NOTICE OF A NEW RIBBON FISH FROM THE COAST OF OREGON.

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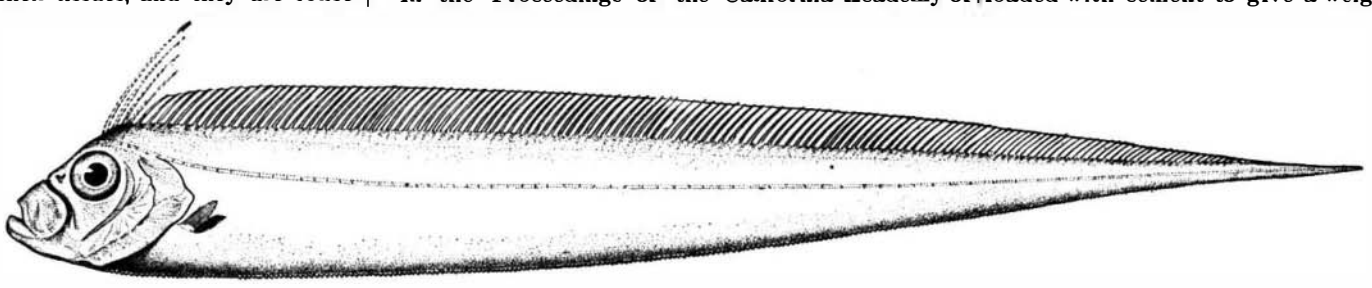
The ribbon fishes are among the most interesting and least known of the many remarkable fishes inhabiting the depths of the sea. Their large size, great fragility and habits make them very rare in collections. Their shape is bandlike; they are sometimes 20 feet long and only 10 or 12 inches deep, the thickness of the body being but a few inches. By some ichthyological writers, these fishes are supposed, from their shape and extraordinary length, to be the basis of "sea serpent" yarns. When they reach the surface of the water, the expansion of the contained gases causes the disintegration of their tissues, and they are consequently nearly always more or less mutilated when found. It is not known at what depth they live, and no specimens have ever been obtained by the use of the deep sea trawl or dredge. They are only discovered when floating dead at the surface or stranded on the shore.



NEW RIBBON FISH FROM THE COAST OF OREGON.

These fishes are very rare in American waters; they are not known to inhabit the waters of the western Atlantic, but have been taken on the coasts of Europe and at several places in the Pacific Ocean.

On the night of July 1, 1897, a large ribbon fish was taken in Rogue River, near Wedderburn, Oregon, at a point three-fourths of a mile above the river's mouth in water perfectly fresh. The fish was caught by being gilled in a salmon drift net and was alive when removed from the net. It was taken to Mr. R D. Hume, the well known salmon canner and cultivator, who recognized its rarity, but was unable to preserve it. He, however, employed an artist to make a sketch of it; took notes on its size, form, color, fins, scales, etc.; made a photograph of it; and forwarded drawing, photographic negative and information to the United States Fish Commission. While the failure to secure this specimen for examination and preservation is very unfortunate, the data on hand regarding it seem sufficiently complete to warrant this notice. Following is a description of the fish, which, in honor of its discoverer, it is proposed to name Trachypterus humei.

Body much elongated, moderately compressed, deepest and thickest at junction with head and tapering regularly backward, terminating in a point. Greatest depth, one-eighth total body length; dorsal and ventral outlines similar; ventral margin, minutely serrate.

Head short and deep; its length contained $7\frac{2}{3}$ times in total length of fish; its greatest depth, 6-7 of its length. Eye large, placed well forward; its diameter contained three times in length of head, once in snout. Mouth slightly oblique, exceedingly protractile, with no teeth on jaws Maxillary very short and broad—as broad as eye—the free margin rounded, extending slightly beyond anterior edge of eye. Mandible rather long; its length contained $1\frac{3}{5}$ times in head, extending to a point under posterior edge of pupil.

Dorsal fin very long and continuous, consisting of about 145 weak spines connected by an extremely delicate membrane, the fin beginning over a point half way between the posterior margin of eye and gill opening and extending to within six inches of end of body; the rays not much elevated, highest anteriorly and gradually becoming lower posteriorly, the first four or five rays produced (torn in specimen and actual length not known). Pectoral short and pointed, about as long as eye; anal and ventral fins absent; apparently no caudal fin, the body terminating in a rather sharp point and, in the specimen described, showing no indications of a fin.

