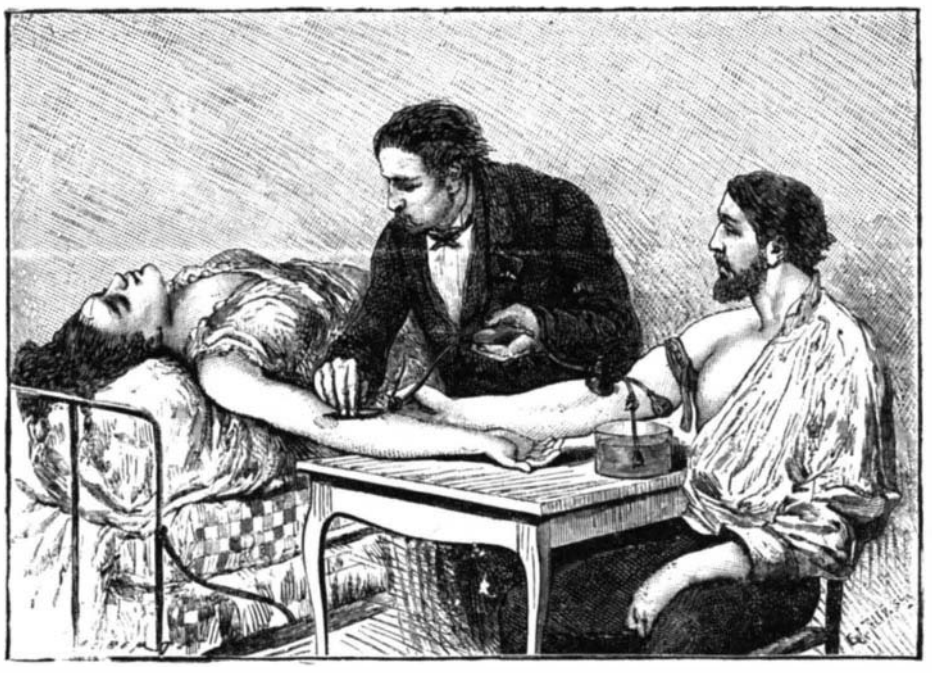
### THE STEAMSHIP AUSTRAL.

The latest addition to the Orient Line of steamers, the Austral, is a distinct advance on the Orient, the first of her type, not only in respect of speed, but in the structure of the hull, the ventilation of the state rooms, the arrangements made for the importation of frozen meat from Australia, and the effectiveness of the vessel as an auxiliary to our naval force. She has been built by Messrs. John Elder & Co., of Govan, on the Clyde, under the superintendence of Mr. J. W. Shepherd, a member of the Institute of Naval Architects. Her length over all is 474 feet, her breadth 48 feet 3 inches, and her depth moulded is 37 feet. Her displacement on the load line is about 9,500 tons. She is thus 10 feet longer, 2 feet broader, and 2 inches deeper than the Orient, but, as her lines are finer, her tonnage will not much exceed that of the Orient. She is built throughout of mild steel, and has three steel decks. She is divided below the inner skin and the double bottom into nineteen separate water-tight compartments, and in the hull proper within the interior skin she is divided by thirteen water-tight bulkheads, ten of which run up to the level of the main deck. If the whole of the lower compartments were filled with water, the effect would be an additional draught to the extent of 18 inches, and if the sea got into two of them, the stability and the surplus buoyancy of the vessel would prevent her from being endangered.

