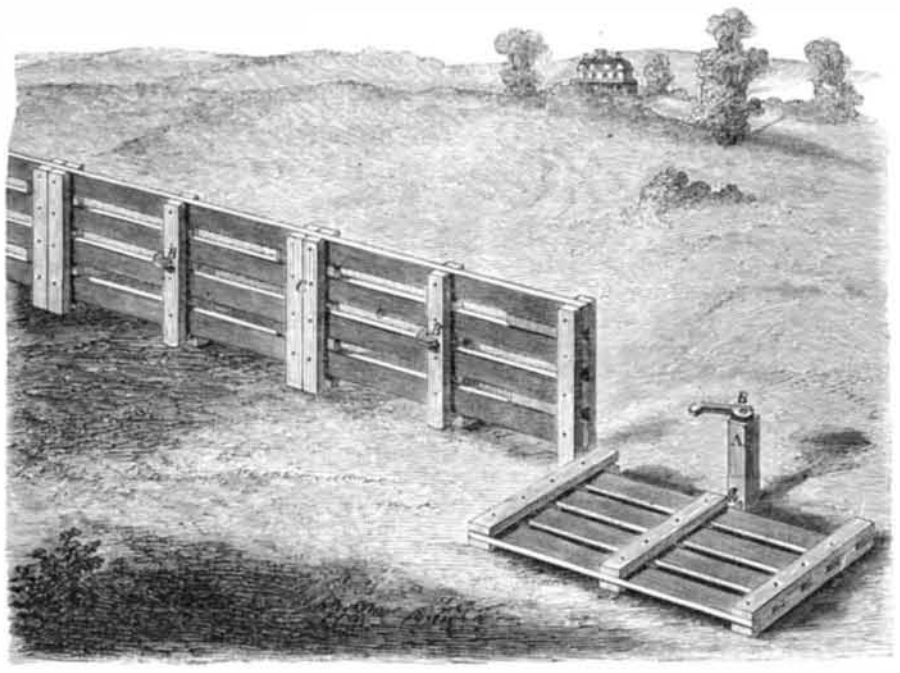
Improved Fence for Submerged Lands.

Throughout the country there are alluvial lands, which, while possessing a rich soil, are kept from yielding any benefit to the cultivator by the certain, or uncertain, contingency of an annual overflow. In many cases dyking is too expensive a process, and when an overflow or freshet occurs, fences, and even outhouses and barns are swept away by the flood. To protect fences, under such circumstances, from being carried away by the flood, is the object of the device illustrated in the engraving.

The permanent posts are quite low, as seen at A, and are firmly seated in the ground. The sections of fence are linked or hinged to these parts, and held in an upright position by means of a latch or catch, B, either of wood or metal, pivoted to the top of the post, and engaging with the middle upright of the section. The sections are secured one to the other by means of wooden keys, or wedges, seen at C, which lock the line together and make a secure and rigid fence. The short posts sustain the whole weight of the fence.

When the water rises, and there is danger of a destructive overflow, the keys may be driven out and the fence be allowed to fall flat on the ground, the sections being prevented from being carried away by their connection with the posts. The prostration of the fence need not be effected until the water is half way up the hight of the fence, when the work can be done by means of a boat. It is evident that in some situations such a device would be invaluable.



BOWLUS' LAY-DOWN FENCE.

It was patented through the Scientific American Patent Agency, Aug 20, 1867, by L. H. Bowlus, who may be addressed relative thereto at Knoxville, Tenn. The entire patent, or State rights for sale.

Lapis Lazuli.

The name of this mineral is derived from the Persian language, and means blue color, or, with the Latin prefix, blue stone. The ancients were well acquainted with it, and have employed it as a substitute for other gems. The Greeks and Romans are said to have called it by the name of sapphire, denominating that with specks of iron pyrites the *sapphirus regilus* ; Pliny called it the *cyanus*. It was formally used as a strengthening medicine.

Lapis lazuli very seldom occurs crystallized ; its regular form is the oblique four-sided prism ; it mostly occurs compact, and in grains and spects, with an uneven and conchoidal fracture ; it is translucent on the edges ; its luster is nearly vitreous and shining ; structure foliated ; its color is fine azure blue, with different shades, often interspersed with spots and veins of pyrites. It scratches glass, but is attacked by quartz and by the file ; its specific gravity is 2·3 ; before the blowpipe and on charcoal it with difficulty runs into a white glass, but with borax it fuses with effervescence into a limpid glass, It consists of lime, magnesia, and silex, with soda, protoxide of iron, and sulphuric acid.

It is generally called in trade, the Armenian stone.

