SOME NEW FISHES.

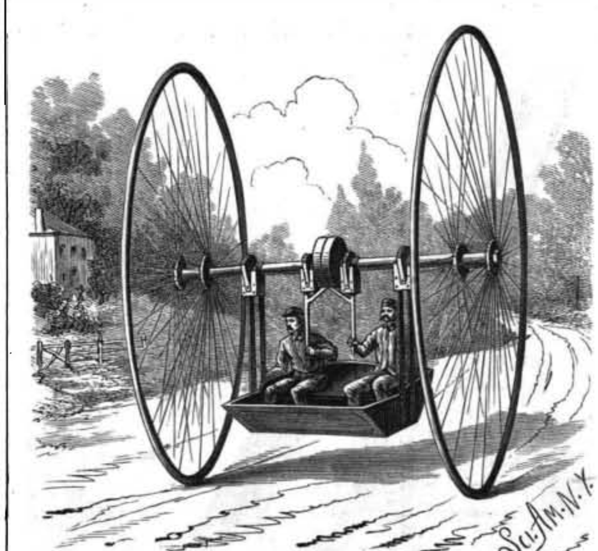
BY C. F. HOLDER.

During the past decade some extremely remarkable fishes have been added to the lists of those already known. Many of these are deep-sea forms, interesting and novel even to the specialist. The majority of these strange creatures were discovered by the Challenger and Talisman expeditions, the former having been sent out by the British government, while the latter was fitted out by France; and it is only fair to say that much has been accomplished by the United States Fish Commission in their dredging along our own shores, although the ground covered by the latter was extremely small when compared to that gone over by the large and fully equipped foreign expeditions.

Only a few years ago, naturalists were almost unanimous in the opinion that fishes could not live in the greater and abyssal depths of the ocean, and it seemed only necessary to mention the enormous pressure that must exist in deep water to show that they were right. Again, the argument was brought up that animal life could not exist below a depth where the sun's rays ceased to penetrate. These arguments have lost their force, however, in the light of recent discovery, and it is found that the very darkest and deepest portions of the ocean bed are peopled with animal life of some kind. How, then, can they withstand the pressure that powders glass in the instruments, hoists iron and copper, and rends and tears the ropes? A most casual examination of one of the extreme deep-sea fishes tells the story. Some, when taken from the water, actually fall to pieces; and although of large size, the types of oceanic carnivora, one and all, are adapted by a peculiar modification to their seemingly unnatural habitation. In short, these dwellers of the deep sea are literally put together in the flimsiest manner. Their bones are cavernous, porous, and apparently permeated with holes in every direction; so much so that a pin thrust at random into the bone will pass into one of these natural pits. In this way, the framework of the fish is enabled to withstand the enormous pressure. Water undoubtedly finds its way into all these crevices, and the pressure is equalized. Often the vertebræ are so loosely connected in large fishes that they drop apart when touched, showing how perfectly they are adapted to a life where the pressure amounts to two or three tons. The distribution of these fishes is interesting. Some genera are found at one level, say a mile, some at two miles, while others seem to rise and fall, passing from one level to another. This change, however, must be made very slowly, to enable the fish to adapt itself to its new surroundings. It is extremely difficult to realize the distances beneath the surface from which these fishes are taken. Imagine a body of water as deep as the distance between Tenth Street and the Arsenal building, Sixty-fourth Street and Central Park. Beneath that expanse of fluid (nearly three miles) is found the fish *Bathyophis ferox*. The genus *Echiostoma* lives at a depth of about two miles and a half from the surface. The naturalists of the Talisman dredged the fish *Alepocephalus rastralus* in water a mile and a half deep. The little luminous *Scopelus* was found in equally abyssal depths; *Lepidodermer macrops*, two miles; *Macrurus affius*, two miles and a quarter; and the list is a large one, many of the latter only visiting the depths given at times, and not having the fragile make up that distinguishes the true deep-sea forms. By the latter, I refer to those that habitually remain in the lower areas, such as the *Trachypteridæ*, *Plagyodus*, *Chiasmodus* (shown in the accompanying figure), *Melanocetus*, and *Saccopharynx*. These forms, though carnivorous, are often so fragile that they fall apart while being handled, and when compared with the surface fishes with which we are familiar, their bony and muscular parts seem but little able to stand the slightest exertion. The bones are extremely light, having very little calcareous matter in their make up, while the muscles appear to have degenerated to almost useless threads of tissue. From this it might be assumed that the fishes were delicate forms, not adapted for vigorous warfare. On the contrary, they are all carnivorous and rapacious in the extreme, undoubtedly moving about with great velocity, and preying upon their fellows in the deep sea.

Perhaps the most interesting feature in connection with some of these fishes is their manner of taking food or prey, and one of the most striking instances is shown in the accompanying figure, that represents the deep sea *Chiasmodus* swallowing a fish several times larger than itself. This would seem an impossibility, but even a casual examination serves to show that it is not more remarkable than the same thing in snakes.

The *Chiasmodus*, in the first place, is a luminous form, its fins and body at portions being covered with a layer or deposit of mucus that has the property of becoming luminous, so that the fish is a veritable finny lantern, and enabled to capture prey by its own light. Often the victims thus seized are several times the actual bulk of the eater, but, by a curious arrangement of the jaws, the enormous mouthful is easily mastered.



