63.—A REVIEW OF THE MACKERELS (SCOMBRINÆ) OF AMERICA AND EUROPE.

By FLETCHER B. DRESSLAR and BERT FESLER.

In this paper we give the principal synonymy of the genera and species of the family *Scombrinæ*, found in America and Europe, together with analytical keys for the separation of the genera and the identification of the species.

The specimens studied by us belong to the museum of Indiana University, and were mostly collected by Professor David S. Jordan. Duplicate series of most of the species are in the U. S. National Museum.

The paper was prepared under the direction of Dr. Jordan, to whom we are indebted for aid of various kinds.

We adopt the family of *Scombridæ* as defined in Jordan and Gilbert's "Synopsis of the Fishes of North America." The true mackerels belong to a subfamily, or perhaps family, *Scombrinæ*, which may be defined thus:

Body elongate, little compressed, covered with small scales or partly naked; the scales about pectoral region generally enlarged, forming a "corselet." Lateral line always present, usually more or less undulating. Head conical. Mouth terminal, rather large. Premaxillary not protractile; maxillary with no supplemental bone. Jaws armed with sharp teeth, of varying size and form. Opercles without spines or denticulations. Gill-openings wide, a slit behind the fourth gill; gill-membranes separate, free from isthmus. Pseudobranchiæ large. Branchiostegals 7. Dorsal fins separate, the spines slender, decreasing in length and strength posteriorly; depressible in a groove; second dorsal of soft rays similar to anal; soft dorsal and anal followed by a series of detached finlets. Caudal peduncle long, slender, usually with lateral keel. Caudal fin large, very deeply forked; caudal lobes narrow, abruptly diverging. Ventral fins thoracic, of moderate size, I, 5. Vertebræ numerous, 31 to 66. Pyloric cœca present, numerous. Air-bladder small or wanting. Sexes similar. Coloration always metallic, often very brilliant. Fishes having a wide range. This definition excludes *Gempylus* and its relatives, elongate species, destitute of finlets, intermediate between the true *Scombrinæ* and the *Trichiurinæ*. There are in *Scombrinæ*, as here restricted, nine genera and about sixty species.

In addition to the eight below-mentioned genera is an Asiatic genus, *Grammatorcynus*, which differs from *Albacora* in having a double lateral line and fewer dorsal spines and finlets.

ANALYSIS OF AMERICAN AND EUROPEAN GENERA OF SCOMBRINÆ.

Finlets present (5 to 10 in number) behind soft dorsal and anal; body not greatly elongate. (*Scombrinæ.*)

a. Caudal peduncle without median keel; dorsals well separated, the interspace being less than two in head; spinous dorsal short, of 9 to 12 spines; body scaly; vertebræ normal; slender teeth on vomer and palatines; maxillary entirely covered by preorbital; a fleshy lobe on each side of the lower jaw near its junction with the maxillary; corselet very small or obsolete; gill-rakers long, slender, and numerous; vertebræ 14 + 17 = 31 ..... SCOMBER, 1.

aa. Caudal peduncle with median keel; a small keel above and one below this.

b. Body scaleless, excepting on and about the lateral line and corselet; dorsal spines 10 to 16; "abdominal vertebræ with their lower foramina enlarged, and a portion between the vertebræ proper and the hæmapophyses developed in the form of a net-work or trellis."

c. Dorsals well separated, the interspace less than 2 in head; corselet well developed; teeth small, some present on vomer, none on palatines; gill-rakers long, slender, and numerous; vertebræ 39 ..... AUXIS, 2.

cc. Dorsals contiguous, the interspace more than 5 in head; palatine teeth villiform.

d. Vomer with teeth; dorsal spines 11 to 13 ..... ORCYNOPSIS, 3.

dd. Vomer toothless; dorsal spines 15 to 16; vertebræ 38 ..... GYMNOSARDA, 4.

bb. Body wholly covered with small scales, those on the corselet and lateral line sometimes larger; dorsal spines 14 to 26; vertebræ normal.

e. Teeth of jaws slender, subconical, little, if at all, compressed; gill-rakers numerous; corselet distinct.

f. Vomer and palatines with villiform or sand-like teeth; body robust, not compressed; vertebræ 39 to 41 ..... ALBACORA, 5.

ff. Vomer toothless; palatines with a single row of rather strong, conical teeth; body elongate, slightly compressed; vertebræ 50 to 54. SARDA, 6.

ee. Teeth of jaws strong, subtriangular or knife-like, more or less compressed; villiform teeth on vomer and palatines; gill-rakers comparatively few; corselet obscure.

g. Dorsal spines 14 to 18; body elongate, compressed; head short; snout short; vertebræ 45 ..... SCOMBEROMORUS, 7.

gg. Dorsal spines 24 to 26; body elongate, fusiform; snout long; vertebræ 32 + 34 = 66 ..... ACANTHOCYBIUM, 8.

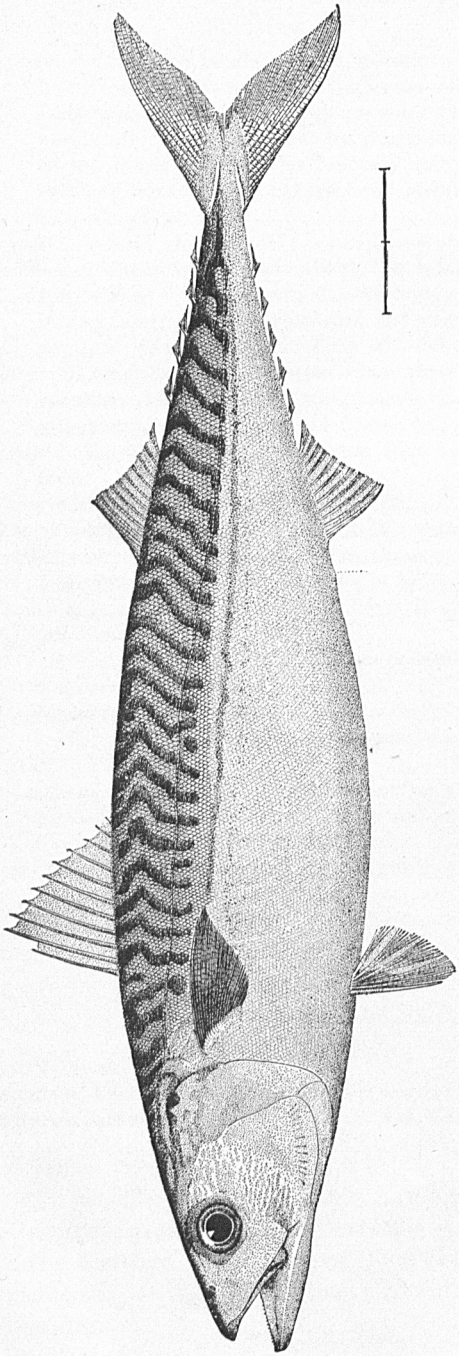
Genus I.—SCOMBER.

Scomber Artedi, Genera, 30, 1738.
Scomber Linnæus, Syst. Nat., ed. x, 297, 1758 (*scombrus*).
Pneumatophorus Jordan & Gilbert, Proc. U. S. Nat. Mus., 593, 1882 (*pneumatophorus*).

TYPE: *Scomber scombrus* Linnæus.

Etymology: σκόμβρος, Latin, *Scomber*, name of the common mackerel.

This well-known genus contains but few species, two of which are common in the North Atlantic, one of them being one of the most valuable of food fishes. It is divisible into two subgenera, on the character of the air-bladder.



SCOMBER SCOMBRUS Linnæus. The Common Mackerel.
(No. 25256, U. S. N. M., from Provincetown, Massachusetts.)

ANALYSIS OF SPECIES OF SCOMBER.

a. Air-bladder wanting (*Scomber*).

b. Dorsal spines, 11 or 12; skull with inconspicuous parallel ridges; subopercle somewhat triangular; posterior border of eye not covered by radiating scales; top of head without translucent area; about 15 or 20 small black specks or mucous pores at base of preopercle, generally arranged in a single row; upper part of body of a dark blue color, shading into green; the back and the sides to some distance below the lateral line are marked with about 35 dark wavy stripes; gill-covers and maxillary bones silvery; belly whitish; a longitudinal groove connecting dorsals; first dorsal about as high as long, and when unexpanded is almost wholly concealed in a groove at its base; the height of second dorsal is about one-third its length; both dorsals margined with white; head 3 in body, to base of caudal; depth, 3½; D. XI, 12–V; A. 12–V.....SCOMBRUS, 1.

aa. Air-bladder present, small. (*Pneumatophorus* Jordan & Gilbert.)

c. Dorsal spines, 9 or 10; skull perceptibly ridged, but ridges not parallel; subopercle rather more elliptical than triangular; posterior border of eye covered with large radiating scales; top of head with a large translucent area; more than 20 black specks or mucous pores on base of preopercle, generally arranged in more than one row; dark blue above, with a shading of light green; about 30 dark wavy streaks passing down the sides to just below the lateral line; sides with soiled mottlings and dusky spots; belly and gill-covers silvery; no longitudinal groove connecting dorsals; first dorsal higher than long, with the last spines short and weak; second dorsal twice as long as high; head 3 in body to base of caudal; depth, 3¼; D. IX or X, 12–V; A. I, 12–V.....COLIAS, 2.

1. SCOMBER SCOMBRUS.

(THE COMMON MACKEREL.)

Scomber scombrus Linnæus, Syst. Nat., ed. x, 297, 1758 (after Artedi: and of the copyists); Cuv. & Val., viii, 6, 1831 (Mediterranean); Steindachner, Ichthy. Berichte, v, 1, 1868 (Spanish coast); Gill, Cat. Fish. East Coast, Rept. U. S. Fish Com., 802, 1872; Baird, Rept. U. S. Fish Com., 825, 1872 (Wood's Holl); Bean, Proc. U. S. Nat. Mus., 25, 1879 (Bergen, Norway); Bean, Proc. U. S. Nat. Mus., 88, 1880 (Wood's Holl; Portland, Me.; no description); Goode, Fish and Fisheries, 95, 1881; Jordan & Gilbert, Proc. U. S. Nat. Mus., 44, 1881; Jordan & Gilbert, Proc. U. S. Nat. Mus., 592, 594, 1882 (doubtfully reported from Santa Barbara, Cal.); Jordan & Gilbert, Synop. Fish. N. A., 424, 1883; Stearns, Proc. U. S. Nat. Mus., 124, 1883 (Triangle Harbor, Labrador); Goode, Nat. Hist. Aquat. Anim., 281, pl. 91, 1884 (Provincetown, Mass.).

Scomber scomber, Linnæus, Syst. Nat., xii, 492, 1766; Brünnich, Ichthy. Massil., 68, 1768; Bloch, Ichthyol., taf. 54; Bloch & Schneider, 24, 1801 (Baltic); Günther, ii, 357, 1860 (Lisbon, mouth Thames).

Scomber vernalis Mitchill, Trans. Lit. and Phil. Soc. New York, i, 423, 1815 (Sandy Hook); Cuv. & Val., viii, 48, 1831 (after Mitchill); Storer, Fish. Mass., 41, 1839 (Boston); De Kay, New York Fauna, Fishes, 101, pl. 12, f. 34, 1842 (New York); Storer, Hist. Fish. Mass., 132, 1867 (Long Point).

Habitat.—Temperate seas; north to Norway and Labrador; south to the Mediterranean and Santa Barbara. The specimens examined by us are from Wood's Holl and the Washington Market.