Scales very small and numerous, their average diameter about $\frac{1}{8}$ of an inch. Lateral line smooth, conspicuous, complete and nearly straight. Color, uniformly bright silvery, without any markings.

The length of the fish was 6 feet 6 inches; its greatest depth was 10 inches; the largest part of the body was about $3\frac{1}{2}$ inches thick and the head was about a foot long. The flesh was very soft and flabby. The premaxillary bones were remarkably protractile, and after death readily permitted the elongation of the mouth downward until the length of the head was doubled, giving the appearance of a horse's head.

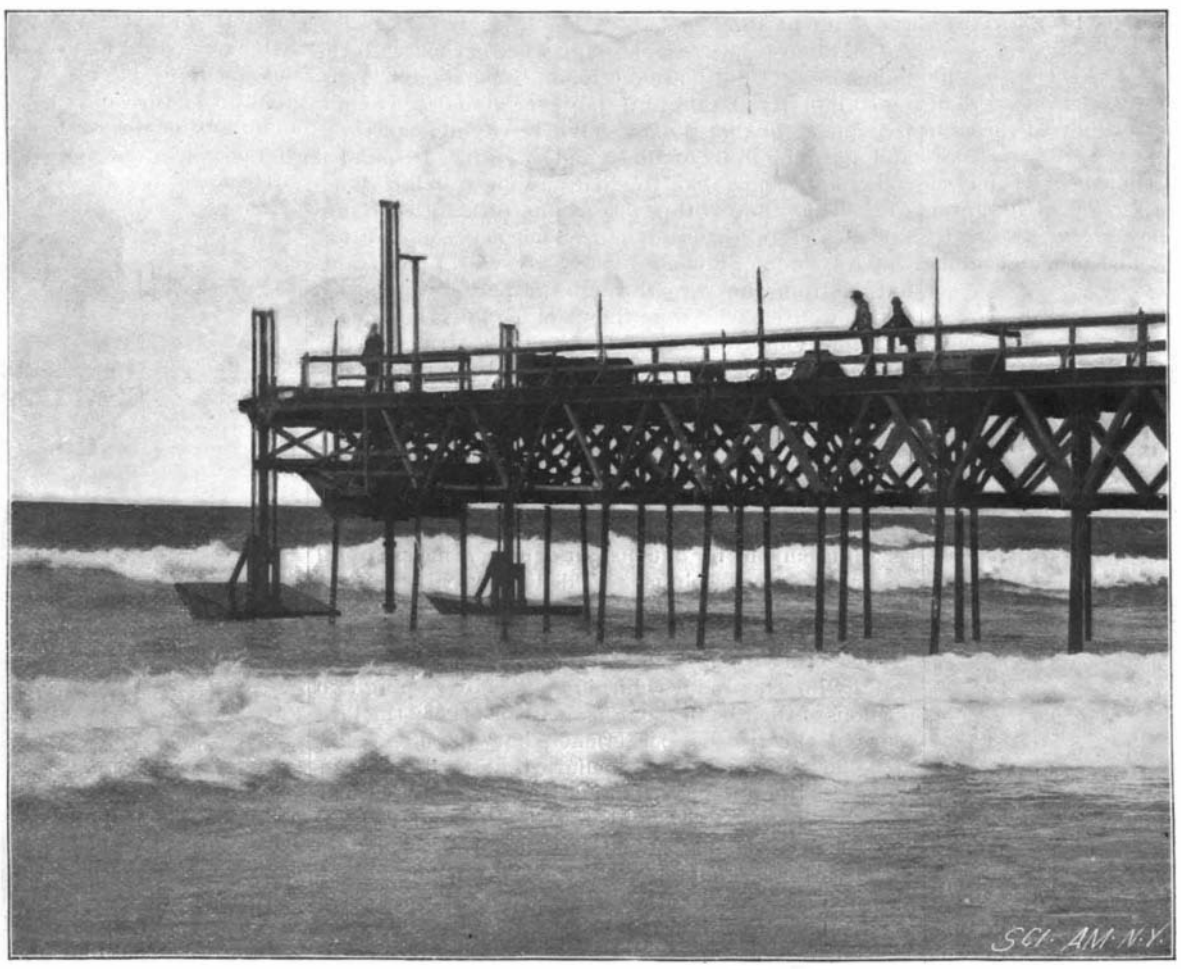
The specimen was a female, containing transparent, ripe eggs, of which a vialful was sent to Washington. The eggs are free, buoyant and one-seventh of an inch in diameter.

