Correspondence.

The Editors are not responsible for the Opinions expressed by their Correspondents.

Grindstones.---Where they come from, and How they are Made.

MESSRS. EDITORS :—The sandstone formation overlying the coal beds of England furnishes the grindstones of that country, the principal quarries being located at Newcastle-upon-Tyne, and at Wickersley, near Sheffield.

These quarries are worked by hand, and all the grindstones are made with mallet and chisel, and have been imported into this country for over one hundred years.

The grindstones from the provinces of Nova Scotia and New Brunswick, are also the over-lying sandstone formations of the coal districts bordering on the Bay of Fundy, and extending across the Province to the Gulf of St. Lawrence. These immense deposits contain a great variety of grits, known as the Nova Scotia grindstones. These quarries are generally worked by the French people known as "Acadians," from the name they gave this country, "Acadia," and are the descendants of the "Huguenots," who were driven out of France by religious persecution.

They are a very industrious and simple-minded people, and the females retain to this day the style of dress brought over from France by their ancestors.

The tides of the Bay of Fundy rise and fall from 60 to 70 feet every twelve hours, and these people avail themselves of this power to work the quarries, which extend from a high bluff on the mainland, down to low water mark in the bay.

At low water a huge mass of stone is loosened from its bed and a heavy chain is passed under it and over a large boat, which is placed alongside. As the tide rises, the stone, attached to the bottom of the boat is floated into a sand cove at high water, and made into grindstones after the tide recedes. This work is done with mallet and chisel, the rough parts being first chopped off with a heavy ax. Machinery has been recently introduced, and the small grindstones are now turned in a lathe by steam power. The sandstone deposits of this country which are made into grindstones, are found along the shores of Lake Erie, and extending for a considerable distance east and west of Cleveland, and inland as far as Marietta, on the Ohio. They are also found on the shores of Lake Huron, above Detroit.

These deposits are of a different character from the foreign stone, and do not seem to be the overlying strata of coal formations, but appear to be a later formation, as the quarries look as though this part of Ohio had once been the bottom of the Lake, the sand of which had become solid, and been up-heaved by some convulsion of nature. Nearly all the Ohio grindstones are made by machinery driven by steam power.

The blocks of stone being loosened from the quarry bed, are roughly hewed out, with a square hole in the center. This is placed on a heavy square iron shaft furnished with a 9-inch collar, against which the stone is securely fastened by means of another collar keyed against the side of the stone. The shaft and stone being driven by steam power, two men on opposite sides of the stone turn it off perfectly true, by means of soft iron bars about 6 feet long, and 2 by ½-inch thick, which are drawn out to a thin point, which is curved upward. This was formerly a very unhealthy occupation owing to the shaft dust being inhaled by the workmen, but this difficulty is now obviated by means of blowers which drives it away. J. E. MITCHELL.

Philadelphia, Pa.

Defense of Patent Right Dealers.

MESSRS. EDITORS :—I notice in several late newspapers that a professor in an agricultural institution of this State, who evidently sets no common value on his own sagacity, warns farmers of the dangerous character of "patent-right men," advising them in no case to have anything to do with the men, or their goods, affirming that in ninety-nine cases out of a hundred these men are robbers, and that their machines are altogether worthless, etc, etc. Now admitting that some of these inventions are of no value, and that persons engaged in selling them have, in some instances, taken undue advantage of the inexperience, credulity, or ignorance of the parties with whom they have dealt, it appears to us to be making rather wholesale work of it to condemn all new inventions indiscriminately at "one fell swoop"—together with the persons engaged in introducing them.

We think that not many farmers will see proper to follow the professor's advice, so gratuitously offered. It should be regarded as only an insult offered to their understanding.

Farmers, as a class, are sensible men, why not let them examine new machines, and decide for themselves?

The professor's method seems to us to do great injustice to inventors, as well as dealers in patents. It may be asserted that no class of men are more indebted to inventors than farmers. They can now, with their improved machinery and implements, accomplish more in a day than they formerly could in a week. Much of the work then performed by human muscle exclusively, is done in one tenth part the time, and less than half the expense, by steam or horse-power.

Now, for farmers to "go back" on the men by whom they have received most benefit, would be as unwise as it would be unjust.

Intelligent farmers who study the best books on farming, and who are regular readers of such excellent journals as the *American Agriculturist* and SCIENTIFIC AMERICAN, are in very little danger of being "robbed" by "patent-right men." JOSEPH R. PARKS.

Muscatine, Iowa.

Ripening of Wine---America Ahead of France.

MESSRS. EDITORS :—Your number of July 31, page 68, states the effects on the wine by the method of heating called Pasteur's process. Permit me to explain the cause of the effects aforesaid, so that your readers may intelligently judge of the merits of the heating process. All fermentation results from the presence of certain microscopic fungi, short-lived, but multiplying with astonishing rapidity under favorable conditions of temperature and atmospheric oxygen in liquids, that contain nitrogenous parts; on these glutinous albuminous parts they feed, and on them their existence depends, the want of gluten precludes their existence. While their action in maturity is to convert the sugar of the fluid into alcohol, a certain high proportion of alcohol terminates their existence, as well as a very large excess of sugar extinguishes their function; fermentation ceases. But this species flourishes only when supplied with atmospheric oxygen. This wanting, they barely exist but in the state of spores or seeds, ready to take maturity and propagate by obtaining the proper conditions to their support. Still, while the species of mycoderms, that causes beneficial or purely alcoholic fermentation, finds insufficient atmospheric oxygen in the fluid for their support, other kinds, able to do with less or differently composed air, can obtain a foothold—provided always there is gluten—and by their presence cause putrefaction, decay, diseases, or under certain conditions of continued surface contact with atmospheric oxygen acetic acidification. Now, all this organism, and the spores or seeds from which they originate, are killed in a brief time at a temperature exceeding about 135° F., or slowly die if 121° to 135° F., is proportionally longer continued.

