Emery.

There are many who use emery every day, but who do not know where it comes from, or how it is manufactured for use. We have recent accounts of emery discoveries in Minesota, but nearly all that is used at present in the arts comes from Turkey, near ancient Smyrna. Dr. Lawrence Smith, the American Geologist, made a discovery of a deposit of emery while residing in Smyrna, and he made an examination of the locality in 1847.

Dr. Smith having reported his discoveries to the Turkish government, a commission of inquiry was instituted, and the business soon assumed a mercantile form. The monopoly of the emery of Turkey was sold to a mercantile house in Smyrna, and since then the price has diminished in the market.

The mining of the emery is of the simplest character. The natural decomposition of the rock in which it occurs facilitates its extraction. The rock decomposes into an earth in which the emery is found imbedded. The quantity procured under these circumstances is so great that it is rarely necessary to explore the rock. The earth in the neighborhood of the block is almost always of a red color, and serves as an indication to those who are in search of the mineral. Sometimes, before beginning to excavate, the spots are sounded by an iron rod with a steel point, and when any resistance is met with, the rod is rubbed in contact with the resisting body, and the effect produced on the point enables a practiced eye to decide whether it has been done by emery or not. The blocks which are of a convenient size, are transported in their natural state but are frequently broken by large hammers; when they resist the action of the hammer they are subjected to the action of fire for several hours, and on cooling they most commonly yield to blows. It sometimes happens that large masses are abandoned, from the impossibility of breaking them into pieces of a convenient size, as the transportation either on camels or horses requires that pieces shall not exceed 100 lbs. each in weight.

Emery appears to be a mechanical mixture of corundum and oxide of iron.

When reduced to a powder, it varies in color from dark grey to black. The color of its powder affords no indication of its commercial value. The powder examined under the microscope shows the distinct existence of two minerals, corundum and oxide of iron Emery when moistened always affords a very strong argillaceous odor. Its hardness is its most important property in its application to the arts, and was ascertained by Mr. Smith in the following manner:—Fragments are broken from the piece to be examined, and crushed in a diamond mortar with two or three blows of a hammer, then thrown into a sieve with 400 holes to the inch. The powder is then weighed, and the hardness tested with a circular piece of glass, about 4 inches in diameter, and a small agate mortar. The glass is first weighed, and placed on a piece of glazed paper; the pulverized emery is then thrown upon it at intervals, rubbing it aginst the glass with the bottom of the agate mortar. The emery is brushed off the glass from time to time with a feather, and when all the emery had been made to pass once over the glass, it was collected, and passed through the same operation three or four times. The glass was then weighed, again subjected to the same operation, the emery by this time being reduced to an impalpable powder. This series of operations is continued until the loss sustained by the glass is exceedingly small. The total loss in the glass is then noted, and when all the specimens of emery are submitted to this operation under the same circumstances, an exact idea of their relative hardness is obtained. The advantages of using glass and agate are, that the latter is sufficiently hard to crush the emery, and in a certain space of time to reduce it to such an impalpable state, that it has no longer any sensible effect on the glass; and, on the other hand, the glass is soft enough to lose during this time sufficient of its substance to allow of accurate comparative results. By this method, the best emery was found capable of wearing away about half of its weight of common French window-glass. The blue sapphire of Ceylon, pulverized and experimented with in this manner, wears away more than four fifths of its weight. This furnished the standard of comparison.

In the ordinary process, the lumps of emery ore are broken up in the same manner as stone is for repairing macadamized roads, and into lumps of similar size. These lumps are then crushed under stampers, such as are used for pounding metallic ores, driven by water or by steam power. It is supposed that the stampers leave the fragments more angular than they would be if they were ground under runners, a mode which is sometimes employed. The coarse powder is then sifted through sieves of wire cloth, which are generally cylindrical, like the bolting-cylinders of corn-mills; but the sieves are covered with wire-cloth, having in general about 90 to 16 wires to the inch. No. 16 sieve gives emery of about the size of mustard-seed; and coarser fragments, extending nearly to the size of peppercorns, are also occasionally prepared for the use of engineers. The sieves have sometimes as many as 120 wires in the inch; but the very fine sizes of emery are more commonly sifted through lawn sieves. The finest emery that is obtained from the manufacturers is that which floats in the atmosphere of the stamping-room, and is deposited on the beams and shelves, from which it is occasionally collected. The manufacturers rarely or never wash the emery; this is mostly done by the glass-workers, and such others as require a greater degree of precision than can be obtained by sifting.

