

	Millimeters.
Greatest thickness of body	130
Height of head at eye.....	85
Length of snout.....	76
Width of snout at nostrils.....	88
Distance from snout to eye, obliquely	98
Distance from tip of snout to vent.....	572
Distance from tip of snout to nostril.....	77
Tip of snout to posterior margin of mouth.....	119
Distance from tip of snout to first gill-opening	205
Distance from tip of snout to origin of dorsal	570
Distance from tip of snout to spiracle, obliquely.....	148
Distance between nostrils in front	43
Width of mouth	57
Width of superior dental lamina	50
Width of inferior dental lamina	35
Extent of projection of inferior dental lamina.....	20
Length of eye	36
Length of iris.....	14
Interorbital width on the bone	86
Distance between anterior gill-openings	155
Distance between posterior gill-openings.....	100
Length of third gill-opening	20
Length of surface occupied by gill-openings	89
Length of nasal flap from anterior margin of nostril.....	44
Greatest width of nasal flap	63
Distance from spiracle to tip of pectoral	478
Greatest length of spiracle	47
Greatest width of spiracle.....	31
Length of dorsal base.....	36
Length of middle ray of dorsal.....	36
Length of last ray of dorsal.....	23
Length of ventral, including cartilaginous prominence	157
Greatest width of ventral	73
Height of tail at root.....	23
Width of tail at root.....	28

ON THE AMERICAN FISHES IN THE LINNÆAN COLLECTION.

By G. BROWN GOODE and TARLETON H. BEAN.

Alexander Garden, one of the earliest American naturalists, was a physician, resident in Charleston, South Carolina, in the middle of the last century. He was an enthusiastic collector and in constant correspondence with the great Swedish naturalist, many of his letters, with the accompanying notes upon his collections, being preserved in the two volumes of Smith's "Correspondence of Linnæus."

He was more especially a botanist, and his contributions to science

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in that department are fitly commemorated by the name *Gardenia*, applied by Linnæus in his honor to the beautiful Cape Jessamine. He collected also reptiles and fishes, and was so careful and conscientious a preparator that almost all of the fishes sent by him to Sweden are still in existence, though the other fishes upon which Linné worked are in a much less satisfactory state of preservation, and most of them indeed have gone to destruction.

Garden's method was to skin half of the fish, leaving the vertical fins attached, to press it in a botanical press, varnish it, and glue it to a sheet of herbarium paper.

These specimens are preserved in the rooms of the Linnæan Society of London, in Burlington House, in connection with the Linnæan herbarium and library.

In the summer of 1883, by the courtesy of Dr. William Murie, librarian of the Linnæan Society, we were permitted to make a careful study of the Linnæan fishes, and especially of the American forms, which were, as has been remarked, almost all collected by Garden, and which were named and described by Linné in the tenth and twelfth editions of his *Systema Naturæ*. The results of these studies are presented in the following paper, which we hope may prove to be a contribution to stability of American ichthyological nomenclature.

The notes are arranged in the order in which the several species are discussed in the twelfth edition of the *Systema Naturæ*.

The following important changes in nomenclature seem to be necessary as a result of this investigation:

1. *Coryphæna psittacus*, L. is a *Xyrichthys*, identical with *X. vermiculatus*, Poey, which must hereafter be called *Xyrichthys psittacus*.

2. *Zeus gallus*, L. is *Selene argentea*, Lac., which must therefore be called *Selene gallus*.

3. *Zeus vomer*, L. is *Vomer setipinnis*, Auctorum, which unfortunately must be called *Vomer vomer*, if we retain our proper regard for priority in the use of specific names.

4. *Pleuronectes dentatus* = *Paralichthys dentatus*, Auctorum, and *P. ophryas*, J. & G., characterized by the presence of numerous gill-rakers.

5. *Sparus chrysops*, L. and *Sparus argyrops*, L. were founded upon specimens of the same species, which is the northern form. Dr. Bean has already indicated that this form should be known as *Stenotomus chrysops*, while for the southern form he has adopted the name *S. aculeatus*. (BEAN, Proc. U. S. Nat. Mus.)

6. *Labrus hiatula*, L. is undoubtedly the *Tautog*. If a name based upon a mutilated specimen is to be allowed to stand this species must be known as *Hiatula hiatula*; it is to be hoped, however, that the revised codes of nomenclature will not force us into this usage.

7. *Perca rhomboidalis*, L. is *Lagodon rhomboides*, Auctorum. It would seem, therefore, that this species must be called *Lagodon rhomboidalis*.

8. *Perca guttatus*, L. is *Epinephelus lunulatus*, Poey, which should be called *Epinephelus guttatus*.

