Engineering and Miscellaneous.

A New Preservative Process, of very general applicability for preserving plants and animals, has been devised by Herr Wickerscheimer, preparator in the Zoötomical Museum of Berlin, and has been deemed of such value that the patent has been purchased by the Prussian Government and given to the public. The procedure was presented and described in detail before one of the late meetings of the Academy of Natural Sciences, of Philadelphia, where it attracted considerable attention. The following is an abstract of the specification of the inventor: "I prepare a fluid, with which I impregnate the object to be preserved in different ways, according to its nature or the purpose I have in view. The bodies of men and animals preserved by this process retain perfectly their form, color, and suppleness, so that we may take sections from them years afterward, for the purposes of science or of criminal justice. Under its operation, corruption, and the insalubrious odours produced thereby, cease. The muscular tissue presents, on cutting it, a condition like that of a fresh body. Finished preparations of selected parts, as the ligaments, lungs, intestines, etc., preserve their softness and flexibility, and the hollow parts may be even blown out. The parts of bugs, crustaceans, and worms remain movable, without exception. The colours may be made to remain perfect, if it is desired, in animal as well as vegetable bodies. The preserving fluid is prepared as follows: In 3,000 grams (45,500 grains) of boiling water, dissolve 100 grams (1,550 grains) of alum, 25 grams (387 grains) of common salt, 12 grams (186 grains) of saltpetre, 60 grams (930 grains) of potash, and 10 grams (150 grains) of arsenious acid. To ten quarts of the neutral, colourless, and odourless fluid, add four quarts of glycerine and one quart of methyl alcohol. The process of preservation, which is applicable to the dead bodies of men, dead animals, and vegetables, as well as to single parts of the same, consists, to speak generally, in soaking them and impregnating them with this mixture. If the preparations are to be preserved dry, they are kept in the fluid for from six to twelve days, according to their size, then taken out, and dried in the air. The ligaments of skeletons, the muscles, crustaceans, bugs, etc., will then remain soft and pliable, so that all the natural movements can be produced on them at any time. * * * * If it is desired to preserve smaller animals, like lizards and frogs, and vegetables, with their colours unchanged, they should not be dried, but should be kept in the fluid. If bodies of men or beasts are to lie for a considerable time before being used for scientific purposes, it is enough to infect [inject? —Ed.] them with the preservative fluid. For this purpose, I apply, according to the size of the object, one and a half liters (about three pints) of the fluid for a child of two years, and five liters (or quarts) for a grown person. The muscles will appear then, even after the lapse of years, fresh when cut. If the infected [injected?] bodies are kept in the air, they will lose their fresh appearance, and the epidermis will become somewhat brown, but that may be avoided if the body is rubbed on the outside with the fluid, and is then kept shut up in an air-tight case. The last method is recommended in the case of corpses which are to be kept for sometime before they are buried, when, instead of having the usual stiff look, the features and color will seem fresh and unchanged, and the bodies will not have a trace of odour. * * * * The treatment in different cases is governed by circumstances, but the composition of the preserving fluid is always the same."

An Improved Method of Remaining Under Water for a considerable time—from twenty minutes to an hour—without the encumbrance of the apparatus at present used by divers engaged in sub-aqueous work, is described by Dr. B. W. Richardson, a well-known writer on topics pertaining to sanitary engineering. The method in question does away with the drawbacks and dangers of the present apparatus in common use, by dispensing entirely with the air-tubes and pumps now employed. The new process was exhibited at the "Royal Polytechnic Institute," in London, where it was closely examined by Dr. Richardson, who makes substantially the following report of it in London *Nature*:

The peculiarity of the method consists in the diver taking a full supply of air-food down with him, which dispenses with pumpimg, no help being needed, except a signal man and cord. Mr. Fleuss, the inventor, showed the apparatus in operation. He descends into the water in an ordinary diver's dress, consisting of helmet, breast-plate, and common water-tight armings and leggings. On his shoulders he carries a weight of 96 pounds and on his boots 20 pounds.

