ich. des Indes Néerland., v. 5, p. 25, 1865.
- > Ostracionidi, *Bleeker*, Nederl. Tijdschr. Dierk., v. 3, p. 15, 1866; Atlas Ich. des Indes Néerland., v. 5, p. 85, 1865.
- > Gymnodontidi, *Bleeker*, Nederl. Tijdschr. Dierk., v. 3, p. 16, 1866; Atlas Ich. des Indes Néerland., v. 5, p. 43, 1865.
- = Plectognathi-Heftkeifer, *Haeckel*, Gen. Morphologie der Organismen, v. 3, p. exxxviii, 1866. (Zweite Ordnung der Physoclisten.)
- = Plectognathi, *Cope*, Trans. Am. Phil. Soc., v. 14, pp. 456, 458, 1870; Proc. Am. Ass. Adv. Sc., v. 20, p. 340, 1872.
- = Plectognathi, *Gill*, Arrangement Families of Fishes, p. 1, 1872.
- = Gymnodontes, † *Fitzinger*, Sitzungsber. K. Akad. der Wissensch. (Wien), B. 67, 1. Abth., p. 47, 1873.

Teleost fishes with the elements of the lower jaw consolidated in single pieces representing the two rami, the supramaxillaries and intermaxillaries more or less closely connected, the interoperculum detached from the other opercular bones, reduced and more or less rod-like in form, and the posttemporals suturally connected with the cranium.

These characters are certainly of more importance than those generally used to characterize the order, and, so far as known (except as to the upper jaw), are distinctive. || It is, however, quite possible that even they may fail and the order be abandoned. But the various representatives of the order are evidently related, and there is a regular grada-

* Recherches sur la classification des poissons de l'ordre des Plectognathes. Par M. C. Dareste. < Ann. des Sc. Nat., 3e série, Zoologie, t. xiv, 1850.

† The "orders" *Gymnodontes* and *Sclerodermi* are combined by Bonaparte in a "section 3, Plectognathi."

‡ Mémoire sur le squelette des poissons Plectognathes, étudié au point de vue des caractères qu'il peut fournir pour la classification, lu à l'Académie des Sciences, le 9 avril 1860. Par M. H. Hollard, professeur à la faculté des sciences de Poitiers. < Ann. des Sci. Nat., 4e série, Zoologie, t. xiii, pp. 5-46, pl. 2, 3.

§ Systema Balistidorum, Ostracionidorum Gymnodontidorumque revisum. Petro Bleeker auctore. < Nederl. Tijdschr. Dierk., t. 3, pp. 8-19, 1866.

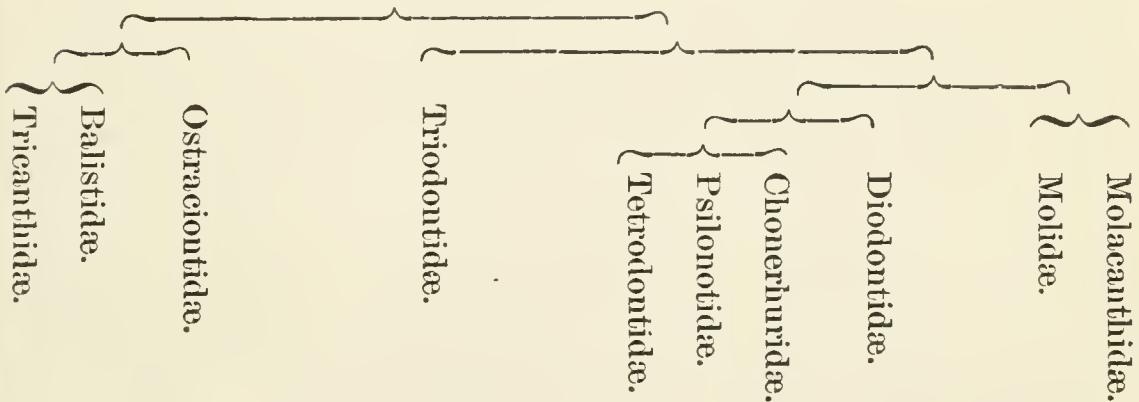
|| Other forms have the supratemporals suturally attached.

tion from the teleosteoid to the most abnormal forms. The group will therefore stand, whatever may be the ultimate valuation of its characters by taxonomists. My conservative instincts impel me to retain the group with its generally recognized ordinal valuation. It is, it is true, of less taxonomic value than the Pediculates, the Apodes, or the Nematognaths, and of very much less importance than such orders as the Dipnoans, Crossopterygians, and Chondrosteans; but, on the other hand, its characters are of greater significance than such as are used for ordinal distinction in the class of birds, and therefore it may be well to keep it in the system till our knowledge of the whole is more ripe.

As to the affinities of the families, there is sufficient evidence to indicate their genetic relations tolerably well, and we have a regular series of gradations from the Triacanthidæ diverging in different directions. The ramifications of the group are indicated in the following tables, in which the left fork in each case indicates the most generalized form, and the right ones the successively more and more specialized forms.

TELEOCEPHALI.

(Teuthydoidea.)



I doubt not that objections will be made to an undue multiplication of families. When a comparison is made with their *characters* and those of generally accepted families in more familiar groups, their importance must be sooner or later acknowledged. It is to be hoped that naturalists may make use of their reasoning powers in considering them, and not *assume* that they are unjustifiable because previous students had not appreciated their value.

In conclusion, I have to make especial acknowledgment to the various memoirs on the Plectognaths published by Mr. Hollard. Had they not been neglected or practically ignored by his successors, a consistent system of the order would not have been deferred so long. The diagnoses have been made as brief as was consistent with clearness; the characters given are reinforced by others often as important, although not so patent as those used.

The families and subfamilies admitted by systematists at various times are indicated in the following table:

Families and subfamilies.	Dunn., 1806.	Raf., 1810.	Cuv., 1817.	Bon., 1832.	Bon., 1850.	Adams, 1854.	Hol., 1857-'60.	Bl., 1859.	Bl., 1866.	Gill, 1872.
Triacanthidæ								xiv ³⁰	85 ³⁰	1
Triacanthodinæ									85 ³⁸	(*) ⁴⁴
Triacanthinæ							46 ¹⁷		85 ³⁹	(*) ⁴⁴
Balistidæ	[105] ¹	41 ²	149 ⁵	39	1	95	46 ¹⁸	xiv ³¹	93 ³¹	1
Balistinæ					1 ⁷		46 ¹⁹		98 ⁴⁰	(*) ⁴⁴
Monacanthinæ					1 ⁸		46 ²⁰		99 ⁴¹	(*) ⁴⁴
Psilocephalinæ									(*) ⁴¹	
Ostraciontidæ		39 ³			1 ⁹	95	46 ²¹	xiv ³²	25 ⁴²	1
Ostracioninæ					1 ¹⁰		46 ²²			
Triodontidæ							46 ²³	xiv ³³	83 ³³	1
Triodontinæ							46 ²⁴			
Tetrodontidæ	[109] ¹	40 ⁴	145 ⁶	39	1	95 ¹⁵	46 ²⁵	xiv ³⁴	45 ³⁴	1
Tetrodontinæ					1 ¹¹		46 ²⁶	xiv ³⁵	49 ³⁵	(*) ⁴⁴
Colomesinæ										
Psilonotidæ										
Pylonotinæ										(*) ⁴⁴
Chonerhinidæ										
Chonerhininæ										(*) ⁴⁴
Diodontidæ										(*) ⁴⁴
Diodontinæ					1 ¹²		46 ²⁷	xiv ³⁶	49 ³⁶	
Molidæ					1 ¹³	95 ¹⁵	46 ²⁸	xiv ³⁷	44 ³⁷	1 ⁴⁵
Molinæ					1 ¹⁴		46 ²⁹			
Molacanthidæ										
Molacanthinæ										(*) ⁴⁴