9. *Clupea thrissa*, L. is undoubtedly an Indo-Pacific species of *Opisthonema*. The Carolina specimens referred by Linnaeus to that species were of the species *Dorosoma cepedianum*. Our *Opisthonema* must therefore probably be called *O. oglina* (Les.).

Trichiurus lepturus, L.

LINNÉ, Syst. Nat., ed. xii, 429.

No. 1, Garden. Snake Fish.

In the twelfth edition of the *Systema Naturæ* there is no reference to this Gardenian specimen of the Hair-tail, and no writing of Linné's is on the reverse of the label. Garden's specimen is in bad condition; it is about 780^{mm} long.

Gadus tau, L.

LINNÉ, Syst. Nat., ed. xii, 439.

No. 16, Garden.

There are two specimens of this species, the larger of which is 160^{mm} long. They represent the ordinary form of *Batrachus tau*.

Echeneis naucrates, L.

LINNÉ, Syst. Nat., ed. xii, 446.

No. 32, Garden. Sucking Fish.

These specimens are not referred to by Linné, who evidently placed them at once with his *Echeneis naucrates*, already described, and to which he also refers Catesby's plate 26. These have 24 laminae in the disk. The larger one is 340^{mm} in length to caudal base.

Coryphæna psittacus, L.

LINNÉ, Syst. Nat., ed. xii, 448.

The type of this species was labeled in Linné's own writing, and marked No. 20 (evidently the No. 20 referred to, on page 313, Correspondence with Linné by Garden, as a fish of surpassing beauty); it is the species which has long been known as *Xyrichthys vermiculatus*. Linné's description agrees fully with this example, except in the count of the dorsal, which for some unknown reason is $\frac{9}{29}$ instead of $\frac{9}{22}$, as Linné would have made it. All the other fin rays are correctly given.

The length of the type to caudal base is 151^{mm}, and the characters are as follows: D. IX, 12; A. III, 12; the last of the dorsal and anal rays double; V. 6; P. 11; C. 14; scales, 2 above, tubes about 24 in all.

Lateral line interrupted under the tenth ray of dorsal. Accessory line beginning on the median line under the end of upper lateral line, and consisting of 5 short tubes.

Height one-third of length to caudal base; head one-fourth.

Eye about equal to upper jaw, and placed about at top of head.

The species must be called *Xyrichthys psittacus*, (L.).

Dr. Günther supposed *Coryphæna psittacus*, L., to be a *Pseudoscarus*, Cat. IV, 225. That *Pseudoscarus* has received another name.

Cottus scorpius, L.

LINNÉ, Syst. Nat., ed. xii, 452.

The condition of the typical specimen is very bad; it appears, however, to resemble closely enough our Scandinavian specimens of that species.

The length of the maxilla is contained $2\frac{1}{2}$ times in the length of the head; the length of the orbit $3\frac{2}{3}$ times.

The second dorsal has 14 rays; the anal 11; pectoral 17.

Zeus gallus, L.

LINNÉ, Syst. Nat., ed. xii, 454.

This is a species of *Selene*.

D. VII, 21, the longest spine more than twice as long as the base of the second dorsal. A. II, I, 19; lateral line not armed. The preanal spines are not much developed. The length of the typical example is about $4\frac{1}{2}$ inches. V. 6; its longest ray equals base of soft dorsal.

The species is identical with the *Zeus capillaris* of Mitchill, and we must use the name *Selene gallus* for that species. If the *Selene argentea* of Lacépède be only the adult stage of *capillaris*, then Lacépède's name, with that of Mitchill, must fall into the synonymy of *Selene gallus*.

Zeus vomer of Linné is the species which has long figured in American writings as *Vomer setipinnis*, which must now be called *Vomer vomer*, or if *Selene* and *Vomer* are not distinct, we must apply to it the name *Selene vomer*.

Pleuronectes plagiusa, L.

LINNÉ, Syst. Nat., ed. xii, 455.

The type of this species may have come from Africa or India. There is considerable doubt as to its origin. (See Garden's Correspondence with Linné, page 314.)

D. ca. 92; A. ca. 75; Scales ca. 77.

The species is more elongate than our specimens of *Aphoristia plagiusa*, so called, the depth being contained in the total length without caudal $4\frac{1}{3}$ times, and the head 6 times. In American specimens of *Aphoristia plagiusa*, so called, there are not fewer than 85 scales in a longitudinal series. The scales in Linné's species are certainly larger than in ours. The depth is contained $3\frac{1}{4}$ times in the total length to caudal base, and the head about 5 times. Under the circumstances it would be better to apply the name *Aphoristia ornata*, Lac., to our species.

Pleuronectes lineatus, L.

LINNÉ, Syst. Nat., ed. xii, 458.

No. 26, Garden. The Sole.

