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Improved Lumber Measure.

The process of measuring lumber—or ascertaining the superficial area in any plank—is much facilitated by the use of the very ingenious instrument herewith illustrated. By simply rolling it over the face of the board the number of superficial feet is shown on the dial. Different lengths of timber are gaged by setting the gear, A, in connection with either one of the train of wheels, B, into which the first wheel gears. In Fig. 2 the driving wheel, C, is shown; this is made of thin steel and has teeth which project through the case, D, so that by rolling the instrument over the board the teeth adhere and rotate the mechanism inside. This consists of the gears formerly mentioned, and the worm, E. The worm gears with the wheel, F, upon the shaft on which the index hands are fixed. A small slide or spring, at G, keeps the wheels in gear; by moving it on one side, the shaft, H, may be moved endwise to alter the registration of the hands on the dial. This little instrument is set on the end of an octagonal rule or staff, such as is generally used by lumber inspectors; and there is, in addition, a shoe or guard, I, at one side of the wheel, which prevents the wheel from turning should the instrument be drawn backwards. This is a very neat and useful article and will no doubt be popular. An application for a patent is pending through the Scientific American Patent Agency by A. M. Olds, of Chicago, Ill., of whom further information may be had by addressing him at that place.

Fig. 1.

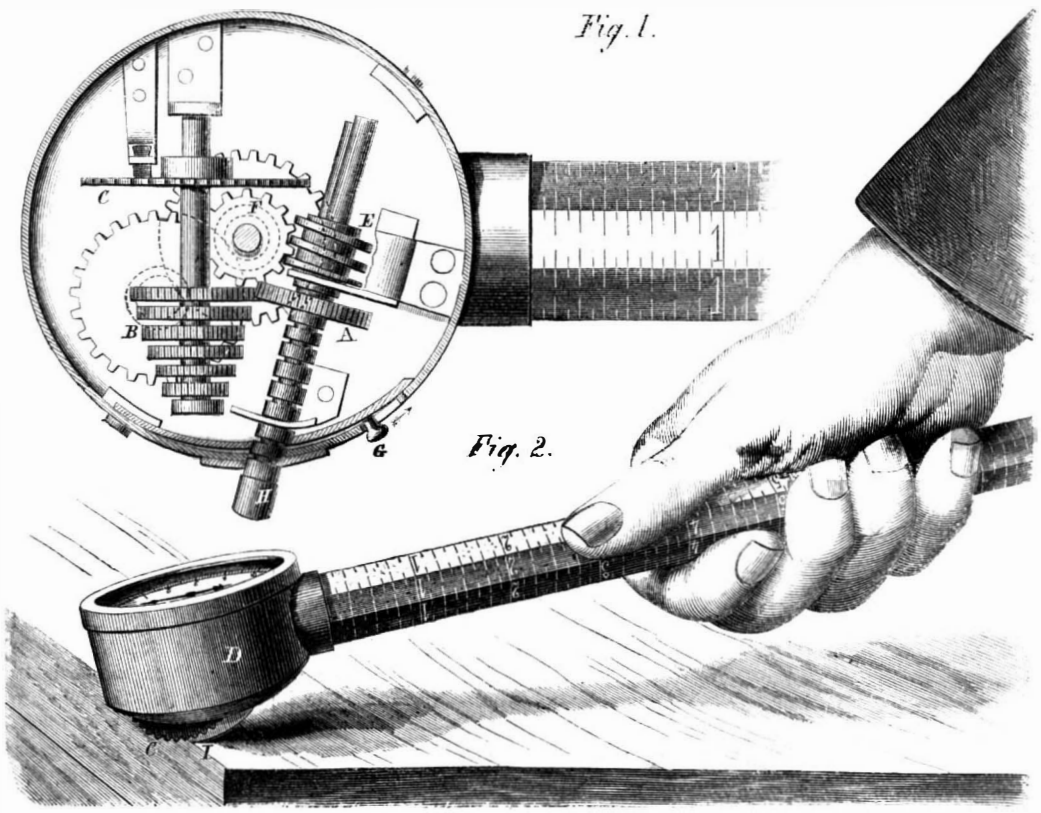

Fig. 2.