Above the main deck the ship is divided into seven fireproof compartments, all in communication with the main deck; and, as the pumping power provided is equal to 2,928 tons per hour, there is ample arrangement made for flooding any of the compartments in case of fire, or extracting the water in case of their becoming waterlogged. In the event of the engines being disabled, the vessel is provided with four masts, the fore and main being square-rigged, and the mizzen and jigger having fore and aft sails, which, combined, will give about 28,000 superficial feet of canvas: thus the vessel is well under command independently of steam power. These provisions for the general safety of the vessel are supplemented by unusual care for the comfort of the passengers. The cabins are all placed within the area of the ship, with a gangway, four feet wide, running right along the vessel, outside the state rooms, and at frequent intervals across the ship. This permits each state room to be constructed like an ordinary compartment, with windows instead of portholes; and the porthole in the side of the ship may be opened even in rough weather without any fear of water entering the cabin. If a sea should strike the vessel when the porthole is open, the water will fall on to the gangway. Upon the upper deck, the gangway running round the whole of the vessel is perfectly open to the air, while it is covered above; and the passengers may promenade there with the full advantage of an open sea before them. The passage round the ship leads fore and aft on each side of the saloon, so that persons can go to either end of the ship without passing through the saloon. Besides this, there are numerous cross passages, three feet wide, between the several quadrangles of state rooms, an arrangement that offers unusual facilities for moving about the ship. The saloon is a handsome apartment, paneled with walnut and embellisbed with carved shields representing the arms of various nationalities. Arrangements are made for the usual long tables, but they can be also divided into sets of a dozen or even four seats. The most striking characteristic of the saloon, however, is the row of dome-shaped painted-glass windows down each side. These can be lowered at will in all weathers, because, instead of opening on to the sea, as usual, they merely admit air from the long corridors. Effective ventilation is provided for the saloon by a centrifugal fan, worked by a small steam-engine. The fan forces a continuous current of pure air into the apartment, and the foul air finds its way out through an ornamental opening above each window. The public rooms, the engine-room, pantries, and passage ways are lighted by the electric light, fitted up by Messrs. Siemens with nine arc lamps and 170 Swan lamps. Five of the arc lights are placed in the engine-room and four on the deck The current is provided by two of Siemens' alternating current machines, each driven by a separate engine.—*The Illustrated London News.*



THE OPERATION OF TRANSFUSING BLOOD.

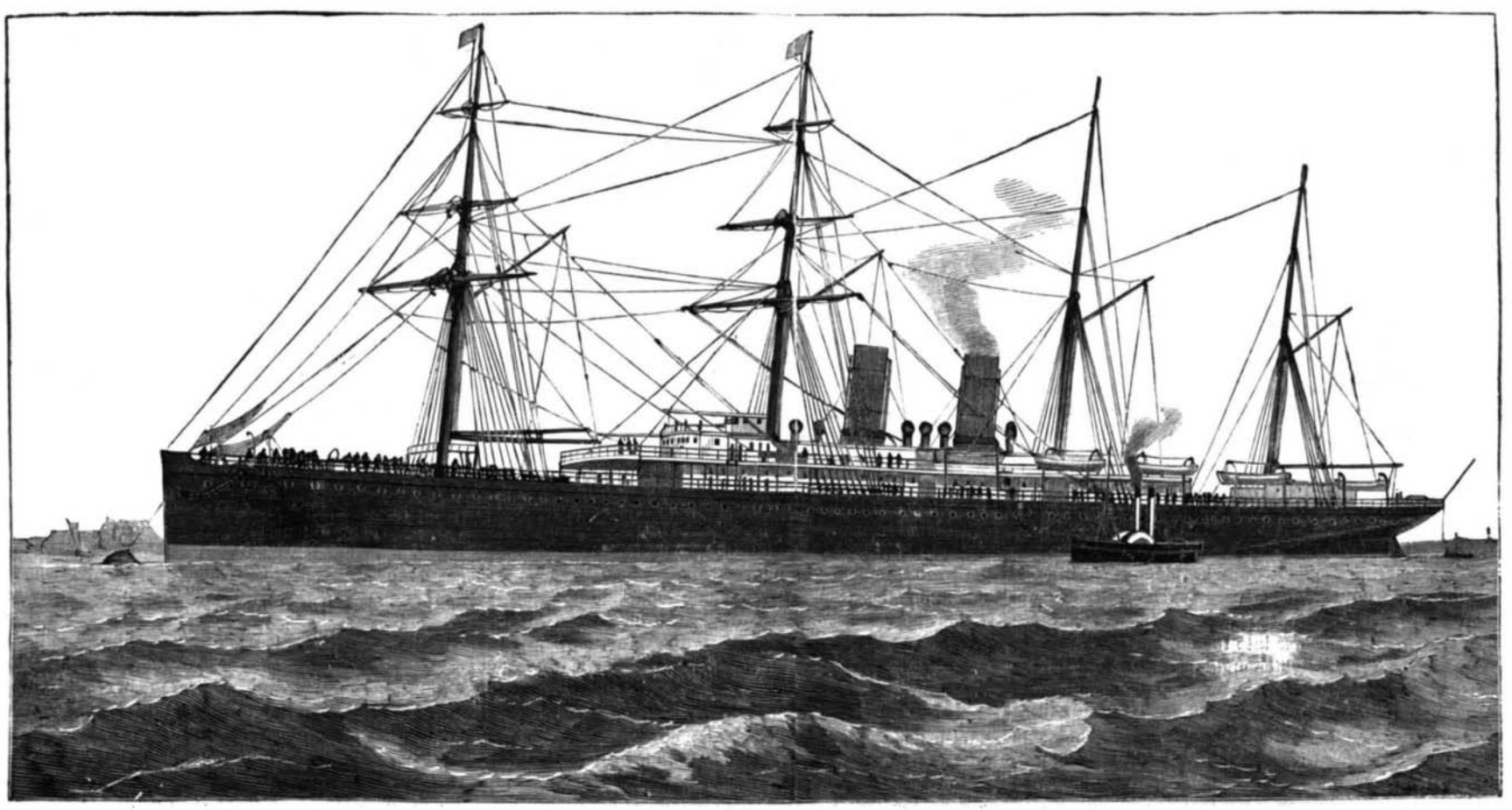
### A Government Fish Steamer.