Washing emery by hand is far too tedious for those who require very large quantities of emery, such as the manufacturers of plate-glass and some others, who generally adopt the following method:—Twelve or more cylinders of sheet copper, of the common height of about two feet, and varying from about 3, 5, 8, to 30 or 40 inches in diameter, are placed exactly level, and communicating at their upper edges, each to the next, by small troughs or channels; the largest vessel has also a waste-pipe near the top. At the commencement of the process, the cylinders are all filled to the brim with clean water; the pulverized emery is then churned up with abundance of water in another vessel, and allowed to run into the smallest or the 3-inch cylinder, through a tube opposite the gutter leading to the second cylinder. The water during its short passage across the 3-inch cylinder, deposits in that vessel such of the coarsest emery as will not bear suspension for that limited time; the particles next finer are deposited in the 5-inch cylinder, during the somewhat longer time the mixed stream takes in passing the brim of that vessel; and so on.—Eventually the water forms a very languid eddy in the largest cylinder, and deposits therein the very fine particles that have remained in suspension until this period; and the water, lastly, escapes by the waste pipe nearly or entirely free from emery. In this simple arrangement, time is also the measure of the particles respectively deposited in the manufacture to which the emery is applied. When the vessels are to a certain degree filled with emery, the process is stopped, the vessels are emptied, the emery is carefully dried and laid by, and the process is recommenced.

Emery-paper is prepared by brushing the paper over with thin glue, and dusting the emery powder over it from a sieve. There are about six degrees of coarseness. Sieves with 30 and 90 meshes per linear inch, are in general the coarsest and finest sizes employed. When used by artizans, the emery-paper is commonly wrapped around a file or a slip of wood, and applied just like a file, with or without oil, according to circumstances. The emery paper cuts more smoothly with oil, but leaves the work dull.

Emery cloth only differs from emery paper in the use of thin cotton cloth instead of paper, as the material upon which the emery is fixed by means of glue. The emery-cloth when folded around a file, does not ply so readily to it as emery-paper, and is apt to unroll.—Hence smiths, engineers, and others, prefer emery-paper and emery-sticks; but for household and other purposes, where the hand alone is used, the greater durability of the cloth is advantageous.

Emery-sticks are rods of board about 8 to 12 inches long, planed up square, or with one side rounded like a half-round file. Nails are driven into each end of the stick as temporary handles, they are then brushed over one at a time with thin glue, and dabbed at all parts in a heap of emery-powder, and knocked on one end to shake off the excess. Two coats of glue and emery are generally used. The emery sticks are much more economical than emery-paper wrapped on a file, which is liable to be torn.

Emery-cake consists of emery mixed with is a little beeswax, so as to constitute a solid lump, with which to dress the edges of buff and glaze wheels. The ingredients should be thoroughly incorporated by stirring the mixture whilst fluid, after which it is frequently poured into water, and thoroughly kneaded with the hands, and rolled into lumps before it has time to cool. The emery-cake is sometimes applied to the wheel whilst they are revolving; but the more usual course is, to stop the wheel, and rub in the emery cake by hand. It is afterwards smoothed down by the thumb.

Emery-paper, or patent razor-strop paper an article in which fine emery and glass are mixed with paper pulp, and made into sheets as in making ordinary paper. The emery and glass are said to constitute together 60 per cent. of the weight of the paper, which resembles drawing paper, except that it has a delicate fawn color. This emery-paper is directed to be pasted or glued upon a piece of wood, and when rubbed with a little oil, to be used as a razor-strop.

In 1842, Mr. Henry Barclay, of England, took out a patent for a method of combining powdered emery into discs and laps of different kinds, suitable to grinding, cutting, and polishing glass, enamels, metals, and other hard substances. The process of manufacture is as follows:—Coarse emery powder is mixed with about half its weight of pulverized Stourbridge loam and a little water or other liquid, to make a thick paste; this is pressed into a metallic mould by means of a screw-press, and after having been thoroughly dried, is baked or burned in a muffle or close receiver at a temperature considerably above a red heat and below the full white heat. In this case, the clay or alumina serves as a bond, and unites the particles very completely into a solid artificial emery-stone, which cuts very greedily, and yet seems hardly to suffer perceptible wear.

Superfine grinding emery is formed into wheels exactly in the same manner as the above, but the proportion of loam is then only one-fourth instead of one-half that of the emery. These emery-stones, which are of medium fineness, cut less quickly, but more smoothly than the above.

