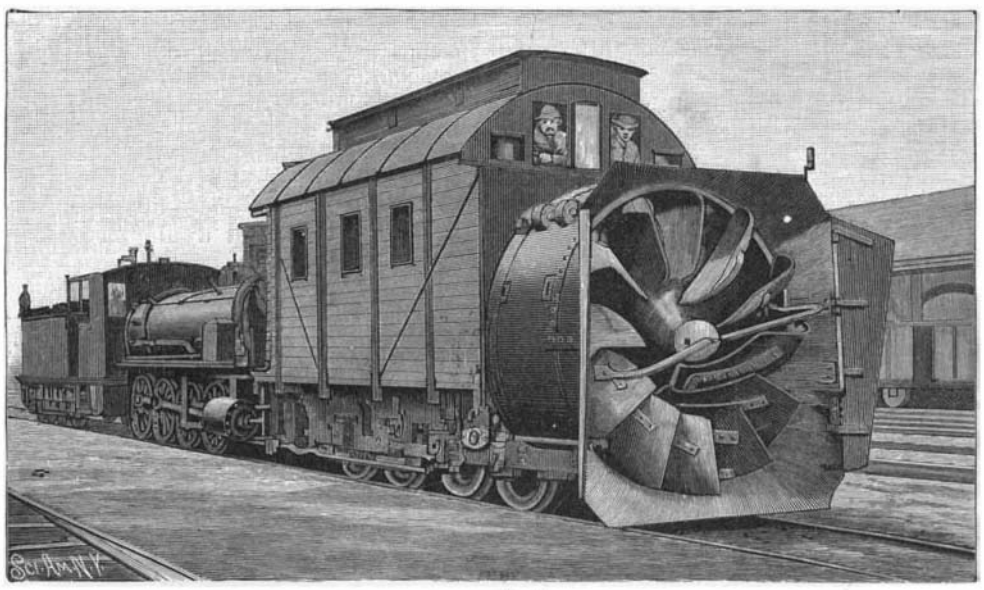
LOCOMOTIVE SNOW PLOWS IN EUROPE.

Owing to the heavy snowfalls during winter the lines in central Europe are greatly interfered with in their traffic; in the north of England, the running of trains is often interrupted during the first fortnight of February; and in Scotland a passenger train, blockaded by snow, sometimes has to stop in the open country for an entire night.

This has called attention to the measures to be taken to prevent railway tracks from becoming buried under snow as the result of severe storms.

At present we have fences, and small masonry walls, or what are called "snow fenders"; and also snow barriers, such especially as those used upon the Cape Cod section of the New York, New Haven and Hartford Railroad. In Saxony, still another arrangement has been devised to prevent the accumulation of snow upon rails and in cuttings. This consists of finely meshed nets of iron wire, expanded metal (metal deployé), or even of cocoa fiber, which have interstices of about 1¼ inches and are strung in lengths of 13 feet by 5 feet in height. They are fastened at the top and bottom to ropes stretched between poles, similarly to a tennis net. Old railway ties often serve as the poles. This net opposes no obstacle to the wind, although it perfectly arrests the snow.



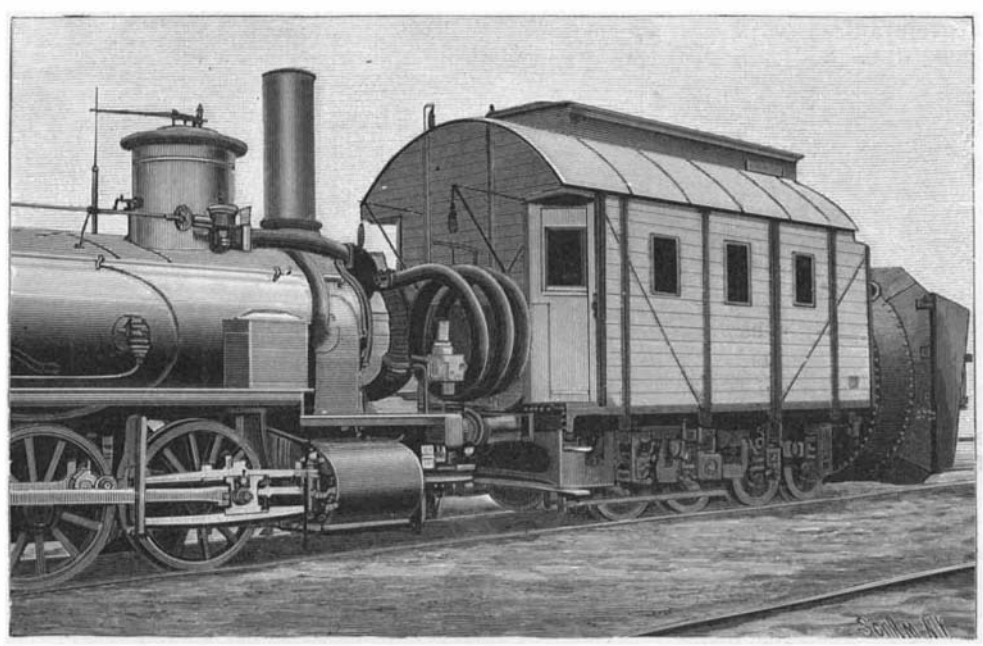
FORM OF ROTARY SNOW PLOW USED ON HUNGARIAN RAILROADS.