The principal part of the foregoing has been satisfactorily established by the laborious investigations of Mr. Pasteur, who fully deserves all praise allotted to him. His works, however, do not show that he paid particular attention to the gluten in liquids to be preserved by heating, but we learn that the spores or organism floating in the air, may subsequently contaminate the wine, which will be restored again and again by heating—still, gluten remains. This is very well, but as the organism cannot live without gluten, is it not so much more perfect a cure to extract at once the gluten, the sustenance of the mycoderms, the root of all disease? A penny's worth of prevention is better than a dollar's worth of cure.

Air-treatment, while it promotes, accelerates, and controls all fermentation, eliminates from all fermenting (and other) fluids the gluten by oxidation, which renders it insoluble, and therein lies a total and economical prevention from all further injury by destructive mycoderms; and without the expensive, and to the common producer of fermented beverages, impracticable and impossible arrangements for carefully heating wine, cider, beer, etc. Thus America is ahead of France.

P. O. Box 6,844, New York city. R. D'HEUREUSE.

Novel Mode of Obtaining Capital.

MESSRS. EDITORS.—I have been unfortunate in business and am anxious to make another start. I propose insuring my life in favor of any one in a mutual life insurance company for $20,000 the party paying the premium receiving the dividends and who will give me $12,000. I will insure in any company the party may wish, and take out any kind of policy. I will pay the premium the first year. If you will exert yourself and make this arrangement for me, I will come on as soon as I receive a notification from you, and as soon as I receive the money will pay you $1,000. It appears to me that almost any of the large capitalists in New York who desire to invest their money in something safe, would make this arrangement, as it would be perfectly safe, at the same time paying a dividend annually. Let me know from you what you think of the proposition and whether you think it practicable or not. I am only 24 years of age, therefore the premium would be very trifling. A. C. McRAE.

Macon Depot, Ala.

[We unfortunately do not know of any capitalist likely to take a venture in the manner our correspondent suggests. If this should meet the eye of any person having $12,000 to thus invest, he may correspond and remit as above. The thousand dollars promised us, may be sent direct to this office.—EDS.

Explanation of Singular Phenomena.

MESSRS. EDITORS :—In answer to your inquiry in the present volume, page 70, for an explanation of the curious phenomena noticed in an oil jar, I think I can give one. When the jar is placed upon a painted board or a hard pine board, the oil exuding from the jar forms with the paint or the pitch in the hard pine board, a gum which prevents further leaking. On the contrary, black walnut being a dry wood the oil cannot form a gum, and consequently it escapes.

Sunbury, Pa. E. H. SCHNEIDER.

Another.

MESSRS. EDITORS :—In answer to your inquiry in number of July 31st, under article headed "Curious Phenomena," may not the reason for the oil exuding from the jar when placed upon a black walnut bench, be on account of the openness of the fibers producing capillary attraction, which would not be the case with a painted board, the paint filling the pores on the surface and destroying this attraction; and the same result would be produced by substituting the hard pine board, as the pitch closes the pores the same as the paint on the painted boards?

If your correspondent would place the jar upon a piece of ash or chestnut board with the same result as upon the painted board, I should think the theory of capillary attraction might be erroneous. A. T. A.

Lowell, Mass.

A Remedy for Lockjaw.

MESSRS. EDITORS :—I am extremely sorry to learn of the death of my old friend, Mr. John A. Roebling. If I had known in time that he had lockjaw I could have saved his life, and would willingly have traveled many miles to do it. Let any one who has an attack of lockjaw take a small quantity of spirits of turpentine, warm it, and pour it on the wound—no matter where the wound is, or what its nature is —and relief will follow in less than one minute. Nothing better can be applied to a severe cut or bruise than cold turpentine, it will give certain relief almost instantly. Turpentine is also a sovereign remedy for croup. Saturate a piece of flannel with it, and place the flannel on the throat and chest—and in very severe cases three to five drops on a lump of sugar may be taken inwardly. Every family should have a bottle of turpentine on hand.

D. A. MORRIS.

New York city.

[We would not be understood as indorsing the above remedy, because we have not tried it. It is a simple matter, and can be easily tested. In all serious ceses the application should be made under medical advice.—EDS.

(For the Scientific American.)

INDELIBLE INK FOR MARKING LINEN.

By Dr. Reimann.

The following are a number of formulæ for preparing indelible ink to be made use of in marking linen. As they have all been thoroughly well-tried, and found effectual, it is to be hoped they may prove of some use to the public.