OLD'S LUMBER MEASURE.

John Fitch Wanted Four Hundred Dollars.

Westcott, in his "Life of John Fitch," relates the following humorous incident. It occurred during a visit of Fitch to Mr. Brown:—

"He stated that he had built a vessel or vessels to give practical proof to the world of the value of his invention; that the machinery of his boat or boats required some change or amendment to satisfy the world that steamboats could and would navigate our rivers against their currents. This, his discovery, would be of peculiar and immense advantage to Mr. Brown's district, of Kentucky. He (Fitch) was without means or resources, and wanted about four hundred dollars, and had called upon Mr. Brown, as a Member of Congress from Kentucky, to advance him that sum. Mr. Brown replied that it was not convenient—that he had not the money to spare him. Mr. Fitch, rising from his seat, said to Mr. Brown, 'Well, sir, if you will not advance me the money, I will go to the Secretary of State's office, and cause it to be entered, that it may remain *res perpetua memoria*, that I, John Fitch, inventor of steamboats, having exhausted all my means in carrying my invention into perfection, needed four hundred dollars to complete my work, and give evidence to the world of its value and utility; that I called upon you, John Brown, Member of Congress from the Kentucky district, in the State of Virginia, to loan me four hundred dollars, to complete my machinery and give unanswerable evidence of the utility and importance of my invention, and that you refused it.' Mr. Brown said, 'You may do so, Mr. Fitch, if you please.' Fitch then said, 'Good morning, Mr. Brown, Member of Congress from Kentucky district,' and Mr. Brown replied, 'Good morning, Mr. Fitch, inventor of steamboats.' Mr. Brown never saw Fitch again."

Discovery of a New Iron Mountain.

The existence of an immense iron mountain, almost on the very shores of Lake Superior, outrivaling the famous iron mountains of Marquette, seems almost too marvelous for belief, yet we can assure our readers, upon the most irrefragible testimony, that the fact is even so. That such a wonderful mineral deposit should remain undiscovered until a very recent date is the most remarkable feature of the whole affair, and shows how great and diversified is the natural wealth of that world-renowned region, contrasted with the tardy pace of its development, particularly on the Canadian side, where the newly-discovered mine is located. At the distance of only about forty-five miles from Ste. Marie, this mountain lifts its frowning summit to the altitude of six hundred feet above the level of the lake, being about twice as high as the iron mountains of Marquette.

The first examination was made in July last by Prof. S. P. Duffield, of Detroit, who, from the general features, came to the conclusion that the range was identical with that of Marquette, and in order to satisfy himself on this point, he visited Marquette to get the range, by which his theory was found to be fully sustained. A company was subsequently formed under the name of the "Batchawanung Iron Company," which obtained a patent from the Canadian Government for 3,200 acres which comprises all, or nearly all of the mineral tract in question. The ore is of the very finest quality, corresponding to the ores of the Marquette mines, and extending through a range of several miles, in deposits many feet in thickness. It is so plentiful that by no human agency can the supply be exhausted for hundreds of years. Of the unequalled richness of the ore we are enabled to speak definitely. A quantity which was taken from the depth of only fifteen feet from the surface, and smelted in a common blast furnace by Professor Duffield, realized 60 per cent of pure iron. When we remember that 30 per cent is a good working average, the richness of the newly-discovered ore will be fully apparent. At a greater depth from the surface, its purity will of course be on a corresponding scale, in accordance with a well-known mineralogical law. In addition to the professional examination, which was conducted by Mr. Forbes, a very large extent of land was thoroughly surveyed and mapped; the Batchawanung river was "meandered" for nine miles from its mouth, soundings were taken in the bay, and an excellent harbor was located; and, finally, a railroad line was run from the harbor to the future mines, by the experienced skill of Prof. Duffield, assisted by Mr. Forbes. Prof. Duffield reports that this line will not be over five miles long, and that it cannot be constructed without heavy grades. The harbor is a good one, sheltered from all winds, accessible by a simple channel to large vessels, and sufficiently extensive to accommodate the largest commerce. He also states that the railroad from the mines to the harbor, will have a down grade of 75 feet to the mile. The cars would thus have a descending grade when loaded and an up grade when light.