When the means of protection are unable to resist the snow, plows of the common type are mounted temporarily upon the locomotives. These attachments may be dismounted when it is so desired. They do very effective work at a speed of 24 miles an hour, when the snow does not exceed a depth of 20 inches. But if the heaps of snow are unmanageable, cover everything, and fill up in the cuttings, recourse has to be had to more powerful means, to the centrifugal snow plow, a machine invented in the United States by Mr. Rocca as long ago as 1887, and subsequently improved.

The most important part of this snow plow is a vane-wheel, mounted on a shaft, driven by a twin engine, the cranks of which are placed at right angles to each other.

An iron bar screwed to the head of the shaft, the two ends of which are secured to two of the blades, serves to break up the snow. The rapidly rotating vanes collect the snow and hurl it across a skirt secured to the periphery of the drum containing the wheel. The skirt can be vertically inclined to an angle of 45°. The engine is constructed for an effective pressure of 150 pounds. The diameter of the cylinder and the length of the stroke are both 22 inches. The bladed wheel has a maximum speed of 180 revolutions per minute. Steam is supplied from the locomotive by a coiled copper pipe. Another pipe of similar form permits part of the steam to escape from the cylinders of the engine used in driving the plow, and pass out of the exhaust in the smoke-box of the locomotive. A steam pipe, branching from the main pipe, enters the drum and melts the accumulation of snow, which would tend to clog the machine.

Tests made on the Hungarian lines showed that freshly fallen snow not more than 7 feet high can be easily cleared away. The trajectory described by the discharged stream of snow is 150 feet long and 50 feet high. If the skirt is inclined 60° the height of the trajectory is 65 feet; but the distance is reduced to 100 feet.



REAR VIEW OF PLOW, SHOWING COILED COPPER STEAM PIPE.

The consumption of steam is great; the locomotive can furnish the necessary amount only for ten minutes at a time, and must then stop to generate a fresh supply. When the snow is more than 7 feet high, it is often necessary to use two or even three locomotives; under these conditions steam can be furnished only for five minutes at a time, by the locomotive used for the purpose.

German Hydraulic Plant.

One of the most recent of the German hydraulic plants is that which has been erected at Marbach, utilizing the force of the Neckar. The station will give 400 horse power at low water and 1,100 at average level. Four turbines of 13½ feet are used, placed side by side; the height of fall varies from 8½ to 10 feet. The turbines have been made at the Voth factory, of Heidenheim, and the electrical apparatus by the Schuckert Company, of Nuremberg. To each turbine is connected directly an alternate current dynamo giving 11,000 volts. The electrical energy is transmitted to Stuttgart, a distance of 12 miles, mainly by overhead conductor, which extends as far as Prag, where a sub-station has been established; the tension is reduced from 10,000 to 3,000 volts, and two cables lead to the second sub-station of Stockach and to the main station in Marienstrasse; in both the latter a part of the alternating current is transformed to direct current.

Chronic Brass Poison.