The linen is first moistened with a fluid, consisting of a mixture of, 2 parts carbonate of soda in crystals, 2 parts gum-arabic, 8 parts of water, and then dried. When quite dry, it is rubbed with a glasscloth to render it as smooth as possible, so that it may be easier to write upon. The composition of the ink itself is as follows : 1⅞ pts. nitrate of silver, 16 pts. distilled water, 2 pts. gum-arabic, and ⅛ pt. of sap green. The nitrate of silver is first disolved in the distilled water, and the gum-arabic and sap green are subsequently added.

It is necessary to write with a quill pen, all metallic pens except gold ones, decomposing the ink. It is a good plan to trace the letters on the linen with a pencil before writing them.

Marking linen is most conveniently effected by using a pencil and a small copper plate with perforations corresponding to the letters required. This plate is laid upon the linen, and the ink is applied with the pencil to the cut-out spaces, so that these spaces, and these alone are smeared with the ink.

The following ink is of service for marking linen with a pencil, when a metallic pattern-tracer is employed : 2 pts. Nitrate of silver, 4 pts. distilled water, 2½ pts. gum-arabic, 3 pts. carbonate of soda crystals, 5 pts. liquid ammonia.

The best way to prepare the ink is to first dissolve the nitrate of silver in the liquid ammonia, and the gum-arabic and soda in the distilled water. The two solutions are then mixed together and slightly warmed, when the whole mixture becomes brown. A few drops of a solution of magenta, makes the ink somewhat more distinct. It is of course unnecessary in this method to previously moisten the spot with gum-arabic solution.

For very fine linen the following ink is best employed : 4 pts. Nitrate of silver, 24 pts. distilled water. To this solution liquid ammonia is added, until the precipitate which is first formed, is re-dissolved. Then a little sap green, indigo, etc., are ground together, and dissolved in a solution of 4 pts. gum-arabic, and this soution and that of the nitrate of silver are mixed together. The whole is then diluted until it occupies 32 parts. This ink is very limpid, and easy to write with.

When dry a hot iron need only be passed over the surface of the linen, when the letters will at once make their appearance, their tint being a deep black. The ink does not injuriously affect even the finest linen.

The discovery of an aniline black has led to the employment of this coloring matter in marking linen.

This ink has the advantage of being cheaper than the ink prepared from nitrate of silver. It has also another advantage over the latter salt, viz. that is it chemically indelible. The ink made with nitrate of silver can be removed by washing the linen with a solution of hyposulphite of soda, or by moistening it with a solution of bichloride of copper and then washing with liquid ammonia. This is not the case with the aniline ink, the color of which cannot be removed by any chemical agent whatever. Linen therefore marked with this ink can never be appropriated by other persons than the rightful owner.

Such aniline ink may be prepared in the following way : 8½ grs. of Bichloride of copper are dissolved in 30 grains of distilled water, then are added 10 grains of common salt, and 9½ grains of liquid ammonia. A solution of 30 grains of hydrochlorate of aniline in 20 grains of distilled wtaer is then added to 20 grains of a solution of gum-arabic, containing 2 pts. water, 1 pt. gum-arabic, and lastly 10 grs. of glycerin. Four parts of the aniline solution thus prepared are mixed with one part of the copper solution.

The liquid which results has a green appearance, and may be at once employed for marking linen, since it invariably becomes black after a few days. A steel pen may be employed as well as a quill. If it is desirable not to wait so long for the appearance of the black color, a hot iron may be passed over the writing when the ink is dry, or the linen may be held over the flame of a spirit lamp, or over a hot plate, or hot water, when the black tint will readily appear.

It is a good plan to put the linen when marked into a tepid solution of soap, which has the effect of bringing out a fine bluish tint. The ink must be so limpid that it is able to permeate the tissue of the linen, so that the marks appear on both sides.

It is advisable to mix the solutions together, only when the ink has to be made use of.

The ink is perfectly indelible, and so easy to write with that the finest devices may be drawn with it.

A very cheap brown marking ink may be prepared from binoxide of manganese, as follows: 4 pts. Acetate of manganese dissolved in 12 pts. of water.

The place on the linen where the marks have to be made, must be previously moistened with the following solution: 1 pt. Yellow prussiate of potash, ½ pt. gum-arabic, 3 pts. water. The linen having been saturated with the above solution, is then dried, and afterwards marked with the manganese solution. On the letters becoming dry, the following solution is spread over the spot with a pencil: 4 pts. Carbonate of potash, 10 pts. water. The letters then become brown, and their color cannot be removed by alkalies, nor by acids, with the exception of dilute hydrochloric acid.

A purple marking ink can be prepared by employing bichloride of platinum: 1 pt. Bichloride of platinum, 16 pts. distilled water.

The place where the letters have to be written, must be moistened with a solution of 3 pts. Carbonate of soda, 3 pts. gum-arabic, 12 pts. water. The spot is then dried and made smooth. After the letters have been written with the platinum ink and become dry, the linen is moistened with a solution of 1 pt. Chloride of tin, 4 pts. distilled water, when an intense and beautiful purple-red color makes its appearance.

Importance of Extensibility in Materials employed for Construction of Machinery and Buildings.

A certain degree of extensibility is indispensable, in most parts of machinery or of buildings which may be supposed to allow, without fracture, any slight alteration of form that may arise from irregularity in the construction or from any extraordinary strain. The importance of this should by no means be overlooked in those structures which consist of several separately-wrought pieces, such as an iron bridge or a boiler; for these can never be so constructed that the strain is from the beginning evenly distributed throughout. If then the component parts are not sufficiently extensible, they may be broken successively long before reaching the strain for which the bridge or the boiler was calculated. In such a case the elastic elongation which the separate parts could assume is commonly an insufficient guide.