A light cord is attached to the helmet for signaling to the attendant above. Before the mask is closed and the helmet adjusted, an "ori-nasal mouth-piece," with a breathing-tube of an inch bore proceeding downward, is firmly tied over the mouth and nose.

Dr. Richardson makes the statement that he was witness of, and carefully observed, two experiments, and that the diver assured him that when under water he breathed as freely and easily as when in the air. The duration of these two experiments was respectively twenty minutes and one hour.

The assertions of the diver were confirmed by his appearance and condition at the end of the longest experiment. He moved about on the floor of the tank, picked up coins, and could lie down and get up without difficulty. The exact mode by which breathing is effected, though evidently very simple, is still kept a secret by the inventor; but, whatever it may be, it is manifestly carried on wholly within the apparatus, so completely, in fact, that not even the *expired air* is visible in the water.

Dr. Richardson concludes that these facts demonstrate that, without any assistance from above, a man without any previous experience in diving can take down with him sufficient oxygen to live there easily for an hour. The diver is reported to have asserted that, but for the cold, he could easily arrange to stay down for four hours. He is also credited with the statement that depth would make no difference as to breathing within the apparatus. Dr. Richardson is quite enthusiastic over the practical possibilities of this invention. He concludes that, if a man can thus take his stock of breathing material with him, and live for hours without external access to air, he may extend the field of his industries and investigations into the deep sea, or into the most rarified atmospheres; into mines filled with choke-damp, or amid the suffocating smoke of conflagrations, without fear of consequences.

The Tunneling of the Simplon.—From the present indications, the St. Gothard tunnel will not have long to boast the proud distinction of being the most notable work of engineering on the continent of Europe, as the same reasons which called it into existence will most probably give birth to another and even greater rival in the projected tunnel through the Simplon.

The object to be secured by this work is to establish a more direct line of communication between France and Italy than is now afforded by the Mont Cenis route, and thus to retain for France the bulk of the traffic, which, it is feared, will be diverted from the latter route by the more direct St. Gothard route. The Simplon tunnel, if ever completed, would be not less than 12 miles in length, as compared with the 9½ miles of the St. Gothard, and 7½ miles of the Mont Cenis tunnel. The Simplon project is being strongly urged, and its actual undertaking in the near future seems to be quite probable.

Shop Cleanliness.—The clear thinking founder of Methodism said that "cleanliness is next to godliness," and if the axiom is not the basis of Methodism it is the basis of method. If there is anything that collects dirt—attracts dirt—faster than a tramp, it is machinery, and it is the worst of ill usage that limits the life of machinery. Some time ago the management of a certain railroad ordered a cessation of the cleaning of its locomotives, with a view to save the cotton waste, labor and time used. The experiment was not successful. There is no machine from a locomotive to a watch, but needs occasional cleaning. Dirt interferes with motion and destroys material. It is a constant annoyance to the workman in the shop as well as the woman in the house. But in the shop there is danger added to annoyance. The danger arises from the presence of heaps of refuse, iron and steel chips and shavings, oil and waste, either of them inflammable alone, and combined are the source of more than one "incendiary" fire. Under favorable conditions—heat and moisture—a heap of chips from the machine shop will generate hydrogen gas in sufficient quantities to take fire when mixed with atmospheric air. Of course, the oil and fragments make a perfect tinder box of such debris. The shop sweepings should be placed under cover awey from valuable property, and the shop and its tools should be kept clean, if for no other reason than that of comfort.—*Ex.*

The Weight of Cast Iron.—The following letter is clipped from a late number of *Iron*, of London: "I shall be glad if any correspondent can inform me if there is any reason to suppose the weight of cast iron was greater 60 or 80 years ago, as manufactured then, than it is now, or not? The School of Naval Architecture at this time takes cast iron in its calculations as weighing 447 lbs, to the cubic foot, but I find in Sir Howard Douglas' work on Gunnery that the size of cannon balls about