¹ Although Duméril first introduced families into ichthyology, they were extremely artificial and based on Lacépède's ideas. *Balistes* (= Balistidæ + Triacanthidæ) was associated in one family (CHISMOPNES) with *Batrachus*, *Lophius*, and *Chimæra*, and *Ostracion*, *Tetraodon*, *Oroides*, *Diodon*, and *Sphæroides* were grouped in another family (OSTÉODERMES) with *Syngnathus*. ² Balistini (= Sclerodermi). ³ Ostracidi (= Ostracodermi). ⁴ Odontini (= Gymnodontes). ⁵ Sclérodernes. ⁶ Gymnodontes. ⁷ Balistini. ⁸ Monacanthini. ⁹ Ostracionidæ. ¹⁰ Ostracionini. ¹¹ Tetraodontini. ¹² Diodontini. ¹³ Orthagoriscidæ. ¹⁴ Molini and Orthagoriscini pt. ¹⁵ Gymnodontidæ. ¹⁶ Cephalidæ. ¹⁷ Balistides. ¹⁸ Triacanthiens. ¹⁹ Balistiens. ²⁰ Monacanthiens. ²¹ Ostracionides. ²² Aracaniens + Ostraciens. ²³ Loganasomes on ²⁴ Triodontiens. ²⁵ Sphérosomes (Orbes epin). ²⁶ Tétrodaniens. ²⁷ Diodoniens. ²⁸ Ellipsomes on ²⁹ Orthagorisciens. ³⁰ Triacanthoidei. ³¹ Balistoidei. ³² Ostracionoidei. ³³ Triodontoidei. ³⁴ Physogastroidei. ³⁵ Tetrodontiformes. ³⁶ Diodontiformes. ³⁷ Orthagoriscoidei. ³⁸ Paratriacanthiformes. ³⁹ Triacanthiformes. ⁴⁰ Balisteiformes. ⁴¹ Monacanthiformes with three phalanges—Monacanthini + Aluterini = Monacanthinæ Gill, and Psilocephalini = Psilocephalinæ Gill. ⁴² Ostracionoidei. ⁴³ Tetrodontiformes with phalanges—Tetrodontini and Canthogastrini. ⁴⁴ See synonymy of respective groups. ⁴⁵ Orthagoriscidæ.

SCLERODERMI.

SYNONYMS AS FAMILIES.

- < Sclérodernes, *Cuvier*, *Mém. Mus. d'Hist. Nat.*, t. 1, pp 132 (120-121), 1815.
 < Sclérodernes, *Cuvier*, *Règne Animal* [1e éd.], t. 2, p. 149, 1817; [2e éd.], t. 2, p. 371, 1829.
 < Sclerodermi, *Günther*, *Cat. Fishes in Brit. Mus.*, v. 8, p. 207, 1870.

SYNONYMS AS SUBORDERS.

- < Sclérodernes, *Hollard*, *Annales des Sci. Nat.* (4), v. 13, pp. 31, 46, 1860.
 = Sclerodermi, *Gill*, *Arrangement Families Fishes*, pp. xli, 1, 1872.
 = Sclerodermata, *Fitzinger*, *Sitzungsber. K. Akad. der Wissensch.* (Wien), B. 67, 1. Abth., p. 46, 1873.

SYNONYMS AS ORDERS.

- < Sclerodermi, *Bonaparte*, Giorn. Arcad. di Scienze, v. 52 (Saggio Distrib. Metod. Animali Vertebr. a Sangue Freddo, p. 39), 1832.
 = Balistides, *Bleeker*, Enum. Sp. Pisc. Archip. Indico, p. xiv, 1859.
 = Les Balistes, *Bleeker*, Atlas Ich. des Indes Néerland., t. 5, p. 85, 1865.
 = Balistidi, *Bleeker*, Ned. Tijdschr. Dierk., v. 3, p. 8, 1866.

Plectognathi with a spinous dorsal or single spine just behind or over the cranium, with a normal pisciform shape, scales of regular form or more or less spinigerous, and distinct teeth in the jaws.

TRIACANTHIDÆ.

SYNONYMY.

- < Scélérodermes, *Cuvier*, Règne Animal, 1e. éd., t. 2, p. 149, 1817; 2e éd., t. 2, p. 371, 1829.
 = Balistidæ, *Nardo*, Atti Congressi Scienz. Ital. rac. et ord., v. 1, p. 70 (1842), 1884.
 = Triacanthoidei, *Bleeker*, Enum. Sp. Piscium Archipel. Indico, p. xiv, 1859; Atlas Ich. des Indes Néerland., t. 5, p. 85, 1865.
 < Sclerodermi, *Günther*, Cat. Fishes Brit. Mus., v. 8, p. 207, 1870.
 = Triacanthidæ, *Cope*, Trans. Am. Phil. Soc., v. 14, p. 458, 1870; Proc. Am. Assoc. Adv. Sci., v. 20, p. 340, 1872.
 = Triacanthoidei, *Bleeker*, Ned. Tijdschr. Dierk., v. 3, p. 8, 1866.
 Balistæ sp., *Fitzinger*, 1873.

Scleroderms with a pair of large ventral spines normally articulating with the pelvic bones, and with rounded scales, more or less spinigerous.

TRIACANTHODINÆ.

SYNONYMY.

- = Triacanthodinæ, *Gill*, Proc. Acad. Nat. Sc., Phila. 1862, p. 235, 1862.
 = Paratriacanthiformes, *Bleeker*, Nederl. Tijdschr. Dierk., v. 3, p. 9, 1866; Atlas Ich. des Indes Néerland., v. 5, p. 85, 1865.

Triacanthidæ with conical teeth in both jaws and a short oblong caudal peduncle.

Two genera are known, *Triacanthodes* (Bleeker), with two rows of teeth, and *Hollardia* (Poey), with a single row in each jaw.

TRIACANTHINÆ.

SYNONYMY.

- < Triacanthiens, *Hollard*, Annales Sc. Nat. (4), v. 13, p. 46, 1860.
 = Triacanthiformes, *Bleeker*, Nederl. Tijdschr. Dierk., v. 9, p. 9, 1866; Atlas des Indes Néerland., v. 5, p. 85, 1865.
 < Triacanthini, *Poey*, Repertorio Fis. Nat. de Cuba, v. 2, p. 210, 1868.

Triacanthidæ with incisorial teeth in both jaws ($\frac{1}{10}$), and with a long, narrowed caudal peduncle.

Triacanthus, the only known genus, has a short inner row of rounded teeth in each jaw.

BALISTIDÆ.*

SYNONYMY.