Etymology: σκόμβρος, the mackerel.

This species is very abundant along our North Atlantic coast, great quantities being taken every season. It is a valuable food-fish. It attains a length of 16 or 17 inches, and a weight of 2 to 3 pounds.

2. SCOMBER COLIAS.

(CHUB MACKEREL; TINKER MACKEREL; SPANISH MACKEREL OF EUROPE; THIMBLE-EYED MACKEREL.)

Lacerto Cetti, "Hist. Nat. Sard., iii, 190, 1774."

Scomber colias Gmelin, Syst. Nat. (Sardinia), 1329, 1788 (based on Cetti); Cuv. & Val., viii, 39, pl. 209, 1831 (Naples); Storer, Fishes Massachusetts, 45, 1839; De Kay, N. Y. Fauna, Fish. 104, pl. 11, f. 33, 1842 (New York); Günther, ii, 361, 1860 (Lisbon); Steindachner, Ichthyologische Notiz., vii, 25, 1868 (coast of Chili); Steindachner, Ichthyologische Berichte, v, 3, 1868 (Spain, Portugal); Gill, Cat. Fish, East Coast N. A., U. S. Fish Com. Rept., 802, 1872; Steindachner, Ichthyologische Beiträge, iii, 53, 1875; Jordan & Gilbert, Proc. U. S. Nat. Mus., 592, 1882 (Charleston, S. C.); Jordan & Gilbert, Proc. U. S. Nat. Mus., 268, 1882; Jordan, Proc. U. S. Nat. Mus., 143, 1883 (Pensacola); Goode, Nat. Hist. Aquat. Anim., 303, pl. 91, f. 2, 1884 (Provincetown, Mass.); Jordan, Proc. U. S. Nat. Mus., 39, 1884 (name only); Steindachner & Döderlein, Beiträge zur Kenntniss der Fische Japan's, iii, 9, 1885 (Tokio); Jordan, Proc. U. S. Nat. Mus., 373, 1885 (Cape San Lucas; no description); Jordan, Proc. U. S. Nat. Mus., 574, 1886 (no description).

Scomber lacertus Walbaum, Art. Pisc., 209, 1792 (after Cetti).

Scomber pneumatophorus de la Roche, "Annal. Mus. Hist. Nat., xiii, 315, 334, 1809" (Balearic Islands); Cuv. & Val., viii, 36, 1831; Günther, ii, 359, 1860 (St. Helena, Madeira); Poey, Enumer. Pisc. Cubens., 73, 1875; Bean, Proc. U. S. Nat. Mus., 25, 1879 (Canaries); Bean, Proc. U. S. Nat. Mus., 88, 1880 (Provincetown, Mass.; no description); Jordan & Gilbert, Proc. U. S. Nat. Mus., 456, 1880 (Monterey Bay; no description); Jordan & Gilbert, Proc. U. S. Nat. Mus., 45, 1881 (Monterey); Jordan & Gilbert, Proc. U. S. Nat. Mus., 593-594, 1882 (Santa Barbara, Cal.); Jordan & Gilbert, Synop. Fish. N. A., 424, 1883; Jordan, Cat. Fish. N. A., 68, 1885.

Scomber macrophthalmus Rafinesque, Indice d'Ittiologia Siciliana, 53, 1810 (Palermo).

Scomber grex Mitchill, Trans. Lit. and Phil. Society N. Y., 422, 1815 (New York); Cuv. & Val., viii, 45, 1831 (Brazil); De Kay, New York Fauna, Fishes, 103, pl. 11, f. 32 (New York); Jordan & Gilbert, Proc. U. S. Nat. Mus., 267, 306, 1882 (Pensacola); Jordan & Gilbert, Proc. U. S. Nat. Mus., 374, 1882 (Panama).

Scomber maculatus Couch, "Mag. Nat. Hist., v, 22, ft 8, 1832."

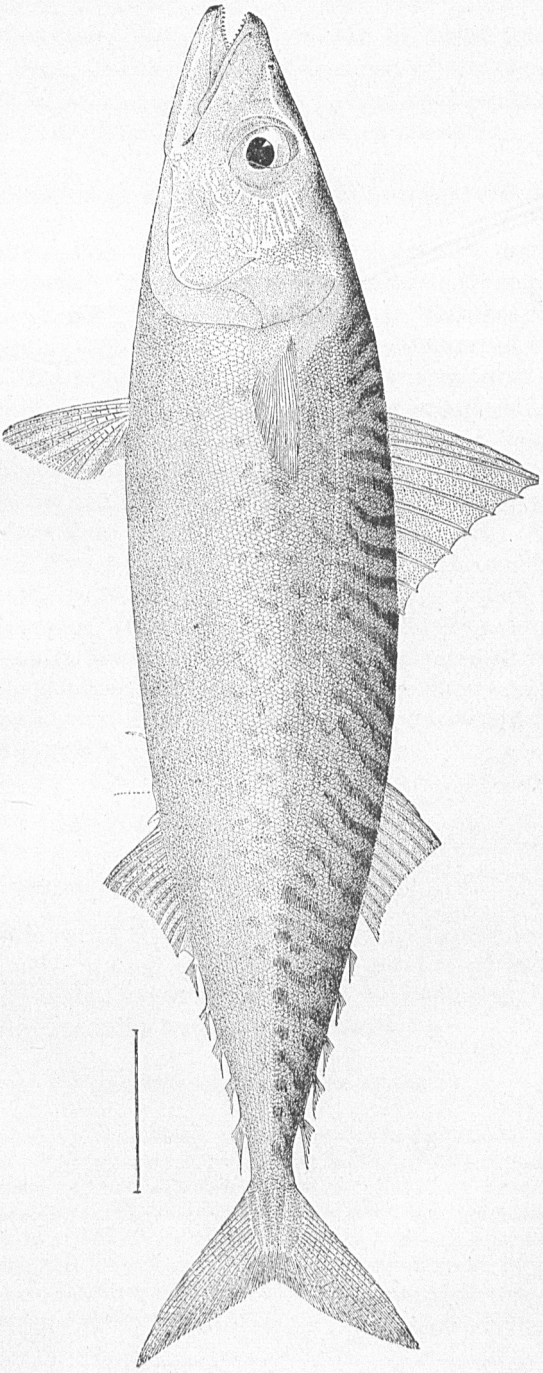
Scomber diego Ayers, Proc. Cal. Acad. Sci., i, 92, 1856 (Santa Barbara); Gill, Proc. Acad. Nat. Sci. Phila., 260, 1862 (Lower California); Jordan & Gilbert, Proc. U. S. Nat. Mus., 456, 1880 (name only); Jordan & Gilbert, Proc. U. S. Nat. Mus., 268, 1882 (Southern California).

Scomber dekayi Storer, Hist. Fish. Mass., 130, pl. 11, f. 1, 1867 (Massachusetts coast); Kidder, Proc. U. S. Nat. Mus., 314, 1879 (Provincetown).

Habitat.—Warm seas, north to Southern Europe, Cape Cod, Monterey, and Japan, south to Chili. The specimens examined by us are from the Massachusetts coast, Block Island, Santa Barbara, Albemarle Island, Galapagos, and Venice.

Etymology: *Colias*, Latin name, probably of this species; bastard tunny.

This well-known species, common in the Mediterranean, is of rather irregular occurrence on our Atlantic coast. It is a good food-fish, but



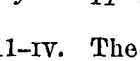
SCOMBER COLIAS Gmelin. The Chub Mackerel.

(No. 23480, U. S. N. M., from Provincetown, Massachusetts.)

of far less importance than its congener. In our opinion Dr. Steindachner is quite right in regarding the *Scomber pneumatophorus* as identical with *S. colias*.

One of the specimens before us, collected at Block Island by Professor Seth E. Meek, shows a remarkable union of the characters of *S. scombrus* and *S. colias*, and is probably a hybrid between the two. It is 13½ inches in length. The following are its characters:

Description of a supposed hybrid, scombrus-colias.

D. XII, I–10–IV; A. I, 11–IV. The hindmost finlets are double, as is the case with *S. scombrus*. The ridges on its head are in three parallel lines, ≡, as in *scombrus*, not  , as in *colias*. Subopercle more elliptical than triangular. Posterior border of eye not covered with large radiating scales. Top of head, as in *S. scombrus*, without translucent area. About 20 small black specks or pores at base of preopercle, arranged in a single row. Coloring on the back in blotches, as in *colias*, rather than in stripes, as in *scombrus*. Sides mottled, much as in *colias*. No longitudinal groove between the dorsals. A black axillary spot. Snout more like *scombrus* than *colias*. Base of pectorals dark. Ventrals and pectorals short. Eye, 5 in head. Head, 4 in length to fork of caudal fin. Body robust, as in *colias*. Caudal peduncle round, as in *colias*, rather than depressed, as in *scombrus*. The following note was made by Professor Seth E. Meek, the collector: "September 16, Block Island. A peculiarly marked *Scomber scombrus*, only four finlets, no air-bladder, low, spinous dorsal, and markings of *S. colias*. Blackford thinks it is a cross between the two."

Genus II.—AUXIS.

Auxis Cuvier, Règne Animal, ed. ii, 119, 1829 (rochei).

TYPE: *Scomber rochei* Risso = *Scomber thazard* Lacépède.

Etymology: αὔξις, a kind of tunny; from αὔξω, to grow.

This genus, in some degree intermediate between *Scomber* and *Gymnosarda*, probably contains but a single species.

ANALYSIS OF SPECIES OF AUXIS.

a [Body robust, scarcely compressed, abruptly contracted at caudal peduncle. Eye as long as snout, 5 in head Opercle very broad. Scales of corselet and along anterior dorsal region comparatively large. Maxillary almost entirely concealed by preorbital. Dorsal spines rather stiff; the space between dorsals ⅓ length of head. Gill-rakers x + 33. Pectorals reaching past middle of first dorsal. Head 4 in length; depth, 4¼. D. X–12–VIII; A. 13–VII. Vertebræ, 39. Blue, variegated with darker above, becoming plain with age; belly silvery.] (*Jordan & Gilbert*) ..... THAZARD, 3.

3. AUXIS THAZARD.

(THE FRIGATE MACKEREL.)

Scomber thazard Lacépède, Hist. Nat. Poiss., iii, 9, 1802 (6° and 7° south lat., coast of New Guinea).

Auxis thazard Jordan & Gilbert, Synop. Fishes N. A., 911, 1883; Goode, Nat. Hist. Aquat. Anim., 305, pl. 92, f. 1, 1884 (Newport, R. I.); Jordan, Proc. U. S. Nat. Mus., 574, 1886. (No description.)

Scomber rochei Risso, Ichth. Nice, 165, 1810 (Nice).

Auxis rochei Günther, ii, 369, 1860 (Jamaica; Amboyna); Steindachner, Ichthyologische Berichte, v, 10, 1868 (Lisbon, Cadiz, Malaga); Goode, Proc. U. S. Nat. Mus., 532, 1880 (Block Island); Jordan & Gilbert, Synop. Fishes N. A., 424, 1883; Steindachner & Döderlein, Beiträge, iii, 12, 1885 (Japan).

Scomber bisus Rafinesque, Caratteri, etc., 45, pl. 2, f. 1, 1810 (Palermo).

Auxis bisus White, "Catal. Brit. Fishes, 32, 1851."

Thynnus rocheanus Risso, "Eur. Mérid., iii, 417, 1826."

Auxis taso Cuv. & Val., viii, 146, 1831 (New Guinea; after Lacépède).

