The pier at Herne Bay, England, three-quarters of a mile in length, was designed by the distinguished T. Telford, C. E., and was built of timber in 1831. After standing seven years the timber piles were found so much injured by the worm that it was decided to use cast iron to a great extent in its repairs. Accordingly a large number of square cast-iron piles were driven down in 1838. These were examined recently by Mr. Webb, and found in a perfect state. The angles of the piles were sharp, and the surface as smooth and sound as when the castings left the foundry. About half of the piles only are of cast iron, and upon these not a penny has been expended since they were put down. The wooden piles have nearly all been cut down by the sea worm, and have required constant repairs and renewals. Mr. Telford had proposed cast iron in the first place for the piles of this pier, and had those been used, the whole structure would have been as sound to-day as when it was constructed. With the exception of the cast-iron piles which have been in the sea water 23 years uninjured, this pier may be termed a ruin. In the extension of Southend Pier, England, by James Simpson, C. E., in 1844, cast-iron piles were used. These have been under sea water for 17 years, and are perfectly uninjured.

As some kinds of cast iron become soft when exposed to water and in damp situations, the kind of metal to be used for docks and piers forms a most important consideration, as it is an undoubted fact that the several cases cited prove that cast iron has withstood the action of sea water perfectly for periods ranging from seventeen to forty years. With respect to the quality which should be employed in sea water, Mr. Webb states that James Simpson, C. E , the successful constructor of one of the piers mentioned, stated that grey cast iron, having a good surface, experienced little injury from the action of sea water. Iron composed of large crystals, and especially if these are irregular, is subject to rapid deterioration in sea water. The softer the iron, the greater is its liability to decomposition. A quality of iron between the limits of extreme softness on the one hand and extreme hardness on the other should be selected by the engineer. Hard cast iron is the most durable, but when very hard it is too brittle. Chilled cast iron corrodes faster than green-sand castings. The glazed skin produced by the sand of the mold in casting should be carefully protected from being broken, cut with a tool or otherwise removed, when the casting is to be placed under sea water. This glazed skin is like a coating of unchangeable silica. Lead, copper, and all metals less oxidizable than iron should not be permitted to come in contact with it, because a positive and negative metal, connected together in water, form a galvanic pile, and the positive metal then oxidizes with great rapidity.

PRESENT CONDITION OF THE "ROANOKE."

As some erroneous statements are going the rounds of the press concerning the iron-clad battery *Roanoke*, we paid a visit to the Novelty Works a few days since, in order to ascertain the facts in the case. The vessel is at present completely covered with her armor, as far as the hull is concerned, with the exception of one or two pieces on the sides; the plates are not beaten with immense sledges, nor are they of the same thickness in all parts, there being a vast difference between the bow and stern, and the side armor above the water line. The deck plating of 1½ inches is being placed in position as fast as possible, but the operations are tedious, involving the execution of many details, such as handling the plates, drilling or punching, and then relaying them. The turrets (three in number) are being bored for the guns; some of the ports are all finished. They are cut out of the solid eleven-inch wall by a machine rigged up for the purpose. The first cut makes a hole 15 inches in diameter; as the ports are oblong, however, there are two holes bored, and the space intervening removed by the same tool, which is necessarily very strongly made and powerful in its action. It runs continually without cessation. In fact all the work is prosecuted with the utmost vigor at all times—night and day, Sundays not excepted. A large force of men are in attendance doing all that can be done. It is undecided as yet whether the gun ports will be enlarged any from the original drawing. So far as regards the *Roanoke's* draft of water, it is less now than it was when she was a wooden frigate, so much has the removal of the guns, spars, top-hamper and two decks relieved her. When fully rigged she formerly drew at least, twenty feet of water; whereas at the present time, with her side armor all on board, and a great part of the deck plating and turret machinery (without the turrets, however), her present draft is 16½ feet forward, and nearly 20 feet aft. She will probably come down to the 20-foot mark, as the ram is fixed at that line.

The turrets are finished but are not set up on deck. Large quantities of additional machinery are being made for the *Roanoke*, such as condensers, turret engines, blowing engines, pumps, &c., these will occupy much time in their execution, and it is thought the frigate cannot be got ready before the expiration of three months at the earliest.

The Novelty Works are also busily engaged on the engines for the Italian iron-clads now building by Wm. H. Webb, Esq., in his yard at the foot of Sixth street. These are very massive engines in their design and execution; being much the same as those furnished to the *Grand Admiral* now in the Russian Navy. Two large beam engines of respectively 100 and 105 inches diameter of cylinder, and 12 feet stroke, are also in hand for the Pacific Mail Company, and, under the able superintendence of the foreman, Mr. James Van Riper, are progressing rapidly.

VALUABLE RECEIPTS.

Composition for Leather.—One of the very best compounds known to us for rendering leather boots and shoes almost perfectly water-proof, and at the same time keeping them soft and pliable, is composed of fresh beef tallow, half an ounce, yellow bees-wax, one ounce and one-eighth of an ounce of shellac. Melt the tallow first and then remove all the membrane from it; add the bees-wax in thin shavings and when it is melted and combined with the tallow, add the shellac in powder and stir until it is melted. Bees-wax is one of the best known preservatives of leather. This compound should be applied warm to the boot or shoe, and the soles should receive a similar application to the uppers. In using it a rag or a piece of sponge should be employed, and the boot or shoe held cautiously before the fire or stove until the compound soaks into it. Care must be exercised not to expose the leather too close to the fire. If the boot be blackened and brushed until it becomes glossy before the application of this preparation it will remain black and shining for a long period after it is applied. A little vegetable tar mixed with the foregoing composition makes it more adhesive and improves its quality for walking among snow. A liberal application of this composition every two weeks during winter will keep boots and shoes that are worn daily water-proof and soft.