In the Proceedings of the California Academy of Sciences, vol. iv., 1893-4, Drs. Jordan and Gilbert have described a new ribbon fish (Trachypterus rex-salmonorum), based on a specimen 17 inches long, taken in the open sea off San Francisco Bay. This seems to be the only other species of Trachypterus known from American waters, the few specimens of ribbon fish previously taken on the Pacific coast of the United States and identified as Trachypterus altivelis probably being referable to T. rex-salmonorum. The Makah Indians, of the Northwest coast, are said to be acquainted with this fish. Among them it is known as the "king of the salmon," and its destruction is thought to have an injurious effect on the salmon fishing.

Trachypterus humei differs from the foregoing species in a number of essential particulars, among which are the absence of a fleshy crest on the nape, the lower dorsal fin, the absence of ventral fins, the shorter and wider maxillary, and the plain coloration, the other species being marked by large black or dusky blotches and bars on the body and head.

THE NEW WAVE MOTOR.

No one who has ever studied the wave movement of the ocean has failed to realize the millions of horse power being wasted daily along the various coasts of the country. The great difficulty has been to utilize this mighty power of the ocean waves so as to transform it into a steady, constant mechanical power. The problem is how to change the unsteady, intermittent power of the waves into a steady, constant power required for the operation of machinery and at the same time to prevent destruction of the plant during frequent periods of storm. The solution of this problem has engaged the attention of many inventors, and we give one of these solutions which appears to be successful. The Wright wave motor has been installed by the Los Angeles Ocean Power Company, which built its first experimental wharf at Potencia Beach, Cal., in January, 1897. Public tests were soon after made in the presence of many witnesses, and, encouraged by the results of these experiments, the company was organized in March of the same year, and they have expended $2,000 to extend and enlarge the plant. The wharf has a metallic structure which extends out about 350 feet into the ocean. At the outer end of this wharf or pier the wave motor plant was installed, consisting of three floats, and the other necessary machinery was situated on the bank. The motor is operated by a series of floats, 10 × 10 feet, made of planks or boiler iron and loaded with cement to give a weight twenty-five per cent greater than the displacement. The floats are connected directly to the piston of the water pump, and, as the floats are securely fastened by rollers to a perpendicular iron framework, they move only in a vertical plane actuated by the waves. The side of the float facing the incoming wave is inclined 30 degrees, so as to utilize the force of the wave to lift the float. The waves give a piston travel of 12 feet per minute on the average. The maximum travel per wave is 8 feet and the minimum is 6 inches. The waves average three to five per minute. The pistons operated by the floats have an area of 33 inches.



WAVE MOTOR AT POTENCIA, CALIFORNIA.

No power is taken when the floats rise, but the weight is utilized in the descent. This provides against any excessive pressure, as the floats will remain suspended when the pressure reaches 350 pounds. When the float descends, it forces water through an ordinary check valve into a reservoir on the bank. The reservoir has a large air space in the top. From this receiver the water is utilized at 200 to 400 pounds pressure. The pressure tank serves to equalize the power from wave to wave and in turn furnishes absolutely reliable and automatic means of regulating the power obtained; so that, during periods of excessive wave movement, as in storms, no more than a given amount of power can be obtained from this mechanism, and during times of danger it practically furls its own sails, as it were. This is done by the accumulated pressure in the pressure tank exerting itself upon the pump pistons so as to offset the weight of the floats tending to draw the pistons down. The water is forced by the compressed air in the tank through a nozzle upon the buckets of a Pelton water wheel, which it drives at a high rate of speed. The latter is connected with a dynamo, but, of course, other machinery may be substituted. From the Pelton wheel the water drops back into the reservoir from which it was originally pumped, and the same water is thus used over and over again without waste, thus reversing the old maxim that "the mill will never grind with the water that has passed." It is a curious example of the transformation of energy.

Each float develops about 2 to 3 horse power. From December 1st to the 16th the average number of waves was about six and the average piston travel was about 14 to 15 feet per minute. The average pressure developed in pounds per square inch was about 162. The average number of cubic feet per minute discharged per float was about 4. The horse power varied from 2·3 to 3·5. Nine electric lights were used to demonstrate the steadiness of the power. It is thought that motors to generate 1,000 horse power, including all of the construction work, without the electrical generators, would cost $110,000 on the Pacific coast and much less on the Atlantic coast. The promoters consider that power at the seaboard will not cost more than $13 per year per horse power, including six per cent on the investment.

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