This specimen is marked "*lineatus*" by Linné, and in edition xii, page 458, is referred to the species *Pleuronectes lineatus*, which had, in edition x, been established upon a description of Brown, Jamaica, 445, and the description and figure of Sloan.

The length of the example to caudal base is 141^{mm}. The greatest height equals $\frac{1}{2}$ of this length, and the length of the head $\frac{2}{5}$.

D. 53; A. 40.

Pleuronectes dentatus, L.

LINNÉ, Syst. Nat., ed. xii, 458.

No. 28, Garden. Plaice.

The type of *Pleuronectes dentatus*, edition xii, page 458, is 240^{mm} long to the base of caudal; the total length is 280^{mm}. The height of the body is contained 3 times, and the length of the head about $4\frac{1}{5}$ times in the total without caudal. The length of the maxilla is contained $9\frac{1}{3}$ times in the standard body length, and slightly exceeds the length of the longest dorsal ray. The upper eye is very little in advance of the lower, and is one-fifth as long as the head. The interorbital space is very narrow. Teeth large, the longest one in front of the lower jaw being 3^{mm} long. The length of the maxilla is 26^{mm} and is contained about $2\frac{1}{5}$ times in the length of the head. There are eleven large teeth on the left side of the lower jaw and two minute ones behind these.

Gill-rakers 5-16, the longest being 6^{mm} in length, or about one-half as long as the upper eye.

D. 84; A. 66; scales about 103. The dorsal begins above the front margin of the eye.

The pectoral is as long as the maxilla, and about equal to the longest dorsal ray.

The ventral is short, somewhat imperfect, one-fourth as long as the head.

Pleuronectes lunatus, L.

LINNÉ, Syst. Nat., ed. xii, 459.

No. 9 (Garden?).

The specimen of *Pleuronectes lunatus* in the Linné collection measures 245^{mm} to origin of middle caudal rays, 290 in total. The habitat is stated to be "in America septentrionali."

The height is contained $2\frac{1}{2}$ times and the length of the head 4 times in the length to caudal base. The maxilla, 26^{mm} long, is three-sevenths as long as the head. The length of the upper eye is contained $5\frac{1}{3}$ times in the length of the head. The eyes are about even in front. The interorbital space is very narrow, about one-third of the length of the upper eye. The teeth are as large as in the preceding example; those of the lower jaw are largely wanting.

The dorsal begins above the front margin of the eye. Its longest ray is about two-fifths of the length of the head.

Gill-rakers 5-15, the longest 7^{mm} long, or about two-thirds of the length of the eye. The rakers, as in the preceding specimen, are minutely dentate, and their width at the base is about one-fourth of their length.

The pectoral is very slightly longer than the maxilla. The ventral is one-fourth as long as the head.

D. 87; A. 69 (and not 79, as Linné gives it). Scales as in the preceding, though not counted.

There is no doubt whatever that this specimen of *lunatus* and the one of *dentatus* belong to the same species. There is no proof that the one marked *lunatus* came from Garden, but the writing seems to be his.

Chætodon alepidotus, L.

LINNÉ, Syst. Nat., ed. xii, 460.

The types of *Chatodon alepidotus* are still preserved; the fin formulæ being as recorded by Linné.

The *Stromateus paru* of Linné, ed. x, 248, ed. xii, 432, was founded entirely upon Sloan's figure, pl. 250, fig. 4. While the subject of this figure may possibly have been the common long-finned *Stromateus* of the Atlantic coast of the United States, we prefer to retain the specific name *alepidotus*, which is accompanied by a description based upon the study of specimens, and concerning which there can be no doubt. Sloan's delineation of the pampus is at the best but a gross caricature, and Linné himself was unable to consider it identical with Garden's specimens, which he described under another name, *alepidotus*.

Chætodon triostegus, L.

LINNÉ, Syst. Nat., ed. xii, 463.

No. 22, Garden. Angel Fish.

In the twelfth edition Linné referred the angel fish, which he had received from Garden, to *Chætodon triostegus*, a species which he had previously described, edition x, page 274, as having its "habitat in Indiis."

In the annotated copy of edition xii, page 463, the reference to the Garden specimen, with the descriptive paragraph, is erased, with the remark, "Pertinet ad *Chatodon faber*," this species having been described by Broussonet in 1782.

The specimen evidently represents the common American form, *Chatodipterus faber*.

Sparus chrysops, L.

LINNÉ, Syst. Nat., ed. xii, 471.

No. 6, Garden. Porgee.

The name *Sparus chrysops* is in Linné's writing. The type of the species measures 190^{mm} to base of caudal, and has the following characters:

D. XII, 12, and not XIII, 11, as stated by Linné; the thirteenth, which Linné mistook for a spine, is really a ray, broken off and somewhat sharp at the point, and the articulations can be very plainly seen with a magnifying glass of low power.