Auxis vulgaris Cuv. & Val., viii, 139, 1831 (Mediterranean); Lowe, Proc. Zool. Soc., 248, 1850 (Madeira).

Auxis thynnoides Bleeker, "Ternate, v, 301, 1855" (Ternate).

Auxis tapeinosoma Bleeker, "Fauna, Japan, 408, 1854; Verhand. Batav. Genootsch., xxvi, 98, tab. 7, f. 1, 1846 (Japan); Günther, ii, 369, 1860 (Sea of Japan, copied).

Habitat.—All warm seas; occasionally northward to Cape Cod.

Etymology: *Thazard*, from the French *Tassard*, a name of *Scomberomorus*.

This species is very erratic in its movements, swimming in large schools. It rarely reaches our coast, but then in immense numbers. It is a poor fish, of little value as food. If all the species of *Auxis* are identical, the oldest specific name is that of *thazard*. The specimen examined by us is from the island of St. Lucia.

Genus III.—ORCYNOPSIS.

Orcynopsis Gill, Proc. Acad. Nat. Sci. Phila., 125, 1862 (*unicolor*).

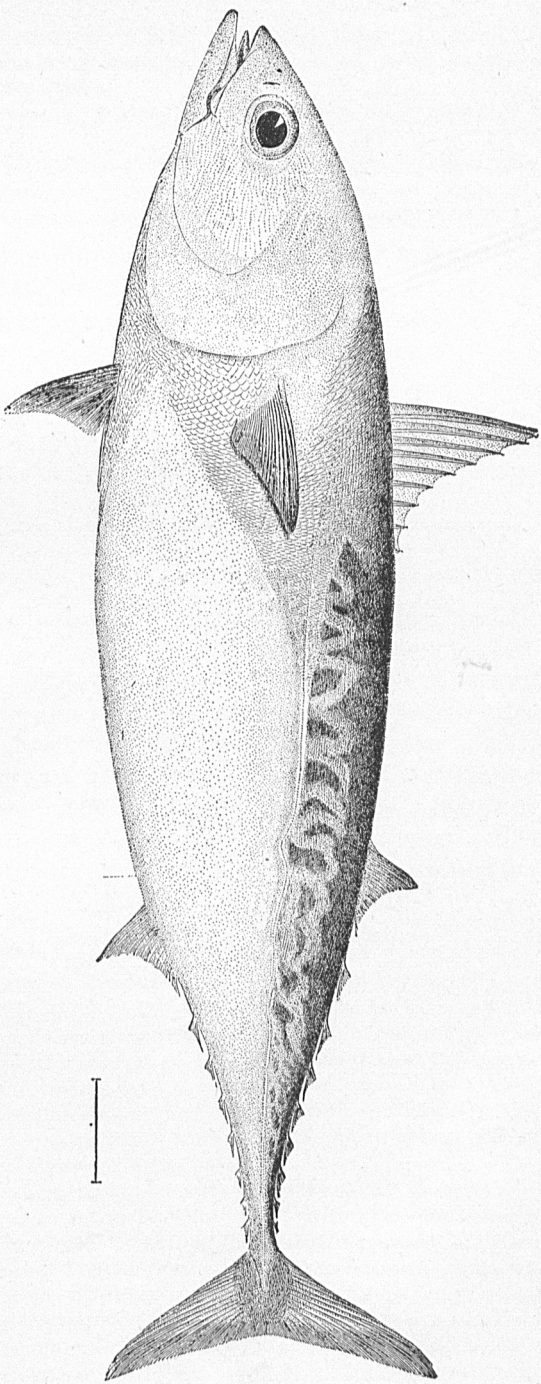
TYPE: *Scomber unicolor* Geoffroy-St.-Hilaire.

Etymology: ὀρκύνος, Orcynus, the Tunny; ὄψις, appearance.

This genus is based on a single species found in the Mediterranean. Its vertebræ have not been examined, but they will probably be found to have the same character as those of *Gymnosarda*, from which genus *Orcynopsis* differs but little.

ANALYSIS OF SPECIES OF ORCYNOPSIS.

a. [Body robust, compressed. About 20 teeth in each jaw. Maxillary extends to posterior margin of pupil. Corselet small, with rudimentary scales. Eyes small. Distance between first and second dorsal equal to the eye. Dorsal spines subequal. Anal inserted behind vertical from the soft dorsal. Soft dorsal and anal falcate, the last rays rapidly shortened. Head short, 5 in length; depth, 3⅓. D. XIII–14–VIII; A. 14–VII. Back bluish; belly silvery-gray; spinous dorsal deep black; pectoral black posteriorly.] (*Collett*).....UNICOLOR, 4.



AUXIS THAZARD (Lacépède). The Frigate Mackerel.
(No. 25757, U. S. N. M., from Newport, Rhode Island.)

4. ORCYNOPSIS UNICOLOR.

Scomber unicolor Geoffroy-St.-Hilaire, "Descr. Ég. Poiss., pl. 24, f. 6, 1827" (Egypt).
Pelamys unicolor Guichenot, Explor. Algér., Poiss., 58, 1850; Günther, ii, 368, 1860 (Mediterranean Sea).
Cybium bonaparti Verany, "Atti dell' ottava riunione degli scienziati Ital., Genova, 493, 1846."
Pelamys bonaparti Filippi and Verany, Memor. della Real. Accad. scienze di Torino, ser. 2, t. xviii, 1857.
Thynnus peregrinus Collett, Meddelelser om Norges Fiske, 20, pl. 1, 1879 (Christiania).

Habitat.—Mediterranean Sea; once taken at Christiania, Norway.
Etymology: *unus*, one; *color*, color.
This species is known to us from descriptions only.

Genus IV.—GYMNOSARDA.

Gymnosarda Gill, Proc. Acad. Nat. Sci. Phila., 125, 1862 (*unicolor*=*nuda*).
Thynnus Lütken, Spolia Atlantica, 460, 1880 (*pelamys;* not of Cuvier nor of Fabricius).
Thynnichthys Giglioli, Cat. dei Pesci Italiani, 25, 1880 (*thunnina;* not of Bleeker, a genus of CYPRINIDÆ).
Euthynnus Lütken, MSS. in Syn. Fish. N. A., Jordan & Gilbert, 429, 1883 (*thunnina*).

TYPE: *Thynnus unicolor* Rüppell=*Pelamys nuda* Günther.
Etymology: γυμνός, naked; σάρδα, *Sarda*, an allied genus.

We adopt this neglected name of Dr. Gill, instead of *Euthynnus*, because the descriptions of *Gymnosarda nuda*, especially that given by Dr. Klunzinger (Fische des Rothen Meeres), agree in all generic respects with the type of *Euthynnus*. The names *Thynnus* and *Thynnichthys* are, of course, ineligible for any mackerels, being preoccupied in other departments of zoology. The three or four species of small tunny which constitute this genus are tropical in distribution and of little value as food.

ANALYSIS OF SPECIES OF GYMNOSARDA.

a. Lateral line making a decided curve immediately beneath the second dorsal. Corselet strongly developed, covering the entire space between the diagonals connecting the posterior extremity of the spinous dorsal and the base of the pectorals. Posterior margin of preopercle about 1½ in inferior margin. Pectorals reach the vertical from the tenth dorsal spine. Back bluish; belly silvery; four brownish stripes on each side of belly, parallel with the lower curve of the body; no spots below the pectorals. Body oblong, robust. Head 3½; depth 4. D. XV–12–VIII; A. II, 12–VII ..... PELAMIS, 5.

aa. Lateral line nowhere making a very distinct curve. Corselet well developed, not covering the entire space between the diagonals connecting the posterior extremity of the spinous dorsal and the base of the pectorals. Posterior margin of preopercle about 2 in inferior margin. Pectorals reach the vertical from the ninth dorsal spine. Bluish above; sides and belly silvery; no stripes of any kind below the lateral line; above the lateral line several wavy, oblique streaks; five round black spots about as large as pupil below the pectoral. Body fusiform, robust. Head 3¾; depth 4¼. D. XV–I, 12–VIII; A. 12–VII.
ALLETTERATA, 6.

5. GYMNOSARDA PELAMIS.

(OCEANIC BONITO.)

Scomber pelamis Linnæus, Syst. Nat., x, 297, 1758 ("in Pelago inter Tropicos"); Linnæus, Syst. Nat., i, 492, 1766.

Thynnus pelamis Steindachner, Ichth. Berichte, v, 7, 1868.

Scomber pelamides Lacépède, Hist. Nat. Poiss. iii, 14, 1802 (after Linnæus).

Thynnus pelamys Cuv. & Val., viii, 113, 1831 (Rio Janeiro and Indian Ocean).

Orcynus pelamys Poey, Synopsis, 362, 1868; Poey, Enum. Pisc. Cubens., 72, 1875; Goode and Bean, Proc. U. S. Nat. Mus., 24, 1878 (Provincetown, Mass.); Bean, Proc. U. S. Nat. Mus., 89, 94, 1880 (Wood's Holl, Bermuda; no description); Goode, Nat. Hist. Aquat. Anim., 316, 319, pl. 95 B, 1884 (Provincetown and Wood's Holl, Mass.).

Euthynnus pelamys Jordan and Gilbert, Syn. Fish. N. A., 430, 1883; Jordan, Proc. U. S. Nat. Mus., 574, 1886 (no description).

Habitat.—Warm seas; north to Cape Cod and Bermudas.

Etymology: πέλαμις, tunny.

This species is scarce on the American coast, and rather more common in Southern Europe. As its name was originally spelled *pelamis*, we retain that orthography.

6. GYMNOSARDA ALLETTERATA.

(LITTLE TUNNY, ALBACORE, BONITO.)

Scomber alletteratus Rafinesque, Caratteri Alcuni Genere, etc., 46, 1810 (Palermo).

Scomber aletteratus Rafinesque, Indice Ittiologia Siciliana, 20, 1810.

Orcynus alliteratus Gill. Cat. Fish. East Coast N. A., U. S. Fish Comm., 802, 1873; Baird, Rept. U. S. Fish Comm., 825, 1873 (Wood's Holl); Goode & Bean, Proc. U. S. Nat. Mus., 24, 1878; Goode & Bean, Proc. U. S. Nat. Mus. 128, 1879 (Pensacola); Goode & Bean, Proc. U. S. Nat. Mus., 237, 1882 (name only); Bean & Dresel, Proc. U. S. Nat. Mus., 155, 1884.

Euthynnus alliteratus Jordan & Gilbert, Syn. Fish. N. A., 430, 1883; Jordan, Proc. U. S. Nat. Mus., 34, 120, 1884 (Key West); Jordan, Bull. U. S. Fish Comm., 77, 1884 (Key West; no description).

Thynnus leachianus Risso, Eur. Merid., iii, 414, 1826 (Nice).

Scomber quadripunctatus Geoffroy-St.-Hilaire, "Descr. Egypt. Poiss., tab. 24, f. 3, 1827" (Egypt).

Thynnus thunnina Cuv. & Val., viii, 104, 1831 (Mediterranean); Günther, ii, 364, 1860; Steindachner, Ichthyologische Berichte v, 6, 1868.

Thynnichthys thunnina Giglioli, Cat. dei Pesci Italiani, 25, 1880 (Naples, Messina, Trieste).

Orcynus thunnina Poey, Enum. Pisc. Cubens. 72, 1875 (Havana).

Thynnus brevipinnis Cuv. & Val., viii, 112, 1831 (Mediterranean).

Thynnichthys brevipinnis Giglioli, Cat. dei Pesci Italiani, 25, 1880 (Genoa, Palermo).