Metallic poisoning in its various forms is quite frequent in certain industries. It is specially common in those employed in lead works and with painters who use lead colors. Those who use hair dyes and cosmetics containing lead also frequently suffer, and water passing through new lead pipes also is responsible for some cases. Other forms of metallic poisoning are less common. Copper poisoning is not generally observed, although it may occur in those engaged in operations in which either the metal itself, or its alloy with zinc, namely brass, enters. A study has been made of this condition as it occurs among artisans in brass in Birmingham, England, and The Medical Record recently contained an editorial upon the subject, from which we glean the following:

The patient is likely to be a young workman, presenting a more or less markedly anxious expression, with a thin and haggard face, a sallow complexion and an unhealthy and wasted appearance. He complains of gradual loss of strength, of a dry and hacking cough, and cold sweats, pain in the chest, loss of appetite, and progressive emaciation in addition raises a suspicion of pulmonary tuberculosis. The nature of the disorder is not clear, and treatment fails to give relief. An examination of the teeth shows a typical green line, probably due to deposition of copper. As the disease progresses emaciation becomes conspicuous, with loss of strength and tremor. Headache is almost always present, as well as neuralgia. As a rule, digestive disturbances are present, with loss of appetite and occasional nausea and vomiting. There may be a dry, tickling cough. Symptoms of catarrh are not uncommon, and there is a sense of dryness or discomfort or contraction in the throat and a metallic taste. A feeling of oppression or nervousness, sometimes intense, is common, also repeated attacks of faintness and sinking in the morning or at work. There is profuse perspiration, staining the linen, the hair is green, and there also are many other bad features of the disease, but phosphorus pills and dilute phosphoric acid yielded satisfactory results. The use of milk as a beverage was found to be of distinct advantage.

Utilization of Sugar Beet Waste as Manure.

No satisfactory process has been found until recently for utilizing waste materials which accumulate so rapidly in German beet sugar factories. The problems which were the most difficult to solve were how to reduce to a useful form the valuable ingredients remaining in the mass, how to obviate the unpleasant odors, and to dispose of the dangerous waste water. These difficulties were particularly felt in establishments which produce sugar or alcohol from molasses, the residuum, known as brown lye or molasses dregs, being a waste substance which it was found difficult to dispose of satisfactorily. When emptied into rivers, through sewers, it resulted in the death of fish. When the lye was reduced chemically the products of combustion escaping from the chimney made offensive odors in the neighborhood. It was found that the manuring of fields with waste materials of this sort is advantageous because the soil thus receives back in easily assimilable form useful matter of which the beet deprived it in its growth, especially potassium and nitrogen. This molasses lye cannot now be conveniently used with manure, owing to the large quantity of water which it contains, which makes its transportation too expensive. It cannot be used in its concentrated form on account of its inconveniently stiff and sirupy form. A process has been invented which obviates all the difficulties named above. Molasses lye is changed into a dry substance, which can be stored and eventually easily scattered over the field.

The United States consul at Magdeburg states that a recent issue of The Hanover Journal of Agriculture and Forestry gives the following analysis of the product: Nitrogen, 3·22 per cent, of which 2·74 per cent is nitrogen soluble in water (of this 0·7 per cent is ammonia nitrogen and 0·09 per cent saltpeter nitrogen); phosphoric acid, 0·13 per cent, of which 0·04 per cent is phosphoric acid soluble in water; potash (soluble), 10·74 per cent; carbonate of lime, 25·99 per cent.

The value of the manure is 3·05 marks (72·59 cents) per centner (110 pounds). It is said that molasses sugar refineries and molasses distilleries will be able to secure higher net profits from this manure than now result from the manufacture of saline and potash, and that the process is of considerable value from a hygienic standpoint. The inventor believes that the application of the process can be extended to waste materials of other industries, and perhaps also to sewage matter.

English Red.

Iron oxide is a material of considerable importance, though not wanted in very large quantities, as a polishing agent for glass, etc., and also as a coloring matter. It is not used in the pure state, but the admixtures and impurities must be restricted to within certain limits. It is a bye-product from the manufacture of sulphuric acid, alum, and of vitriol from pyrites. Hardness and fineness are the chief requisites. In testing such natural or artificial preparations, the substance is not further ground, but dissolved in hydrochloric acid, and the iron, aluminium, calcium, magnesium, and copper contained in the filtrate are determined. The residue is essentially silica; further mica, quartz, feldspar, substances which can be distinguished under the microscope, and which give clues as to the origin of the material. Good English red is an expensive substance, and should contain a high percentage of iron oxide, 90 per cent and more. No hard impurities can be tolerated.

A New Fruit.

A new fruit was recently exhibited to the Fellows of the Royal Horticultural Society, in London. The plant bearing it is a hybrid between the raspberry and the common blackberry. The taste of the fruit combines the flavors of the dewberry with that of the raspberry, and it comes into bearing as the raspberries are failing.