Flour-emery, when manufactured into artificial stones, requires no uniting substance, but the moistened powder is forced into the metal mould and fired; some portions of the alumina being sufficient to unite the whole. These fine wheels render the works submitted to them exceedingly smooth, but they do not produce a high polish on account of the comparative coarseness of the flour-emery.

Locomotive Improvements.

Mr. Editors—Knowing that you like to keep yourselves posted up on all matters relating to improvements in machinery, I think it may not be uninteresting to you and your readers to know that there was an improvement on locomotive steam engines got up here in February last, which bids fair to make a material reduction in the cost of running railroad trains, and of course increasing the profits of railroads. It is the invention of Israel P. Magoon, of this town, Chief Engineer of the Passumpsic Railroad, and consists of an apparatus for heating the water carried in the tender tank of a locomotive, while the machine is running on the road, by making use, for that purpose, of the heat, and heated exhaust steam, which, after it has left the boiler, usually passes off through the chimney and escapes. The apparatus has been thoroughly tested on the "Caledonia" engine, keeping the water in the tank (while running) at from 90 to 150° Fahr. Experienced engineers on the Passumpsic Road, who have repeatedly run the "Caledonia" before and since the heater was attached to it, both on passenger and freight trains, assert that it saves from one quarter to one-third of the fuel, an item of no small amount in railroad expenditures. It also gives the engineer a better command of his machine, as he can pump water into it without reducing the steam going up as well as down grade, and it also enables railroad companies to use smaller machines to do the same work for which they are now compelled to use large ones. Measures have been taken to secure a patent, and in due time the invention, with all its details, will be brought before the public. P.

St. Johnsbury, Vt., June, 1852.

[Does the exhaust steam not pass up through the smoke pipe? If not, how is the proper draught maintained?—Ed.

A Serpent in a Railway Train.

Recently, towards evening, the travellers journeying to Paris by the train from Havre, were greatly terrified by an extraordinary incident. The train carried a collection of wild beasts, which were destined to appear at the Hippodrome, in a representation of a piece called the "Christian Martyr." The animals were under the charge of M. Herbert, a friend of Gerard, the lion tamer. The collection was accompanied by a boa constrictor, seventeen feet in length, which was intended as a present to the director of the Hippodrome. The serpent was contained in a box suspended under the van which held the beasts. Whether the box was too small or the animal too large, may be doubtful; but the serpent was dissatisfied, and breaking one of the sides of its prison, wound its way to the top of the train, and amused itself by passing from one carriage to another. When it had promenaded in this manner unperceived for nobody knows how long, it announced its presence by thrusting its head up close to the engine-driver. To describe the cry of terror which the poor man sent up would be impossible. The train was immediately stopped, and M. Herbert, with two African assistants, took measures for capturing the reptile, which wound itself about the machinery of the locomotive, and was only detached with much difficulty, and secured in a box stronger than the first. Although the serpent had not visited those in the interior of the carriages, the passengers by the train were exceedingly nervous, and expressed a strong dislike to accompany the boa to Paris.

Fall of a Bridge.

The Boonsboro' Odd Fellow says:—"The wooden suspension bridge over the Juniatta river, six miles north-east of Shirleysburg, Pa., gave way and fell with a crash in the water below, a height of forty-five feet. At the time the bridge fell the team of Mr. Daniel Shindle was crossing. Two men with the team were seriously but not fatally wounded, and two horses were instantly killed. The bridge was erected upon the Remington principle, and was owned by a company, upon whom the loss falls heavily. It was only erected last summer. The bridge is a total loss, except the abutments and piers."

Water-Melon Butter.

Split the water-melons open, with a spoon scrape out the pulps into a cullender, and strain the wat[illegible] into vessels; boil it down to syrup, then put in apples or peaches, like making apple butter or any kind of preserves. Or the syrup may be boiled without fruit down to molasses, which will be found to be as fine as the best sugar-house molasses. The season for making this table sauce will soon be at hand; those who wish to partake of it should be prepared for the event.

Soundings were taken on board the U. S. Sloop-of-war Albany, with a line of wire 5,700 fathoms, without finding any bottom; this was in the Atlantic Ocean, 300 miles east of Bermuda. There is an under as well as an upper current in the Atlantic; the under one runs in an opposite direction to the upper one. The bottom of the ocean is like that of the dry land—hill and valley.

Fruits, such as apples, pears, and quinces, may be kept a long time unfaded, by dipping the end of the stem in melted white wax, and laying them carefully in a dry place.

The surface of a human body, middle size, is estimated at 15 or 16 square feet.