The Government is now building in Delaware a fine new iron steamship for the special use of the Fish Commission. It is to cost $200,000, to be named the Albatross, and to be ready in about four months. Its dimensions will be: Length, 200 feet; beam, 27 feet 6 inches; depth of hold, 16 feet 9 inches; burden, 800 tons. Among the special appliances fitting the vessel for its purpose will be a deep-sea dredge and eight miles of wire rope. One of the first important services of the Albatross will be the transportation to London of the collection which will represent this country in the great Fish Exposition next May.

### THE DIRECT TRANSFUSION OF BLOOD.

Among the various methods of transfusing blood that have been employed, the most commendable appear to be those of Dr. Oré, of Bordeaux, and Dr. Roussel, of Geneva. The process of the latter has recently occasioned a remarkable cure which bas attracted much attention from the medical world, and we are therefore glad to make it known to our readers. Facts, as we know, speak for themselves, so we will give these in a succinct manner. Mrs. M., aged 31 years, had had five living children and two miscarriages. In December, 1881, after six months of gestation, she gave birth to two children—one of them was stillborn and the other lived for a few hours only. The patient in spite of all cares gradually became feeble from week to week. She was attended by her physician, Dr. Chauvin, and by Drs. Brochin and Pean. On the 31st of January she went from bad to worse; and, on tbe 1st of February, there was little hope for her. Anorexia, vomitings, insomnia, inertia, diarrhea, anemic hectic fever, cadaverous face, and approaching dissolution; such were her symptoms. Drs. Pean and Brochin then suggested transfusion as a last resource. This was performed by Dr. Roussel, who describes the remarkable operation as follows: On the 5th of February Dr. Brochin came to the Grand Hotel to ask my concurrence. I found the patient inert, scarcely conscious, without heat, without respiration, as pale as a corpse, veins invisible, and pulse filiform at 140.