When the parts, in order to be joined together, have become weakened at any point, either by some of the material having been removed as by riveting, or by the material having at any point been overheated, it must by no means be expected to show in all parts as great an extensibility as it exhibited in experiments on tensible strength. If, however, we know to what extent a bar or a plate has been weakened at a certain part by diminution of area, or by heating, and also know the limit of elasticity in the other parts of the material, together with the absolute strength and elongation on rupture, it will then be easy to estimate approximately, in every case, the elongation which the bar or plate may assume before being broken. If, for instance, a stay be taken, manufactured of soft steel with a limit of elasticity at 41,172 lbs., and the breaking load at 68,620 lbs., per square inch, and which, on fracture, has shown an elongation of 10 per cent; and if the area, at any part, has been diminished 20 per cent, or the absolute strength of the material has been lowered to the same extent by overheating, then the stay must break with 0·8 of the strain required to break the unweakened part of the bar (that is, when the load at this part amounts to nearly 54,896 lbs. per square inch); but since the permanent elongation, as previously shown, will increase almost in the same proportion as the excess of the loads above those at the limit of elasticity, and this increase is generally greatest when approaching fracture, the stay, therefore, when loaded with 54,896 lbs. per square inch can elongate, at most, only half as much as with the load of 68,620 lbs. on the same area, or 5 per cent of the original length.

If the absolute strength were diminished at any place, to the amount of 60 per cent of the original strength, the stay would (under the same conditions and if made of the same material) break with a strain of 41,172 lbs. per square inch on the unweakened part: thus rupture would take place at the limit of elasticity and, consequently, before the part last mentioned could assume any considerable elongation.

In like manner, if in riveting an iron plate, whose absolute strength is 48,034 lbs., and the limit of elasticity 30,879 lbs. per square inch, the riveted part becomes 40 per cent weaker than the rest, it is of little avail that the plate possesses great extensibility, for it will break at the rivets when the strain on the other parts reaches 28,820 lbs. per square inch, and it can then only give way a little in the actual line of rivets. If, however, the plate were constructed of puddled steel, Bessemer steel, or cast-steel, having a breaking strain of 68,620 and a limit of elasticity of 34,310 lbs. per square inch, and could elongate on fracture 10 per cent, but was only 0·7 as thick as the former plate; then, on the same supposition with regard to the strength of the riveted portion in relation to the rest, the part riveted would break with the same absolute weight as in the previous case, corresponding to 41,172 lbs. per square inch on the rest of the steel plate; but the plate last mentioned has elongated nearly 2 per cent, that is, almost ¼ inch per foot. The latter structure would, therefore, be more worthy of reliance than the former, although it required 30 per cent less material.

As the ratio of the breaking load to the limit of elasticity is generally greater in rolled puddled steel and other kinds of soft steel than in puddled iron, the employment of such steel would consequently allow the structure to assume a greater change of form than would be permitted if sort iron were employed. When, however, these materials are compared with each other in the form of homogeneous bars, the steel usually shows less extensibility.

From what has now been advanced with reference to the disadvantage of weakened points in machinery and building structures, it will readily be understood how desirable it is, both for economy and security, that the girders and stays employed in the construction of lattice-work and suspension bridges should have bosses or swellings at the points where they are penetrated by bolts or rivets.

In employing steel for purposes in which the material must be heated for further working, especial attention should be paid to the diminution of strength consequent upon such heating. For this diminution, as proved by the experiments on fracture, is greater in steel than in iron; and in different kinds of steel is greater according as the metal is harder, or richer in carbon.—*Sandberg's Translation of Styffe's Treatise on Iron and Steel.*

Faults in Cheap Building.

These are set forth as follows in the *American Builder*:

"1st. Cramping a house down to the smallest possible space, so as to make more 'yard room,' which will never be used.

"2d. Making no calculation as to the size of rooms or the location of furniture.

"3d. Building chimneys by guess, so that one has to have a dozen lengths of useless stove pipe, or else place his stoves in the most inconvenient locations.

"4th. Arranging windows and doors so that one opens against the other, or in the very spot to be occupied by a piece of furniture, or so placing them that no fresh air can get through the house, even though the whole should be open.

"5th. Providing no means of ventilating rooms, save by open doors or windows; hence all the impure air which is generated by breathing, cooking, and fermentation, as it is rarified, rises to the top of the room, and there remains to breed discomfort, disease, and death.

"6th. Nailing sheathing to the outside of the studding, and clapboards (or siding) close to the outside of that, leaving small or no air chambers between them, and, as in nine cases out of ten, green materials for each covering have been used, they shrink and rot, soon making a honey-comb of the shell, though plastered with paint and cement.

"7th. Laying the lower floor directly upon joists, or at best lining it with culls, full of knots and shapes which are but little better than nothing, and as a consequence the floor is always cold and uncomfortable.

"8th. In finishing, first laying the bases, pilasters, and casings (perhaps of green lumber), and then lathing and plastering up to them, so that when they dry large orifices are left to let in cold and moisture.