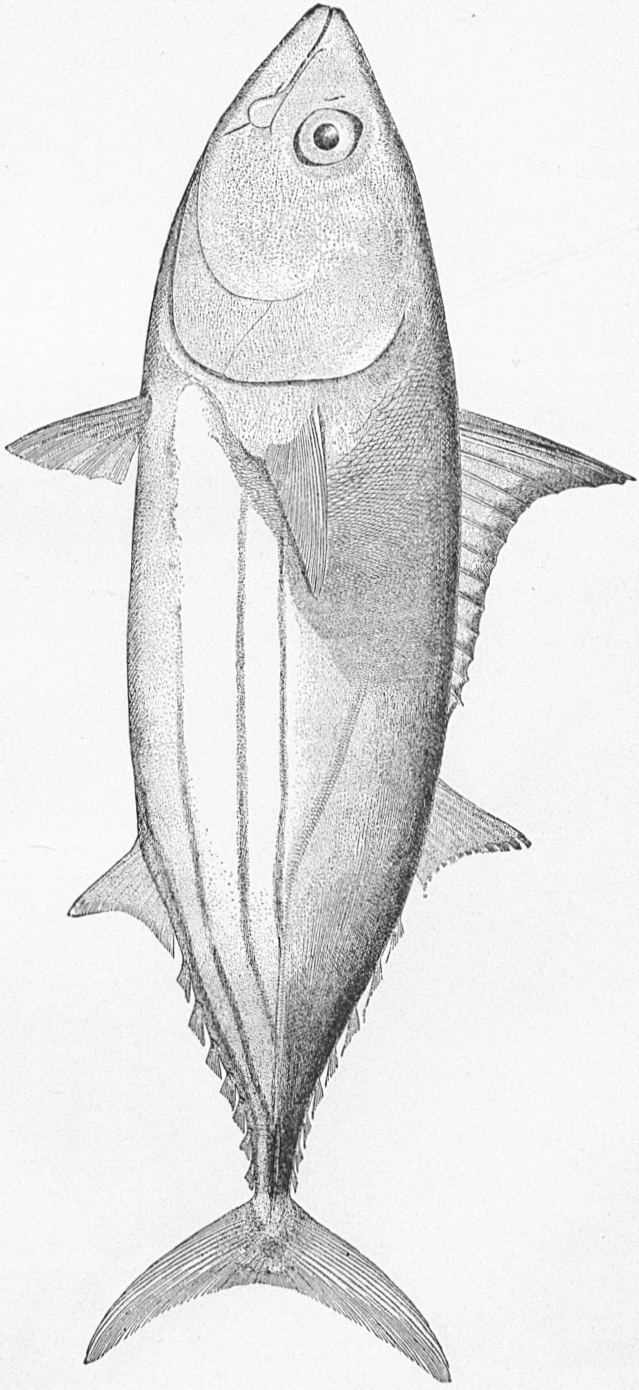
Thynnus brasiliensis Cuv. & Val., viii, 110, 1831 (Brazil).

Thynnus affinis Cantor, Cat. Malay Fishes, 106, 1850 (Sea of Pinang); Günther, ii, 363, 1860.

Habitat.—Warm seas; occasionally north to Cape Cod. The specimens examined by us are from Key West and Pensacola.

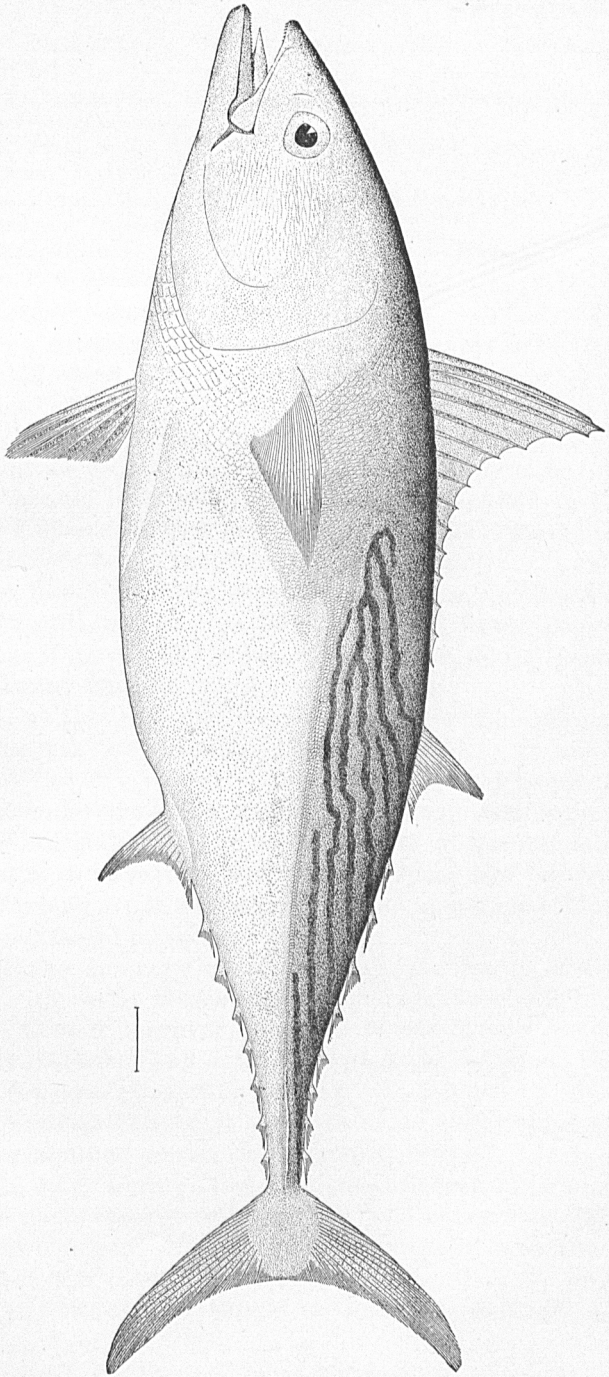
Etymology: *alleteratu*, a local Italian name at Palermo.

This species is rather common both in the West Indies and in Southern Europe. On our coast it is usually known as the bonito or little tunny. The name *alletteratus* has clear priority over *quadripunctatus* and *thunnina* and must supersede them.



GYMNOSARDA PELAMIS Linnæus. Oceanic Bonito.

(No. 20762, U. S. N. M.)



GYMNOSARDA ALLETTERATA (Rafinesque). Little Tunny, Albacore, Bonito.

(No. 10436, U. S. N. M., from Wood's Holl, Massachusetts.)

Genus V.—ALBACORA.

Thynnus Cuvier, Règne Anim., 313, 1817 (*thynnus*); (not of Fabricius, a genus of butterflies).

Orcynus Cuvier, Règne Anim., 314, 1817 (*alalonga*); (not of Rafinesque (1815), which is *Scombroides*, Lacépède.)

Orycnus Gill., Proc. Acad. Nat. Sci. Phila., 125, 1862 (*alalonga*; misprint for ORCYNUS).

Orcynus Cooper, Proc. Cal. Ac. Nat. Sci., 1863, 77 (*alalonga*).

Orycnus Cooper, l. c. (*thynnus*).

Albacora Jordan, Manual of Vertebrates, edition v, 1889 (*thynnus*).

Germo Jordan, Proc. Ac. Nat. Sci. Phila., 1888 (*alalonga*).

TYPE: *Scomber thynnus* Linnæus.

Etymology: Albacora, the Portuguese name, said to be from *bacora*, a little pig, a Moorish word, preceded by the article *al*.

This genus consists of probably but two species, one of them the largest of all the bony fishes, the other similar in technical respects, but quite different in general appearance, and certainly to be placed in a different subgenus. The early generic names applied to this group *Orcynus* and *Thynnus* are both preoccupied. We have therefore adopted the name *Albacora* lately proposed by Dr. Jordan.

In a recent paper on "the proper generic name of the Tunny and Albicore" (Proc. U. S. Nat. Mus. 1888, 319), Dr. Gill proposes to substitute the name *Orycnus*, of Cooper, for *Albacora*, as the generic name both of the Tunny and the long-finned Albacore.

It seems to us that this undesirable name should be set aside. The name *Orycnus* was first used by Dr. Gill, in 1862. It was due to a misreading of Cuvier's name, *Orcynus*, and it should be placed in the category of emendations of that name. If the name itself is preoccupied, erroneous or variant spellings of it, due to misprints, misreadings or purism ought to be preoccupied also. *Orcynus* had been previously used when Cuvier gave it as the name of the long-finned Tunnies. To spell it *Orycnus* does not save it.

But in 1863 the name "*Orycnus*" was, in the words of Gill, "specifically and with *malice prepense* resurrected and proposed for retention by Cooper." Cooper, however, proposed to use it for a group typified by the Tunny (*thynnus*), and not for the *alalonga*, for which he retained the name of *Orcynus*, given it by Cuvier.

The name *Orycnus* Cooper, it seems to us, is preoccupied by its previous use for another genus, or subgenus, by Gill. It is therefore ineligible. In other words, a generic name originating in a misprint of a well-known name can not be later used as a name of another genus.

That the two genera are now generally merged into one does not specially affect the case. Each generic name has its own typical species, and the two species should be placed in different subgenera at least.

It may be urged that the argument for rejection of the name *Orycnus* is based on a trifling technicality. This may be true, but it is true of

the reasoning by which *Orycnus* could be retained instead of *Albacora*. The burden of proof rests against a name having such an origin as the former.

The case of *Athlennes* vs. *Ablennes*, mentioned by Dr. Gill, is not quite relevant. Apparently *Ablennes*, the name intended, should stand, as against *Athlennes*, the name printed; but surely in any case, *Athlennes* would not be eligible for some other group of *Belonidæ*.

ANALYSIS OF SPECIES OF ALBACORA.

a. Pectoral fins long, saber-shaped, extending as far as first dorsal finlet; their length about 2½ in body in adult (shorter in the young). (subgenus *Germo* Jordan). Body elliptical, elongate, and but slightly compressed. Corselet small, indistinct; caudal keel extending forward to fifth finlet from caudal; maxillary not reaching to pupil. Dorsals and anal of equal height, equal to length of second dorsal; ventrals shorter. Bluish above, silvery below, sides steel-blue; finlets yellowish, tipped with blue. Head 3¼; depth 3½. D. XIV–14–VIII; A. II, 12–VII ..... ALALONGA, 7.

aa. Pectoral fins comparatively short, reaching to about the ninth dorsal spine; their length about 6 or 7 in body in adult (shorter in the young). (subgenus *Albacora*). Body oblong, very robust. Corselet well developed, extending further back than pectorals; caudal keel extending forward to second finlet from caudal; maxillary reaching to pupil. Second dorsal and anal short, 2 in the height of the first dorsal; ventrals longer than anal. Dark blue above; beneath soiled silvery with lighter spots. Head 3¾; depth 4. D. XIV–1, 12–VIII; A. II, 12–VIII ..... THYNNUS, 8.

7. ALBACORA ALALONGA

(GERMON, ALBACORE, ALILONGHI, LONG-FINNED ALBACORE.)

Ala-longa Cetti, "Hist. Nat. Sard. iii, 191," 1778 (Sardinia).

Scomber alatunga Gmelin, Syst. Nat., 1330, 1788 (based on Cetti; misprint for "*alalonga*," fide Cuv. & Val.).

