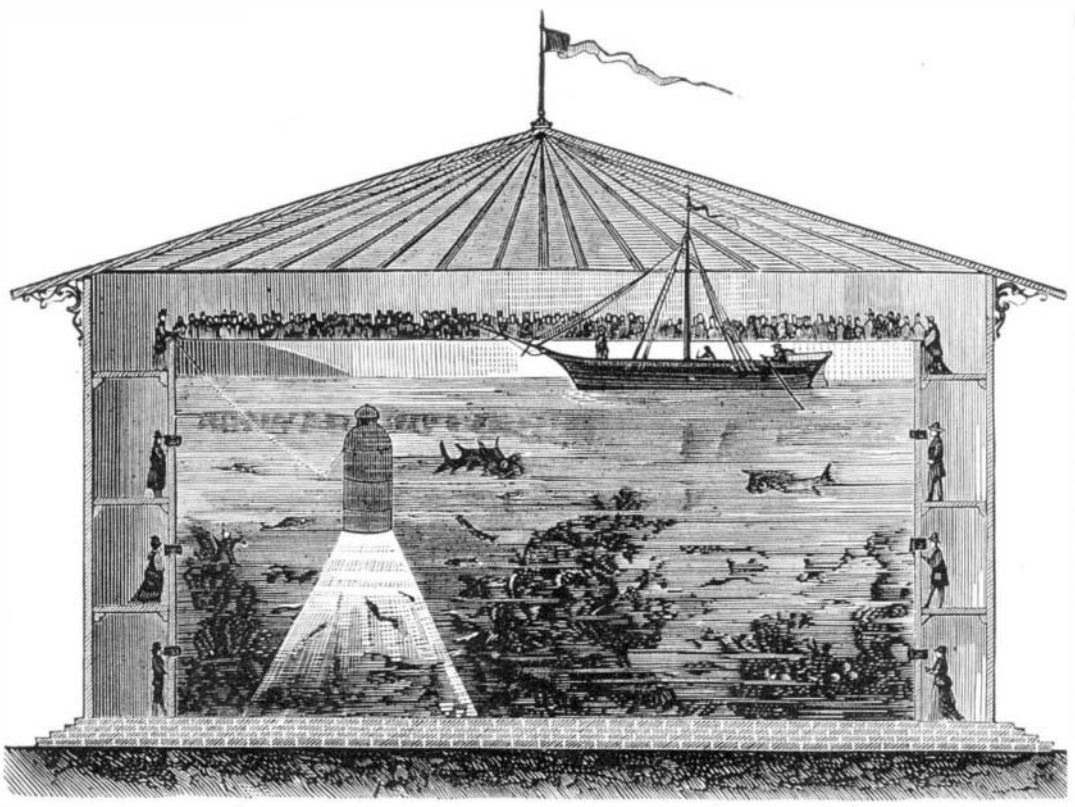
A COLOSSAL AQUARIUM.

M. Toselli, whose ingenious grappling irons and other marine apparatus we have frequently described, has devised an ingenious and novel plan for exhibiting his inventions under conditions of actual use, and in connection with a mammoth aquarium to be erected at the French International Exposition of 1878. He proposes to erect a circular iron edifice, some 32 feet in height, by 60 feet in diameter. In this will be a huge tank, which will be furnished with rocks and marine vegetation, and will contain a large number of fish of all kinds. On the sides of the tank, are to be inserted powerful lenses, and the annular space between tank and building will be divided into galleries, so that visitors in each gallery may look through lenses and thus view submarine life at various depths. In the tank will also be placed M. Toselli's submarine mole, a curious invention somewhat analogous to the diving bell, but which carries its own air supply and is capable of locomotion and also of illuminating the water in its vicinity by means of the electric light. After viewing the descent of this apparatus from the upper gallery, the visitor is to be conducted to the gallery next below. This corresponds to a descent of about 10 feet below the surface, at which point the water still retains its blue color. On the next floor below, a depth of 22 feet is reached, and here the water becomes green, the summits of the rocks on the bottom become visible, and the motions of the huge fish can plainly be followed. On the lowest floor, the visitor will be able to see the interior of the submarine mole as it rests on the bottom, and at the same time will view the sponges, corals, and other inhabitants of the ocean bed illuminated by the electric light.

