

Scientific Museum.

Gilding—No. 4.

[Concluded from page 96.]

6th.—ANOTHER METHOD TO GILD IRON AND STEEL.—Pour cautiously into a vessel containing gold dissolved in nitro-muriatic acid, about twice its volume of sulphuric ether, and then shake the liquids well together, and set aside the bottle to rest. In a short time the ether will separate by itself and float on the surface. The acid becomes more transparent, and the ether darker in color than it was before, because it takes up the gold. The whole mixture is then poured into a glass funnel, the lower aperture of which is small, and which aperture must not be opened till the ether and acid have completely separated from one another. It is then opened and the heavy nitro-muriatic acid is run off, leaving the ether gold solution, which is placed into a well stoppered bottle and kept for use. The iron or steel to be gilded is first polished with the finest emery or *crocus* and brandy. The ether gold solution is then applied with a fine brush by painting it on the sword or other steel article. The ether soon evaporates, and the gold remains on the surface of the article, which is then put into the fire and heated, and afterwards taken out and burnished.—By this process all kinds of golden figures may be delineated with a fine brush, on sabres, &c.

If silver is polished bright, and its surface perfectly freed from grease, the same ether solution applied in the same way, it is said, will gild it.

Gilding is quite a different art from *plating*, and simply means covering articles with a thin skin of gold. Mercury in fire gilding performs the office of a *uniter* or *biter*, for the gold, with the other metal to which it is applied. Quicksilver being volatile, and gold the reverse, heat expels the one, while the other is left in the pores of the metal; it is carried in by the mercury, which possesses the quality of flowing through the pores of metals, as water and oil flow through the pores of lamp wick. The experiments of Prof. Horsford, of Cambridge, Mass., on the permeability of metals by mercury, which have been published in a pamphlet, are very interesting, and affords a solution of the use of mercury as an amalgam for gilding. The use of quicksilver in gilding is very unhealthy, its fumes are dangerous, consequently great care must be exercised in conducting such fumes into a proper receptacle, and preventing them from mixing with the atmosphere of the workshop.

7th.—Leaf gilding is performed on paper, vellum, or metals, by covering them with a coat of isinglass dissolved in water, then putting on gold or silver leaf before the liquid is quite dry, after which the surface is burnished with an agate burnisher; gum water or size may be used as well as isinglass.

Gold ink is made by grinding upon a porphyry slab, with a muller, gold and honey, until they are reduced to the finest possible state of division. The gold paste is then collected upon the edge of a knife and put into a glass vessel—a tumbler—containing water. The honey soon diffuses through the water when stirred, and the gold by its superior gravity falls to the bottom, and must be decanted off. Repeated washings removes the honey, and leaves a very fine gold powder, which, when dried, is very brilliant, and makes gold ink by simply mixing it with a little gum water. When the writing becomes dry, it must be burnished with a burnisher. The grinding of gold leaf is a very nice operation. If, after it has been reduced to powder, the least blow is struck upon the muller, the gold is at once resolved into a solid piece under the blow.

California Coal.

The "Sacramento Union" describes some specimens of coal taken from the foot-hills of the Sierra, in Butte county, about 40 miles above Maysville:

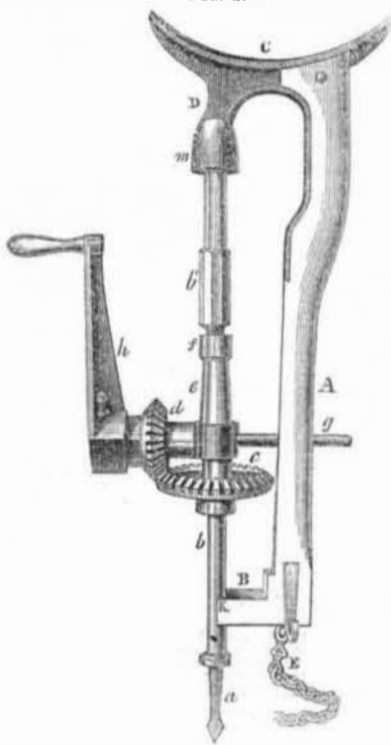
"In external appearance it much resembled the more bituminous varieties of coal, breaking with a shining fracture; but as this coal was taken from near the surface, it could not be

considered as a fair sample, and we have no doubt that more favorable specimens will be found. It was comparatively light, the specific gravity certainly not being so high as that of ordinary bituminous coal.