Orcynus alalonga Risso, "Eur. Mérid., iii, 419," 1826; Jordan & Gilbert, Proc. U. S. Nat. Mus., 456, 1880 (Monterey Bay, Santa Barbara, San Pedro; no description); Jordan & Jouy, Proc. U. S. Nat. Mus., 12, 1881 (Santa Barbara; name only); Jordan & Gilbert, Proc. U. S. Nat. Mus., 41, 42, 45, 1881 (Santa Barbara channel); Jordan & Gilbert, Syn. Fish. N. A., 428, 1883; Goode, Nat. Hist. Aquat. Anim., 320, pl. 95 A, 1884 (Banquereau); Jordan, Proc. U. S. Nat. Mus., 373, 1885 (near Mazatlan; no description); Jordan, Proc. U. S. Nat. Mus., 574, 1886 (no description).

Thynnus alalonga Cuv. & Val., viii, 120, 1831 (western coast of France); Günther, ii, 366, 1860 (Cape of Good Hope); Steindachner, Ichth. Berichte, v, 7, 1868.

Scomber germo Lacépède, Hist. Nat. Poiss., ii, 598; iii, 1, 1802 (17° S. lat., 103° west long.).

Orcynus germo Lütken, Spolia Atlantica, 474, 1880.

Thynnus atlanticus Lesson, "Voy. Coquille, Zoöl., ii, 165," 1828.

Thynnus balteatus Cuv. & Val., viii, 136, 1831 (tropical parts of Atlantic).

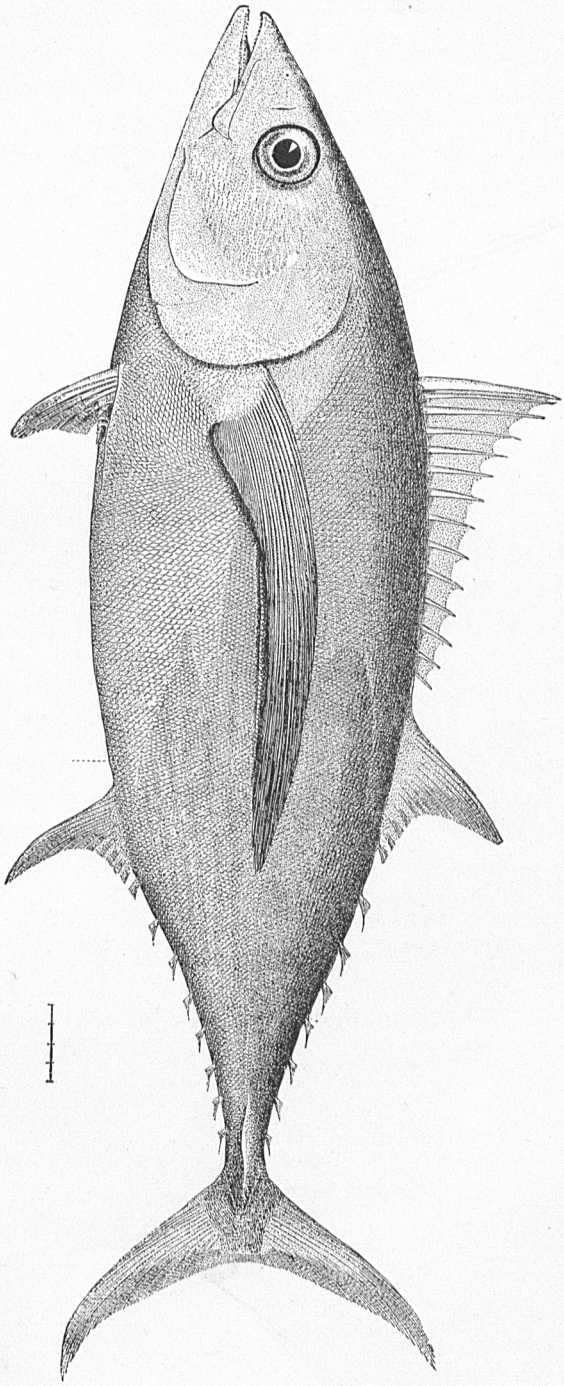
Orcynus balteatus Poey, Enum. Pisc. Cubens., 71, 1875 (Cuba).

Thynnus pacificus Cuv. & Val., viii, 133, 1831 (27° and 26° S. lat., 103° West long.); Günther, ii, 366, 1860 (copied from Cuv.).

Orcynus pacificus Cooper, Proc. Cal. Acad. Nat. Sci., 75, 1863 (California).

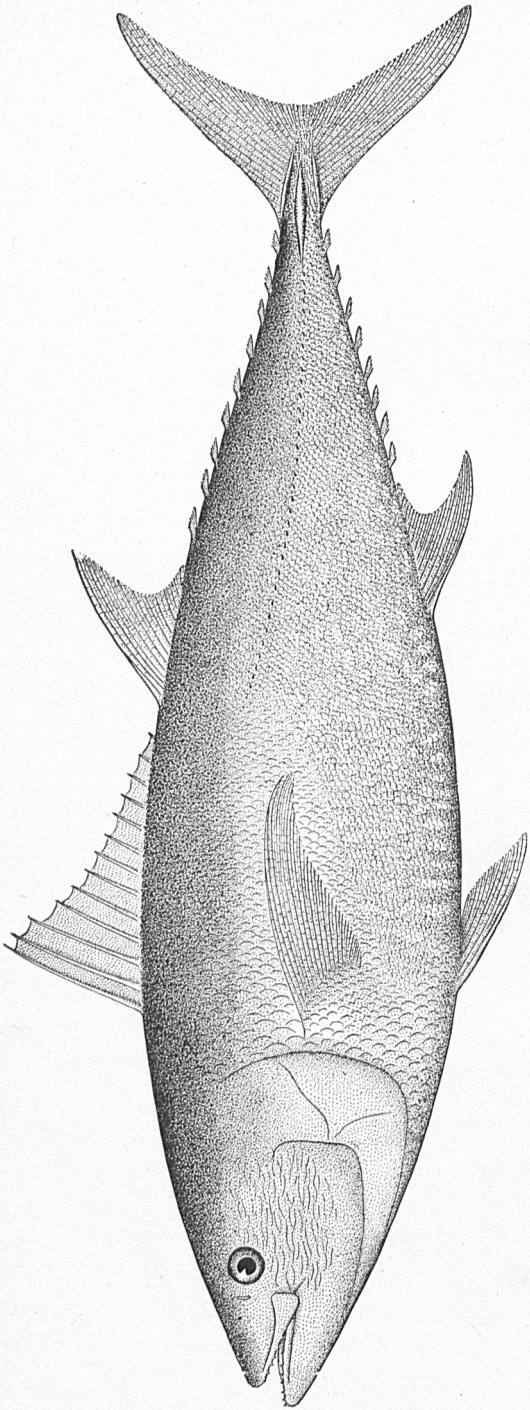
Thynnus argenti-vittatus Cuv. & Val., viii, 134, 1831.

Orcynus argentivittatus Goode, Nat. Hist. Aquat. Anim., 320, 1884.



ALBACORA ALALONGA Gmelin. Germon, Albacore.

(No 21884, U. S. N. M., from Banquereau.)



ALBACORA THYNNUS (Linnæus). Tunny, Horse Mackerel.
(From specimen collected in Vineyard Sound, Massachusetts.)

Thynnus albacora Lowe, "Proc. Zoöl. Soc., 77, 1839, and Trans. Zoöl. Soc., iii, 4," 1842; Günther, ii, 365, 1860 (copied).
Orcynus albacora Poey, Enum. Pisc. Cubens., 71, 1875.
Thynnus macropterus Temminck & Schlegel, Fauna Japan, Poiss., 98, pl. 51, 1850.
*Orcynus subulatus** Poey, Enum. Pisc. Cubens., 71, 1875; Lütken, Spolia Atlantica, 596, 1880.

Habitat.—Warm seas; north to Japan, southern California, and the Grand Banks of Newfoundland; south to Cape of Good Hope.

Etymology: *ala*, wing; *longa*, long.

This species does not grow so large as the tunny. It is but rarely seen on our Atlantic coast, but is common in the Mediterranean. It is found on the Pacific coast as far north as San Francisco, and is abundant in the spawning season about the Santa Barbara Islands. As a food-fish it is of little value. It reaches a length of 3 feet and a weight of 20 pounds.

8. ALBACORA THYNNUS.

(TUNNY, HORSE MACKEREL.)

Albacore, Sloane, "Hist. Jam., i, 28, pl. 1, f. 1," 1727.
Scomber pinnulis 8, etc., Artedi, Genera, 31, 1738.
Scomber thynnus Linnæus, Syst. Nat., ed. x, 297, 1758 (based on Artedi); Bloch, Ichthyologia, pl. 55, 1783 (and of the various copyists).
Thynnus thynnus Günther, ii, 362, 1860 (Weymouth and Plymouth).
Orcynus thynnus Poey, Enum. Pisc. Cubens., 70, 1875; Jordan & Gilbert, Proc. U. S. Nat. Mus., 375, 1878 (Beaufort); Goode, Proc. U. S. Nat. Mus., 533, 1880 (New England); Jordan & Gilbert, Syn. Fish. N. A., 429, 1883; Goode, Nat. Hist. Aquatic Anim., 320, pl. 96, 1884 (Vineyard Sound); Jordan, Proc. U. S. Nat. Mus., 574, 1886 (no description).
Scomber albacores Bonnaterre, Tabl. Encyc. Ichth., 140, 1788 (based on Sloane).
Thynnus mediterraneus Risso, "Eur. Mérid., iii, 414," 1826.
Thynnus vulgaris Cuv. & Val., viii, 58, pl. 210, 1831 (European seas); Storer, Fishes Mass., 47, 1839 (Kettle Island, Pigeon Cape); DeKay, New York Fauna, Fishes, 105, pl. 10, f. 28. 1842; Steindachner, Ichth. Berichte, v, 7, 1860 (Spain and Portugal); Tybring, Bull. U. S. Fish Comm., 150, 1886 (Antilles).
Thynnus brachypterus Cuv. & Val., viii, 98, pl. 211, 1831 (Mediterranean); Günther, ii, 363, 1860 (copied); Steindachner, Ichth. Berichte, v, 6, 1868 (Spain and Portugal).
Thynnus coretta Cuv. & Val., viii, 102, 1831 (Caribbean Sea); DeKay, New York Fauna, Fishes, 106, 1842 (Gulf of Mexico); Günther, ii, 363, 1860 (copied).
Scomber sloanei Cuv. & Val., viii, 148, 1831 (based on Sloane).
Thynnus secundo-dorsalis Storer, Hist. Fishes Mass., 143, 1867 (Cape Ann and Provincetown).
Orcynus secundidorsalis Gill, Rept. U. S. Fish Comm., 802, 1871–'72 (Newfoundland to Florida); Baird, Rept. U. S. Fish Comm., 825, 1871–'72 (Wood's Holl); Poey, Enum. Pisc. Cubens., 76, 1875.
Orcynus schlegelii Steindachner & Döderlein, Beiträge zur Kenntniss der Fische Japan's iii, 11, pl. 3, f. 1, 1885 (Tokio).

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* Poey, who describes this species, writes as follows of the length of the pectoral, on which point alone it fails to agree with *alalonga*; the pectoral is $1\frac{3}{4}$ in anal, 5 in total to base of caudal, $\frac{1}{4}$ in ventral, $\frac{6}{7}$ in head. Lütken unites other disputed species, *albicora, pacificus, germo*, etc., with *alalonga*, and hesitates to do the same with *subulatus* only on account of the length of its pectoral, which he thinks is a little too long for *thynnus* and not nearly long enough for *alalonga*.