The heart and lungs appeared to me to be healthy, and I consented to operate, February 7th, 4 o'clock P.M. The patient is in the state above described; to-day she has had diarrhea nineteen times; her pulse is filiform, tremulous, and 150. The sister and husband of the patient offer me their arms; but, after an examination, I prefer to make a choice elsewhere. There is made known to me a business man of the street who employs many strong workmen. Mr. Z. at once comprehends the importance of my request and causes his men to call, and to them I explain that it is a question of saving a mother of a family by giving her a little blood taken from the arm of one of them by a single puncture which I affirm will be harmless. Several consent. I select a young man of about thirty years of age, healthy and robust, named Adrien Renaud. We go up to the patient's room, where are present Drs. Brochin and Chauvin and the husband, sister, and other relatives. The transfuser is washed in warm water to which has been added a little soda. I uncover the breast of the patient, and stretch her arm along the edge of the bed. I seat R., and place his arm parallel with that of the patient, and surround it with a bandage so as to cause his veins to swell. After having carefully sougbt and noted with ink the course of the humeral artery at the bend of the elbow, I mark a point of ink at two centimeters beyond the course of the artery, on the median vein, which appears to be prominent and well swollen with blood. Resting the initial cylinder of the transfuser in such a way that it figures the circumference of this central point,



THE NEW STEAMSHIP AUSTRAL, OF THE ORIENT LINE.

I cause the annular cupping apparatus to adhere by a pressure on its bulb.

Then, turning to the patient, I find that her veins are so bloodless as to be invisible. I succeed in discovering them by placing a bandage on her arm. I raise a fold of the skin transverse to the median vein, and, cutting it with the bistoury, find that the vein is bluish and very narrow. I prick it with a fine erine, and then, removing the bandage from the arm, confide to Dr. Brochin the care of cutting a small piece from the vein with the point of a fine scissors and of introducing the canula into the narrow vessel. A few drops of very pale, thin, and incoagulable blood run out.

During this time I have dipped the bell of the aspirating tube of the instrument into a vessel of water heated to about 40 degrees. By working the bulb, this water fills the entire transfuser, heats it and expels the air that it contains. It was after all the air was expelled by the water that Dr. Brochin introduced the canula into the patient's vein.

The patient is now in such a state of inertia and anemic anæsthesia that she makes not even the slightest movement, either during the incision of the skin or during the preparation of the vein.

Our two subjects are now united by an uninterrupted channel full of water and free of air. A sharp tap on the head of the lancet opens Renaud's vein, and his blood soon makes its appearance at the orifice of the tubes, after having driven the water before it. The water section tube as well as the expulsion tube are closed, and a direct current of blood is set up. Slowly, never removing my eyes from the patient, I press the pump bulb, and force the blood easily into the vein in quantities of 10 grammes each time. At the tenth contraction of the bulb the patient breathes more deeply and quickly. When questioned she answers that she feels no discomfort, but experiences a heat rising from her arm into her breast.

Dr. Brochin easily ascertains under his finger that the blood is distending the rubber tube and the vein at each pressure; and, moreover, we all perceive the vein becoming more apparent and turgid as far as the arm pit.

At the seventeenth injection of ten grammes, perceiving a resistance in the bulb and a slight agitation in the patient, I stop transfusing, after 170 grammes of Renaud's blood have passed into the patient's veins.

The preparations for the operation were somewhat prolonged by the absolute lack of comfort and room in the apartment. It was difficult to light the latter well, and Dr. Chauvin was good enough to hold a lamp so as to light alternately each subject. The operation itself lasted five minutes.

Renaud's arm was dressed with a simple bandage, and he returned to his work very much pleased with the service that he had rendered.

February 8th.—The patient has slept, although she has awakened several times. During the day she has eaten six times. She has spoken aloud, and has not felt the least pain.

February 9th.—The patient has slept well the entire night, and for the first time in six months.

Feb. 10th and 11th.—State of convalescence assured.