A. III, 11; scales 6 or 7-50-15.

The third dorsal spine is one-fourth as long as the entire dorsal base, and slightly longer than the seventh and eighth spines. The tips of the fourth, fifth, and sixth spines are broken off.

The second anal spine is as long as the third, but stronger, its length being exactly one-third of that of the anal base.

The pectoral is not quite perfect, but its longest ray (fourth), if laid straight back, would reach the vertical through the second anal spine at present.

The greatest height of the body is four-ninths of the length to caudal base. The length of the head is contained $3\frac{1}{4}$ times in the total without caudal. The eye is three-elevenths as long as the head and the orbit about one-third as long. The length of the anal base is one-fourth of the total without caudal.

The incisors are *very narrow*, and much compressed, the widest one in the upper jaw being only about three-fourths of a millimeter in width, while its exposed length is scarcely 2^{mm} . The molars are in two rows, the inner row containing larger teeth than the outer; but even the inner molars are comparatively small.

The species is our present *Stenotomus chrysops*.

Sparus argyrops, L.

LINNÉ, Syst. Nat., ed. xii, 471.

No. 7, Garden. Porgee.

The type is named in Linné's own handwriting. It measures 183^{mm} to caudal base, and has the following characters:

D. XII, 12; A. III, 11; scales 6 or 7-49-14.

The third dorsal spine is broken, but the fourth seems almost perfect. Its length is contained $3\frac{1}{2}$ times in that of the dorsal base. The seventh and eighth spines are only one-fourth as long as the dorsal base.

The second anal spine is a little more than one-third as long as the anal base; the third anal spine is imperfect.

The pectoral rays are all broken, but the portion of the longest one now remaining would reach to the vertical through the anal origin.

The greatest height of the body is contained $2\frac{1}{5}$ times in the length to caudal base; the length of the head about $3\frac{1}{3}$ times. The eye is three-elevenths as long as the head. The anal base is one-fourth as long as the total without caudal.

The incisors are exactly the same as in the type of *S. chrysops*, and the molars just as in the other. The eyes of the two types, as far as we can see now, are both yellow. The upper jaw in both is about one-third as long as the head.

There is no apparent difference between the types of *Sparus chrysops* and *S. argyrops*; the only evident foundation for the two names is the mistake as to the number of spines in *chrysops* and of anal rays in *argyrops*.

Sparus virginicus, L.

LINNÉ, Syst. Nat., ed. xii, 472.

No. 10.

The length of the specimen to the end of the large scales is about 195^{mm} , the height 95^{mm} , and the head about 62^{mm} .

The second spine of the dorsal equals one-half the length of the base of soft dorsal, and is about equal to that of the second anal spine. The eye is one-quarter as long as the head; the head one-third of the length to caudal base.

D. X, i, 18; A. III, 10; scales 10-62-18; there are 62 counting to the extremity of the lateral line, the last 4 or 5 being smaller than those preceding.

In the annotated copy of edition xii Linné has written the following addition to the printed description: "radiis compressis ut in dorsali. Corpus ovatum. Dentes subulati, æquales, approximati."

Labrus auritus, L.

LINNÉ, Syst. Nat. ed. xii, 475.

No. 43, Garden. "Fresh-water Bream."

This is the copper-nosed bream, with coarse squamation and heavy nape, and with a broad, long ear.

The longest dorsal spine equals the longest anal; its length is one-eighth of the total without caudal, and about two ninths of the greatest height. There are six rows of scales on the preoperculum.

D. X, 11; A. III, 10; Sc. 7-45-14.

Another example, labeled by Linné *Labrus auritus* (No. 11, Garden. See Correspondence, page 311, second line from bottom), is apparently the ordinary form of long and slender eared sunfish, which we find in more northern rivers, as the Potomac and the Susquehanna.

D. X, 11; A. III, 9; Sc. 7½-47-14.

The longest dorsal spine equals the third anal spine in length, and is about one-eighth of the total length to the end of the lateral line, and about one-quarter of the greatest height. Seven rows of scales on preoperculum. The maxilla is as long as the orbit and about one-third as long as the head.

The external characters of these two typical specimens seem to agree pretty closely. The pharyngeal teeth and the gill-rakers could not be examined.

Labrus rufus, L.

LINNÉ, Syst. Nat., ed. xii, 475.

No. 7, Garden. Spanish Hog Fish.

This is the specimen which Garden procured from the island of Providence. Linné did not receive it until after the twelfth edition was printed.

The anal spines seem to have been overlooked by Linné in his description of the species.

D. XII, 10; A. III, 12.

This is *Harpe rufa*, (L.) Gill.

Labrus hiatula, L.

