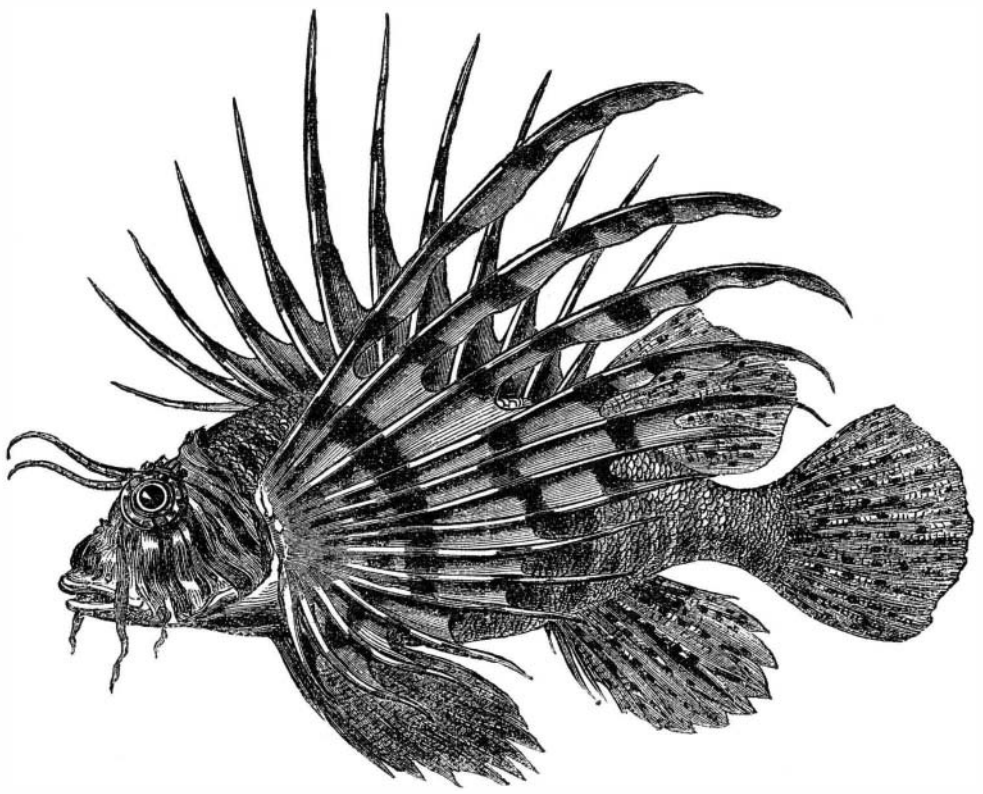
THE RED FIRE FISH.

The singularly weird-looking fish shown in our engraving* is a native of the Indian Ocean, and the race is represented in all parts of the tropical seas of the eastern hemisphere, on the coasts of Africa, India, Ceylon, New Guinea, and Australia. It is much prized as food by the natives of Ceylon, the flesh being firm, white, and nutritious. The color of the fish is a pinky brown, barred with darker brown, and the head is redder than the body. The pectoral and dorsal fins are very large, and crossed with black bars; the ventral fin is black, spotted with white; and the other fins and the tail are light brown, spotted with black. There are nine or ten species of this genus, and the usual size is seven or eight inches in length. The singular development of the dorsal and pectoral fins has given rise to an idea, in the minds of some naturalists, that they were used for the purpose of flying. This, however, is now known to be a mistake, as the rays of bone which carry the membrane which joins them are not sufficiently supported by the osseous system proper, and are therefore too weak for such use. Indeed the purpose of this abnormal form is unknown, and it adds one to the many thousands of curious problems which make comparative anatomy, especially of fishes, so fascinating a study.

The Cingalese have a belief that the thorny prickles of this fish inflict incurable wounds; but although this is an error, the fire fish is a formidable antagonist, and one which bathers and swimmers near his habitat will do well to keep clear of. The skeleton of this fish is one of the most remarkable known to Science its organization being very complex; and it will well repay investigation by those who can obtain a specimen.