Habitat.—Warm seas; north to Newfoundland and Japan. The specimen examined by us is from Venice.

Etymology: θύννος, tunny—*thynnus*.

This species, according to Dr. Gill, reaches an average weight of 200 pounds, and a length of 8 to 10 feet. Specimens of 1,500 pounds weight are, however, on record. It is scarce off our coasts, but so abundant in Southern Europe as to be the object of very extensive fisheries. Its flesh is rather coarse, and not of superior flavor.

Genus VI.—SARDA.

Sarda Cuvier, Règne Anim., 120, 1829 (*sarda*).
Pelamys Cuv. & Val., viii, 149, 1831 (*sarda*), (not of Daudin, a genus of snakes).

TYPE: *Scomber sarda* Bloch.

Etymology: σάρδα=a kind of tunny caught near Sardinia.

This genus contains two closely related species, the one of the Atlantic, the other equally abundant in the Pacific.

ANALYSIS OF SPECIES OF SARDA.

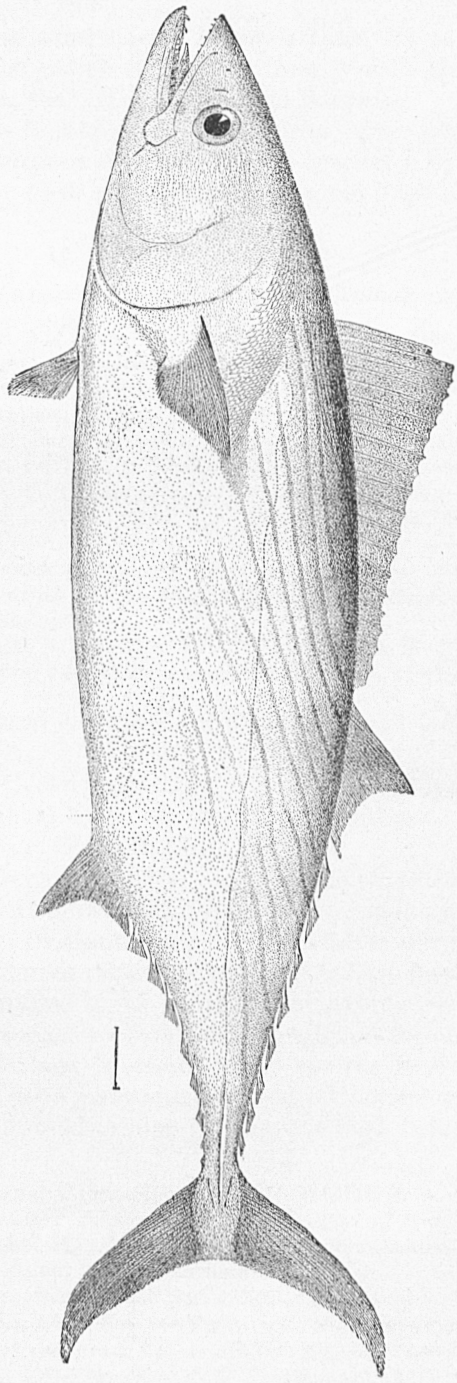
a. Dorsal spines 21. Body rather elongate, moderately compressed. Maxillary reaching beyond orbit. Teeth small, slightly compressed, about 30 in each jaw. Gill-rakers small, about 11 or 12 below angle. Lateral line scarcely undulating, nowhere making any decided curve. Dark steel-blue above, silvery below; several blackish stripes running obliquely downward and forward from the dorsal region. Head $3\frac{3}{4}$; depth $4\frac{1}{3}$. D. XXI–I, 13–VII; A. I, 13–VI ... SARDA, 9.

aa. Dorsal spines 18. Body elongate, not much compressed. Maxillary not reaching beyond orbit. Teeth strong, curved, slightly compressed, about 40 in each jaw. Gill-rakers long, equaling diameter of eye, about 16 or 17 below angle. Lateral line undulating, making a sharp angular turn below soft dorsal. Dark metallic blue; sides dusky; several blackish stripes running upward and backward from the pectoral region. Head $3\frac{3}{5}$; depth $4\frac{3}{4}$. D. XVIII–I, 12–VIII; A. I, 11–VII ..... CHILENSIS, 10.

9. SARDA SARDA.

BONITO, SKIP-JACK.

Scomber pelamis Brünnich, Ichthy. Massil., 68, 1768 (Marseilles, not of Linnæus).
Scomber pelamys Tybring, Bull. U. S. Fish Comm., 149, 1886.
Scomber sarda Bloch, Ichthyologia, x, p. 35, pl. 334, 1793.
Pelamys sarda Cuv. & Val., viii, 149, pl. 217 (Cape Verde, coast of France); Storer, Rept. Fish. Mass., 49, 1839 (Holmes's Hole, Martha's Vineyard); DeKay, New York Fauna, Fishes, 106, pl. 9, fig. 27, 1842 (New York Harbor); Ayres, "Proc. Cal. Acad., 74," 1855; Günther, ii, 367, 1860 (Cape Good Hope); Günther, Fishes of Central America, 435, 1866; Storer, Hist. Fish. Mass., 141, 1867; Steindachner, Ichthyologische Berichte, v, 8, 1868.
Sarda sarda Jordan & Gilbert, Proc. U. S. Nat. Mus., 19, 1884.
Scomber mediterraneus Bloch and Schneider, 23, 1801 (after Brünnich).
Scomber pelamitus Rafinesque, Caratteri etc., 44, pl. 2, 1810 (Palermo).
Thynnus sardus Risso, "Eur. Mérid., iii, 417, 1826."
Sarda pelamys Gill, Rept. U. S. Fish Com., 802, 1872 (Boston Market); Baird, Rept. U. S. Fish Com., 825, 1872 (Holmes's Hole); Bean, Proc. U. S. Nat. Mus., 89, 1880 (Noank, Conn.; mouth Potomac River).



SARDA SARDA (Bloch). Bonito, Skip-jack.
(No. 10419, U. S. N. M., from Wood's Holl, Massachusetts.)

Sarda mediterranea Jordan & Gilbert, Synop. Fish. N. A., 427, 1883; Goode, Nat. Hist. Aquat. Anim., 316, pl. 92, 1884 (Wood's Holl); Jordan & Gilbert, Proc. U. S. Nat. Mus., 19, 1884.

Habitat.—Coasts of America and Europe; Cape Cod to Cape of Good Hope. The specimen examined by us is from Wood's Holl.

Etymology: σάρδα, the Greek name, from Sardinia.

This species seems to inhabit the open ocean, approaching the shores for food or for the purpose of spawning. It reaches a length of 2½ to 3 feet and a weight of 10 to 12 pounds. It is a fair food-fish, but not of fine quality.

10. SARDA CHILENSIS.

(CALIFORNIA BONITO, SKIP-JACK, TUNA.)

Pelamys chilensis Cuv. & Val., viii, 1831, p. 163 (Valparaiso); Günther, ii, 1860, p. 368; Steindachner, Ichthyologische Notizen, vii, 25, 1868.

Sarda chilensis Jordan & Gilbert, Proc. U. S. Nat. Mus., iii, 1880, p. 27 (San Diego, Cal.), no description; Jordan & Gilbert, Proc. U. S. Nat. Mus., iii, 1880, p. 456 (Monterey Bay, San Pedro), no description; Jordan & Jouy, Proc. U. S. Nat. Mus., iv, 1881, p. 12 (San Diego, Cal.), no description; Jordan & Gilbert, Proc. U. S. Nat. Mus., iv, 1881, p. 45; Jordan & Gilbert, Syn. Fish. N. A., 1882, p. 428; Jordan, Nat. Hist. Aquat. Anim., 1884, p. 319 (California).

Pelamys orientalis Temminck & Schlegel, "Fauna Japan, Poiss., 1850, p. 99, pl. 52" (Japan); Günther, ii, 1860, p. 368; Steindachner, Ichthyologische Beiträge, iv, 11, 1875 (Panama).

Pelamys lineolata Girard, U. S. Pac. R. R. Exp., Fishes, 1857, p. 106 (San Diego, Cal.).

Sarda lineolata Lockington, Report Commissioners Fisheries California, 1879, p. 33 (Monterey Bay).

Sarda chilensis var. *orientalis* Steindachner & Döderlein, Beiträge zur Kenntniss der Fische Japan's, iii, 11, 1885 (Tokio).

Habitat.—Pacific Ocean; southern California to Japan and Chili. The specimens examined by us are from Santa Barbara.

Etymology: *chilensis*, living in Chili.

Dr. Steindachner regards the Japanese bonito (*S. orientalis*) as a variety of *S. chilensis*. It inhabits the open ocean, coming on the coast of California to spawn. Dr. Jordan says: "This fish is everywhere known as the bonito. The names 'Spanish mackerel,' 'Skip-jack,' and 'Tuna' are also sometimes applied to it. It reaches an average weight of about 12 pounds. It approaches to within half a mile of the shore, where it is taken in great numbers by trolling. It spawns in August or September. Its arrival is in early summer and its departure in the fall. As a food-fish it is not held in high esteem, the flesh being coarse."

Genus VII.—SCOMBEROMORUS.

Scomberomorus Lacépède, Hist. Nat. Poiss., iii, 292, 1802 (*plumierii* = *regalis*).
Cybium Cuvier, Règne Anim., 120, 1829 (*commersonii*).
Apodontis Bennett, Proc. Comm. Zoöl. Soc. I, 169, 1831 (*immunis*).
Lepidocybium Gill, Proc. Acad. Nat. Sci. Phila., 125, 1862 (*flavobrunneum*).
Chriomitra Lockington, Proc. Acad. Nat. Sci. Phila., 133, 1879 (*concolor*).
Scomberomorus Jordan & Gilbert, Proc. U. S. Nat. Mus., 573, 1882 (*regalis*).

TYPE: *Scomber regalis* Bloch = *Scomberomorus plumierii* Lacépède.

Etymology: σκόμβρος = mackerel; ὁμόρος, bordering on, near.

This genus contains numerous species which are more decidedly shore fishes than any of the others of the family, and consequently of narrower distribution. The name *Scomberomorus* must take the place of *Cybium*, the generic name heretofore most used by European authors.

ANALYSIS OF SPECIES OF SCOMBEROMORUS.

a. Gill-rakers rather long, slender, more than 8 below angle; dorsal spines 17 or 18; lateral line slightly wavy, descending obliquely.

b. Teeth small, slightly compressed, about 50 in each jaw; body comparatively little compressed; mouth oblique; gill-rakers long and slender, 18 below angle; premaxi lary short, not reaching to posterior margin of eye; caudal peduncle nearly cylindrical; head a little depressed, about 5 in length; ventral fins short; pectorals inserted slightly above axis, and about 8 in length; depth of body equal to length of head. Color of the male dark steel-blue above, becoming silvery on sides; the female a shade lighter above, two rows of round bronze spots on sides equal to pupil. D. XVII–16–VIII; A. I, 16–VIII ..... CONCOLOR, 11.

bb. Teeth strong, triangular, compressed; body somewhat compressed; gill-rakers long and slender, 8 to 12 below angle.

c. Color bluish above, silvery on sides and marked with many round bronze spots; no stripes on sides; head pointed, little compressed; teeth, 30 to 32 in each jaw; scales on base of pectorals; pectorals, about 5¼ in body; eye, 2 in snout; interdorsal space equal to the diameter of the eye; pectorals inserted a little above center of orbit; gill-rakers about 9 below angle. Head 4⅜; depth 5. D. XVIII–17–IX; A. II, 18–VIII ..... MACULATUS, 12.

cc. Color silvery; sides with two black stripes crossing lateral line under soft dorsal, posteriorly broken up into irregular spots; snout somewhat convex in profile; lateral line wavy along the tail; teeth about 40 in each jaw; pectorals, 5½ in body; eye 2¼ in snout; interdorsal space less than half diameter of eye; pectorals inserted a little below the center of orbit; gill-rakers slender, about 11 below angle. Head 4¼; depth 4½. D. XVIII–16–VIII; A. II, 14–VIII ..... REGALIS, 13.