- > Balistini, *Rafinesque*, Indice d'Ittiolog. Siciliana, p. 41 (58. ord.), 1810.
 < Balistides, *Risso*, Hist. Nat. de l'Europe Mérid., t. 3, p.—, 1827 (= Selérodermes).
 < Acanthopteres, *Blainville*, Journ. de Physique, 1816.
 < Selérodermes, *Curier*, Regne Animal, 1e éd., t. 2, p. 149, 1817, 2e éd., t. 2, p. 371, 1829.
 < Balistidi, *Bonaparte*, Fauna Italica, v. 3, Pesci, fol.
 < Balistidæ, *Bonaparte*, Giorn. Arcad. di Scienze, v. 52 (Saggio Distrib. Metod. Animali. Vertebr. a Sangue Freddo), p. 39, 1832.
 < Balistididæ, *Bonaparte*, Nuovi Annali delle Sci. Nat., t. 2, p. 131, 1838; t. 4, p. 186, 1840.
 < Balistidæ, *Swainson*, Nat. Hist. and Class. Fishes, &c., v. 2, pp. 193, 323, 1839.
 < Balistina, *MacLeay*, Calcutta Journ. Nat. Hist., 1841.
 = Balistidæ, *Nardo*, Atti Congressi Scienz. Ital. rac. et ord., v. 1, p. 70, (1842), 1844.
 < Quatrième famille [des Plectognathes], *Darrest*, Ann. Sc. Nat. (3), v. 14, p. 126, 1850,
 < Balistidæ, *Adams*, Manual Nat. Hist., p. 95, 1854.
 < Balistides, *Hollard*, Ann. Sc. Nat. (3), v. 20, pp. 77, 113, 1853; (4), v. 13, p. 23, 1860.
 < Balistidæ, *Girard*, Expl. and Surv. for R. R. Route to Pacific Oc., v. 10, Fishes, p. 338, 1858.
 = Balisteoidei, *Blecker*, Enum. Sp. Piscium Archipel. Indico, p. xiv, 1859; Atlas Ich. des Indes Néerland., t. 5, p. 93, 1865; Ned. Tijdschr. Dierk., v. 3, p. 9, 1866.
 < Sclerodermi, *Günther*, Cat. Fishes Brit. Mus., v. 8, p. 207, 1870.
 = Balistidæ, *Cope*, Proc. Am. Assoc. Adv. Sci., v. 20, p. 340, 1872.
 > Balistæ, *Fitzinger*, Sitzungsber. K. Akad. der Wissensch. (Wien), B. 67, 1. Abth., p. 47, 1873.
 > Aluteræ, *Fitzinger*, Sitzungsber. K. Akad. der Wissensch. (Wien), B. 67, 1. Abth., p. 47, 1873.
 = Balistidæ, *Jordan & Gilbert*, Syn. Fishes N. Am., pp. 852, 854, 1882.

Scleroderms without paired ventrals or spines, and with reduced rhombiform or more or less spiniform dorsal appendages.

BALISTINÆ.

SYNONYMY.

- = Balistia, *Rafinesque*, Analyse de la Nature, p. —, 1815.
 < Balistinæ, *Swainson*, Nat. Hist. and Class. Fishes, etc., v. 2, pp. 194, 324, 1839.
 < Balistidini, *Bonaparte*, Nuovi Annali delle Sci. Nat., t. 2, p. 131, 1838; t. 4, p. 186, 1840.
 = Balistini, *Nardo*, Atti Congressi Scienze Ital. rac. et ord., v. 1, p. 70 (1842), 1844.
 < Balistini, *Bonaparte*, Catal. Metod. Pesci Europei, p. 8, 1846.
 = Balistiens, *Hollard*, Annales des Sci. Nat. (4), t. 13 (p. 7), p. 46, 1860.
 = Balistinæ, *Gill*, Cat. Fishes E. Coast N. Am., p. 56, 1861.
 = Balisteiformes, *Blecker*, Atlas Ich. des Indes Néerland., t. 5, p. 98, 1865.
 = Balistidiformes, *Blecker*, Ned. Tijdschr. Dierk., v. 3, p. 9, 1866.
 < Balistina, *Günther*, Cat. Fishes Brit. Mus., v. 8, pp. 208, 211, 1870.
 = Balistinæ, *Jordan & Gilbert*, Syn. Fishes N. Am., p. 854, 1883.

Balistidæ with vertebræ in small number (17=7+10), an anterior dorsal consisting of 3 (or 2) spines, of which the first is enlarged and

* Monographie de la famille des *Balistides*, par M. Hollard. Travail lu à l'Académie des Sciences le 4 août 1851. <Annales des Sci. Nat., 3e série, Zoologie, tome xx, pp. 71-114, pl. 1, 2, 3; 4e série, Zoologie, tome i, pp. 39-72, pl. 2, 3, pp. 303-339, pl. 5; tome ii, pp. 321-366, pl. 12, 13, 14; tome iv, pp. 5-27, pl. 1.

the second locks it in erection, and the branchial apertures behind or under the eyes.

MONACANTHINÆ.

SYNONYMY.

- < Monacanthini, *Nardo*, Atti Congressi Scienze Ital. rac. et ord., v. 1, p. 70 (1842), 1844.
 < Monacanthini, *Bonaparte*, Catal. Metod. Pesci Europei, p. 8, 1846.
 < Monacanthiens, *Hollard*, Annales des Sci. Nat. (4), t. 13, p. (19,) 46, 1860.
 = Monacanthinæ, *Gill*, Cat. Fishes E. Coast N. Am., p. 56, 1861.
 < Monacanthiformes, *Bleeker*, Atlas Ich. des Indes Néerland., t. 5, p. 99, 1865.
 < Monacanthiformes, *Bleeker*, Nederl. Tijdschr. Dierk., v. 3, p. 11, 1866.
 = Monacanthinæ, *Jordan & Gilbert*, Syn. Fishes N. Am., p. 854, 1883.
 Balistina gen., *Günther*.

Balistidæ with the vertebræ in small number (18—21=7+11—14), the anterior dorsal represented by a comparatively slender spine, behind which is at most a rudimentary one, and the branchial apertures behind or under the eyes.

PSILOCEPHALINÆ.

SYNONYMY.

- < Monacanthiformes (=Phalanx Psiloecephalini), *Bleeker*, Nederl. Tijdschr. Dierk., v. 3, p. 11 (14), 1866; Atlas Ich. des Indes Néerland., v. 5, pp. 99, 100, 1865.

Balistidæ with the vertebræ in increased number (29—30), the anterior dorsal represented by a feeble spine over the frontal region, and the branchial apertures in advance of the eyes.

OSTRACODERMI.

SYNONYMS AS FAMILY NAMES.

- < Sclérodermes, *Cuvier*, Règne Animal, 1e éd., v. 2, p. 149, 1817; 2e éd., v. 2, p. 375, 1829.
 < Sclerodermi, *Günther*, Cat. Fishes in Brit. Mus., v. 8, p. 207, 1870.

SYNONYMS AS SUBORDERS.

