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 vertebrae 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 vertebrae of Psiloecephalus (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., Cottidae and Blenniidae) 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., Teuthididae, Siganidae, Nemophididae, &c.) and Malacopterygians (e. g., some Characinidae, Dalliidae, &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:

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PLECTOGNATHI.*

SYNONYMS AS ORDINAL NAMES.


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-

† The “orders” Gymnodontes and Sclerodermi are combined by Bonaparte in a “section 3, Plectognathi.”
|| 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 Triacanthidae 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.**

(Thuthydoidea.)

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. Holland. 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:

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1 Although Duménil first introduced families into ichthyology, they were extremely artificial and based on Lacépède's ideas. Balistes (= Balistidae + Triacanthidae) was associated in one family (Chinomorphes) with Batrachus, Lophius, and Chinonura, and Ostracion, Tetradon, Ocoide, Diotion, and Sphéroïdes were grouped in another family (Osteodermes) with Synagnathus. 2 Balistinae (= Scleroderma). 3 Ostracidi (= Ostracodermi). 4 Odontini (= Gymnodontes). 5 Scleroderma. 6 Gymnodontes. 7 Balistina. 8 Monacanthi. 9 Ostracodinae. 10 Ostracodontinae. 11 Tetraodontinae. 12 Diodontinae. 13 Orthagogiscida. 14 Molini and Orthagogiscini pt. 15 Gymnodontidae. 16 Cephalidn. 17 Balistidae. 18 Triacanthi. 19 Balistiens. 20 Monacantiens. 21 Ostracodantes. 22 Aracanii + Ostraciens. 23 Loganiomones. 24 Triodontiens. 25 Sphéroïsomes (Orbes spin). 26 Tédrodeltae. 27 Diotioniens. 28 Ellipsones. 29 Orthagogiscia. 30 Triacanthoidei. 31 Balistoiidei. 32 Ostracionoidei. 33 Triodon-toidei. 34 Physogastroidei. 35 Tetrodontiformes. 36 Diodontiformes. 37 Orthagogisoidae. 38 Paratria-canthis. 39 Triacanthiformes. 40 Balistiformes. 41 Monacanthiformes with three phalanges—Monacanthini + Aluterini = Monacanthinae Gill, and Psileocephalini = Psileocephalina Gill. 42 Ostracionoidei. 43 Tetrodontiformes with phalanges—Tetraodontini and Canthogastri. 44 See synonymy of respective groups. 45 Orthagogiscida.

**SCLERODERMI.**

**SYNONYMS AS FAMILIES.**

< Sclerodermi, Günther, Cat. Fishes in Brit. Mus., v. 8, p. 207, 1870.

**SYNONYMS AS SUBORDERS.**

= Scleroderma, Gill, Arrangement Families Fishes, pp. xii, 1, 1872.
SYNONYMS AS ORDERS.


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.


= Balistide, Nardo, Atti Congressi Scienz. Ital. rac. et ord., v. 1, p. 70 (1842), 1884.


= Scleroderne, Günther, Cat. Fishes Brit. Mus., v. 8, p. 207, 1870.


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.


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.


= Triacanthiformes, Bleeker, Nederl. Tijdschr. Dierk., v. 9, p. 9, 1866; Atlas des Indes Néerland., v. 5, p. 85, 1865.


Triacanthidæ with incisorial teeth in both jaws (\(\frac{1}{2}\)), and with a long, narrowed caudal peduncle.

Triacanthus, the only known genus, has a short inner row of rounded teeth in each jaw.
PROCEEDINGS OF UNITED STATES NATIONAL MUSEUM.

BALISTIDAE.*

SYNONYMY.

> Acanthopteris, Blainville, Journ. de Physique, 1816.
> Balistidi, Bonaparte, Fauna Italiana, v. 3, Pesci, fol.
> = Balistidae, Girard, Expl. and Surv. for R. R. Route to Pacific Oc., v. 10, Fishes, p. 338, 1858.
> = Selérodermi, Günther, Cat. Fishes Brit. Mus., v. 8, p. 207, 1870.

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

BALISTINÆ.

SYNONYMY.