LINNÉ, Syst. Nat., ed. xii, 475.

No. 14, Garden.

(See Smith's Correspondence, p. 313.)

A half skin without anal fin is labeled as above. Its length without caudal is 230^{mm}.

D. XVII, 10 (see Linné xii, 475); scales at least 65 in lateral line.

The species is evidently the Tantog, and if the genus *Hiatula*, based upon a mutilated specimen, is considered worthy of retention, we must call our species *Hiatula hiatula*.

Perca saltatrix.

LINNÉ, Syst. Nat. ed. x, p. 293.

This is a useless name and should be ignored forever hereafter. It is founded upon Catesby's *Perca marina sectatrix*, a species of *Kyphosus* (*Pimelepterus*), familiarly known as *P. Bosei*, p. 8, pl. 8, 2d fig. The name *saltatrix* was a *lapsus pennæ* of Linnæus. In the annotated copy of edition x the name is changed to *sectatrix*, and so appears in edition xii, p. 480. The *Gasterosteus saltatrix* of ed. xii refers clearly to *Pomatomus*, and is collated with pl. 14 of Catesby.

Perca rhomboidalis, L.

LINNÉ, Syst. Nat., ed. x, 293.

This is a half skin of *Lagodon rhomboides*. The length without caudal is 183^{mm}.

D. XII, 11; A. III, 11; Sc. 9-65-16.

This is *Perca rhomboidalis* of edition x, page 293, as is indicated by identical synonymy, and the note in Linné's handwriting referring *Perca rhomboidalis* to the genus *Sparus*.

Perca punctatus, L.

LINNÉ, Syst. Nat., ed. xii, 482.

The *Perca punctata* of the tenth edition, page 291, is founded upon Catesby's "Negro Fish—*Perca marina puncticulata*"—page 7, Plate VII, upper figure, and is apparently a species of *Epinephelus*. By a slip of the pen Linné wrote *punctata* instead of *puncticulata*; it was doubtless his intention to call the species *puncticulata*, following Catesby, otherwise the anomaly of two species of the same name in the same genus would hardly have occurred.

Perca punctatus, edition xii, 482 (changed to *punctata* in the annotated copy of edition xii, in Linné's handwriting), is founded upon two specimens of *Bairdiella*, sent by Garden (No. 12, Yellow-Tail), this labeled *Perca punctata* in Linné's writing being still preserved by the Linnean Society of London.

No. 5, Garden. Sea Trout.

The basis of the description of *Perca punctatus*, edition xii, 482, was perhaps in part a specimen of *Cynoscion maculatum*, Garden's No. 2 (*Bairdiella*), and No. 5 (*Cynoscion maculatum*), both having probably been included under the name Yellow-Tail (Correspondence, page 312), and the description of color in *P. punctatus*, "Corpus lineis plurimis e punctis nigris," might have reference to the latter.

D. X, i, 24; A. I, 10.

Perca alburnus, L.

LINNÉ, Syst. Nat., ed. xii, 482.

The length of the typical specimen without caudal is 245^{mm}.

D. X, i, 24; A. I, 7; Scales 7—ca. 75—13.

The species is our *Menticirrus alburnus*.**Perca undulata**, L.

LINNÉ, Syst. Nat., ed. xii, 483.

No. 8, Garden.

The length of the type to base of caudal is 220^{mm}.

D. X, i, 28; A. II, 8.

The species is *Micropogon undulatus*.**Perca ocellata**, L.

LINNÉ, Syst. Nat., ed. xii, 483.

No. 39, Garden. The Bass.

The type of this species is 352^{mm} long to base of caudal.

D. X, i, 24; A. II, 8; scales 7-48-8.

In the annotated copy of edition xii Linné has written opposite this species, "*Sciæna*, Brouss."**Perca philadelphica**, L.

LINNÉ, Syst. Nat., ed. xii, 484.

No. 14, Garden.

D. X, 11; A. III, 7; scales 7-53-15.

The lateral line has fifty-three scales to the base of the caudal; besides these there are five or six accessory scales extending upon the tail.

No. 2, Garden. Chub.

This seems to have been one of Linné's specimens of *Triloburus philadelphicus* = *Triloburus trifurcus*. It has D. X, 11; A. III, 7; scales 7-55-15.**Perca atraria**, L.

LINNÉ, Syst. Nat., ed. xii, 485.

No. 14, Garden. "Black Fish."

The length of this type to caudal base is 191^{mm}. It is the southern form of the sea bass.

D. X, 11; A. III, 7; scales 6-45-13.

The description of *Perca atraria* is grossly inaccurate, but there is no doubt as to the species represented by the type.

Gmelin's description is almost entirely a paraphrase of Linné's, and it is not probable that he counted the rays at all.