- < Sclérodermes, *Hollard*, Annales des Sci. Nat. (4), v. 8, p. 275, 1857; v. 13, p. 31, 1860.
 = Ostracodermi, *Gill*, Arrangement Families of Fishes, pp. xii, 1, 1872.
 = Cataphracti, *Fitzinger*, Sitzungsber. K. Akad. der Wissensch. (Wien), B. 67, 1. Abth., p. 47, 1873.
 = Ostracodermi, *Goode*, Proc. U. S. Nat. Mus., v. 2, p. 268, 1880.

SYNONYMS AS ORDINAL NAMES.

- < Sclerodermi, *Bonaparte*, Giorn. Aread. di Scienze, v. 52 (Saggio Distrib. Metod. Animali Vertebr. a Sangue Freddo, p. 39), 1832.
 = Ostraciones, *Bleeker*, Enum. Sp. Pisc. Archip. Indico, p. xiv, 1859; Atlas Ich. des Indes Néerland, v. 5, p. 25, 1865.
 = Ostracionidi, *Bleeker*, Nederl. Tijdschr. Dierk., v. 3, p. 15, 1866.

Plectognaths without a spinous dorsal, with the body inclosed in an angular box formed by polygonal scutes joined at their edges, and with distinct teeth in the jaws.

OSTRACIONTIDÆ.*

SYNONYMS AS FAMILY NAMES.

- =Ostracidi, *Rafinesque*, Indice d'Ittiolog. Siciliana, p. 39 (50. ord.), 1810.
 =Ostraciontidae, *Nardo*, Atti Congressi Scienz. Ital. rac. et ord., v. 1, p. 70 (1842), 1844.
 =Cinquième famille [des Plectognathes], *Darveste*, Ann. Sc. Nat. (3), v. 14, p. 131, 1850.
 =Ostraciones, *Bleeker*, Bijdr. tot der Kennis Balist. en Ostraciones van dem Ind. Archipel., pp. 28-36, 1852.
 =Ostraciontidae, *Adams*, Manual Nat. Hist., p. 95, 1854.
 =Ostracionidae, *Kaup*, Archiv für Naturg., Jahrg., v. 1, pp. 215-221, 1855.
 =Ostracionides, *Hollard*, Ann. Sc. Nat., Zool. (3), v. 7, p. 121, 1856; (4), v. 13, pp. 26, 46, 1860.
 =Ostracionoidei, *Bleeker*, Enum. Sp. Piscium Archipel. Indico, p. xiv, 1859; Atlas Ich. des Indes Néerland., t. 5, p. 25, 1865; Nederl. Tijdschr. Dierk., v. 3, p. 15, 1866.
 =Ostraciontidae, *Cope*, Trans. Am. Phil. Soc., v. 14, p. 458, 1870.
 =Ostraciidae, *Cope*, Proc. Am. Assoc. Adv. Sci., v. 20, p. 340, 1872.
 =Ostraciontidae, *Gill*, Arrangement Fam. of Fishes, p. 1, 1872.
 =Ostraciontes, *Fitzinger*, Sitzungsber. K. Akad. der Wissensch. (Wien), B. 67, 1. Abth., p. 47, 1873.
 =Ostraciontidae, *Goode*, Proc. U. S. Nat. Mus., v. 2, p. 269, 1880.
 =Ostraciidae, *Jordan & Gilbert*, Syn. Fishes N. Am., p. 852, 1882.

SYNONYMS AS SUBFAMILY NAMES.

- =Ostracidia, *Rafinesque*, Analyse de la Nature, p. —, 1815.
 =Ostraciontini, *Bonaparte*, Nuovi Annali delle Sci. Nat., t. 2, p. 131, 1838; t. 4, p. 186, 1840; Consp. Syst. Ich., 1850.
 =Ostracinae, *Swainson*, Nat. Hist. and Class. Fishes, &c., v. 2, pp. 193, 323, 1839.
 =Ostraciontini, *Nardo*, Atti Congressi Scienz. Ital. rac. et ord., v. 1, p. 71 (1842), 1844.
 >Ostraciens, *Hollard*, Ann. Sc. Nat., Zool. (4), v. 13, p. 46, 1860.
 >Aracaniens, *Hollard*, Ann. Sc. Nat., Zool. (4), v. 13, p. 46, 1860.
 =Ostraciontina, *Günther*, Cat. Fishes Brit. Mus., v. 8, pp. 208, 255, 1870.

The only family of the suborder.

GYMNODONTES.

SYNONYMS AS FAMILIES.

- =Gymnodontes, *Curier*, Règne Animal, 1e éd., t. 2, p. 145, 1817; 2e éd., t. 2, p. 364, 1829.
 =Gymnodontes, *Günther*, Cat. Fishes in Brit. Mus., v. 8, pp. 207, 269, 1870.

SYNONYM AS SUBORDER.

- =Gymnodontes, *Hollard*, Annales des Sci. Nat. (4), t. 8, pp. 275-328, 1857.†
 =Gymnodontes, *Fitzinger*, Sitzungsber. K. Akad. der Wissensch. (Wien), B. 67, 1. Abth., p. 47, 1873.

* Monographie de la famille des *Ostracionides*, par H. Hollard, professeur à la faculté des sciences de Poitiers. Travail présenté à l'Académie des Sciences dans sa séance du 27 octobre 1856. <Annales des Sci. Nat., 5e série, Zoologie, tome vii (1857), pp. 121-170, pl. 13.

† Études sur les Gymnodontes et en particulier sur leur ostéologie et sur les indications qu'elle peut fournir pour leur classification, par M. H. Hollard, professeur à la Faculté des Sciences de Poitiers. <Ann. des Sci. Nat., 4e série, Zoologie, t. 8, pp. 273-328, pl. 5. 6, 1857.

SYNONYMS AS ORDERS.

- =Gymnodontes, *Bonaparte*, Giorn. Arcad. di Scienze, t. 52 (Saggio Distrib. Metod. Animal Vertebr. a Sangue Freddo, p. 39), 1832.
 =Pachydontes, *Bleeker*, Enum. Sp. Pisc. Archip. Indico, p. xiv, 1859.
 =Gymnodontes, *Bleeker*, Atlas Ich. des Indes Néerland., t. 5, p. 43, 1865.
 =Gymnodontidi, *Bleeker*, Nederl. Tijdschr. Dierk., v. 3, p. 16, 1866.

Plectognaths without a spinous dorsal, with the body more or less sacciform, the scales typically spiniform and with root-like insertions, (archaetypically rhomboid), and with the jaws enveloped in an enamel-like covering, and without distinct teeth.

TRIODONTOIDEA.

SYNONYM.

Triodontoidea, *Gill*, n. superfam.

Gymnodontes with a movable pelvic apparatus, well-developed ribs, a normally developed caudal region, the upper jaw with a median suture, and the lower jaw subdivided.

TRIODONTIDÆ.

FAMILY SYNONYMS.

- =Deuxième famille [des Plectognathes], *Darrest*, Ann. Sc. Nat. (3), v. 14, p. 122, 1850.
 =Loganosomes, *Hollard*, Ann. Sc. Nat. (4), Zool., v. 13, pp. (33), 46, 1860.
 =Triodontoidei, *Bleeker*, Ich. Atlas des Indes Néerland., v. 5, p. 83, 1865; Nederl. Tijdschr. Dierk., v. 3, p. 19, 1866.
 =Triodontidæ, *Gill*, Arrangement Fam. of Fishes, p. 1, 1872.
 =Triodontes, *Fitzinger*, Sitzungsber. K. Acad. der Wissensch. (Wien), B. 67, 1, Abth., p. 47, 1873.