> Balistinae, Swainson, Nat. Hist. and Class. Fishes, etc., v. 2, pp. 194, 324, 1839.
> = Balistini, Nardo, Atti Congressi Scienze Ital. rac. et ord., v. 1, p. 70 (1842), 1844.
> = Balistinae, Gill, Cat. Fishes E. Coast N. Am., p. 56, 1861.
> = Balisteiformes, Blecker, Atlas Ich. des Indes Néerland., t. 5, p. 98, 1865.
> = Balistinae, Günther, Cat. Fishes Brit. Mus., v. 8, pp. 208, 211, 1870.

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

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.
=Monacanthinae, Gill, Cat. Fishes E. Coast N. Am., p. 56, 1861.

Balistidae with the vertebrae 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.


Balistidae with the vertebrae 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.

<Sclerodermes, Cuvier, Regne 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.

=Ostracodermi, Gill, Arrangement Families of Fishes, pp. xii, 1, 1872.

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.

Proc. Nat. Mus. 84—27
OSTRACIONTIDÆ.*

SYNONYMS AS FAMILY NAMES.

=Ostraciontide, Gill, Arrangement Fam. of Fishes, p. 1, 1872.

SYNONYMS AS SUBFAMILY NAMES.

=Ostraciontina, Günther, Cat. Fishes Brit. Mus., v. 8, pp. 208, 255, 1870.

The only family of the suborder.

GYMNODONTES.

SYNONYMS AS FAMILIES.

=Gymnodontes, Günther, Cat. Fishes in Brit. Mus., v. 8, pp. 207, 269, 1870.

SYNONYMS AS SUBORDER.


SYNONYMS AS ORDERS.

=Gymnodontes, Bleeker, Atlas Ich. des Indes Néerland., t. 5, p. 43, 1865.

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.

Triodontidae, Gill, n. superfam.

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

TRIODONTIDÆ.

FAMILY SYNONYMS.

=Triodontide, Gill, Arrangement Fam. of Fishes, p. 1, 1872.

SUBFAMILY SYNONYM.


The only family of the superfamily.

TETRODONTOIDEA.

SYNONYMY.

<Tetradontidae, 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.

SYNONYM.

=Gymnondontidae, Girard, Expl. and Surv. for R. R. Route to Pacific Oc., v. 10, Fishes, p. 339, 1858.
<Tetradontidae, Gill, Arrangement Fam. of Fishes, p. 1, 1872.

Tetrodontaidea 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 pectoral.

TETRODONTINÆ.

SYNONYMS AS SUBFAMILY-NAMES.

<Tetradoniæ, Swainson, Nat. Hist. and Class. Fishes, etc., v. 2, pp. 194, 328, 1839.
<Tetradontina, Githier, Cat. Fishes Brit. Mus., v. 8, pp. 269, 270, 1870.
<Tetradontina, Gill, Johnson's New Univ. Cycal., v. 4, p. 792, 1877.
<Tetradontina, Jordan & Gilbert, Syn. Fishes N. Am., p. 859, 1883.

Tetrodontaidea 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 Naturae", 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. testudineus, 332, T. (Cheilichthys) testudineus, G. viii, 282.
2. lagocephalus, 332, T. (Gastrophysus) lagocephalus, G. viii, 273.

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.

T. lineatus. Bloch, 141.†
T. testudineus. Ib. 139.‡
T. maculatus. Haimit. pl. 30, fig. 1.
T. floviatilis. Haimit. pl. 30, fig. 1.

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

T. levisissimus. Sch.§
T. marmoratus. Haimit. pl. 18, fig. 3.

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

L. stellatus. Bl. pl. 143.

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

C. Spengleri. Bloch, pl. 144.

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

P. rostratus. Bl. pl. 146.
T. (Anosinus) margaritatus, 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

‡ Generically distinct from T. testudineus, L., = T. (Cheilichthys) testudineus, G. viii, 282.
§ There is no "T. levisissimus" in Bloch and Schneider's "Systema Ichthyoelogia," and Swainson has simply copied the name from Régue Animal of Cuvier, who, in his second section of the genus Tetraodon, characterized by the entire body smooth, groups two species: "T. levisissimus, Bl., Schm." and "T. rostratus, Buchan, xiii, 3." The first species is unidentifiable, unless it be with the T. rostratus, Bl., Schm.
in two cases under different names, without, however, specifying the types, viz:

Tetrodon, 194.  Tetrodon, 328.  
Leiodon, 194.  Leisomus, 328.  
Lagocephalus, 194.  Lagocephalus, 328.  
Cirrhosomus, 194.  Cirrhosomus, 328.  
Canthigaster, 194.  Psilonotus, 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 Linnæan 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, Leisomus, Cirrhosomus and Psilonotus may then be retained for the species enumerated under them by Swainson and for related ones.