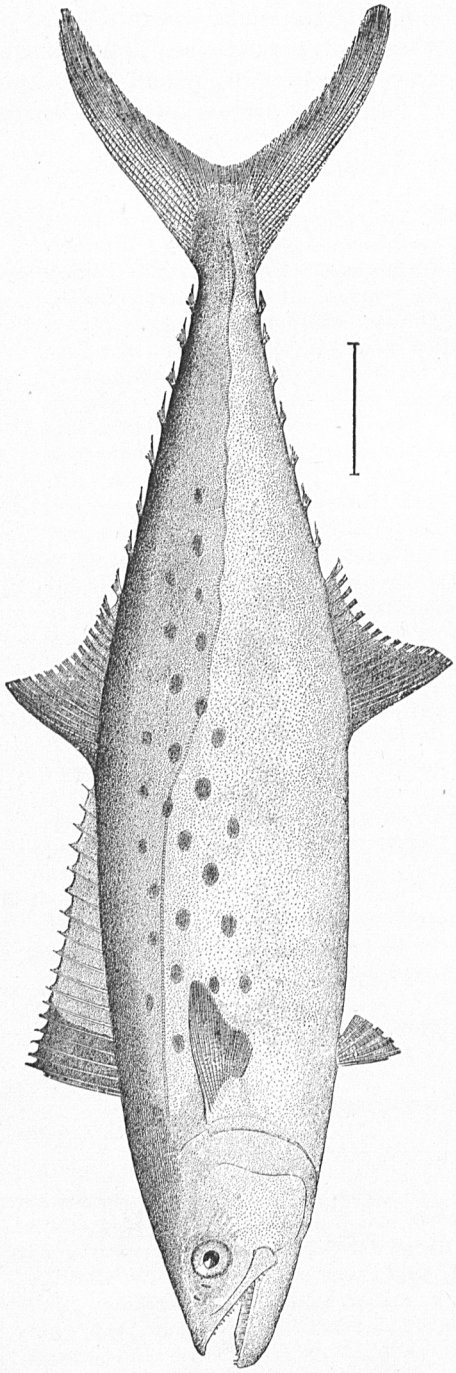
aa. Gill-rakers short, thick, less than 8 below angle; dorsal spines 14 or 15; lateral line making an abrupt descent beneath soft dorsal; teeth large, compressed, about 30 in each jaw; anterior part of spinous dorsal without black blotch; pectorals 5 in body; eye 2 in snout; interdorsal space less than eye. Color of adult, iron gray, nearly or quite immaculate; young with yellowish spots. Head 5; depth 6. D. XV–15–VIII; A. II, 15–VIII ..... CAVALLA, 14.

11. SCOMBEROMORUS CONCOLOR.

(MONTEREY MACKEREL.)

Chriomitra concolor Lockington, Proc. Acad. Nat. Sci. Phila., 1879, 133 (Monterey); Lockington, Report Cal. Fish Comm. (1878–'79), 1881, 34 (Monterey).

Scomberomorus concolor Jordan & Gilbert, Proc. U. S. Nat. Mus., 1880, 456 (Monterey; no description); Jordan & Jouy, Proc. U. S. Nat. Mus., 1881, 13 (Soquel, Cal.; no description); Jordan & Gilbert, Proc. U. S. Nat. Mus., 1881, 45 (Monterey Bay); Jordan & Gilbert, Syn. Fishes N. A., 1883, 425 (Monterey Bay); Jordan, Nat. Hist. Aquat. Anim., 1884, 316 (Monterey); Meek & Newland, Proc. Acad. Nat. Sci. Phila., 1884, 233 (Soquel).



SCOMBEROMORUS MACULATUS (Mitchill). Spanish Mackerel.
(No. 15582, U. S. N. M., from Fulton Market, New York City.)

Habitat.—Monterey Bay. The specimen examined by us is from Soquel, Cal.

Etymology: *con* and *color*, uniformly colored.

This species attains a length of about 2½ feet and a weight of 5 to 8 pounds. It has only been seen in Monterey Bay, where but a limited number are taken each fall. Its flesh is of very fine flavor, and always brings a high price in the markets. They appear in September and disappear in November.

12. SCOMBEROMORUS MACULATUS.

(SPANISH MACKEREL.)

Scomber maculatus Mitchill, Trans. Lit. and Phil. Soc., i, 426, pl. 6, f. 8, 1815 (New York).

Cybium maculatum Cuvier, Règne Anim., ed. 2, 121, 1829 (after Mitchill); Agassiz, Spix, Pisc. Brazil., 103, pl. 60, 1829 (Atlantic); Cuv. & Val., viii, 181, 1831 (New York); Storer, Bost. Jour., iv, 179, 1842 (Lynn, Mass.); Ayres, Bost. Jour. Nat. Hist., iv, 261, 1842 (Brookhaven); DeKay, New York Fauna, Fishes, 108, pl. 73, f. 232, 1842 (Long Island); Storer, Synopsis, 92, 1846; Baird, Fishes N. J. Coast, 21, 1855 (Beaseley's Point); Holbrook, "Ichth. South Carolina, 66, pl. 9, f. 1, 1855;" Günther, ii, 372, 1860; Günther, Fishes Central America, 388, 1866 (Belize; no description); Storer, Hist. Fish. Mass., 146, pl. 13, f. 1, 1867 (Lynn, Mass.); Gill, Rept. U. S. Fish Comm., 802, 1871–'72 (name only); Baird, Rept. U. S. Fish Comm., 825, 1871–'72 (Wood's Holl; no description); Gill, Cat. Fish., E. Coast N. A., 24, 1873 (name only); Poey, Proc. U. S. Nat. Mus., 4, 1878 (after Cuv. & Val.); Jordan & Gilbert, Proc. U. S. Nat. Mus., 375, 1875 (Albemarle Sound); Goode, Proc. U. S. Nat. Mus., 3, 1879 (Florida; no description); Goode & Bean, Proc. U. S. Nat. Mus., 128, 1879 (Pensacola); Goode & Bean, Fish., Essex Co., Mass., 15, 1879 (no description); Bean, Proc. U. S. Nat. Mus., 89, 1880 (Washington Market; no description); Ryder, Bull. U. S. Fish. Comm., 25, 1881; Earll, Bull. U. S. Fish Comm., 416, 1884 (Mobjack Bay); Smiley, Bull. U. S. Fish Comm., 74, 1885 (near Tampa Bay).

Scomberomorus maculatus Jordan & Gilbert, Bull. U. S. Fish Comm., 106, 1882 (Mazatlan; no description); Jordan & Gilbert, Bull. U. S. Fish. Comm., 110, 1882 (Panama; no description); Goode & Bean, Proc. U. S. Nat. Mus., 237, 1882 (Gulf of Mexico); Jordan & Gilbert, Proc. U. S. Nat. Mus., 268, 1882 (Pensacola; no description); Jordan & Gilbert, Proc. U. S. Nat. Mus., 594, 1882 (Charleston, S. C.; no description); Jordan & Gilbert, Proc. U. S. Nat. Mus., 625, 1882 (Panama; no description); Jordan & Gilbert, Syn. Fish. N. A., 426, 1883; Bean, Cat. Fish. Ex. London, 51, 1883 (Charlotte Harbor; no description); Meek & Newland, Proc. Acad. Nat. Sci. Phila., 232, 1884; Goode, Nat. Hist. Aquat. Anim., 307, pl. 93, 1884; Jordan, Bull. U. S. Fish Comm., 78, 1884 (Key West; no description); Jordan, Proc. U. S. Nat. Mus., 373, 1885 (Mazatlan and Panama; no description); Page, Bull. U. S. Fish Comm., 406, 1886; Jordan, Proc. U. S. Nat. Mus., 27, 1886 (Beaufort; no description); Jordan, Proc. U. S. Nat. Mus., 36, 1886 (Key West).

Habitat.—Warm seas of America; north to Lynn, Mass.; south to Brazil, Panama, Mazatlan. The specimens examined by us are from Key West, Pensacola, and Washington Market.

Etymology: *maculatus*, spotted.

This is one of the most valuable of our food-fishes, appearing in schools on our Atlantic coast in greatly varying abundance. It reaches a weight of 8 or 9 pounds. It is found on the west coast of Mexico, where, according to Dr. Gilbert, it is held in low esteem as a food-fish.

13. SCOMBEROMORUS REGALIS.

(PINTADO, CERO, SIERRA.)

Scomber regalis Bloch, Ausl. Fische, pl. 333, 1793 (after a drawing by Plumier); Bloch & Schneider, Systema Nat., 22, 1801 (after Bloch); Jordan & Gilbert, Proc. U. S. Nat. Mus., 573, 1882.

Cybium regale Cuvier, Règne Animal, ed. 2, 121, 1829 (name only; after Bloch); Cuv. & Val., viii, 184, 1831 (San Domingo); DeKay, New York Fauna, Fishes, 108, 1842 (Gulf of Mexico); Günther, ii, 372, 1860 (Jamaica); Poey, Syn. Pisc. Cub., ii, 326, 1868 (Cuba); Gill, Rept. U. S. Fish Comm., 802, 1871–'72 (name only); Baird, Rept. U. S. Fish Comm., 825, 1871–'72 (Wood's Holl; no description); Gill, Cat. Fish. E. Coast N. A., 24, 1873 (name only); Poey, Enum. Pisc. Cubens., 73, 1875; Poey, Proc. U. S. Nat. Mus., 4, 1878 (Cuba); Goode, Proc. U. S. Nat. Mus., 3, 1879 (East Florida; no description).

Scomberomorus regalis Goode & Bean, Proc. U. S. Nat. Mus., 237, 1882; Jordan & Gilbert, Syn. Fish. N. A., 426, 1883 (Cape Cod to Brazil); Jordan, Proc. U. S. Nat. Mus., 120, 1884 (Key West); Jordan, Bull. U. S. Fish Comm., 78, 1884 (Key West; no description); Goode Nat. Hist. Aquat. Anim., 307, 316, pl. 94, f. 2, 1884 (Key West); Meek & Newland, Proc. Acad. Nat. Sci. Phila., 234, 1884 (Key West, Havana); Jordan, Proc. U. S. Nat. Mus., 36, 1886 (Havana); Jordan, Proc. U. S. Nat. Mus., 574, 1886 (West Indies; no description).

Scomberomorus plumieri Lacépède, iii, 292, 1802 (after Aubriet's copy of Plumier's drawings).

Cybium acervum Cuv. & Val., viii, 186, 1831 (in part; type); Poey, Repertorio, i, 322, 1867 and ii, 13 (Cuba); Poey, Enum. Pisc. Cubens., 73, 1875; Poey, Proc. U. S. Nat. Mus., 4, 1878 (no description).

Habitat.—East coast of America; Cape Cod to Brazil. The specimens examined by us are from Key West and Havana.

Etymology: *regalis*, kingly.