Perca chrysoptera, L.

LINNÉ, Syst. Nat., ed. xii, 495.

No. 8, Garden. Sailor's Choice.

There are two half skins labeled (probably by Garden in reference to Catesby, plate ii) *Perca marina*. These appear to be Linné's types of *Perca chrysoptera*, which he has put on record as having been received

from Dr. Garden. They agree perfectly with Linné's description of *Perca chrysoptera*. The radial formula, strangely enough, is omitted. The species is the one long known to us as *Pristipomus fulvomaculatum*.

Additional arguments for its identity with this species is the persistence of the common name and the fact that the collection of Linné contains no *Hæmulons* from Garden.

The length of the larger type is 280^{mm} without caudal, and of the smaller 180^{mm}.

D. XII, 16; A III, 13; scales 10-75-17.

Perca guttata, L.

LINNÉ, Syst. Nat., ed. xii, 485.

In the Linnaean Society collection is a half skin labeled *Perca guttata*, Linné. It is 240^{mm} in length without caudal; the height is contained $2\frac{2}{3}$ times and the head $2\frac{1}{2}$ times in this length.

D. XI, 16; A. III, 8.

This is evidently identical with a specimen in the National Museum, which was labeled *Epinephelus lunulatus* by Professor Poey.

Perca formosa, L.

LINNÉ, Syst. Nat., ed. xii, 488.

No. 35, Garden.

The length of the type to the base of the middle caudal rays is 170^{mm}.

D. X, 12; A. III, 7.

The species has been known in our lists under the name of *Diplectrum fusciculare*.

Gasterosteus carolinus, L.

LINNÉ, Syst. Nat., ed. xii, 490.

No. 8, Garden. The Crevallée.

This is the type of the present *Trachynotus carolinus*. It is 190^{mm} in length to caudal base; in this length the height is contained twice, and the head three and one-half times.

D. VI, i, 26; A. II, i, 23.

Gasterosteus canadus, L.

LINNÉ, Syst. Nat., ed. xii, 491.

No. 7, Garden.

The type of this species, marked number 7 in Garden's handwriting, and "*Gasterosteus*" in that of Linné," is 328^{mm} in length to caudal base. It is referred to by Garden (Correspondence, 312) as having no English name.

The species is now known as *Elacate canada*.

Scomber hippos? L.

LINNÉ, Syst. Nat., ed. xii, 494.

A specimen of a *Caranx*, No. 16, apparently referred to in the Correspondence with Linné, page 312, is labeled by Linné *Scomber chrysurus*.

It is not, however, the *Scomber chrysurus*, ed. xii, 494, but it is the *Caranx hippos* of Jordan & Gilbert, Bull. 16, U. S. National Museum, pages 437, 438, and agrees, except in the count of the anal, with *Scomber hippos*, Linné, ed. xii, 494.

The specimen is 220^{mm} long to end of sentes, and has the following characters:

D. VIII, i, 20; A. II, i, 16; sentes 31.

Opercular spot large; breast naked, except a small patch in front of ventral; curved portion of lateral line as long as the head. Third dorsal spine a little more than one-third length of head. Eye one-fourth as long as head; head one-third of total to origin of rudimentary caudal rays; maxilla one-third height of body; mandible almost one-half length of head.

Scomber chrysurus, L.

LINNÉ, Syst. Nat., ed. xii, 494.

This species is represented by four type specimens, ranging in length from 95 to 150^{mm} to caudal base.

There are two spines in front of and somewhat remote from the anal.

D. VIII, i, 28; A. II, I, 27.

The species is *Chloroscombrus chrysurus*.

Trigla evolans, L.

LINNÉ, Syst. Nat., ed. xii, 498.

No. 21, Garden.

The type of *Trigla evolans* is 90^{mm} long to base of caudal, and has the following characters:

D. X., 12; A. 12. There seem to be about fifty tubes in the lateral line (sixty or more rows of scales).

The length of the head is contained about $2\frac{1}{5}$ times in the total without caudal. The eye is $\frac{2}{5}$ as long as the head. There is no trace of a furrow behind the eyes, and there are no dark lines at present along the sides. The spines of the head do not appear nearly as much developed as in young *P. tribulus*. The spine at the angle of the preoperculum is not quite so long as the eye, and has a small spine at its base. The opercular spine measuring back to the beginning of the ridge is about as long as the orbit. The length of the maxilla is $\frac{1}{8}$ of the total without caudal. The pectoral reaches to the sixth anal ray.

Cobitis heteroclitus, L.

LINNÉ, Syst. Nat., ed. xii, 500.

No. 11, Garden. "Anonymos."