The vein in which it occurs is about six feet thick, cropping out with a dip of about 45°; but at some distance in the hill, where a shaft of twenty-nine feet has been sunken, to intercept the vein, it is found nearly horizontal. It burns with a clear, bright flame, but appears not to have much strength."

Improved Hand Drill.

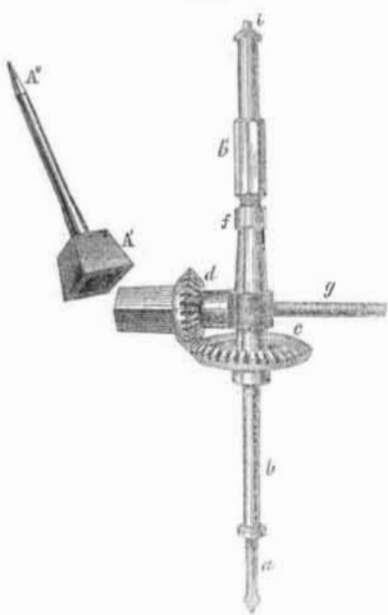
FIG. 1.



The engravings herewith presented are illustrations of Reuben Daniels' improved Hand drill, for which a patent was granted Sept. 21, 1852.

The bit, *a*, is fitted into a socket in the mandrel, *b*, so that it may be removed. This mandrel is made in two parts, *b* and *b'*, the one screwing into the other, so that it can be lengthened at pleasure. Upon this mandrel a bevel wheel, *c*, gears into another, *d*, mounted on a pivot projecting from a sleeve, *e*, placed upon the mandrel, and held between the wheel, *c*, and a collar, *f*; on the side of the sleeve opposite the wheel, *d*, an arm, *g*, projects, which may be held by the attendant to steady the drill. The wheel, *d*, is fitted with a crank, *h*. The extremity of the part, *b'*, of the mandrel is fitted with a point of hardened steel, *i*, where it sets into the stock at *m*.

FIG. 2.



The stock upon which the mandrel and gear are mounted, consists of a bar, *A*, a bracket, *B*, with a concave rest, *K*, to support the mandrel, and a crutch, *C*, on the under side of which is the bucket, *D*, having in it a cylindrical aperture, *m*, in which is a step of hardened steel to receive the pivoted end of the mandrel. On the lower end of the bucket, *B*, is a stirrup into which is fastened the chain, *E*. This

chain is to be fastened around the article to be drilled, when it is practicable, in order to keep the drill steady. As the hole deepens, the mandrel is elongated by turning the part *b'*. *A'* and *A''*, in fig. 2, is an extension arm to be fitted on the end of the shaft, in order to enable it to be turned at a distance as when the drill is placed inside a boiler, and it is desirable to turn it from the outside.

For further information address the inventor, Woodstock, Vt., or S. C. Hills, New York City.

To Cure the Grape Disease.

Dr. A. P. Price, of England, read a paper before the last meeting of the British Association for the Advancement of Science, on the disease of the grape, which has destroyed the vine in the Island of Madeira, and has greatly injured the vine crops of France, Germany, and Portugal. In three vineries in England, the disease had appeared for five successive years, and no remedy was found for it; flowers of sulphur and various other things were experimented with in vain. At last, he (Dr. Price) was induced to employ a solution of penta-sulphide of lime, a diluted solution of which he found to act in no way injuriously to the young and delicate shoots of several plants. A few applications of this solution were applied to the stems and branches of the diseased vines, and they soon became coated with a protective deposit of sulphur, when the disease gradually disappeared, and the vines became perfectly healthy, and have continued so for two years, although growing contiguous to diseased vineries, where the vines have not been treated in the same manner. The way to make the solution of penta-sulphide of lime, is as follows. Boil 30 parts (by weight) of caustic lime with 80 parts of the flowers of sulphur in a sufficiently quantity of water; the boiling is kept up until the solution has acquired a dark red color, and the excess of sulphur ceases to dissolve. The clear of the solution (when cold) is then drawn off, and after being diluted with twenty times its volume of water, it may be applied to the vines with a brush or a sponge. This information, we are confident, will be of great value to all our people.