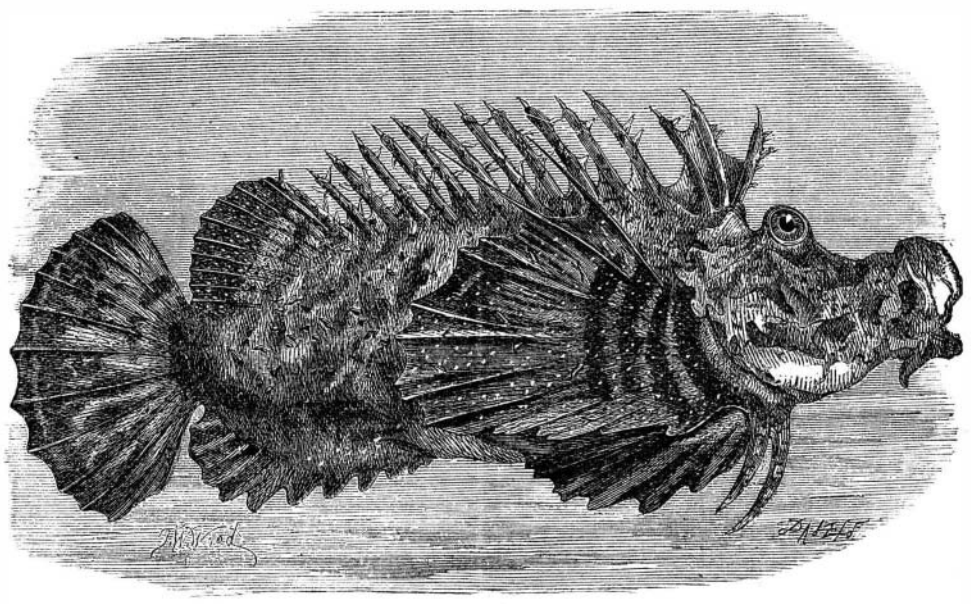


THE RED FIRE FISH.—(PTEROIS VOLITANS.)

THE FILAMENTOUS GURNARD.

The family of fishes known as *triglida* or gurnards are in many ways remarkable. Their colors are generally beautiful and often singularly brilliant; and their forms are various, some of them being almost repulsive. They are not strong swimmers, and therefore remain mostly in deep water; but some of them have large pectoral fins which enable them to leap from the water, and endure the air for a brief space. The mouth is mostly large, and the aspect is frequently repulsive.

The filamentous gurnard* (*pelor filamentosum*) is an instance of the capriciousness of Nature, being one of the strangest and most eccentric forms to be found in the annals of ichthyology; the head appears to be crushed out of shape, and is hung with scraps of depending skin. The body is armed with formidable looking spines, which are not suggestive of any purpose but that of self-defence. This gurnard is found in large numbers on the shores of the Mauritius. Its color is a light grayish brown, mottled with a dark shade of the same hue, and it is minutely spotted with white dots. Its usual food consists of crustaceans and molluscs, but pieces of cuttle fish have been found in its stomach. Possibly, the dreaded octopus has here found an enemy dangerous to meddle with, and one whose voracious appetite and defiant digestion may make him terrible in attack.



THE FILAMENTOUS GURNARD.—(PELOR FILAMENTOSUM.)

Sham Coffee.

We learn from a statement in the *Journal of the Chemical Society* that sham coffee is manufactured from tough dough, squeezed into little molds and baked until the color becomes dark enough to deceive the eye. Real coffee berries, when small and worthless, are improved in color by rolling them about with leaden bullets in a cask. The green berries, too, are treated by a coloring matter. In coffee sold ready ground, the difficulty of detecting adulterations is greatly increased; beans, beet root, carrots, and carrot-like roots are roasted and mixed in large quantities with the genuine article. In the south of Europe, especially in the provinces of Austria, figs are roasted in enormous quantities and sold as coffee.

The British Ironclad Fleet.

A discussion recently took place in the House of Lords, relative to the constitution of the ironclad fleet. Lord Dunsany moved for statistics as to the draft of water of the present sea-going ironclad vessels, especially with regard to their capability of passing through the Suez canal; and he called attention to the necessity of adequate dock accommodation for these large and heavy ships. He also stated that Italy is now having built some 100-tun guns, and armor plates of 22 inches thickness (as described in our last issue) are now being rolled for the same government. Attention was called to the Russian circular ironclad, already described and illustrated in these columns. On behalf of the government, it was stated that the recently built vessels, of all calibers, were especially constructed with a view to their passage through the Suez canal. Ample dock accommodation is already provided at Portsmouth, and additional docks are to be constructed at Devonport and in Ireland. It was suggested in the course of the discussion that, looking to the dangers of accidental collision of vessels fitted with rams, movable rams, to be used only in time of war, should be constructed.

*The engravings are selected from the Rev. J. G. Wood's "Illustrated Natural History."

Horse Power and Fuel Equivalent of Storms.