We understand that the reports of Prof. Duffield, Mr. Forbes and Messrs. Adelberg and Raymond will soon be given to the public, and that steps will immediately be taken for the development of the Batchawanung district.

The mineral was first discovered a year ago last winter by an Indian named Caucosh, but who is now known by the *soubriquet* of "Pewabie," signifying iron. In trapping he came to a tree that had been blown down, whose upturned roots revealed to view the previously hidden wealth. The news was communicated to a half-breed named Peter Bell, who revealed the secret.—*Buffalo Advertiser.*

At the agricultural competition of Vaucluse, in France, held at Thor, last summer, the prize for plowing was carried off by a young woman twenty years of age.

Saving Silver by Photographers.

In reply to some correspondents, we publish the following remarks on this important matter, by the editor of the *American Journal of Photography*, the very highest authority on all questions connected with this art.

"——Save the silver, has been a frequent recommendation of this Journal; and the advice is not given in vain. There are very many of our readers who, at a trifling expense, recover more than one-half of the silver which they purchase. But there are others who, at much labor, save very little; what is the matter with these latter? We have lately seen two lots of 'waste,' which contained the savings of two thriving galleries, which had been produced in the space of nearly a year; and the amount of silver in them did not pay the cost of separation. On inquiry, we learned that the method of saving in both cases was substantially the same, and was the one best calculated to collect a good quantity of dirt, while it permitted the silver to get away.

"There is a fundamental principle which should be had in view by those who wish to save silver easily, and that is that the solution from which silver is to be precipitated should be as strong as practicable. If any one has a doubt of it, let him try a few experiments: Dissolve 60 grains of nitrate of silver in a barrel of water; now recover the silver. Add to the barrel of solution of nitrate of silver, 60 grains of salt previously dissolved in a small quantity of water. The nitrate is now completely converted into chloride of silver. Now the chloride is a solid body quite insoluble in water, and yet in this case the fact does not clearly appear. The water is scarcely turbid, it goes through a filter unchanged and without leaving anything on it. Leave the whole mass of water at rest for a day, and the lower stratum will be slightly different from that on the top, but yet the chloride of silver is still entirely suspended. Let the water rest a month, and the precipitate will have fallen to the bottom, and by carefully decanting the water a considerable part of it might be recovered. If, instead of six grains of salt, a handful been thrown in, no precipitate would ever appear, for in that case it would have been completely dissolved. If any one will try the experiment during the pressure of business of his gallery, he will be thoroughly satisfied that it is not worth his while to save silver from very weak solutions. Dissolve the sixty grains of silver in half an ounce of water, convert into chloride, and the chloride can be recovered completely in a few minutes. From weak solutions precipitates are light and fine; from strong solutions, heavy and course.

The error of silver savers who fail, is the unnecessary dilution of solutions. There are various jimcrack contrivances which the inventors claim will keep back the silver, however much water passes through them; and they place them in sinks where all the washing water passes; these humbugs ought to be abolished. A two gallon earthen jar set near the developing place will save all the silver that is worth while to save from the development in the largest establishment in the country. Let the waste developer and the first washings, not to exceed two or three ounces for a 4-4 plate, go into it; every morning pour off the water. A large vessel may be more convenient, but there will be risk of putting too much water into it."

A Smokeless Furnace.

