please state through the columns of the SCIENTIFIC AMERICAN your views on the subject?

CHARLES A. GARDINER.

New York City, April 16, 1866.

[The science of therapeutics—the effect of medicines on diseases—is one of the most difficult problems that has ever been undertaken by the human mind. Constitutions differ; what will cure one man will kill another, and very frequently people recover in spite of medicines, instead of in consequence of them. It is only by the method pursued by Lewis, Velpeau, and other modern investigators, that any truths in regard to the effect of medicines can be established. They take large numbers of cases, divide them fairly in two equal portions, treat one-half with the proposed remedy, and leave the other half without treatment, and carefully record the result. We attach no weight whatever to the loose and careless method which usually prevails in observing the effect of medicine on disease. In this case it is our opinion that the man would not have had the cholera, had there been no fumes of the cyanide of potassium around him. There are several persons in this city who are not in the habit of breathing those particular fumes, and who have, notwithstanding, escaped the cholera.—EDS.

Hot and Cold Solutions.

MESSRS. EDITORS:—In the SCIENTIFIC AMERICAN of April 7th, your correspondent "F. T. E" asks the question: "Why does salt not dissolve in hot water in larger quantities than in cold?' He adds: "All *other* soluble substances dissolve more readily in warm than in cold water." "F. T. E." is mistaken in this last statement. About twice as much lime may be dissolved in water at the freezing point, than at the boiling point. May it not be because the lime expands more with a given amount of heat than the water? In this case the particles of lime would be forced further apart by heat than the particles of water, and cold water would dissolve more than hot.

In your article headed "Solid floating on molten iron," you say that Dr. Rowell has observed that several other substances besides iron expand in solidifying, and you mention lead as one of them. I have tried the experiment according to your directions, and think that it is a mistake. The lead floated, it is true, but it seemed to sink a little below the surface of the melted lead. I think it floated for the same reason that needles or iron filings will float on water when not wet on top; that is, on account of the repulsion between the melted lead and the dry surface. If you pour melted lead into a mold, it will be seen to fall in on the surface at the instant of solidifying, showing that it contracts.

CHARLES JANES.

Providence, R. I., April 7, 1866.

Photo-lithograpy with Half-tone.

(From the London Photographic News.)

The production of printing surfaces on stone, zinc, etc., by the agency of photography, has occupied the attention of experimentalists for many years, and in many respects a high pegree of success has been obtained. The process of Mr. Osborne, for the working of which a company has recently been formed in America, gives results in line and stipple which leave little to be desired. Mr. Ramage, of Edinburgh; Mr. Lewis, of Dublin; Col. James, and many others have also attained great excellence in the same direction. Messrs Simonau and Toovey, of Brussels, have attained some success in the production of half-tone, and the attempts of Col. James in the same direction have not been without promise. Still the fact remains, that no process for the actual production of photographs from nature by means of photo-lithography is in practical working, or has hitherto established a position, and that such a process remains an important desideratum, any means of meeting which would be hailed with a glad welcome by all concerned in the graphic arts.

Unless we are mistaken in our estimate of a series of specimens before us, by Messrs. Bullock Brothers, of Leamington, a process which they have recently patented bids fair to meet the long-felt want most successfully, and to render with a fair amount of delicacy, the true photographic gradation of negatives from nature. The subjects before us, consisting of landscapes with variety of foliage and architecture, are exceedingly excellent, and present all the good points of a good photograph, perfect gradation and half-tone, and great brilliancy, differing little in general effect from good silver prints from the same negatives.