SUBFAMILY SYNONYM.

- =Triodonius, *Hollard*, Ann. Sc. Nat. (4), Zool., v. 13, p. 46, 1860.

The only family of the superfamily.

TETRODONTOIDEA.

SYNONYMY.

- <Tetrodontoidea, *Gill*, Cat. Fishes E. Coast N. Am., p. 1, 1873.

Gymnodontes without either pelvis or ribs, with a normally developed caudal region, with the intermaxillary and dentary bones severally connected by suture at middle, the supramaxillaries curved outwards behind the intermaxillaries, the ethmoid more or less projecting in front of the frontals, and the postfrontals extended outwards as far at least as the frontals.

TETRODONTIDÆ.

SYNONYMY.

- < Odontini, *Rafinesque*, Indice d'Ittiolog. Siciliana, p. 40, 1810.
 < Odopsia, *Rafinesque*, Analyse de la Nature, p. —, 1815.
 < Gymnodontes, *Curier*, Règne Animal, 1e éd., t. 2, p. 145, 1817; 2d éd., t. 2, p. 364, 1829.
 < Tetraodontidæ, *Bonaparte*, Giorn. Arcad. di Scienze, v. 52 (Saggio Distrib. Metod. Animali Verteb. a Sanguine Freddo, p. 39), 1832.
 < Tetraodontidæ, *Bonaparte*, Nuovi Annali delle Sci. Nat., t. 2, p. 131, 1838; t. 4, p. 186, 1840.
 < Première famille [des Plectognathes], *Darvèze*, Ann. Sc. Nat. (3), v. 14, p. 117, 1850.
 < Gymnodontidæ, *Adams*, Manual Nat. Hist., p. 95, 1854.
 = Tetraodontiens, *Bibron*, Revue et Mag. Zool., t. —, p. 279, 1855.
 < Gymnodontidæ, *Girard*, Expl. and Surv. for R. R. Route to Pacific Oc., v. 10, Fishes, p. 339, 1858.
 < Phycogastroidei, *Bleeker*, Enum. Sp. Piscium Archipel. Indico, p. xiv, 1859.
 > Sphérosomes, *Hollard*, Annales des Sci. Nat. (4), t. 8, p. 326, 1860.
 > Tetraodontoidei, *Bleeker*, Atlas Ich. des Indes Néerland, t. 5, p. 45, 1865; Nederl. Tijdschr. Dierk., v. 3, p. 17, 1866.
 = Tetraodontidæ, *Cope*, Proc. Am. Assoc. Adv. Sci., v. 20, p. 340, 1872.
 < Tetraodontidæ, *Gill*, Arrangement Fam. of Fishes, p. 1, 1872.
 = Tetraodontes, *Fitzinger*, Sitzungsber. K. Akad. der Wissensch. (Wien), B. 67, 1. Abth., p. 47, 1873.
 < Tetraodontidæ, *Jordan & Gilbert*, Syn. Fishes N. Am., pp. 853, 859, 1883.

Tetrodontoidea with the frontals articulated with the supraoccipital and the postfrontals confined to the sides, the ethmoid little prominent to view above and short or narrow, the vertebrae in small number (7, 8 + 9 — 13), the head wide and with a heavy wide snout, and the dorsal and anal fins short and pauciradiate.

TETRODONTINÆ.

SYNONYMS AS SUBFAMILY-NAMES.

- < Tetraodontini, *Bonaparte*, Nuovi Annali delle Sci. Nat., t. 2, p. 131, 1838; t. 4, p. 186, 1840.
 < Tetraodina, *Swainson*, Nat. Hist. and Class. Fishes, etc., v. 2, pp. 194, 328, 1839.
 < Tetraodontiformes, *Bleeker*, Enum. Sp. Piscium Archipel. Indico, p. xiv, 1859.
 < Tetraodontiens, *Hollard*, Annales des Sci. Nat. (4), t. 8, p. 327, 1860.
 < Tetraodontiformes, phalanx A. Tetraodontini, *Bleeker*, Atlas Ichthyol. Indes Orient. Néerland., v. 5, p. 49, 1865; Nederl. Tijdschr. Dierk., v. 3, p. 18, 1866.
 < Tetraodontina, *Günther*, Cat. Fishes Brit. Mus., v. 8, pp. 269, 270, 1870.
 < Tetraodontinæ, *Gill*, Johnson's New Univ. Cycl., v. 4, p. 792, 1877.
 < Tetraodontinæ, *Jordan and Gilbert*, Syn. Fishes N. Am., p. 859, 1883.

Tetrodontidæ with the frontals expanded sideways and forming the lateral roofs of the orbits, the postfrontals limited to the posterior portions.

As the name *Tetrodon* has been variously employed, the essentials of its early history may be in place here.

Linnaeus, in the tenth edition of the "Systema Naturæ", in which the binomial system was first universally applied, accepted the genus *Tetro-*

don with six species, as follows, the names under which they were retained in the last systematic work on fishes—Günther's Catalogue of the Fishes in the British Museum being added:

- | | | |
|--------------------------|------|---|
| 1. <i>testudineus</i> , | 332, | <i>T. (Cheilichthys) testudineus</i> , G. viii, 282. |
| 2. <i>lagocephalus</i> , | 332, | <i>T. (Gastrophysus) lagocephalus</i> , G. viii, 273. |
| 3. <i>lineatus</i> , | 333, | <i>T. (Arothron) fahaka</i> , G. viii, 290. |
| 4. <i>ocellatus</i> , | 333, | <i>T. (Gastrophysus) ocellatus</i> , G. viii, 279. |
| 5. <i>hispidus</i> , | 333, | <i>T. (Arothron) hispidus</i> , G. viii, 297. |
| 6. <i>mola</i> , | 334, | <i>Orthagoriscus mola</i> , G. viii, 317. |

No species having been signalized as the type of the genus, it remained for succeeding naturalists to restrict the names to a more definite group.

The *T. mola* was first removed as the type of the genus *Mola* by Cuvier in 1798.

The remaining species were left together till W. Swainson,* in 1839, subdivided the genus, and named five sections distinguished by trivial characters, but which, nevertheless, must be taken cognizance of.

These were named and defined at p. 328 of v. 2 as follows:

Tetraodon Linn.—Head short; the body being entirely covered with prickles.

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|--|---|
| <i>T. lineatus</i> . Bloch, 141.† | <i>T. (Arothron) stellatus</i> , G. viii, 294. |
| <i>testudineus</i> . Ib. 139.‡ | <i>T. (Arothron) reticularis</i> , G. viii, 296.‡ |
| <i>maculatus</i> . Hamilt. 18, fig. 2. | <i>T. (Chelonodon) patoca</i> , G. viii, 288. |
| <i>fluviatilis</i> . Ib. pl. 30, fig. 1. | <i>T. (Arothron) fluviatilis</i> , G. viii, 299. |

Leisomus Sw.—Head short; the body entirely smooth.