February 12th and 13th.—Madame M. is sitting up, and is certainly cured. Hereafter she can dispense with my care.

Such is the interesting case that we have desired to make known. It now remains to say a few words in regard to the instrument employed by Dr. Roussel—his transfuser.

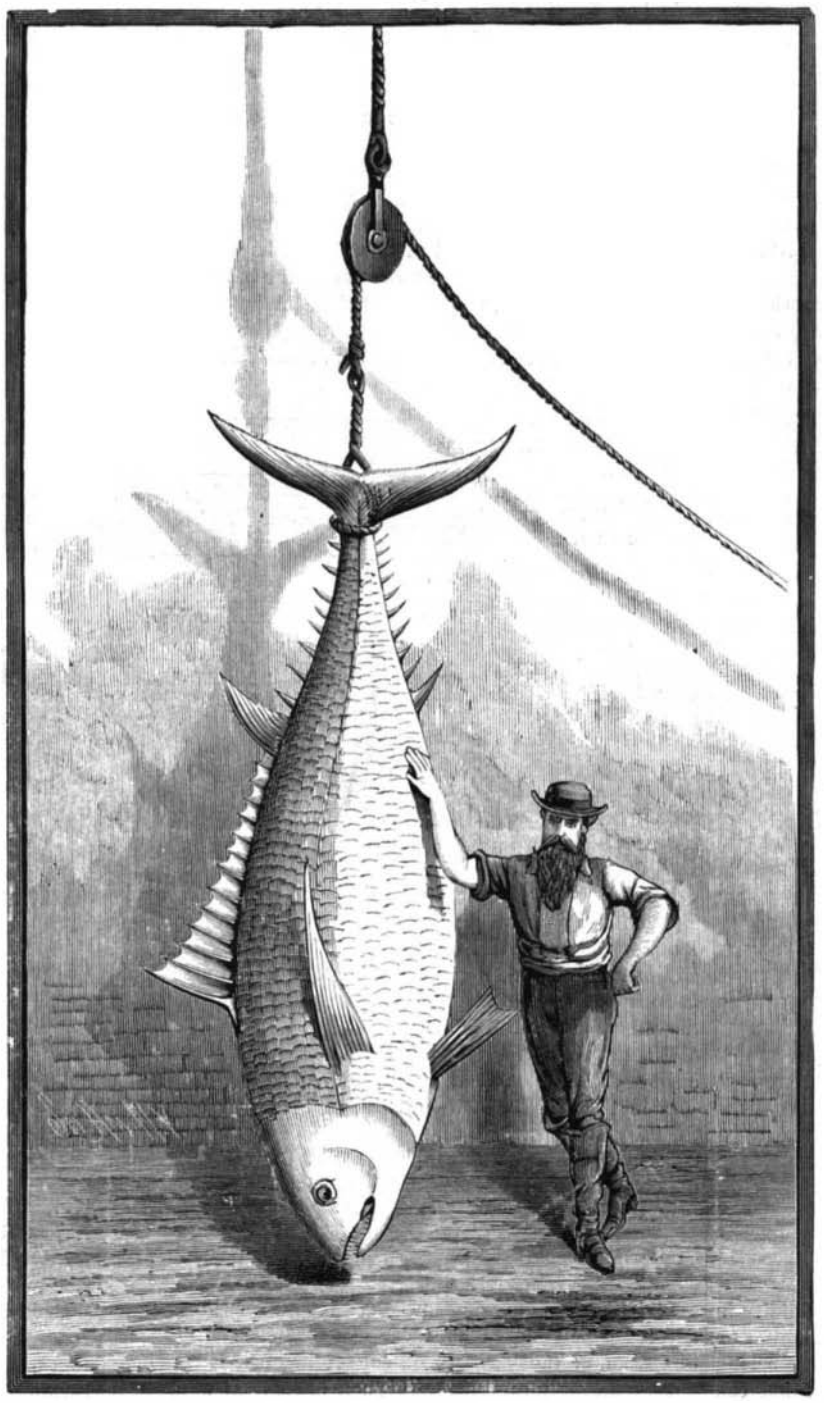
The apparatus consists of a soft, elastic, warm, and moist tube, after the style of the blood vessels, designed to be placed between the vein that yields the blood and that which receives it. This tube carries a suction and force pump, which gives impulsion to the venous blood, while measuring the quantity and velocity of the same. Two bifurcations, one at the beginning, and the other at the end of the tube, allow of the entrance and exit of a current of warm water so as to drive out the internal air and heat the instrument without the water itself being forced into the patient's circulation.—*La Nature.*