See page 305, volume i, Smith's Correspondence of Linné. The editor of this volume has evidently been misled by the common name "mud-fish," in referring number eleven to *Amia calva*, which was number 4 of a later lot. (See page 312.)

The above example was apparently the type of Linné's description of *Cobitis heteroclitus*. In the annotated copy of edition xii, Linné wrote

that it was referred to a new genus, "*Borborys*," by Broussonet, with the following characters: "Corpus squamosum. Pinu. dorsi unica. Maxill. infer. intr. carin. Caput squamosum."

We have not been able to ascertain whether or not Broussonet has published a description of this genus.

The skin is 122^{mm} long. The head is one-fourth of the total length without caudal, and the depth about the same.

D. 12; A. 10. Scales in 33 longitudinal and 12 transverse rows.

A black blotch is still apparent on the posterior part of the dorsal.

The species is now known to us as *Fundulus heteroclitus*.

Amia calva, L.

LINNÉ, Syst. Nat., ed. xii, 500.

There being no doubt concerning this species, we have merely to say that the length of the type to caudal base is 285^{mm}.

Silurus felis, L.

LINNÉ, Syst. Nat., ed. xii, 503.

No. 19, Garden.

The length to base of caudal is 270^{mm}.

D. I. 8; A. 23.

The species is, of course, the one now known as *Arius felis*.

Teuthis hepatus, L.

LINNÉ, Syst. Nat., ed. xii, 507.

The length of the type is 208^{mm} to caudal base. The height of the body equals nearly two-thirds of this length; the length of the head is contained $3\frac{2}{3}$ times in the total without caudal; the eye is one-fourth as long as the head. The least height of the tail is contained 9 times in total without caudal, the longest dorsal spine $6\frac{1}{2}$ times. The longest anal spine is one-half as long as the head. There are 7 teeth on a side in each jaw.

D. IX, 26; A. II, 25; V. I, 5.

Esox osseus, L.

LINNÉ, Syst. Nat., ed. xii, 516.

No. 9, Garden.

The species is our well-known *Lepidosteus osseus*.

Elops saurus, L.

LINNÉ, Syst. Nat., ed. xii, 518.

The type of this species is a half skin cut in two pieces, pasted one above the other. The length to caudal base is 460^{mm}.

D. 24; A. 16.

In the margin of the annotated copy Linné has written: "Forsk. Tr. Orient, p. 68, No. 100."

The reference to Brown, Jamaica, 452, 2, is stricken out.

Mugil albula, L.

LINNÉ, Syst. Nat., ed. xii, 520.

The length of the typical example is 290^{mm} without caudal. There are forty scales in a longitudinal series, and thirteen in a transverse series. At least two scales seem to be absent from the end of the lateral line.

Anal III, 8.

There seems to be no doubt that this is the species which is known to recent writers as *Mugil albula*.

Clupea thrissa, L.

LINNÉ, Syst. Nat., ed. xii, 524.

Two skins labeled by Linné "*Clupea thrissa* e Carolina" are *Dorosoma cepedianum*. Upon the strength of these specimens referred, in edition xii, 524, to *C. thrissa*, the name *thrissa*, evidently not based upon Brown's meager data, Nat. Hist. Jam., 443, but upon the notes of Lagerström and Osbeck, has been attached to our American *Opisthonema*. The specific name *thrissa*, which has been applied since the time of Broussonet, 1782, to fishes of the *Opisthonema* type, properly belongs to some Chinese form, perhaps some member of the genus *Dorosoma*.

The description given by Linné, x, 318, is based upon the descriptions of three previous authors—Brown, Nat. Hist. Jam., 443, whose few words do not constitute a description from which the fish seen by him can be identified; Odhelius, who, in his Chinese Lagerströmania, gave a partial description,* with radial formulæ from which Linné borrowed his count of anal rays in his description, and which may possibly apply to Richardson's *Chatoëssus maculatus*; and Osbeck's Dagbok öfver en Ostindisk Resa, &c., Stockholm, 1757, 257, the description in which is moderately full, and may apply to the *Chatoëssus punctatus*, Schlegel, of China and Japan.

As already stated, the specimens sent by Garden to Linné, which the latter provisionally referred (edition xii, 524) to *C. thrissa*, are *Dorosoma cepedianum*.

Broussonet was the first to make a definite assignment of the Linnean name to the American form, of which he had seen specimens from Carolina collected by Dr. Blagden, and from Jamaica collected by J. Ellis, the latter in Mus. Banks. And of this form he published a good description and figure, Ichth. Decas, i, penultimate species, with plate following.

The first description of the *Opisthonema* of the Western Atlantic appears to have been that of Lesueur, Jour. Acad. Nat. Sci., Phila., i, 1817, page 359, under the name *Megalops oglina*. If this be correct the species must be called *Clupea* (or *Opisthonema*) *oglina*.