- | | |
|---|---|
| <i>T. lavissimus</i> . Sch. § | |
| <i>marmoratus</i> . Hamilt. pl. 18, fig. 3. | <i>T. (Monotretus) cutcutia</i> , G. viii, 290. |

Lagocephalus Sw.—Head short; the upper parts of the body smooth; the belly armed with angulated spines, as in *Diodon*.

- | | |
|--------------------------------------|---|
| <i>L. stellatus</i> . Bl. pl. 143. | <i>T. (Gastrophysus) Houckeuii</i> , G. viii, 276. |
| <i>Pennantii</i> . Yarrell, ii. 347. | <i>T. (Gastrophysus) lagocephalus</i> , G. viii, 273. |

Cirrhisomus Sw.—Sides of the body furnished with cirriform processes.

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|---------------------------------------|--|
| <i>C. Spengleri</i> . Bloch, pl. 144. | <i>T. (Cheilichthys) Spengleri</i> , G. viii, 284. |
|---------------------------------------|--|

Pylonotus Sw.—Fore part of the head and muzzle prolonged, narrow, as in *Balistes*; the back carinated; belly furnished with prickles.

- | | |
|--|---|
| <i>P. rostratus</i> . Bl. pl. 146. | <i>T. (Anosmius) rostratus</i> , G. viii, 303. |
| <i>electricus</i> . Ph. Tr. 76, pl. 3. | <i>T. (Anosmius) margaritatus</i> , G. viii, 300. |

It is necessary to add that the author, on a previous page (v. 2, p. 194), had defined the same groups in essentially the same manner, but

* On the Natural History and Classification of Fishes, Amphibians, and Reptiles, by William Swainson, v. 2, pp. 194, 328.

† Not identical but congeneric with *T. lineatus*, L., = *T. (Arothron) fahaka*, G. viii, 290.

‡ Generically distinct from *T. testudineus*, L., = *T. (Cheilichthys) testudineus*, G. viii, 282.

§ There is no "*T. lavissimus*" in Bloch and Schneider's "Systema Ichthyologiae," and Swainson has simply copied the name from Règne Animal of Cuvier, who, in his second section of the genus *Tetraodon*, characterized by the entire body smooth, groups two species: "*T. lavissimus*, Bl., Schn.;" and "*T. cutcutia*, Buchan, xiii, 3". The first species is unidentifiable, unless it be with the *T. lavigatus*, Bl., Schn.

in two cases under different names, without, however, specifying the types, viz :

Tetrodon, 194.	Tetrodon, 328.
<i>Leiodon</i> , 194.	<i>Leisomus</i> , 328.
Lagocephalus, 194.	Lagocephalus, 328.
Cirrhosomus, 194.	Cirrhosomus, 328.
<i>Canthigaster</i> , 194.	<i>Psilonotus</i> , 328.

Dr. Bleeker has preferred to take the first names, but it would have been absolutely impossible to have identified these types with certainty had not some species been enumerated under them, and we may therefore regard them as determinable only from the last mention of them; this is fortunate, because the names finally given were much better than those first used.

Inasmuch as the name *Tetrodon* was thus restricted to a group of which two *Linnean* species are representatives (although Swainson's references did not represent the species), it must be retained for them and their allies, and the subsequently given name *Arothron*, as well as the still later terms for congeneric species, must be relegated to its synonymy.

The genera *Lagocephalus*, *Liosomus*, *Cirrhosomus* and *Psilonotus* may then be retained for the species enumerated under them by Swainson and for related ones.

COLOMESINÆ.

SYNONYMY.

=Colomesinæ, *Gill*, n. snbf.
Tetrodontinæ sp. *auct.*

Tetrodontidæ with the frontals narrowed and excluded from the orbits, the postfrontals being elongated and projected forward and connected with the prefrontals!

This subfamily is established for the genus *Batrachops* of Bibron and Hollard,* founded on a species identified with the "*Tetr. psittacus* Bl. Schn., ou *Tetr. perroquet* de Lacépède." The name *Batrachops* had been preoccupied for another genus of fishes by Heckel, and *Colomesus* is used as a substitute.†

PSILONOTIDÆ.

SYNONYM AS SUBFAMILY.

=Tetraodontiformes phalanx Canthogastrini, *Bleeker*, Atlas Ich. des Indes Néerland., v. 5, p. 49, 1865; *Nederl. Tijdschr. Dierk.*, v. 3, pp. 18, 19, 1866.
=Pylonotinæ, *Gill*, Johnson's Univ. Cyclopædia, v. 4, p. 792, 1878.

Tetrodontoidea with the frontals separated from the supraoccipital by the intervention of the postfrontals, which are connected together

* *Batrachops* *Hollard* *Annales des Sc. Nat.* (4), v. 8, p. 321, pl. 6, f. 3, 1857.

† *Κολος*, defective, *μεσος*, middle.

and laterally expanded but short, the ethmoid prominent above, enlarged and narrowed forwards, the vertebræ in normal number (about 8+9), the head compressed and with a projecting attenuated snout, and the dorsal and anal fins short and pauciradiate.

CHONERHINIDÆ.

SYNONYMY.

=Xenopterinae, *Gill*, Johnson's Univ. Cyclopædia, v. 4, p. 792, 1878.

Tetrodontoidea with the frontals separated from the supraoccipital by the intervention of the postfrontals, which are much enlarged and assume a quadrangular form, the ethmoid little prominent to view and very short, the vertebræ in increased number (12+17), the head wide and with a blunt wide snout, and the dorsal and anal fins long and multiradiate (D 32—38; A 28—32).

DIODONTOIDEA.

Gymnodontes without a pelvis, with a normally developed caudal region, with the intermaxillary and dentary bones coössified into single sutureless arches, the supramaxillary portions extended laterally behind, the ethmoid retracted backwards under the frontals, and the postfrontals retracted inwards to the sides of the supraoccipital and behind the frontals.

DIODONTIDÆ.

SYNONYMS AS FAMILY NAMES.

- <Odontini, *Rafinesque*, Indice d'Ittiolog. Siciliana, p. 40, 1810.
- <Gymnodontes, *Risso*, Hist. Nat. de l'Enrope Mérid., t. 3, p. 102, 1826.
- <Gymnodontes, *Cuvier*, Règne Animal, 1re éd., t. 2, p. 145, 1817; 2e éd., t. 2, p. 364, 1829.
- <Gymnodontidæ, *Adams*, Manual Nat. Hist., p. 95, 1854.
- <Diodoniens, *Bibron*, Revue et Mag. de Zool., v. —, p. —, 1855.
- <Gymnodontes, *Günther*, Cat. Fishes Brit. Mus., v. 8, p. 269, 1870.
- ≡Diodontidæ, *Cope*, Trans. Am. Phil. Soc., v. 14, p. 458, 1870; Proc. Am. Assoc. Adv. Sci., v. 20, p. 340, 1872.
- =Diodontes, *Fitzinger*, Sitzungsber. K. Akad. der Wissensch. (Wien), B. 67, 1. Abth., p. 48, 1873.
- =Diodontidæ, *Gill*, Cat. Fishes, E. Coast N. Am., p. 6, 1873.

SYNONYMS AS SUBFAMILY NAMES.