It is found in gangues of the older formations, and in Bucharia ; it exists in granite rocks, and is disseminated in all veins of thin capacity ; on the Baikal Lake it is found in solid pieces ; also, in Siberia, Thibet, China, Chili, and Great Bucharia. Lapis lazuli is much used for jewelry, such as rings, pins, crosses, ear-rings, etc. The best pieces are generally cut out from larger lumps by means of copper saws and emery, then ground with emery on a lead wheel, and polished with rotten stone on a tin wheel. The rocks which yield lapis lazuli, where it is contained in specks, are likewise cut for ornamental purposes, such as snuff-boxes, vases, candlesticks, cups, columns, cane-heads, etc. ; also, for architectural ornaments and stone mosaic ; the larger specimens, having specks regularly disseminated on a white ground of the rock, are those selected for cutting. The most important use of this mineral is that of furnishing the celebrated and beautiful pigment called ultramarine blue, used by painters in oil, and said never to fade. The lapis lazuli takes a very high polish, but becomes dull again after being used for some time. It is sometimes imitated by lazulite (azure stone), or blue carbonate of copper, which, however, is not near so hard, and effervesces on testing with nitric acid. Those specimens having iron pyrites inclosed are difficult to polish well, on account of the unequal hardness of the two minerals.

Lapis lazuli has lately been discovered in California, but the color of the mineral from this locality is very indifferent, and its price is therefore much inferior to that from Persia.

The value of lapis lazuli, although depending upon its purity, intensity of color, and size, has nevertheless much diminished when compared with its former prices.

The Chinese, who have for a long time employed lapsis lazuli in their porcelain painting, call the pure and sky-blue stone *zuisang*, and the dark blue, with disseminated iron pyrites, the *tchingtchang*, preferring the the latter to the former ; they work the same for many ornaments, such as vases, snuff boxes, buttons, and cups. In the palace which Catharine II. built for her favorite, Orlof, at St. Petersburg, there are some apartments entirely lined with lapis lazuli, which forms a most magnificent decoration.

The process of preparing ultramarine was known as early as the fifteenth century. The color is now mostly prepared at Rome, in the following manner : those pieces which are free from pyrites specks, are first calcined and pulverized ; the powder is then formed into a mass with a resinous cement (*pastello*), and fused at a strong heat ; this is then worked with the hands in soft water, whereby the finest coloring particles are disengaged in the water, which will soon be impregnated with the blue color ; a fresh portion of water then taken, and the same operation is continued until the remains are colorless. The ultramarine, after a short time, settles to the bottom of the vessels and is carefully separated and dried. If the lapis lazuli be of the best quality, the product will be from two to three per cent. That color which remains yet in the mass is of an inferior quality, and is called the ultramarine ashes ; it is of a paler and more reddish color.

Good ultramarine has a silky touch, and its specific gravity is 2·36. It does not lose its color if exposed to heat, but is soon discolored by acids, and forms a jelly. In order to distinguish the pure ultramarine from numerous spurious and adulterating coloring materials, such as indigo, Prussian blue, mineral blue, etc., it is only necessary to test the article in question with some acid, when after a few minutes the real ultramarine is discolored, yielding a clear solution and a white residuum. The real ultramarine has always been at a very high price, on account of the small product obtained from the mineral. An ounce of the purest ultramarine is sold in France for two hundred to two hundred and fifty francs, which is not within the reach of all painters.

In the year 1828, the discovery was made by Professor Gmelin, in Tubingen, that sulphuret of soda was the proper material for imitating this precious and valuable pigment. By his experiments he succeeded in preparing this substance from silex, alumina, soda, and sulphur, producing a color in every respect corresponding with the true color of the lapis lazuli, and bearing the same relation to acids as the genuine ultramarine. This, for economy, has become a great object to painters and color men, since a whole pound of it may be purchased in France for twenty francs. As it bids fair to meet with a great consumption, being even substituted for cobalt in bluing paper, thread, and other stuffs, several manufacturers have already been induced to engage largely in its preparation ; and there is now a very extensive establishment in full operation by M. Guimet, three leagues from Lyons, who likewise claims the priority of its discovery : the royal porcelain manufactory at Meissen, in Saxony, also prepares it. The process for making the artificial ultramarine, as it was first described by Gmelin, is here given, as it was published in the *Annales de Chimie.* The whole process is divided into three parts :

1. The pure hydrate of silica is prepared by fusing fine pulverized quartz or pure sand with four times its own weight of salt of tartar, dissoling the fused mass in water and precipitating by muriatic acid ; also the hydrate of alumina is prepared from alum in solution, precipitated by ammonia.

2. Dissolve the silex so obtained in a hot solution of caustic soda, and add to seventy parts of the pure silex seventy-two parts of alumina ; then evaporate these substances until a moist powder remains.

3. In a covered Hessian crucible, a mixture of dried sal soda, one part to two parts of sulphur, is heated gradually, until it is fully fused, and to the fused mass add small quantities of the earthy precipitate, taking care not to throw in fresh quantities until all the vapors have ceased ; after standing for an hour in the fire, remove the crucible, and allow it to cool. It now contains the oltramarine, mixed with an excess of sulphuret, which is to be removed by levigation ; and if the sulphuret is still in excess, it is to be expelled by moderate heat. Should the color not be uniform, levigation is the only remedy.—*Feuchtwanger.*

Science Familiarly Illustrated.