M. Toselli will occasionally wreck a small vessel loaded with ten tons or so of stone, allow her to sink and then will raise her again by a new automatic apparatus, which he calls the air-hydric chain. Visitors will also be carried down in the submarine mole, which is large enough to accommodate four persons. The general construction and disposition of the tank and galleries will be understood from the annexed sectional view of the building, which we extract from the *Revue Industrielle.*



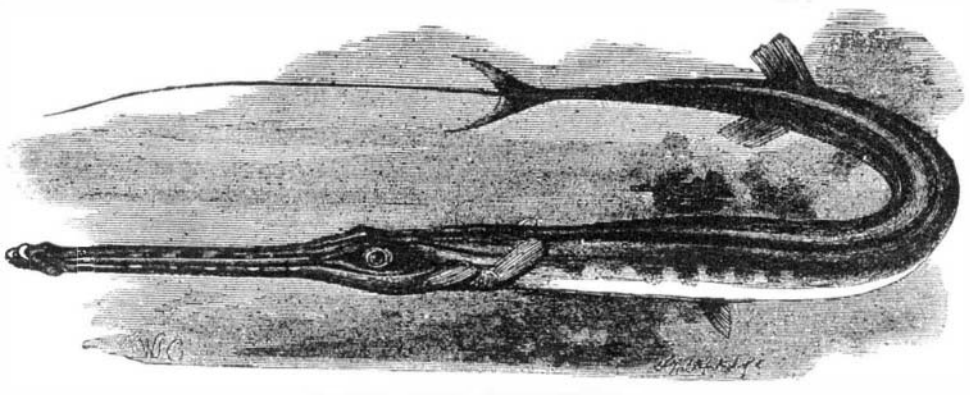
THE AQUARIUM FOR THE PARIS EXPOSITION, 1878.

A Cunning Old Fox.

A farmer near York, Pa., says the *Daily* of that town, recently set a trap to catch a fox which was making severe depredations in his hen roosts. At each of fourteen successive visits, he found the trap sprung, a stick of wood between its jaws, and the bait eaten up. The circumstance, so often repeated, surprised him. There were no other tracks to be seen but his own and those of the fox, and who sprung the trap was a question that puzzled him sorely. By continuing to rebait his trap he hoped to catch the author of the mischief. On the fifteenth night he found a fine old fox hung to it by the nose, and in his mouth was a stick of wood.

THE TOBACCO PIPE FISH.

In the remarkable tube of fishes known to zoölogists as *fistularidæ*, the snout is greatly prolonged as in the *centriscidæ* or spike-bearing fishes, and it bears the mouth at the end of a long tube. The body is long and snake-like, and there is no long spine to the dorsal fin. One of the most singular members of this family is the tobacco pipe fish shown in our engraving; it is found in many parts of the tropical Atlantic. The body is without scales, and the tail fin is deeply forked, the two central rays being sometimes united and prolonged into a lengthened filament, and at other times being separate, but still elongated. The outer edge of the tube is either smooth or very slightly notched. The color is greenish-olive and the upper parts of the body are marked with blue streaks and spots. In some specimens of this curious race, the back takes a reddish brown hue.



FISTULARIA TABACCARIA.

Iron Pyrites—"Fool's Gold."

The name pyrite is derived from *pur*, fire, and originally referred to the sparks produced by friction with steel. Pliny mentions several varieties of pyrites, and among them there is a kind resembling brass or copper; this was, in all probability, the substance now known as pyrites. But with it were confounded copper pyrites (chalcopyrite), marcasite, and pyrrholite, none of which produce sparks.

Pyrites occur abundantly in rocks of all ages, from the oldest crystalline to the most recent alluvial deposits. It usually occurs in small cubes, but sometimes in nodular or concreted masses, often radiated within. It is found both stalactitic and amorphous in form and veins, in clay-slate, argillaceous sandstones, the coal formation, etc. Cubical crystals of gigantic dimensions have been found in the Cornish mines, England, the island of Elba, and elsewhere. Nickel, cobalt, thallium, and copper sometimes replace a little of the iron in the pyrites, or else occur as mixtures; and, in auriferous districts, gold is sometimes present: distributed invisibly through it. Yellow and white or magnetic (marcasite) iron pyrites are dimorphous forms of the bisulphuret of iron (FeS_2); the first named is the most common of crystallized minerals. When in the form of minute scales it is very often taken for gold, although it is considerably lighter in color. It is nearly as hard as flint (from 6 to 6.5), of a pale brass yellow, nearly uniform in color; it is brittle, and gives out fire when struck with steel. It is represented by the formula FeS_2, and consists of sulphur 53.3, iron 46.7, parts in 100. Iron pyrites are chiefly prized as a source of sulphur, for making sulphuric acid, alum, Spanish brown, and copperas (sulphate or iron); and immense quantities of it are used in the arts for dyeing, etc. The sulphide is subjected either to a process of roasting or to slow oxidation (fermentation).

In Nature, pyrites readily change to sulphate of iron by oxidation, some sulphur being set free, also to limonite (on the surface), brown clay, ironstone (sometimes in concretionary nodules of brown and yellow ochre), and afterward throughout by the action of soluble bicarbonate of lime, which carries off the oxidized sulphur as sulphuric acid, with which the lime forms an almost insoluble salt. This salt is gypsum, the source of plaster of Paris. The limonite changes to red oxide of iron.