Cyprinus americanus, L.

LINNÉ, Syst. Nat., ed. xii, 530.

There are two types of *Cyprinus americanus*, and the paper on which they are fastened is labeled by Linné.

*Amœn. Acad., iv, 1759, 251.

The larger of the two measures 145^{mm} to caudal base, and the smaller 108.

In the annotated copy of edition xii, Linné has added the words "linea laterali curva."

D. 9; A. 17-18, besides a minute one in front; V. 9; scales 10-46 or 47-3 $\frac{1}{2}$, or 4 $\frac{1}{2}$.

The dorsal base is $\frac{1}{2}$ as long as the head. The fourth ray of the dorsal is as long as the head. The head is two-ninths of the total length to caudal base. The eye is as long as the snout, and about one fourth as long as the head. The anal base is nearly as long as the head and nearly one-fifth of the length to caudal base. The fourth anal ray is as long as the ventral. The length of the ventral equals one-half the height of the body at the dorsal origin. The species is the southern form of *Notemigonus americanus*.

Hæmulon arcuatum, C. & V.

There is in the Linnæan collection a specimen of *Hæmulon arcuatum* from the Bahamas, which was sent to Linné by Garden in 1771, under the name Marget Fish (No. 3 of list in Smith's "Correspondence," page 331), and which appears never to have been described by Linné.

This is probably the Margate Fish of Catesby, plate 2, figure I, although this figure is without the blue stripes upon the cheeks. Catesby's plate 6, figure 1, should probably be referred to another species (*Hæmulon elegans*).

The skin has: D. XII, 18; A. III, 9; Scales 6-49-14.

The attempt to saddle upon this fish the name *Labrus plumieri*, which has been made ineffectually since the time of Lacépède, might as well be abandoned. Plumier's painting labeled *Turdus aureo-cæruleus*, reproduced in Lac., t. 3, pl. 2, page 84, fig. 2, and the description derived from this figure upon page 482 of the same work, have no relation to any known species of fish which has yet been satisfactorily demonstrated. Cuvier and Valenciennes were misled by Linné's course in citing Catesby, plate 6, fig. 1, in connection with his description of the Squirrel Fish, which he received from Garden, and which he named *Perca formosa*. This is evidently the species so long catalogued by American ichthyologists under the name *Diplectrum fasciculare*.

Plate 6, of Catesby, upper figure, appears to represent the type of the species described later by Cuvier and Valenciennes under the name *Hæmulon elegans*.

Hæmulon sciurus, Shaw.

This species is represented in the Linnæan collection by a bad half skin, apparently the No. 4, "Yellow Grunt" of Garden's list ("Correspondence," page 331), and corresponding to Catesby, plate 6, figure I. The figure, however, does not represent the stripes upon the sides, which are still evident in the Linné skin.

The dorsal spines are not all present.

Second dorsal, 16; A. III, 9; Scales 7-55-14.

Linné never named this form.

Stelliferus lanceolatus, Holbrook.

A specimen apparently of this species, labeled "No. 13" by Garden (not No. 13 of "Correspondence," p. 313), is in the collection, but was never described by Linné.

Archosargus probatocephalus, (Walb.) Gill.

A small specimen labeled as below by Garden is the species now called *A. probatocephalus*:

No. 15. SPARUS <i>species</i> . <i>Nostralibus</i> SHEEPSHEAD.

It does not appear to have been named by Linné, owing, perhaps, to mutilation. The persistence of the common name is worthy of note.

Micropterus salmoides, Lac.

Linné had two examples of the large-mouth black bass from Garden (Nos. 8 and 40 Garden), but he does not seem to have described the species.

For No. 8, see Correspondence with Linné, 311; for 40, see p. 306.

No. 40 is labeled thus by Garden:

No. 40. LABRUS. <i>Nostralib.</i> FRESH-WATER TROUT.

Clupea vernalis, Mitchill.

A species labeled by Garden "No. 4 Clupea" is in the collection. No allusion is made to it by Linné or in Garden's Correspondence.

NOTE ON EPINEPHELUS NIGRITUS.

By DAVID S. JORDAN.

In the fish market at Indianapolis, I examined, recently, a large black "jew-fish" (*Epinephelus nigritus*, Holbrook) from near Pensacola.

The following are some of the characters shown by this specimen:

Length 5 feet. Anal rays III, 9.

Second dorsal spine longest, its length $2\frac{1}{4}$ times in head, and half longer than the third spine. Interorbital width $4\frac{1}{3}$ in head; maxillary about 2 in head. Eye small. Preopercle without salient angle or enlarged teeth. Top of head not broad, nor especially depressed. Caudal fin very slightly lunate, the angles rounded. Scales of lateral line of the ordi-