There is in operation at the engineering works of Messrs. Moreland, London, a furnace patented by Mr. E. B. Wilson, which is said to economize fuel to a considerable extent, and which may be rendered almost smokeless. This furnace, which is used for heating rivet bars, has no fire-bars. It consists of a chamber or box at the back, to contain the fuel, and a reverberating oven connected therewith, the flue being at the other end of the oven, and connected with the ordinary chimney-stack. The coals are ignited in the box, to which they are supplied about twice a day. As there are no fire-bars in the furnace, the air enters upon the surface of the fresh coal in the box, causing a downward draft, as the floor of the reverberating oven slants downward from the coal-box. The gas is thus slowly and continuously distilled until it comes in contact with the lower stratum of burning coals, when it receives its proper dose of caloric, and passes into the reverberating oven, heating any material that may be placed there, and passes downwards by the flue which descends at a point a little inwards from the mouth of the oven.

The principle adopted seems to be that of turning a common fire upside down, not unlike "the *Builder's* Fire," or a furnace back foremost, so that the fresh coal is applied at that end whence the smoke of its first ignition goes through the fire and is consumed, instead of being placed on the end of the fire, whence the direction of the draft carries it off as soon as evolved. The principle is very simple, and probably efficient, though not novel.

Effects of the Excessive Use of Sugar on the System.

Dr. Champouillon communicated the result of his observations on the effects of the excessive use of sugar on the system. So far back as the year 1846, the author undertook a series of experiments on himself, in order to supply the Minister of War with information as to the possibility of replacing salt by sugar in the preparation of the preserved meats destined for the use of the army during a campaign. In accordance with his instructions, M. Champouillon strictly confined himself to the diet which may be accidentally enforced on the garrison of a besieged city by the hardships of war, and for several days in succession lived on the following rations: sixteen ounces of beef preserved in sugar, and four ounces of biscuit; water was his only beverage. Various phenomena supervened in the following order: thirst, sinking at the stomach, distaste for food, nausea, acid regurgitation, epigastric pain, diarrhœa, prostration and syncope.

"I carefully watched these symptoms," says M. Champouillon, "and the loss of appetite and nausea indubitably proceeded from the absence of variety in my diet; whereas, the thirst, heartburn, epigastric pain, and diarrhœa were clearly referable to the difficulty of digesting cane sugar. In proportion to the impression produced by this substance on the organs of taste, it clogs the palate, and destroys natural appetite. This excessive indulgence in sirups, sweet-meats, pastes, and highly-sweetened diet drinks brings on distaste for food, and annihilates the digestive powers, especially in cases of pulmonary consumption." After expatiating on the transformation of cane sugar into glucose, in consequence of its contact with the acids contained in the gastric juice, and on the injury caused by the increased activity imparted to the functions of the stomach by frequent repetition of the process, M. Champouillon showed that in addition to the inflammatory congestion thus occasioned, glucose powerfully contributed to the establishment of a plethoric condition of the system, and that the prevalent opinion that the excessive use of sugar tends to cause pulmonary irritation and a disposition to atrophy, is but too well justified by facts. In support of this view the author adduced two interesting cases, one of apoplexy, the other of hæmoptysis, in which the agency of this cause was distinctly evident.

"I have often remarked," said he, "in thirty-three years' experience of tubercular disease, that the cough, hectic fever, and night-sweats are increased by the fondness of the patients for sweet substances. I conceive this to be the natural consequence of the combustion of the glucose in the system, a phenomenon which necessarily implies the production o water, carbonic acid, and heat. It is a well-known fact that three and a half ounces of sugar consumed in the human body evolve an amount of heat equivalent to what might be produced by the combustion of thirty-two grains of charcoal. MM. Favrot and Silberman have shown that fifteen grains of charcoal are sufficient to impart one degree (cent.) of heat, to eight kilogrammes, or sixteen pounds of water. If the capacity of the human body for caloric is the same as that of water, three ounces and a half of sugar will, in a subject weighing seventy-five kilogrammes (12½ st.), raise during their combustion the temperature of the body four degrees and a half, centigrade."