"9th. Letting his work out, as a whole, trusting to the honesty of the contractor to do it, without having plans or specifications properly drawn, and without any one to oversee, criticise, or direct it."

General Observations on Fatty Substances.

The industrial fatty bodies are the products of the two living kingdoms, vegetable and animal.

DIVISION OF FATTY BODIES.—According to the state in which the fatty bodies occur under ordinary circumstances, they receive particular names; thus they are called oils, butters or concrete oils, greases, tallows, waxes.

The oils are liquid at the ordinary temperature; they are vegetable or animal.

The butters or concrete oils are vegetable oils, soft or solid at the ordinary temperature, soft at 64·4° F., and fusible at 96·8°.

The greases and tallows are extracted from the animal organism; the first are soft and very fusible, the tallows are solid and melt only at 100°

Lastly, the waxes may be of vegetable or animal origin; they are hard and brittle, begin to soften at 95°, and generally melt at 147°.

IN THE VEGETABLES.—In vegetables, the fatty oils are generally met in the seeds; they are contained in the part which gives birth to the cotyledons, but the substance of the plumule and the radicle does not contain any. The seeds of the *cruciferæ, drupaceæ, amentaceæ, solana,* and *papaveraceæ*, deserve to be named on account of their richness in oils.

It is very rare that fatty substances are met with in the pulpy parts of the fruits. We know only the olive, the cornel tree, and the laurels, the fruits of which contain oil in their pulpy part. The *cyperus esculentus* presents the very rare case of an oil in its root.

In the seeds of plants, the oils are generally accompanied by vegetable albumen; thus, when they are triturated with water, the albumen keeps the oil in suspension in this liquid, which then becomes white and opalescent like milk, and takes the name of *emulsion.*

Among the vegetable oils there are some which are as hard as mutton tallow; they receive then the name of concrete oils or butters. Such are those of palm, coco, nutmeg, cacao, laurel, etc.

IN THE ANIMALS.—The fatty matter, grease or tallow, is found in the cavities of the cellular tissue, but it principally affects certain parts of the body; ordinarily it is abundant under the skin, at the surface of muscles, around the kidneys, and near the intestines. It presents modifications in the different classes of animals.

In the herbivorous, it is firmer, more solid, less odoriferous than in the carnivorous. The grease of birds is soft, unctuous, and very fusible. That of fishes and cetacea is nearly fluid and very odoriferous. White and abundant in young animals, it becomes yellow and diminishes in quantity with age.

ANIMAL WAX.—Waxes are animal or vegetable concretions. Animal wax is produced by a few insects of the family of the *hymenoptera*, by bees in particular; it is secreted under the rings of the stomach of these precious insects.

Vegetable wax is abundantly met with in vegetables. It constitutes the greater part of the chlorophyl, or green substance of the different organs of plants; it exists in the pollen of flowers, in the fruit of the beech tree, poplar, etc.; it covers the envelopes of many stone fruits; it forms the varnish of leaves, is met at the surface of the leaves of the palm tree (carnauba wax), on the bark of the violet sugar cane; it surrounds the berries of the *myristica* of Para and French Guiana, of the *Chinese fustic*, of all the *myrica* of the Indias, America, and Louisiana.—*Dussauce's Treatise on the Manufacture of Soaps.*

Products of Coal.

Mr. C. A. Moon, in a recent lecture delivered to working men in Whitehaven, after enumerating the more common and well known products of the distillation of coal, including carbolic acid, says:

"But another of the discoveries of chemistry is the manufacture of the most fragrant scents, the greatest variety of odorous essences from coal-tar. The young lady arrayed in her ball-room dress, with her finest cambric pocket handkerchief in her hand, perfumed with the celebrated "millefleurs," would be astonished, perhaps shocked, if she were told that she positively carried the product of coal-tar about with her. But startling as the information might be, it would nevertheless, be an undeniable fact. It may seem strange that from this black compound, which is so offensive to our nasal organs, chemistry can really manufacture the sweetest scents. But strange as it may appear, it is a positive chemical fact.

"Lastly, alcohol is mentioned as one of the products of the Boghead coal, and is said to be more stupefying in its effects than that extracted from malt. Now, as we have an ample supply of this fiery element for all needful purposes, we shall vote that the coal keeps its alcohol undisturbed, and, instead of inflaming our tongues and stomachs with it, we turn it to illuminating and heating purposes.

"Still this enumeration does not exhaust the stock of the useful products of coal which the wondrous power of chemistry has discovered and applied, but it is neither necessary nor desirable that we should add to the list. Sufficient has been said to show that from coal alone we derive warmth, light, easy motion, beautiful dyes, and rich perfumes. And what more do we require? In fact, there seems to be no end to the solid, liquid, and gaseous things which the chemist can call forth from this black, compact substance, disinterred from the bosom of our venerable Mother Earth."

Patent Block Fuel.

Various methods have been employed in this country to consolidate coal slack into portable and convenient blocks for fuel. As yet, from various causes, none of these have proved successful. We are now informed a new patent block fuel has been introduced in England, being a mixture of small coal, coal dust, lime coal slack, culm, or other bituminous substance, which is ground fine, and to which is added, during the process of grinding, coal shale clay, and, in preference, the shale usually found associated with coal underground. This is mixed in a pan with pulverized resin, asphalte, or natural bitumen, and a vegetable glue made in the following manner: To fifty gallons of water are added five pounds of rice and five pounds of glue or gluten extracted from Indian corn, maize, or meal, which when boiled for half an hour is fit for use. The paste thus formed is then removed from the pan and molded into cakes or bricks, and afterwards dried. This fuel is said to be free from odor, and is not liable to spontaneous combustion; properties which would if combined with great heating power, as asserted, render it an admirable fuel for ships' use.