THE nitric solution of the two metals is mixed in a beaker, or a large porcelain crucible, with 4 to 5 c. c. of pure glycerine, supersaturated with ammonia, and mixed with 10 to 15 c. c. of concentrated soda-lye. The clear liquid thus obtained is heated, and boiled for three to five minutes; the formation of a silver deposit on the sides is prevented by stirring with a glass rod. When cold the reduced silver is filtered off, washed with boiling water, with warm dilute acetic acid, and again with hot water. The acetic acid in the filtrate is neutralized, and the lead thrown down with sulphuretted hydrogen. The separation of silver from lead is practicable in presence of copper and bismuth, as the oxides of these metals are soluble in glyceric alkalies.—*E. Donath.*

## THE AMERICAN TUNNY.

BY C. F. HOLDER.

Probably no family of fishes exceeds the mackerels (*Scombrinæ*) in their economic value. Having a wide geographical range, the different genera are found in almost all the waters of the world, everywhere being a benefit to man, and from their beauty, form, and peculiar habits attracting universal attention. The family is divided into four sub-families: 1st. Scombrinæ, distinguished by the short first dorsal and the wide space between it and the second, and the pectorals high up, including the genus *Scomber*, or common mackerels. 2d. The Orcyninæ, of which the subject of our illustration is a member. Here the spinous dorsal is contiguous to the soft, the pectorals comparatively low, the caudal peduncle with a median adipose carina, or fleshy keel, and two others, one above and one below, converging backward. This sub-family includes orcynus, sarda, and cybium, and related forms. 3d. Thyrsitinæ, in which the spinous dorsal is also long and pectorals comparatively low, but the caudal peduncle is not keeled. This family includes the genera thyrsites, ruvettus, etc. 4th. Gempylinæ, distinguished from the others by the very long body (the height being less than a tenth of the length), and the numerous spines of the first dorsal, represented by the genus gempylus. Very recently an American tunny was brought into Fulton Market, and from its great size attracted general attention. It was nearly nine feet long, and weighed between 800 and 900 pounds—a magnificent fish, its entire make up denoting wonderful speed and activity in its native element, where, with their rich coloring, iridescent and silvery tints, they present a wondrous spectacle. It is rarely that they are captured so near New York city. In Rhode Island and by some of the more northern fishermen it is called the albicore, as well as American tunny, and its range is from Newfoundland to Florida. Rondelet figures a tunny under the name Thon, and another species which he calls Pelamyde, or Thon d'Aristole. The first he denominates in Greek as Orkunos, which, he says, is the "Grand Thon." The generic name now used is evidently from the old Greek designation, and tunny is from thynnos, the more common term in use among the ancients. The fish seems to have been well known along the Mediterranean Sea. Rondelet figures a bize, which he calls also sarda, and which he says is called by Pliny pelamydes. It will be seen, then, that these names, which are retained by modern naturalists, were used by the earliest writers to designate species very closely allied.



THE AMERICAN TUNNY.

Storer says: "The species known along our coast as horse mackerel and albicore comes on to Massachusetts Bay about the middle of June and remains until October. It is frequently taken for its oil, which is taken from the head and belly, a single specimen often yielding twenty gallons."