Leeches.

This animal has had a reputation from the earliest periods of medical science. Even from the time of Homer, the appellation of leech was given to the practitioners of the art of surgery, and in many of the languages of German derivation the word signifying a physician is identical with that given to the leech. From an English exchange we gather the following facts relative to the life and habits of this species of aquatic worm, which is indeed among the lowest classes of the animal chain of being :—

"There are about thirteen or fourteen species of the leech, some of which are found in most parts of the world ; but the medicinal species is best known, and abounds in various parts of the world—as America, Russia, Hungary, Spain, Portugal, in the marshy plains of Egypt, and in various parts of Asia. It belongs to the class *annelides*, or ringed worms, its body being composed of a series of rings, or circular muscles, by the successive contraction of which it moves along either in the water or upon the surface of leaves, reeds, or other solid bodies. The tail extremity is in the form of a cup, or sucker, by which it adheres firmly to flat substances, on the same principle as a boy's leather sucker adheres to and lifts up a stone. The mouth is also in the form of a sucker, and is, moreover, furnished with three cartillaginous teeth, placed so as to form with each other a triangle. When examined and felt with the point of a finger, they seem soft and blunt ; but the animal, when about to pierce the skin, seems to have the power of erecting them into firm, sharp-edged lancets, which saw through the integuments in a single instant, and almost without inflicting any pain. Having made the puncture, the blood is extracted by a process of suction, and is passed through the œsphagus into the stomach, or rather stomachs, of the animal, which consist of a series of communicating cells, that occupy the greater part of the interior of its body. The leech having thus gorged itself to the utmost, if undisturbed, remains in a half-torpid condition till it has digested its gory meal, and not unfrequently dies of the surfeit. If it survives it will be greatly increased in size. They can live for months and years on what appears to be pure water alone. This forms the singular circumstance in the diet of these animals. They delight to gorge themselves with a full meal of blood, even to surfeit ; and yet with plain water they live, grow, and seem to have the greatest enjoyment of existence. It would appear as if their three lance-formed teeth, and their carniverous appetites, were bestowed more for the benefit of man than for themselves, and that, in their system of dietetics water is the rule and blood the exception.

The medicinal leech is a native of many parts of Britain, but is now becoming very rare. France is supplied chiefly from Strasburg, whence they are imported from Hungary, Turkey, Wallachia and Russia, and kept in ponds. They are carried into France on spring wagons, and are contained in moistened bags, each bag containing 120 leeches. Previous to 1834 upward of 46,000,000 of leeches were imported into France annually. At present the numbers have decreased to 17,000,000. They are imported into London and Leith by sea, packed in little bags, which are occasionally moistened with water during the short voyage. In general they arrive fresh and healthy ; but they are not unfrequently liable to disease, which destroys great numbers. There are three sorts, or sizes, the largest and middle sorts being reckoned the best. A large leech is calculated to abstract half an ounce of blood, besides the quantity which flows from the wound afterward. The smaller sizes are comparatively inefficacious.

A common animal in the pools of this country is the horse leech. It nearly resembles the other, but is of a more uniform color, and not so decidedly marked with greenish streaks on the backs as the medicinal species. The horse leech has no great inclination to fasten on the human skin, but when it does so it takes its fill, just like the other, and no more. There is a popular but unfounded belief that if a leech of this description do fasten on the skin, it will continue to suck and discharge the blood till every drop in the body is exhausted. Hence they are the dread of every school boy who happens to wade with naked legs into their dominions.

The leech, like many other animals, appears to have a very nice sensibility in regard to atmospheric changes, and especially what regards the electric modifications of the air. Before storms, or any sudden change in the atmosphere, the leech is seen in great activity, and darting up to the surface of the water in its jar. These animals, too, at certain times, are found to move out of the water, and remain for a considerable period clustered on the dry upper surface of the jar ; while on other occasions they will remain for days immersed in the water near the bottom. They produce small eggs, which form into cocoons, from which in due time the living young make their appearance.

Grindstone Grit as a Substitute for Fire Brick.

Mr. Ludwig Wolf, who has charge of a number of the tempering furnaces in the ax factory at Collinsville, Conn., says that "noticing the great amount of fire brick required to keep them in order, I thought of using grindstone grit—of which we have a large quantity—knowing the adhesive quality of the grit. I tried it, and found it to work well. It does not last so long as fire brick, but it keeps the fire cleaner than the brick, and does not form clinkers so fast. I do not know if it will work as well in fires where a heavy blast is required, but if it will it is cheap enough, as for other purposes it has little value."

Silica is the principal ingredient of grindstone grit, together with oxide of iron. It would appear to be well adapted for lining such furnaces as our correspondent manages.