- <Odopsia, *Rafinesque*, Analyse de la Nature, 2 subf. of 22 fam., p. —, 1815.
- =Diodontini, *Bonaparte*, Nuovi Annali delle Sci. Nat., t. 2, p. 131, 1838; t. 4, p. 186, 1840.
- =Diodontini, *Nardo*, Atti Congressi Scienz. Ital. rac. et ord., v. 1, p. 71 (1842), 1844.
- <Diodoninae, *Swainson*, Nat. Hist. and Class. Fishes, etc., v. 2, pp. 194, 329, 1839.
- =Diodoniens, *Hollard*, Annales Sc. Nat., Zool. (4), v. 8, p. 313, 1857; (4), v. 13, p. 46, 1860.
- =Diodontiformes, *Bleeker*, Enum. Sp. Piscium Archipel. Indico, p. xiv, 1859; Atlas Ich. des Indes Néerland., t. 5, p. 49, 1865; Nederl. Tijdschr. Dierk., v. 3, p. 17, 1866.
- <Tetrodontina, *Günther*, Cat. Fishes Brit. Mus., v. 8, pp. 208, 255, 1870.
- =Diodontina, *Jordan & Gilbert*, Syn. Fishes N Am., p. 859, 1883.

The only family of the superfamily.

MOLOIDEA.

Gymnodontes without a pelvis or ribs, with the caudal region aborted and the body truncated behind, and with the jaws destitute of median sutures.

MOLIDÆ.

SYNONYMS AS FAMILY NAMES.

- =Molæ, *Ranzani*, *Novi Comm. Acad. Scient. Bonon.*, v. 3, tab. after p. 81, 1837.
 =Orthragoriscidæ, *Bonaparte*, *Nuovi Annali delle Sci. Nat.*, v. 2, p. 131, 1838; v. 4, p. 187, 1840.
 =Orthragoriscidæ, *MacLeay*, *Journ. Asiat. Soc. Bengal*, v. —, p. —, 1841.
 <Troisième famille [des Plectognathes], *Darèste*, *Ann. Sc. Nat.* (3), v. 14, p. 125, 1850.
 <Cephalidæ, *Adams*, *Manual Nat. Hist.*, p. 95, 1854.
 =Ellipsomes, *Hollard*, *Annales des Sci. Nat.* (4), v. 13, p. 46, 1860.
 =Orthragoriscoidei, *Bleeker*, *Enum. Sp. Piscium Archip. Indico*, p. xiv, 1859; *Atlas Ich. des Indes Néerland.*, v. 5, p. 44, 1865; *Nederl. Tijdschr. Dierk.*, v. 3, p. 16, 1866.
 =Orthragoriscidæ, *Gill*, *Arrangement Fam. of Fishes*, p. 1, 1872.
 =Orthragorisci, *Fitzinger*, *Sitzungsber. K. Akad. der Wissensch. (Wien)*, v. 67, 1. Abth., p. 48, 1873.
 <Orthragoriscidæ, *Jordan & Gilbert*, *Syn. Fishes N. Am.*, pp. 852, 864, 1883.

SYNONYMS AS SUBFAMILY NAMES.

- *> Orthragoriscini, *Bonaparte*, *Nuovi Annali della Sci. Nat.*, 1838; v. 4, p. 187, 1840.
 ×Molini, *Bonaparte*, *Nuovi Annali della Sci. Nat.*, 1838; v. 4, p. 187, 1840.
 <Cephalinæ, *Swainson*, *Nat. Hist. Class. Fishes, etc.*, v. 2, pp. 195, 329, 1839.
 ×Molini, *Bonaparte*, *Cat. Metod. Pesci Europei*, p. 87, v. 1, p. 199, 1846.
 >Orthragoriscini, *Bonaparte*, *Cat. Metod. Pesci Europei*, p. 87, v. 1, p. 199; 1846.
 =Orthragoriscinæ, *Gill*, *Cat. Fishes East Coast N. A.*, p. 57, 1861.
 <Molina, *Günther*, *Cat. Fishes Brit. Mus.*, v. 8, pp. 269, 317, 1870.

Moloidea with a moderately compressed oblong body (longer than high), with a posterior marginal or caudal fin intervening between the dorsal and anal and with corresponding interspinal bones (at least 4 or 5 above and 8 or 9 below in the adult) connected with the posterior surfaces of the neural and hæmal spines of the last complete (typically 16th) vertebra.

There are three well-marked genera of this type.

MOLA.

SYNONYMY.

- <Mola, *Cuvier*, *Tableau Élém. Hist. Nat. Animaux*, p. 323, 1798.
 <Orthragoriscus, *Bloch*, *Systema Ichthyologiæ*, *Schneider* ed., p. 510, 1801.
 <Cephalus, *Shaw*, *General Zoology*, v. 2, p. 432, 1804.
 ×Diplanchias, *Rafinesque*, *Caratt. Ale. Nuov. Gen. e Nuov. Sp. Anim. e Piante della Sicilia*, p. 17, 1810.

* The two subfamilies admitted by Bonaparte in the family "Orthragoriscidæ" were defined as follows:

"*Orthragoriscini*. Sceletum omnino cartilagineum; pinnae ente communi tectæ."

"*Molini*. Sceletum sub-osseum; pinnae ente peculiari tectæ."

Molacanthus as well as *Mola* were referred to the Molini; *Orthragoriscus* Bon. (= *Ranzania* Nardo) alone to the "Orthragoriscini."

- × *Orthragus*, *Rafinesque*, Caratt. Alc. Nuov. Gen. e Nuov. Sp. Anim. e Piante della Sicilia, p. 17, 1810.
- × *Cephalus*, *Ranzani*, Novi Comm. Acad. Scient. Bonon., v. 3, tab. after p. 81, 1837.*
- × *Tympanomium*, *Ranzani*, Novi Comm. Acad. Scient. Bonon., v. 3, tab. after p. 81, 1837.*
- × *Diplanchias*, *Ranzani*, Novi Comm. Acad. Scient. Bonon., v. 3, tab. after p. 81, 1837.*
- × *Trematopsis*, *Ranzani*, Novi Comm. Acad. Scient. Bonon., v. 3, tab. after p. 81, 1837.*
- × *Orthragoriscus*, *Ranzani*, Novi Comm. Acad. Scient. Bonon., v. 3, tab. after p. 81, 1837.*
- × *Ozodura*, *Ranzani*, Novi Comm. Acad. Scient. Bonon., v. 3, tab. after p. 81, 1837.*
- × *Pedalion*, *Guilding* MSS., *Swainson*, Nat. Hist. and Class. Fishes, &c., v. 1, p. 199; v. 2, pp. 195, 329, 1839.
- = *Orthagoriscus*, *Swainson*, Nat. Hist. and Class. Fishes, &c., v. 2, pp. 195, 329, 1839.
- = *Mola*, *Bonaparte*, Cat. Metod. Pesci Europei, p. 87, 1846.
- × *Aledon*, *Castelnau*, Mém. sur Poissons Afrique Aust., p. 75, ?1860.

Molidæ with the caudal truncated behind and the skin without laminar scutes, but granulated.