COLOMESINÆ.

SYNONYM.

=Colomesinae, Gill, n. subf.
Tetrodontinae sp.  nov.

Tetrodontidae 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.

=Psilonotinae, Gill, Johnson’s Univ. Cyclopædia, v. 4, p. 792, 1878.

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

† κολος, defective, μεσος, middle.
and laterally expanded but short, the ethmoid prominent above, enlarged and narrowed forwards, the vertebrae in normal number (about 8+9), the head compressed and with a projecting attenuated snout, and the dorsal and anal fins short and pauciradial.

**CHONERHINIDÆ.**

**SYNONMY.**

= Xenopterina, Gill, Johnson's Univ. Cyclopedia, v. 4, p. 792, 1878.

Tetrodontioidea 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 vertebrae in increased number (12+17), the head wide and with a blunt wide snout, and the dorsal and anal fins long and multiradial (D 32—38; A 28—32).

**DIODONTOIDEA.**

Gymnodontes without a pelvis, with a normally developed caudal region, with the intermaxillary and dentary bones coossified 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.**

< Gymnodontes, Risso, Hist. Nat. de l'Europe Mérid., t. 3, p. 102, 1826.
< Gymnodontes, Günther, Cat. Fishes Brit. Mus., v. 2, p. 239, 1870.
≡ Diodontidae, Gill, Cat. Fishes, E. Coast N. Am., p. 6, 1873.

**SYNONYMS AS SUBFAMILY NAMES.**

≡ Diodoniæ, Shaw, Nat. Hist. and Class. Fishes, etc., v. 2, pp. 194, 329, 1839.
< Tetrodonton, Günther, Cat. Fishes Brit. Mus., v. 8, pp. 208, 255, 1870.

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.

= Orthagoriscidae, Gill, Arrangement Fam. of Fishes, p. 1, 1872.

SYNONYMS AS SUBFAMILY NAMES.

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

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 haemal spines of the last complete (typically 16th) vertebra.

There are three well-marked genera of this type.

MOLA.

SYNONYMY.

< Orthagoriscus, Bloch, Systema Ichthyologice, Schneider ed., p. 510, 1801.

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

"Orthagoriscini. Sceletum omnino cartilaginænum; pinæae eute communi tectæ."

"Molini. Sceletum sub-osseum; pinæae eute peculiari tectæ."

Mulowanthus as well as Mola were referred to the Molini; Orthagoriscus Bou. (= Ranzi, Nardo) alone to the "Orthagoriscini."


= Mola, Bonaparte, Cat. Metod. Pesci Europei, p. 87, 1846.


Molidae 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 pourrait 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 estoit long, et que Mr. Pallas en a fait connoître un ronde de cette espèce, § ce genre comprendroit trois espèces." (IV, 85, pl. 128.)

RANZANIA.

SYNONYMY.


= Orthoragoriscus, Bonaparte, Cat. Metod. Pesci Europei, p. 88, 1846.

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

Type R. truncatus = Tetrodon truncatus Retzius.

MASTURUS.

SYNONYMY.

Orthoragoriscus sp., Blecker.

Molidae 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 = Orthoragoriscus oxyuropterus Blecker.

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

SYNONYMS AS SUBFAMILY NAMES.

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

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.

Mola juv., Steenstrup & Lütken.
Orthagoriscus 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, Molacanthidae, 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 Mola, § 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 Molacanths,

† 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," 1 inch long") and the next ("d," "g—i, stuffed, 1½ feet long"); the smallest were probably Molacanthi; the others Mola.
§ 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.

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**A REVIEW OF THE SPECIES OF LUTJIANINÆ 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, *Hoplopagrines* and *Lutjaninae*. We arrange the American species in eight genera. Three of these (*Ocyurus*, *Rhomboptilus*, 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; oratus) should be examined before their position can be considered as definitely fixed. The latter is prob-