Glazed Leather.—The basis for glazed or what is called "enameled leather" is boiled linseed oil. The oil is prepared by boiling it with metallic oxides, such as litharge (oxide of lead) and white copperas (sulphate of zinc) until it acquires a sirupy consistency. Five gallons of linseed oil are boiled with 4½ pounds of white lead and the same weight of litharge until the whole becomes thick like cream. This mixture is then combined with chalk in powder, or with yellow ocher, is spread upon the leather and worked into the pores with appropriate tools. Three thin coats are thus applied, each dried before the other is put on, and when the last is perfectly dry the surface is rubbed down with pumice-stone until it is quite smooth. A mixture of the prepared oil without ocher or chalk, but rendered black with ivory-black and thinned with turpentine, is now put on in one or two thin coats according to circumstances; then dried. The final coating consists of boiled linseed oil and copal varnish thinned with turpentine and colored with lamp-black. The apartment in which such leather is dried is maintained at a temperature ranging from 134° to 170° Fah. White enamelled leather is prepared in the same manner; but white lead and chalk is exclusively used to thicken the oil. Copal varnish colored with lamp-black, will make very good enameled leather if it is put on in several thin coats and dried after each application.

Preparing Kid Leather.—Yelk of egg is largely used in the preparation of kid leather for gloves in France, to give it the requisite softness and elasticity. The treatment of the skins in this manner is called by the French glove-makers *nourriture*. As a substitute for the yelk of egg the brains of certain animals, which in chemical nature closely resemble the yelk of egg, have been used. For this purpose the brain is mixed with hot water, passed through a sieve, and then made into dough with flour and the lye of wood ashes. The glove leather is also steeped for a short period in a weak solution of alum. The Indians of our forests employ the brains of deer and buffalo, mixed with a weak lye of wood ashes, and after this they smoke the skins; the pyroligneous acid of the wood in the smoke accomplishes the same object as the alum used by the French skin-dressers. Indian-prepared skins stand the action of water in a superior manner to French kid. Furs dressed in the same manner resist the attacks of insects. It is believed that the carbolic acid in the smoke is the preservative principle which renders the skins tanned by the Indians superior to those tanned with alum and sumac in the usual way. The skins are rubbed with the mixture of the brains of the animals and the lye by the squaws; then dried in the open air. Three and four such applications are necessary before they are smoked in pits covered with the bark of trees.

Tanning Nets, Sails and Cordage.—The cloth of awnings, sails, also nets and cordage may be prepared in a simple manner to endure for a far greater length of time than is usual with such articles. Take about 100 pounds of oak or hemlock bark, and boil it in 90 gallons of water until the quantity is reduced to 70 gallons; then take out the bark and steep the cloth, sails or cordage in the clear liquor for about twelve hours; then take it out and dry it thoroughly in the atmosphere or in a warm apartment. The cloth should be entirely covered with the tan liquor, and should lie loose in it, so as not to press the folds too closely together. By boiling the cloth or cordage in the tan liquor it will be ready in a shorter period. Sail and awning cloth so prepared will resist the action of damp for years in situations where unprepared cloth will decay in a few months.

FOREIGN SCIENTIFIC ITEMS.

French Aniline Colors.—A complicated law trial has lately terminated in France on suits for the infringement of the patent of M. Renard, of Lyons, for manufacturing *rouge d' aniline*. One of the pleas of the defense was that this color had been discovered by Professor Hoffman, of London, and an account of it published six months before Renard's patent was taken out. Upon evidence it was shown that Professor Hoffman while making some experiments submitted one part of bichloride of carbon and three parts of aniline for thirty hours to a heat of 180° in sealed tubes, and casually noticed that a substance of a splendid crimson remained in dissolution, but he took no very special notice of it then. Renard not only produced the color and applied it to dyeing, but discovered several agents for producing this aniline red, and took out a series of patents for each discovery. He exhibited at the International Exhibition and received two medals—one in the class of dye-stuffs, the other for chemical productions. The following is the pedigree of aniline colors:—Coal, when distilled, produces tar; distilled tar produces benzine; benzine, treated with nitric acid, produces nitro-benzine; nitro-benzine, treated by certain reagents and notably by hydrogen, produces aniline; aniline, treated by reagents (under divers patents), produces fuchsine, azaleine, analeine, &c.; fuchsine, azaleine, analeine, &c., treated by ammoniacal agents, produce the pure coloring principle or rosaniline. Fuchsine, azaleine and analeine are the different salts of this one base—rosaniline. The French court decided in favor of Renard's patent, and awarded him several thousand francs in damages.

An Ancient Oven containing Loaves.—A correspondent of the London *Athenæum*, writing from Naples, states that a baker's oven was lately discovered in Pompeii. He was present when the iron door of the oven was removed, and he says: "We were rewarded with the sight of an entire batch of loaves which were deposited in the oven seventeen hundred and eighty-three years ago! They are eighty-two in number, and are, so far as regards form, size and