They grow to a great size, and in 1855 one was caught off Lynn, Mass., that weighed over 1,000 pounds, was 10 feet long, and 6 feet in girth. It was presented to the Lynn Natural History Society by Dr. J. B. Holder, who was then the honorary curator. In a memorandum note in the History of Lynn, Dr. Holder says: "In this year (1850) they were very abundant, small ones being seen jumping out of the water; and I have measured several that were 10 feet in length."

After this they were rarely seen, but in 1871 a number were observed, as well as great quantities of a small tunny, *Orcynus alliteratus*, which, remarkable to relate, and showing their great range, had previously only been known in the Mediterranean Sea. The common tunny of the locality is the *Thynnus vulgaris*, and is said to have been seen in our waters. It attains a much greater size than its American representative (*Orcynus secundo-dorsalis*). Specimens have been found 20 feet in length, exceeding half a ton in weight. A casual observer would hardly note a specific difference between the two, so much do they resemble one another. From a very remote period the fisheries near the Island of Sicily have been valued, and in the summer vast shoals of them are caught in large nets or by means of what the Italians call tonaro.

In appearance the thynnus bears a close resemblance to our mackerel, except in point of size. Each jaw is furnished with a row of small sharp pointed teeth, slightly curved inward; the tongue and inside of the mouth are very dark colored; the cheeks covered with long narrow pointed scales; the operculum is smooth; the dorsal and anal fins are followed by nine small finlets, and the tail is crescent-shaped. The upper part of the body is very dark blue; the belly a light gray, spotted with silvery white; the first dorsal fin, pectorals, and ventrals black; the second dorsal and anal nearly flesh-colored, with a silvery tint; the finlets, above and below, yellowish, tipped with black. This description well applies to the American tunny, though the Fulton Market specimen had lost its brilliant colors when we saw it. Mr. Garrell, quoting from Mr. Couch, says that "the tunny appears on the Cornish coast of England in summer and autumn, but is not often taken because it does not take bait, or at least the fishermen use no bait that is acceptable to it, and its size and strength seldom suffer it to become entangled in the nets. It feeds on pilchards, herrings, and perhaps most other small fishes, but the skipper (*Esox saurus*) seems to be its favorite food, and it has been seen to leap in the air after them and endeavor to cut them down after the manner of the thrasher.

According to a French writer the greatest tunny fishery of the present day is that at Provence. Here the haul is made by an inclosed net called the *madrague*. The net consists of a combination of nets, which is quickly cast into the sea to head the tunnies at the moment of their passage. When the sentinels posted for the purpose have signaled the approach of a shoal of tunnies and its direction by the indications of a flag which points to the spot occupied by the finny tribe, the fishing boats are immediately directed to the spot indicated and ranged in curved lines, forming, with the light floating net, a half circular inclosure turned toward the shore, the interior of which is called the garden. The tunnies thus inclosed in this garden between the shore and the net become crazed with terror; as they advance along the shore they press upon the inclosure, or rather a *new* interior inclosure is formed with other nets held in reserve. In this second inclosure an opening is left through which the fish have to pass. In continuing thus to diminish the space by successive inclosures each occupies a smaller diameter, in which the fish are inclosed in about a fathom and a half of water. At this moment a seine is thrown into the garden, this is in turn hauled by the men into shallow water, and the small fish taken by hand, and the larger by hooks made for the purpose and thrust into the gills. A single day of such fishing will oftentimes produce 16,000 tunnies, ranging from twenty-five pounds upward. The madrague above mentioned is a permanent fishery, and consists of a vast inclosure formed of nets into various chambers, supported by corks and held in place by weights. The net is intended to arrest the shoals of tunnies as they leave shallow water for open sea. For this purpose a long alley or run is established between the sea shore and the park or madrague. The fish follow the run, and after passing from chamber to chamber, at last find their way into the interior. To force them near the "park" long nets are used, hauled by boats, and finally, when they are thoroughly in the toils, the net is raised to the surface, and the victims killed with