It appears to have been generally overlooked, unless by some Scandinavian naturalists, that this genus first received a name, in 1798, from Cuvier. Bloch had indicated (but without naming) the genus in the following terms:

“Ce poisson [*Diodon mola*], quant à la forme, diffère tellement des autres poissons du même genre, qu'on pourroit avec raison lui consacrer un genre particulier, et donner la queue tronquée pour un caractère distinctif, comme Aldrovandi* et Mr. Pennant† ont décrit un de ces poissons qui étoit long, et que Mr. Pallas en a fait connoître un rond de cette espèce, ‡ ce genre comprendroit trois espèces.” (IV, 85, pl. 128.)

RANZANIA.

SYNONYMY.

- < *Orthragoriscus*, *Bloch*, Syst. Ich., Schneider ed., p. 510, 1801.
- < *Cephalus*, *Shaw*, Gen. Zool., v. 2, p. 432, 1804.
- = *Cephalus*, *Swainson*, Nat. Hist. and Class. Fishes, &c., v. 2, pp. 195, 329, 1839 (not of *Ranzani*).
- = *Ranzania*, *Nardo*, Ann. Sci. Regno Lombard. Venet., v. 10, p. 105, 1840.
- = *Orthagoriscus*, *Bonaparte*, Cat. Metod. Pesci Europei, p. 88, 1846.

Molidæ with the caudal truncated behind and the skin covered with small and mostly hexagonal scutes.

Type *R. truncatus* = *Tetrodon truncatus* Retzius.

MASTURUS.

SYNONYMY.

Orthagoriscus sp., *Bleeker*.

Molidæ with the caudal extended backwards at the subaxial or submedian rays, and assuming a mastoid shape, the skin covered behind and below with scutes of various and often elongated forms, the eyes nearer the snout than the branchial apertures, and the pectorals with rays reduced in number.

Type *M. oxyuropterus* = *Orthagoriscus oxyuropterus* Bleeker.

* De Pisc., p. 413. † B. Z., III, p. 129, n. 54, fig. 7. ‡ Spic. Zool., fasc. VIII, p. 39, tab. 44.

MOLACANTHIDÆ.

SYNONYMS AS SUBFAMILY NAMES.

=Molacanthinæ, *Gill*, Cat. Fishes East Coast N. A., p. 57, 1861.

=Molacanthinæ, *Jordan & Gilbert*, Syn. Fishes N. Am., p. 865, 1883.

Moloidea with a much compressed vertically expanded body (higher than long), without a marginal posterior or caudal fin, or interspinal bones for its support, and with a short intestine "making but two turns." (Putnam.)

Pelagic fishes of very small size.

MOLACANTHUS.

SYNONYMY.

=Molacanthus, *Swainson*, Nat. Hist. and Class. Fishes, &c., v. 2, pp. 195, 329, 1839.

=Pallasia, *Nardo*, Ann. Sci. Regno Lombard. Venet., v. 10, p. 112, 1840.

=Acanthosoma, *De Kay*, New York Fanna, Fish., p. 330, ? 1842.

Molæ juv., *Steenstrup & Lütken*.

Orthagorisei juv., *Günther*.

Dr. Günther has mistaken for the young of the common *Mola rotunda* (called by him *Orthagoriscus mola*) the remarkable genus *Molacanthus*, and in 1870 quite gratuitously remarked that "these [supposititious] young fishes form a distinct family, *Molacanthidæ*, in Mr. Gill's system." Mr. Günther erred in two respects: (1) in the entirely baseless assumption that *Molacanthus* is the young of *Mola*; and (2) in the statement that *Molacanthus* had been elevated to family rank "in Mr. Gill's system."

Molacanthus is diametrically opposite to the young of *Mola*, as has been well shown by Mr. F. W. Putnam,* and the young of this family, instead of being shorter than the old, are, as might have been anticipated, *a priori*, from a knowledge of the morphology and relations of the forms, at least as long as, if not longer than, the adult.† Dr. Günther seems to have had the material at his command for a proper comprehension of the changes of *Mola*, as he claimed specimens for the British Museum from "1 inch long" to "7 feet long."‡ If his specimens "1 inch long" really were *Molæ*,§ a simple comparison of them with figures of *Molacanthi* (if he had no specimens) might have served to convince him of the difference between the two. If the specimens were *Molacanthi*,

* On the Young of *Orthagoriscus mola*. By F. W. Putnam. [August, 1870.] <Am. Nat., v. 4, pp. 629-633, Dec., 1870; also <Proc. Am. Assoc. Adv. Sci., v. 19, pp. 235-260, 1871.

† I have examined three specimens of *Mola rotunda* little larger than *Molacanthus aculeatus*.

‡ There was, however, a considerable gap between the smallest specimens ("f," "k, l, 1 inch long") and the next ("d," "g-i, stuffed, 1½ feet long"); the smallest were probably *Molacanthi*; the others *Molæ*.

§ Dr. Günther's descriptive remarks indicate that he had examined also representatives of the genus *Molacanthus*.

in view of the range of specimens of *Mola* he had, and of the differences between *Mola* and *Molacanthus*, he failed to exercise his reasoning powers when he determined the latter to be the young of the former. In fact, the differences between *Molacanthus* and *Mola* when young are considerably greater than between the former and *Mola* when old.

A slight attention to the logic of facts, aided by a very moderate use of the reasoning faculties, might have convinced Dr. Günther of the wide differences between the forms in question.

"In Mr. Gill's system," so far as was expressed in his "Catalogue of the Fishes of the East Coast of North America" (1861, p. 57), the genus *Molacanthus* was simply differentiated from *Mola* or *Orthagoriscus* as a distinct subfamily; to this extent, at least, its differentiation is justified by anatomical contrasts. It is probable, however, that even family rank should be awarded to it in order to adequately express its decided and manifold differences, and to such rank I do now propose to elevate the group. There is not much doubt that the anatomical differences already known to exist will be supplemented by others when the osteology, and especially skulls of the two types, are compared.

A REVIEW OF THE SPECIES OF LUTJANINÆ AND HOPLOPAGRINÆ FOUND IN AMERICAN WATERS.

By DAVID S. JORDAN and JOSEPH SWAIN.

In this paper is given the synonymy of the American species of the genera allied to *Lutjanus*, with descriptions of the species which we have been able to examine, and analytical tables by which these species may be distinguished.

We accept the views of Dr. Gill as to the relationships of these forms, placing them in the family of *Sparidae*, in which group they appear to constitute two subfamilies, *Hoplopagrinae* and *Lutjaninae*. We arrange the American species in eight genera. Three of these (*Ocyurus*, *Rhomboplites*, and *Tropidinius*) have formerly not been admitted by us as distinct from *Lutjanus*, from which genus they are not indeed distinguishable by any single external character of high importance. An examination of a series of skulls of West Indian species, kindly shown to us by Dr. Gill, has convinced us of the desirability of recognizing each of these groups as a genus separate from *Lutjanus*, as the secondary characters of each are accompanied by well-marked peculiarities of the cranium, the structure of which is very constant in species properly referred to *Lutjanus*. For the characters drawn from the skull in the following analysis of the genera, we are indebted to Professor Gill. The skull of *Hoplopagrus* has never been studied, and that of two of the more aberrant species of *Lutjanus* (*inermis*; *aratus*) should be examined before their position can be considered as definitely fixed. The latter is prob-