Steam vs. Mortar.

In the New York SCIENTIFIC AMERICAN, of May 15th, is a communication from Fairfield, Iowa, reporting the fall of a chimney of a flouring mill in that place, which caused the entire destruction of the mill in question. The origin of the catastrophy was the turning of the escape steam into the brick flue. Now, it is strange that such errors can be committed by thinking men as to let such a subtile agent as steam in upon such an absorbent material as brick. With the exception of oil, there is no more searching power than that possessed by steam. And when we consider how liberally brick admits water into its pores we cannot be surprised to see what the effect of the injection of steam must be on it. It is not impossible that common lime mortar was used in the brickwork, and that there was a total absence of pargeting. We should under these circumstances, be very much surprised indeed if such a chimney, under such a destructive influence, could stand for any length of time.

The writer alluded to, says, that the escape pipe was let into the chimney near its base, and that at this point the bricks could be crushed between the fingers, while the balance of the chimney was perfectly solid.—*Architectural Review.*

THE landing of the French-American Cable was celebrated at Duxbury, on the 27th of July, with appropriate ceremonies. A battery came from Boston to fire the salute, and about four hundred sat down to dinner in a tent on Abram's Hill.

Improvement in Stump-pulling Machines.

We present herewith an improved stump puller; it combines great power and simplicity with efficiency and facility of operation.

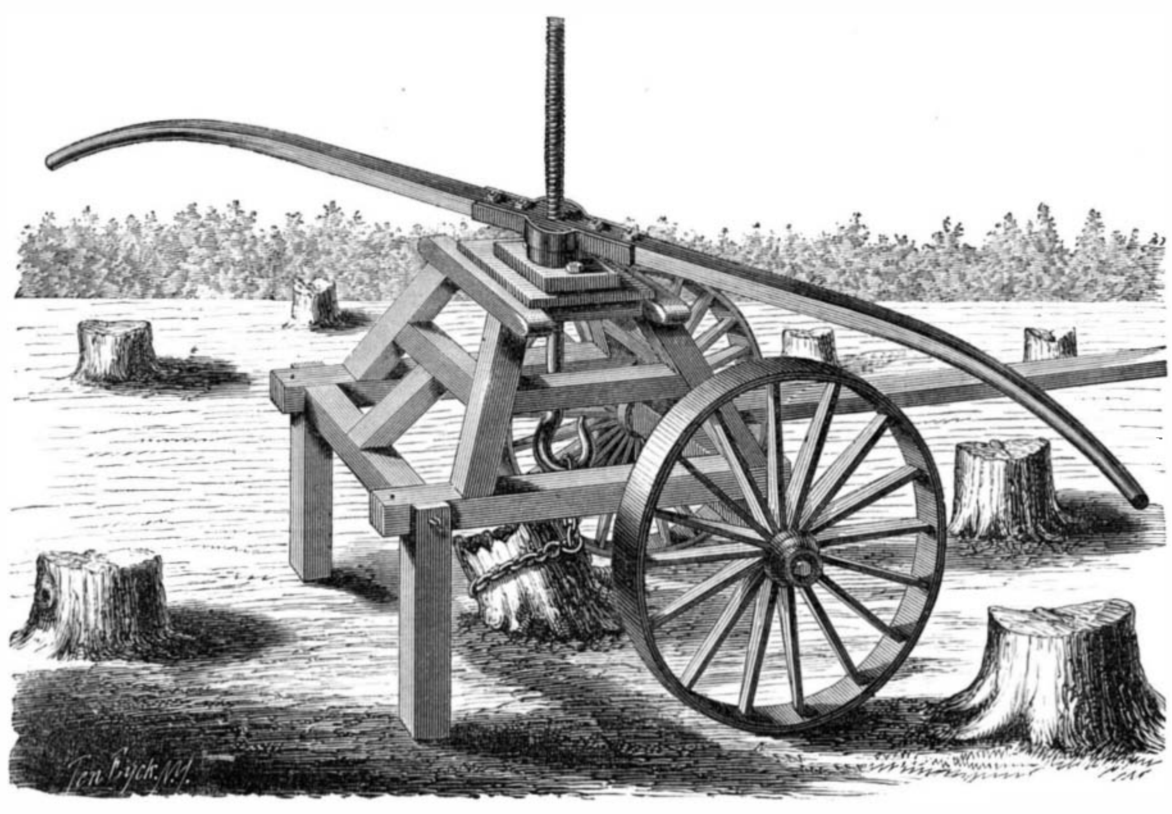
The engraving will convey so clear an idea of the machine as to render a detailed description unnecessary. It depends for its power upon a large screw and a long lever. These are mounted in a peculiar manner upon a pair of broad-tired timber wheels.

To the rear of the wheels is a strong framework of wood in the form of a truncated pyramid, with one of its lower edges resting on the axle of the wheels. On the top of this pyramidal framework, rising above the top of the wheels, rests an iron plate, through which passes a powerful screw, with a hook or other equivalent attachment at its lower end. The nut of the screw has two lateral sockets into which are fastened the two long drooping levers which pass entirely over the wheels.