Messrs. Bullock have followed in paths already partially trodden, but have made such practical deviations and modifications as have led them to success where others have only failed. Their aim is to secure in the transfer a suitable grain, so as to obtain the kind of gradation possible in lithography, without producing a coarse or woolly effect. Among the various methods by which they propose to effect this end, the plan used in producing these examples seems to be at once the most practical and efficient. A transfer paper is prepared with a plain solution of gelatin, and when this is dry a grain is printed on it from an aquatint plate. Paper so prepared can be kept in stock, and rendered sensitive when required by immersion in a solution of bi-chromate of potash. It is then ready for printing and transferring in the usual manner, and produces on the stone a photographic image, the continuous gradation of which is broken up into the stippled gradation of an aquatint plate. This is the broad principle; but it admits of much ingenious modification in practice, which is so far effective that it produces the most successful and promising examples of photo-lithography with half-tone which we have yet seen.

New Process for Indigo Dyeing.

Before it can be used for dyeing, indigo must be rendered soluble in alkaline and caustic solutions by being treated by a reducing body; by this reaction indigo loses its color, but after being fixed on stuff and exposed to the air, it absorbs fresh oxygen and returns to its original color. This process, theoretically so simple, is practically complicated by serious difficulties, and requires, on the part of the dyer, much practice and great dexterity. Thus, for instance, with indigo reduced by fermentation with vegetable matters, in a caustic solution, the various acids produced during the fermentation combine with the alkali, the liquid soon ceases to be caustic, and loses the property of dissolving the reduced indigo. To remedy this a fresh quantity of alkali (soda, potash, or lime) must be added from time to time; but should an insufficient quantity be added, a portion of the reduced indigo remains undissolved, and soon decomposes under the fermenting matter. If, on the contrary, an excess of alkali be added, a certain quantity of white indigo is lost by its combining with potash, and forming an insoluble product.

According to M. Leuchs, of Nuremberg, all these objections are obviated by effecting the change from blue to white indigo by pectine. Pectine exists in considerable quantities in the turnips of different species, in pumpkins, melons, etc., it may be extracted from these fruits, or they may even be direcly used to reduce indigo. The most simple process consists in heating 45 or 50 kilogrammes of the caustic lye to 75° C., adding half a kilogramme of well pulverized indigo, then suspending in the vat a kind of basket of iron wire, containing from 8 to 10 kilogrammes of fresh turnips, cut into small pieces. Then heat gradually to boiling point; the indigo soon loses its color, and the solution decanted into special vats and diluted with water freed from air, will be ready for dyeing purposes. Contact with air must of course be as far as possible avoided.

When the dye bath is exhausted it may serve for a fresh operation by adding indigo, a little caustic soda, and boiling it as above with a certain quantity of turnips.

On the iron wire trellis there will remain hardly 5 or 6 six per cent of the original quantity of turnips. This residue may used in paper making.

The simplicity of this new process may easily be proved by introducing into a closed tube a small quantity of indigo mixed with a few drops of soda or caustic potash, adding a small piece of turnip, and boiling; the indigo will rapidly lose its color, and redissolve and return to its original color by exposure to the air.

As turnips are not everywhere cultivated, and during certain seasons are not to be procured fresh, the author has found that the active principles may be extracted by boiling the turnips with water, under a pressure of two or three atmospheres. C. Leuchs & Co., of Nuremberg, now manufacture on a considerable scale an extract of turnips, 1 kilogramme of which will dissolve cold 4 kilogrammes of indigo. —*Annalen Chem. und Pharm.*

NEW INVENTIONS.

Let-off Motion for Looms.—This invention relates to a let-off motion which is governed by the force with which the batten meets the fabric in striking up, or in other words, by the density of the fabric itself. The invention consists in the arrangement of an angular roller shaft (or a shaft or roller supported by the arms of two cross levers), over which the warp runs, and on the end of which an arm is mounted from which extends a spring bar in combination with a lever carrying one or more pawls which gear into a ratchet wheel mounted on the end of the warp-beam in such a manner, that by the tension of the warp, produced by the latter in the act of beating up, the shaft or roller over which the warp passes, is depressed, and a longitudinally sliding motion is imparted to the spring bar, and thereby the lever, which carries the pawls, is caused to swing back more or less in proportion to the force exerted by the batten on the fabric in beating up; and the pawls are made to take one or more teeth of the ratchet wheel, and as the batten recedes, the angular rock shaft, or its equivalent, returns to its original position, and the lever which carries the pawls is moved back by the action of a spring or by the direct action of the spring bar, causing the pawls to act on the ratchet wheel and to turn the warp beam in proportion to the number of teeth previously taken by said pawls. Samuel Estes, Newburyport, Mass., is the inventor.