Health and Oil.

"I noticed some time since a paragraph in the Scientific American that workmen in woolen factories are generally healthy, owing to the oil used upon the wool. A young man of my acquaintance was in poor health two years since, at which time he began working in a manufactory of printer's ink, when his health began to improve, and he is now in better health than at any former period. He attributes the improvement to the fumes of the boiling oil used in the manufacture of the ink."

Wm. G. R.

Andover, Mass.

[Dr. Davy, Inspector General of Army Hospitals in Britain, read a paper a few months ago, before the Royal Society of Edinburgh, which has a relative bearing on this subject. We do not know what kind of oil may have been used in the factories to which our correspondent has alluded, nor the kind used in making the printer's ink spoken of, but the beneficial effects of cod liver oil in cases of consumption have been well established, and we presume will not be disputed. The paper of Dr. Davy embraced an enquiry into the nutritive properties of fish. He found the common mackerel having a specific gravity of 1043, to contain 37.9 per cent. of solid matter, while sirloin beef of the specific gravity of 1078 contained only 26.9 per cent. of solid matter. Common cod with a specific gravity of 1059, contained 19.2 per cent. of solid matter. Mutton with a specific gravity of 1068, contained 26.5 of solid matter. Salmon contained more solid matter than beef, mutton, veal, or common fowls. The mackerel was found to abound in oil, no less than 15.52 per cent, being obtained by pressure between the folds of blotting paper. He therefore considers that there is not much difference between the nutritive power of fish and flesh. As it regards the healthfulness of a fish diet, he speaks in terms of praise. He considers fish easy of digestion, especially the cod which has little oil interspersed through its muscular tissue, and even those like the mackerel which have much

oil so interfused, he considers to be superior food on many accounts. From information which he had been able to collect, he was disposed to think that fishermen and their families living principally on fish, were healthy above the common average. At the public dispensary of Plymouth, England—a seaport, where there are many fishermen, out of 654 cases of confirmed phthisis, and hemoptysis, only four belonged to fishermen's families (one male and three females.) Dr. Cookworthy, the able physician of that institution, asserts that scrofula and tubercular consumption, are very rarely to be found among the families of those whose diet consists in a great measure of fish. Dr. Davy attributes this exemption in fishermen's families from peculiar diseases, to the presence of *iodine*, distinct traces of which he has found in all salt water fish. He had found it in the herring, mackerel, cod, sole, smelt, salmon, sea trout, shrimp, lobster, &c. In fresh water fish he had found no traces of this element. The medicinal effects of cod liver oil he attributes to iodine, and it may be that this is the very substance which exerts the salutary influence spoken of, in woolen and printer's ink factories, as all oil obtained from seal, or sea fish of any description, no doubt contains iodine.

During the past two months, many of the ships which have arrived in this city with foreign emigrants were no better than floating hospitals, forty, fifty, and in one case one hundred died on the passage. The disease has ceased whenever the ship reached our shores.

LITERARY NOTICES.

MOORE'S RURAL NEW YORKER.—We have always admired the ability and practical character of this journal of agriculture, science, and family miscellany. We regard it as one of the best in its branch, and can safely recommend it to agriculturists as one of the best publications of the day. It is edited by several practical writers in their several departments, and is altogether a well managed paper.

AN ORATION.—We are indebted to E. J. Alford, of Southport, Ct., for a pamphlet containing an account of the Centennial Anniversary celebration of the Lionian Society of Yale College; the oration of Wm. M. Everts, Esq., and the poem of Francis M. Finch, on the occasion—are both fine literary productions. The addresses at the banquet are all felicitous and interesting.

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