When a stump is to be pulled the outer or rear edge of the pyramid is supported on two stout hinged legs or props.

These legs, when the machine is to be moved, are hooked up underneath the framework by their lower ends

When the machine is to be operated it is wheeled into position, by the team, directly over the stump, the outer props or legs are let down, and the pyramid is thus supported at every corner—by the two wheels at one edge and the two props at the other. In case the ground is soft, pieces of broad thick plank may be placed under the wheels and props. The levers are then put into their sockets at the nut, and the screw is run down. A chain or gripper is then fastened around the stump, or under some of its roots and attached to the hook of the screw. The levers are then revolved to raise the screw, either by hand or animal power, and the stump must come. The top of the stump is drawn up into the hollow of the pyramid, and when it is clear of the ground the levers are detached and placed along the tongue, the props are knocked loose and hooked up, and the stump may then be hauled off out of the way. The long and heavy tongue or pole, in conjunction with the lever, will fully balance the stump and the framework.



ROBERTSON'S STUMP PULLER.

This machine may be made of any size and power to suit the region where it is to be used, and was specially designed for use in river bottoms, where the stumps are six and seven feet in diameter.

This stump puller was patented, January 7, 1868, by Judge J. B. Robertson, of New Orleans, La., one of our oldest patrons, and one who claims to have acquired his mechanical education and taste from the SCIENTIFIC AMERICAN. He has other valuable inventions he will soon bring forward. The entire right of this stump puller is for sale. Address John B. Robertson, New Orleans, La.

Improved Seeder.

This is a simple, light, and seemingly effective implement for sowing seeds with rapidity and uniformity, or it may be advantageously applied to the distribution of artificial manures.

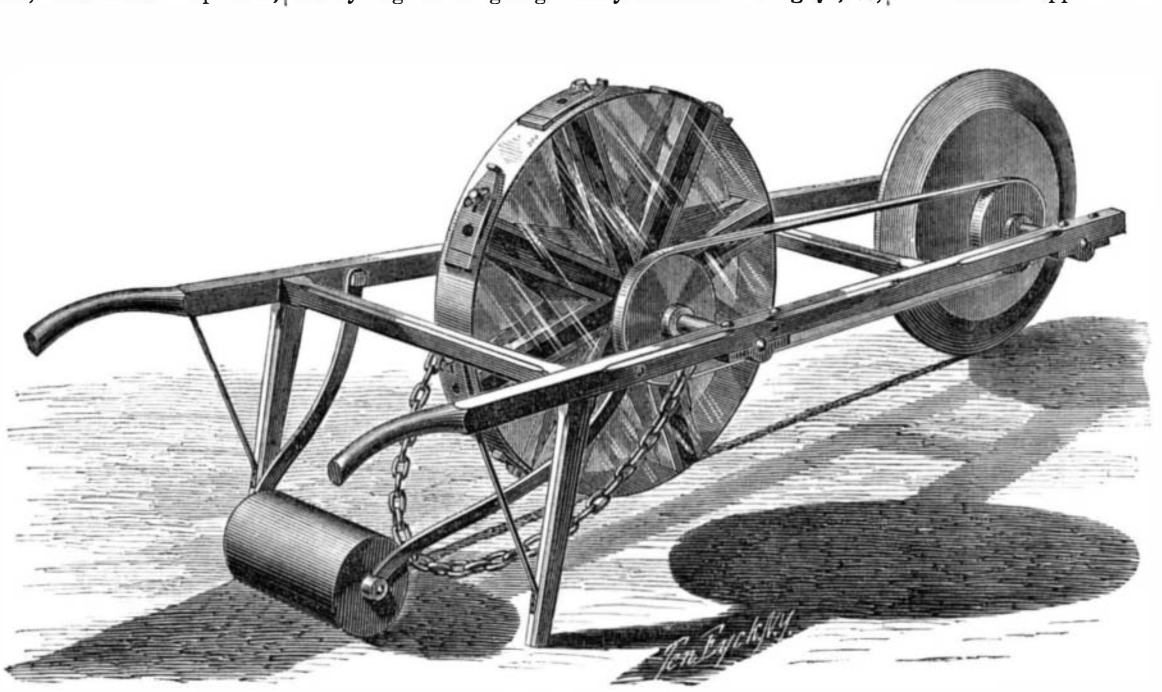
It is of the barrow form, and the seeding wheel is driven by a belt running from a pulley on the shaft of the wheel on which the machine rolls when the handles are grasped, and the seeder is propelled by the operator. Cone pulleys may be used to adjust the speed of the seeding wheel, which needs to run fast when used for distributing manures. The seeding wheel has numerous chambers radiating from the center of the wheel, each provided at the perimeter with detachable, perforated plates, with openings of various sizes for different kinds of seeds.

The seed is thus deposited in a furrow, made by the wheel upon which the machine rolls, its perimeter being so shaped as to make a furrow of the width and depth required. The seed is covered by a chain attached to the machine, which drags over the furrow behind the seeding wheel, and which is followed by a roller, also attached to the frame-work of the seeder, as shown in the engraving.