The practical conclusion of this paper is, that it is desirable to reduce within as narrow limits as possible the consumption of sugar, especially in cases of tuberculosis, and to replace that substance by honey, or a decoction of liquorice.

The Use of Fuzes.

All spherical shells, except the 24 and 12-pounder howitzer and all shrapnel, are fitted with the "navy time fuze." This fuze is made of a composition driven in a paper case, and then inserted in a metal stock, which screws into a bouching fitted to the shell. The composition is covered with a "safety cap," which protects it from moisture and accidental ignition; also with a water cap of peculiar construction, intended to protect the flame from being extinguished on ricochet. A "safety plug" at the lower extremity prevents the communication of fire to the powder in the shell in the event of the accidental ignition of the fuze after being uncapped. It is strictly forbidden to show or explain to foreigners or others the construction of any fuzes, except so far as may be necessary for the service of the guns. These fuzes are of 3½, 5, 7, 10, 15, and 20 seconds time of burning; which is supposed to offer a sufficient variety for most of the exigencies of service All shells are fitted and issued from the shell-houses, with the 5" fuze, which is to be regarded as the general working fuze. For greater or less distances this fuze may be drawn and any of the others substituted. The navy time fuze is rarely extinguished by several ricochets on water; and near the end of its flight, when fired direct, frequently acts by concussion. The fuze used should not be of longer time of burning than requisite to reach the object; the shorter time are of quicker composition, therefore more certain; also in firing on ricochet the shell may sink short of the distance necessary for its explosion, and consequently be supposed to fail.

For special firing, as for example, at masses of uncovered troops, any of these fuzes may be shortened. To do this, unscrew the water cap, and back the paper case out from the lower end with a drift and mallet; cut off from the lower end with a fine saw, or sharp knife struck with a mallet, the proportional part required, and insert the upper part in the stock, forcing it down with a few gentle blows with the drift; screw on the water cap. The Borman fuze is fitted to the 24-pounder and 12-pounder howitzer ammunition, and all shrapnel. It has also been fitted to certain shells used for special firing. The length of fuze is the limit of the distance within which this fire is effective. This fuze is cut, or rather opened, at the required number of seconds, cutting close to the right of the mark on the index plate. The cut should be made down to the plane of the table, in order to expose the composition, and is best made at two or three efforts instead of trying to effect the cut at once. This fuze should be carefully explained, as shells have been taken from guns with the cut made into the priming magazine, which would explode them at the muzzle.

The best effect of a percussion fuze is obtained by firing into a mass of timber. They frequently fail if fired into a bank of soft earth, or other material which does not offer a sufficiently sudden resistance; also if fired at high angles of elevation, owing to the fact that the shells do not generally strike point foremost. Time fuzes are also very unreliable in rifle guns, owing to the fact that the expanding class of projectiles cut off the flame from the fuze.—*Ordnance Instructions of the U.S.N.*

Gun Cotton.—Trials are still going on with gun cotton, and if its deterioration can be prevented there can be little doubt that it will prove a most valuable addition to, if not a substitute for, gunpowder. We have already recorded its power in the destruction of an Armstrong 110-pounder, when used in a shell, and we may hence judge that the armor plates, which are little affected by the explosion of powder shells, will be cut in two by shells filled with gun cotton. It is true that gunpowder deteriorates both from damp and motion, but not in so great a degree from exposure to the atmosphere as gun cotton. On the other hand, gun cotton may be carried wet in tanks in perfect security, and possesses, both in power and extreme lightness and cost, and in not fouling the guns, very great advantages over gunpowder.—*Army and Navy Gazette* (*England*).

Sydney Smith once remarked, "After you have written an article take your pen and strike out half of the words, and you will be surprised to see how much stronger it is."