The *Bulletin of the American Iron and Steel Association* says: "One of the most severe wind storms prevailed throughout a large portion of our country the week before last, extending probably 500 miles. It is stated that it exerted a pressure of 30 lbs. per square foot, or $\frac{1}{5}$ lb. per square inch, and traveled at the rate of sixty six miles per hour. It is interesting to estimate the force of such a storm, and the resulting figures are truly startling. There are in a square mile 27,878,400 square feet, or 4,014,489,600 square inches. Assuming that the pressure of the storm was exerted for a half mile of vertical hight, we have for each mile in width of the track of the storm an area of 2,007,244,800 square inches, upon which the storm acted with a pressure of $\frac{1}{5}$ lb., and with a speed of 5,800 feet per minute. To find horse power we have the formula:

$$\frac{\text{Area in inches} \times \text{pressure in lbs.} \times \text{speed in feet per minute.}}{33{,}000}$$

And our calculation becomes:

$$\frac{2{,}007{,}244{,}800 \text{ square inches} \times \frac{1}{5} \text{ lb pressure} \times 5{,}800 \text{ feet.}}{33.000}$$

which gives, as a result, 70,557,700 horse power developed for each mile of breadth of the track of the storm. To produce the same horse power, with improved engines consuming but 2 lbs. of coal per hour per horse power, would require 63,000 gross tuns of coal. Assuming, as above, the track of the storm to be 500 miles wide, the hourly consumption of coal to generate an equal power would be at least 31,500,000 gross tuns, or one and a quarter times the annual product of the entire anthracite coal region.

Steam Domes on Boilers.

Mr. Thomas Hoge, of Waynesburgh, Pa., in commenting on our answer on this subject on page 171, current volume, states that, after many years' experience with boilers of all kinds, he is unable to find any practical appreciable advantage in the use of steam domes.

"Small-necked cast iron domes, so much used on portable boilers," he states, "are of no use so far as dryness of steam is concerned, even admitting that large-bottomed ones are; and domes are generally placed in about the worst place on the boiler to secure dry steam. Steam should always be taken from the back end of the boiler, or at the furthest possible place from where the most of the steam is generated.

'My experience and reading have led me to have less faith in the steam generating power of flues and to have more in that of the fire box or of the two or three rings of boiler immediately over the fire, in stationary boilers. The greatest amount of ebullition taking place from the fire box, there evidently will be the greatest amount of foam, spray, or water in other form, carried up with the steam, its upward current there being greatest; and the dome being gradually set right over this point, water goes directly into it with the current of steam; and if the neck or entrance to the dome is small (making in effect only a large swell in the steam pipe) the current of steam will there (in the neck) be so strong that no particle of water can ever descend through it while steam is being rapidly used, the only time when priming occurs. I believe that, usually, three fourths of the steam made in a boiler is made in the first third or half of the boiler. If, instead of drawing it off here, it were allowed to pass slowly back to the back end, and there enter the steam pipe, we should, in effect, convert nearly all the steam space along the top of the boiler into a steam dome"

The Use of Glass by the Chinese.

At the last session of the Commercial Geographic Commission, of France, held in Paris, M. Edward Rénard, a former delegate of the Department of Agriculture and Commerce for the extreme Eastern countries, made the following interesting communication: "The product of manufacture which I submit to the Commission is as little known among us as is the process employed in its manufacture, which requires great dexterity. The specimen I exhibit consists of a thin layer of colored glass, which appears to have been cast over a sheet of lead. Its production is a branch of industry which flourishes in many parts of the great and industrious city of Canton, and is practised in many places, even in the streets and in front of the houses, on a small scale.

"While in India and Burmah I was often surprised at the lustrous appearance of the domes on the Buddhist temples, which were covered with curved plates, colored violet, green, etc., or white and yellow, looking like bright silver and gold; and at a distance showing, with surprising brilliancy, a light having the appearance of an electric light, especially when seen from the sea. I was also often surprised to see the Chinese glassblowers, whose labor is ill paid, and who, notwithstanding this, show very remarkable results in their exercise of this curious industry, and who make these brilliant and multi-colored plates while exposed to wind and weather.

"A few days ago, I sent specimens of this singular product to M. Robert, the able director of the Sêvres porcelain works, and also to the savant M. Clemendot, whose thirty years service in the direction of our principal glass manufactories has made him the most competent man now in this line. I am confident that, thanks to these men and their investigations, we will be able in a short time to see the effects of such reflected lights in the ornamentation of kiosks and domes of various buildings, in the manufacture of reflectors for headlights, coast lighthouses, street lamps, and several other useful and practical purposes."

Ancient Trademarks.

Examples of the practice of using trademarks, to show the workmanship of various manufactures, have been discovered at Herculaneum, such signs having been in vogue among bakers and others. In modern times similar tokens have been adopted in textile and various other fabrics. The trademark is a recognized part of the system of commerce, by which a guarantee is given to the purchaser, and a legitimate protection afforded to the manufacturer. It is upon the uniform good quality of manufactured commodities that any foreign trade depends for its continuance; and (as the *Textile Manufacturer*, a London journal, says) it is in such cases that the use of trademarks is most useful.