Seed can be thus sown and covered in a single operation, as fast as a man can walk The whole is so simple that it must be durable, and it will, doubtless, prove a valuable addition to the improved agricultural implements already in the market.

The inventor informs us that this machine has been thoroughly tested, and found to work admirably; sowing, covering, and rolling the seed with singular accuracy and regularity, and with light labor on the part of the workman.

Patented through the Scientific American Patent Agency, June 15, 1869, by Robert B. Tunstall, of Norfolk, Virginia, who may be addressed for the entire right for the United States.



TUNSTALL'S SEEDER.

Wooden Railways in Canada.

Some time ago we gave a description of the wooden railroad from Carthage to Harrisville, N. Y., a distance of 47½ miles, and alluded to the importance of cheap wooden railways as a substitute for the more perfect iron road, to be used with light locomotives. Experiments made in Canada seem to justify the belief that heavier locomotives can be employed than we were then inclined to suppose. The Montreal *Gazette* gives the following summary of a report made by a committee appointed to report on the Clifton Wooden Railway, which contains points of general interest:

The locomotives weigh ten tuns without wood or water, have taken from 30 to 40 tuns freight a trip, and cost $6,500 each, American currency. They have since been supplemented by engines weighing twenty tuns and costing $8,500, which will draw double the weight on the general down grade from the mines to Ogdensburg, over, in some places, an up grade of from 80 to 90 feet to the mile as soon as some portions of the road bed have been strengthened, some of the rails now springing under the immense weight.

The cost of keeping up the track, continues the committee, has been, and will not hereafter, Mr. Hurlbert (engineer of the road) says, exceed the wages of two men for every three miles of road, and these men will keep it in good running order and replace the worn out rails as fast as required. This does not include renewal of trestle or crib work. We notice that from one to two new rails per mile were put in this spring, and this was rendered necessary from the difficulty of obtaining good sound maple when the road was built, and some of the rails had got "warped" before being used, so that they were laid on the ties "heart side" up; they will not last so long that way as if the heart of the rail was laid downward. We counted 21 track men on the 20 miles we passed over, the track was required to be made ready for the large locomotives as quick as possible. It is estimated that these 20-tun locomotives will take easily 80 tuns per trip, and they intend to make two trips daily. It takes 22,000 feet maple to lay a mile of track, and from $80 to $100 States currency will pay for the labor required to replace it in position.

We may mention that we came down from the mines at the rate of 8 miles an hour, including all stoppages, having about 25 tuns of freight aboard. Mr. Hurlbert is strongly in favor of the gage in use generally in the United States for railways, and thinks that a narrower gage than 4 feet 8½ inches will not be found an improvement, though at the same time he acknowledges that rolling stock can be built much cheaper for a gage say 3½ or 4 feet than for the other gage. We noticed that where in building an iron railway there would have been "deep fills" that trestle work was used for cheapness; and in some cases for a long distance where, say a mile or more of low wet land had to be crossed, the track was made by placing logs crosswise of the road, with stringers upon these logs, the ties being placed in the usual way upon the longitudinal stringers. This gives a cheap roadway perfectly safe for a number of years. When we traveled over the railway the rails were quite wet, and in going up the steepest grades sand had to be used; the cars were loaded with from 15 to 18 tuns of castings for the works at the mines. The sharpest curves on the road were of 250 feet radius, which would seem hardly practicable, but it is beyond question that such curves are used in several places to avoid rock cuttings. A 14-tun engine can draw, on these wooden roads, on an occasional up grade of 250 feet to the mile, 20 tuns of freight easily; and from 100 to 140 feet grade is not considered very objectionable; of course the easier the grades the better for any sort of road, and the more level the route can be made, without too great expense, the better. The rails are made of maple, 14 feet long, 6 by 4 inches, laid edge wise. Mr. Hurlbert suggests that rails would be best 7 by 3½ inches. The rims of the wheels are like those used on iron railways, only wider and the flanges a little beveled, so that the flange in pressing against the rail does not cut it. We did not see a single rail "broomed up" or cut on the inside, and only a few on the outside, where the heart of the rail had been laid uppermost. The "switches" are made in the usual way, the rails being kept together with iron rods when required to be moved. The "keys" are made of maple plank. The rails are sunk into the ties (which are cut into six inches wide and four inches deep) and are kept in place by wedges or keys, twelve inches long by four inches wide and one and a half inches thick at one end, by ⅝ of an inch at the other, and driven in on the outside of the rail, keeping it against the shoulder of the tie. The ties are put down without being sided. There has not been a single car off the tracks since the road went into operation. The country through which the Clifton Railway is built is not only broken but even mountainous, and there is no difficulty, in our opinion, in constructing such a railway in almost any part of these townships. From the information obtained as to the cost of labor, materials, etc., in the vicinity of the Clifton road, we are of opinion that the cost of grading, furnishing ties and rails, and laying the same, with a moderate allowance of rolling stock, sufficient for some years, will not exceed, for our railways, $5,000 a mile, exclusive of large bridges—and this to build in a more permanent manner than the Clifton road is built. We are fully convinced of the practicability of wooden railways, where the principal object is a freight traffic, at rates of speed from 8 to 12 miles an hour, and that next to an iron railway, or where the cost of an iron road is too great to be undertaken, that wooden railways can be cheaply built, economically carried on, and a large paying business done by their means.

NATURE unrelentingly punishes those who obey not her laws.