BROWN'S SWING BICYCLE.

In ordinary fishes that we are familiar with, deglutition is performed "by means of the muscles of the pharynx," but in the *Chiasmodus* there is an independent and alternate movement of the jaws, that the reader has perhaps noticed in our common snakes. When the *Chiasmodus* secures a hold upon its victim, it probably lengthens out, and if we could witness the operation, we would observe one side of the jaw move forward, and then the other, each advancing a little at every turn, the teeth taking hold at every move; and if we imagine this repeated continuously, it must be evident that the animal so operated upon must be hauled hand over hand, as it were, into the stomach of the *Chiasmodus*. This is exactly what occurs. The *Chiasmodus* hauls itself over its victim. It is evident that a large stomach would be a necessary adjunct for such an operation, and this we find to a remarkable degree in *Chiasmodus*, *Melanocetus*, etc.; the organ when distended depending from them like an enormous pouch, its size increased probably by the gases that generate during digestion.

A SMALL FISH THAT SWALLOWS A LARGER FISH.

The deep-sea fishes are supplied with lights and feelers, with which to capture their prey, and the former peculiarity is one of great interest, showing that even the deepest recesses of the sea are not the gloomy spots generally supposed, but have their living moons and stars. In some fishes the luminosity appears from the mucous envelope at random over the body, in others it is confined to phosphorescent plates arranged here and there or in groups. These organs have been described as "a sort of bi-convex transparent lens, closing externally a chamber filled with a transparent liquid. This chamber is furnished with a membrane of black color, formed of little hexagonal cells, much resembling the retina. It is connected with the nerves."

In *Scopelus* a luminous spot is seen, like a headlight, between the eyes, and in the deep-sea fish *Malacosteus niger*, extremely large plates are found directly beneath the eyes, while the *Stomias* has side plates. Equally strange are numbers of new fishes, as *Eurypharynx*, *Melanocetes*, and *Macrurus*, that seem to "run to head," that portion being extremely large and entirely out of proportion to the rest of the body. Thus, in the pelican fish, first mentioned, the mouth of the fish would hold its own body eight or ten times over.

The *Macrurus* is another strange form recently dredged. Its head and eyes are enormous when compared to the body, that dwindles away in an eel-like temination.

It is a matter of regret that the United States Government does not see fit to send out a well-equipped ship like the Challenger, so that our specialists might have as favorable opportunities as those of Europe. Some of the men-of-war lying at the navy yards might easily be fitted up for such work, and dispatched on a four or five years' cruise that would undoubtedly result in extremely valuable results to the nation and the cause of scientific education.

SWING BICYCLE.

The bicycle shown in the accompanying engraving is the invention of Mr. Nathaniel Brown, of Emporia, Kans. The wheels are secured to the outer ends of two hollow axles or shafts, which are mounted upon a central shaft, and are formed with ratchet wheels and friction disks. The seat is suspended by means of arms connected to centrally slotted straps passing over the axles; the ratchet wheels pass through the slots in the straps, and are engaged by spring pawls secured to the forward upper ends of the arms. In connection with each of the two other ratchet wheels is arranged a block, held to the hollow shaft by straps, and provided with a spring pawl engaging with the teeth of the ratchet. Pivoted in recesses in the lower ends of the blocks are lever arms, formed with inwardly extending fingers, arranged so that when the arms are swung toward each other upon their pivots, the fingers will be brought to bear against the faces of the friction disks.

The pulling of the levers downward starts the main wheels forward, and at the same time swings the seat forward, thus moving the pawls carried by the arms supporting the seat backward, and bringing them into engagement with teeth upon their ratchets, not so far advanced as were the teeth with which they were primarily engaged. As the levers are moved forward, the swing of the seat toward its normal position will act to advance the bicycle, and by so reciprocating the levers it will be seen that a pendulum motion will be imparted to the seat, which will, when once started, propel the machine for some time. When it is desired to turn the machine, say to the left, extra force is exerted upon the right hand lever, which will tend to drive the right hand wheel forward faster than the other; or the motion of the left hand wheel may be checked by moving the left hand lever so that its finger will bear against the friction disk. To stop the machine, both brakes are applied by moving the levers toward each other. The rider may stop at any desired point, when ascending a grade, and rest at ease, since any tendency of the machine to run backward would be counteracted by the weight of the seat.

Improved Telephone Wires.

The German Post Office is now using, to a considerable extent, the new anti-induction telephone cables made by Messrs. Felten & Guilleaume and others. The usual cable for overhead circuits contains wires of 27 to 30 mm. diam., each separately insulated, and wrapped on the outside with tin foil. The cable thus formed is surrounded with three naked copper wires, and sheathed with a lead covering. The whole is protected by a hemp taping and bitumen. These cables, when used for overhead circuits, are not strong enough to support themselves, and must be suspended from cast steel wires. The three naked copper wires, as well as the wrappings of tin foil, are all connected to earth. A smaller cable, containing only fourteen wires, is also manufactured. A large number of these cables are now erected throughout Berlin, and are used with satisfactory results.