If a small fragment of pyrite be placed in a small narrow glass tube, closed at one end, and gradually heated over a spirit lamp, or in a Bunsen flame, a rapid decomposition will ensue; and the cool portions of the tube will immediately become encrusted with a sublimate of yellow sulphur. If, after subjecting the test fragment in the tube to the influence of the hot flame for a few minutes, and removing it from the tube by breaking the glass, it is presented to a small magnet or vertically poised compass needle, it will be found to have become possessed of strong magnetic properties. This is due to the artificial formation of magnetite (lodestone), a compound containing both the protoxide and sesquioxide of iron. If a fragment of pyrite be subjected, on a piece of charcoal, to the inner flame of a blowpipe, the blue flame of burning sulphur will be readily recognized, accompanied by the pungent and characteristic odor of sulphurous acid gas, which is evolved in large quantity from the burning sulphur. The residue, like that in the former experiment, will be found to be magnetic; but if subjected for a moment to the outer top of the flame it will lose this property, and become completely converted into the red or anhydrous sesquioxide of iron. Polished plates of the concretionary variety, as well as the small, perfectly formed cubical crystals of pyrites, have at times been employed as jewelry. It forms very beautiful ornaments; but the polished surfaces do not hold their lustre and brilliancy very well, unless protected by a film of varnish from contact with moist air. The compound is not worth working for its iron.

This *pseudo* gold, from its wide dissemination throughout the earth's crust, has caused more high-flown hopes and disappointments than any other mineral known to Science. From what has been said, it is obvious that the most elementary acquirements in the science of chemistry or metallurgy would suffice to dispel at once these delusive hopes. By the use of the true philosopher's stone, applied chemistry, thoughtful and enterprising investigators have at last succeeded in transforming even the common pyrites into gold, by extracting the useful constituent, sulphur. In view of the deceptive and pretentious appearance of pyrites to the eye of the unlearned, it has been well said that no more appropriate title could well be attached to the mineral than that by which it is most commonly known—"fool's gold."

Curious Inter-Fertilization of Pear Trees.

A curious instance of natural mingling of species recently came under our notice, which offers a valuable hint to fruit growers. In an enclosure some 50 feet wide by 150 feet long were set out, about nine years ago, a number of pear trees. Several varieties were included, notably the Bartlett, Sheldon's, Flemish Beauty, and other fine species, together with three or four trees which bore coarse, late ripening winter pears, scarcely fit for anything but cooking purposes. All the trees bore abundantly; and until the last two years the pears of each variety showed no change. Recently, however, and in a more marked degree during last summer than during 1875, it was found that all the fine pears were slowly becoming of a single hybrid species, or rather series of modifications, of the winter pears. The Bartletts especially are showing the characteristics of the winter pears in a remarkable manner, and the "puckery" taste of the latter is especially observable. It is curious that the active part is taken by the winter pears in influencing the others, while they themselves, as yet, show no modification. The question is, how could the winter pear exert this predominating influence, not only over the trees in its immediate neighborhood, but over others at the opposite end of the enclosure. It is, of course, probable, that while the trees were in blossom, the pollen of the winter pear flowers was transported to the flowers of the other trees. The phenomenon is in any event doubly suggestive: first, in that it is an instance of a new species being gradually formed by the action of Nature; and second, in that it indicates to fruit growers the danger in placing fine pear trees in proximity to those of inferior variety.

Human Leather.

The question is whether, in this age of utilization, we are going to allow the bodies of the dead to remain unutilized. Although the majority of mankind will doubtless promptly dispose of this not over agreeable consideration by an unequivocal affirmative, two shoemakers in this city think otherwise; and they exhibit a handsome pair of boots made from human leather in support of their views. The skin was furnished from the front and back of a dissecting room subject, who had died suddenly from accident, and upon whom decay had not yet begun to act. It was placed in a solution of hemlock and white oak barks, and, after the tanning, which lasted three weeks, emerged in the shape of a soft, pliable, light brown leather, like fine calf skin, but more porous. The available skin on a good sized man, says these progressive Crispins, will make the legs and uppers of two pair of boots after allowing for reasonable waste. This is the second utilization that has been proposed. The other was to cremate the bodies in gas retorts, and to convert the volatile matter into illuminating gas, and the bones into phosphates.

Asphalt Tiles.

At the Bavarian Industrial Museum there has recently been exhibited a new kind of flooring tiles made from asphalt, in a very simple way. The drawing of the intended design is first made on coarse heavy paper. Then it is covered with bits of china and glass, so as to form a mosaic. Lastly, a border is made to the sheet, and liquid asphalt is poured upon it. After the whole has been covered, the paper is taken away with cold water, and the tile is finished. This flooring is said to be handsome in appearance, and to resist damp for an indefinite period of time.