This species is closely allied to *maculatus*, from which most fishermen do not distinguish it. It attains a length of 5 or 6 feet and a weight of 20 or 30 pounds.

14. SCOMBEROMORUS CAVALLA.

(KING-FISH, SIERRA.)

Guarapucu Marcgrave, Hist. Brasil., 178, 1648 (Brazil).

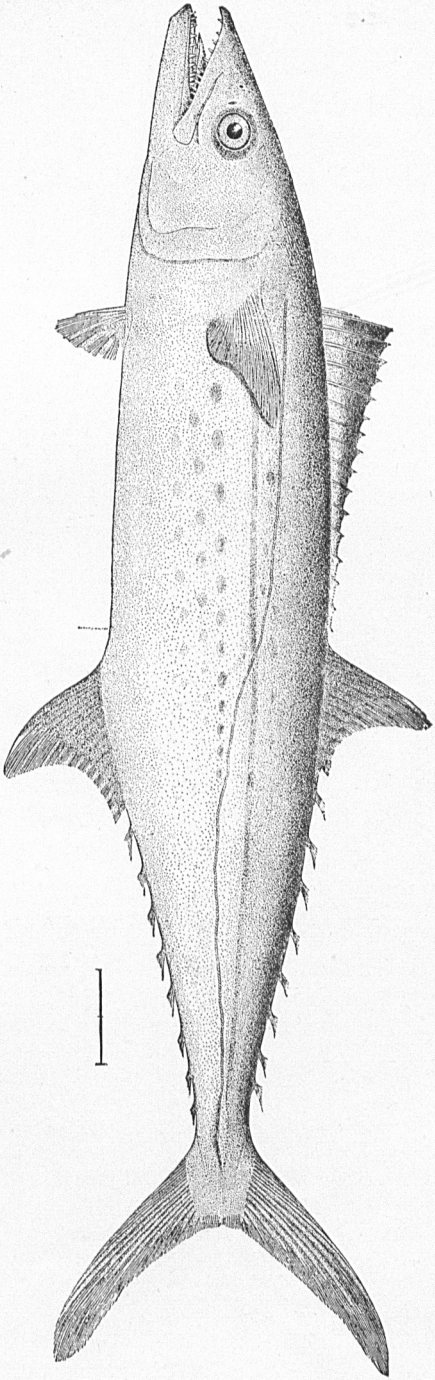
Cybium cavalla Cuvier, Règne Animal, ed. 2, 121, 1829 (after Marcgrave); Tybring, Bull. U. S. Fish Comm., 150, 1886.

Cybium tritor Cuv. & Val., viii, 176, pl. 218, 1831 (West Coast of Africa); Günther, ii, 372, 1860 (after Cuv. & Val.).

Cybium caballa Cuv. & Val., viii, 187, 1831 (Brazil); Günther, ii, 373, 1860 (San Domingo); Guichenot, Sagra, Hist. Cuba Poiss., 103, 1850 (Cuba); Poey, Repertorio, i, 322, and ii, 13, 1867 (Cuba); Poey, Synopsis, 362, 1868; Poey, Enumeratio, 73, 1875 (Cuba); Poey, Proc. U. S. Nat. Mus., 3, 1879 (East Florida; no description); Poey, Bull. U. S. Fish Comm., 118, 1882 (Key West; no description).

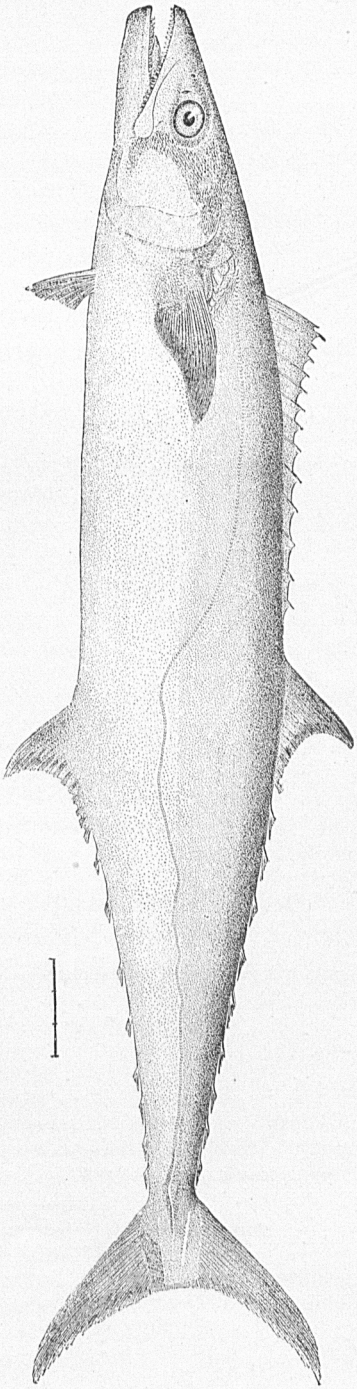
Cybium immaculatum Cuv. & Val., viii, 191, 1831.

Scomberomorus caballa Goode & Bean, Proc. U. S. Nat. Mus., 237, 1882 (no description); Jordan & Gilbert, Proc. U. S. Nat. Mus., 268, 1882 (Pensacola); Jordan & Gilbert, Proc. U. S. Nat. Mus., 594, 1882 (Charleston; no description); Jordan & Gilbert, Syn. Fish. N. A., 427, 1883 (copied); Goode Nat. Hist. Aquat. Animals, 307, 316, pl. 94, f. 1, 1884 (Wood's Holl, Mass.).



SCOMBEROMORUS REGALIS (Bloch). Pintado, Spotted Cero, Sierra.

(No. 12527, U. S. N. M., from Key West, Florida.)



SCOMBEROMORUS CAVALLA (Cuvier). Cero, King-fish.

(No. 19419, U. S. N. M., from Wood's Holl, Massachusetts.)

Scomberomorus cavalla Jordan, Proc. U. S. Nat. Mus., 119, 1884 (Key West); Jordan, Bull. U. S. Fish Comm., 77, 1884 (Key West; no description); Meek & Newland, Proc. Acad. Nat. Sci. Phila., 235, 1884; Collins, Bull. U. S. Fish Comm., 359, 1885; Jordan, Cat. Fish. N. A., 68, 1885; Jordan, Proc. U. S. Nat. Mus., 36, 1886 (Havana; no description); Jordan, Proc. U. S. Nat. Mus., 574, 1886, (West Indies; no description).

Habitat.—Warm parts of the Atlantic; north to Wood's Holl; south to Cuba, Brazil, and west coast of Africa. The specimens examined by us are from Havana and Key West.

Etymology: The Spanish name, from *caballus*, a horse (horse-mackerel.) In the West Indies and about Florida it is one of the best food-fishes, reaching a large size and having flesh of excellent quality. It reaches a weight of 40 to 100 pounds, and a length of 3 to 5 feet.

We follow Meek & Newland in using the original orthography *cavalla*.

Genus VIII —ACANTHOCYBIUM.

Acanthocybium Gill, Proc. Acad. Nat. Sci. Phila., 125, 1862 (*sara*).

Type: *Cybium sara* Bennett = *Cybium solandri* Cuv. & Val.

Etymology: ἄκανθα = spine, κύβιον = the cured flesh of the pelamis, or the pelamis itself when at a particular age.

This remarkable genus indicates a long step from the type of *Scomberomorus* toward the type of the sword-fishes. The single species ranges widely in the warm seas.

ANALYSIS OF SPECIES OF ACANTHOCYBIUM.

a. Body elongate, fusiform; premaxillaries in front produced in a sort of beak, which is nearly half the length of the snout; teeth in jaws strong, serrated, enlarged posteriorly, about 50 in each jaw; corselet small; spinous dorsal very long; second dorsal and anal short and low; anal inserted behind the vertical from the soft dorsal; pectorals 2¼ in head; lateral line descending abruptly beneath the 16th spine. Color of back dark steel blue, paler underneath; indistinct vertical bands of young disappear with age. Head, 4; depth, 6½. D. XXVI—12—VIII; A. 12—IX ..... SOLANDRI, 15.

15. ACANTHOCYBIUM SOLANDRI.

(WAHOO, PETO.)

Cybium solandri Cuv. & Val., viii, 192, 1831.

Acanthocybium solandri Jordan, Proc. U. S. Nat. Mus., vii, 119, 1884 (Key West); Jordan, Bull. U. S. Fish. Comm., 77, 1884 (Key West; no description); Jordan, Cat. Fishes N. A., 68, 1885 (Cuba; Key West); Jordan, Proc. U. S. Nat. Mus., 574, 1886 (West Indies; no description); Jordan, Proc. U. S. Nat. Mus., 36, 1886 (Havana; no description).

Cybium sara Bennett, "Beechey's Voyage, Zool., 63, pl. 20, f. 2, 1849" (Loo-Choo); Günther, ii, 373, 1860 (after Bennett).

Cybium petus Poey, Memorias Cuba, ii, 234, tab. 16, f. 1, 1860 (Havana).

Acanthocybium petus Poey, Synopsis, 363, 1868; Poey, Enumeratio Pisc. Cubensis, 73, 1875; Poey, Proc. U. S. Nat. Mus., 5, 1878.

Cybium verany Döderlein, Giorn. di Sc. Nat. ed Econ., viii, 1872 (Palermo).

Habitat.—Tropical seas; north to Key West.

Etymology: SOLANDER, an early explorer.

This species is occasionally found about the Florida Keys, and is called by the fishermen of that region *Wahoo*, by the Cubans *Peto*. It reaches a length of 6 feet and a weight of over 50 pounds.

RECAPITULATION.

The following is a list of *Scombrinæ* recognized by us as occurring in the waters of America and Europe. The distribution, in general, of each species is indicated by the use of the following letters:

E. Europe.
I. Islands of Eastern Atlantic.
N. North Atlantic Coast, north of Cape Hatteras.
S. South Atlantic and Gulf Coast.
W. West Indies and Brazil.
C. Southern California.
P. Pacific Coast of Tropical America.
V. Pacific Coast of South America.

Family SCOMBRIDÆ.—Subfamily SCOMBRINÆ.

1. **Scomber** LINNÆUS.

1. *Scomber scombrus* (Linnæus) E. N. (C.?)
2. *Scomber colias* (Gmelin) I. N. C. P.

2. **Auxis** CUVIER.

3. *Auxis thazard* (Lacépède) S. W. I. N.

3. **Orcynopsis** GILL.

4. *Orcynopsis unicolor* (Geoffroy), E.

4. **Gymnosarda** GILL.

5. *Gymnosarda pelamis* (Linnæus) W. N. E.
6. *Gymnosarda alletterata* (Rafinesque) N. E. W.

5. **Albacora** JORDAN.

§ *Germo* Jordan.

7. *Albacora alalonga* (Gmelin) C. E. V. W. N.

§ *Albacora.*

8. *Albacora thynnus* (Linnæus) N. E. W.

6. **Sarda** CUVIER.

9. *Sarda sarda* (Bloch) N. E.
10. *Sarda chilensis* (Cuv. & Val.) C. V.

7. **Scomberomorus** LACÉPÈDE.

11. *Scomberomorus concolor* (Lockington) C.
12. *Scomberomorus maculatus* (Cuvier) N. S. C. W. P.
13. *Scomberomorus regalis* (Bloch) W. S. N.
14. *Scomberomorus cavalla* (Cuvier) S. W. N. E.

8. **Acanthocybium** GILL.

15. *Acanthocybium solandri* (Cuv. & Val.) S. W. E.