Lamps.—The object of this invention is to correct inequality or unevenness in the light of lamps wicks, and also to clear the wick of cinders and of any other matter which obscures the light or hinders the perfect burning of the fluid. It consists in placing around the top of the wick tube a supplementary tube which is pivoted or arranged in such a way as to be capable of being vibrated to and fro, for the purpose of clearing or cleaning the wick and the top of the wick tube from cinder and from any matter that adheres to the tube, and also of being placed in positions out of parallelism with the top of the wick tube so as to bring it into parallelism with the wick, when the latter has been trimmed to an angular line or has been forced up unequally by the wheel so that one side is higher than the other. The supplementary tube is operated by a lever which extends through the side of the burner. Edmund Brown, Burlington, Vt., is the inventor.

Grate Bar.—The object of this invention is to furnish a simple and cheap grate bar, protected by its construction, from vertical or lateral warping from the effects of pressure or heat, to take the place of the complicated and costly grate bars now in use for that purpose. This object is accomplished in a simple and effective manner, by corrugating the rib or lower part of the bar with one or more longitudinal corrugations. George O. Tupper, 23 Abingdon Square, New York, is the inventor.

Apparatus for Distilling Petroleum and other Liquids.—This invention relates to an apparatus composed of a hollow drum and steam coil, which are heated by superheated steam, and surrounded or covered by a suitable jacket, in combination with a helical trough, commencing on the top of the steam drum and extending down to its bottom, in such a manner that crude petroleum, or other liquids, let into the top end of the helical trough, are gradually heated and partially evaporated, and those parts of the liquids which reach the bottom end of the trough, in a liquid state, drip down upon the highly-heated steam coil, where they instantly flash into vapors, and the distillation of petroleum, or other liquids, can thus be conducted without interruption, and without danger of an explosion or conflagration. L. V. Fichet, 440 Broadway, New York.

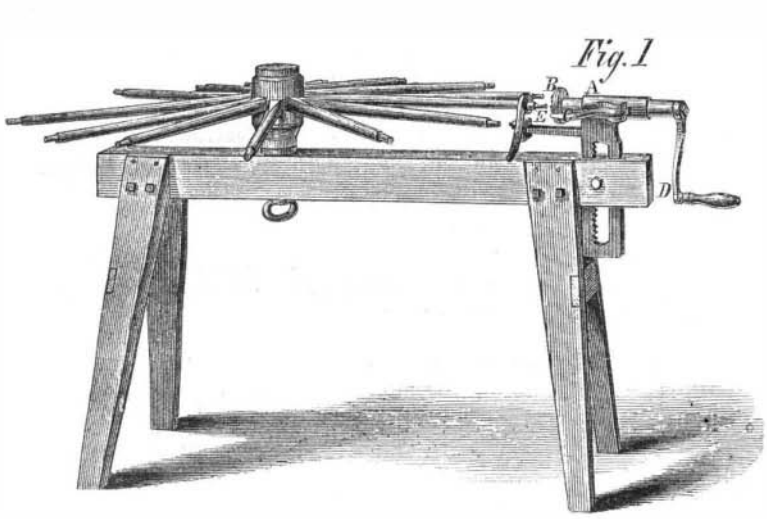
ONE of the strange properties of aluminium bronze is that after being forged it is annealed by precisely the reverse treatment to which iron is subjected, as it is heated to dull redness and then plunged into cold water.

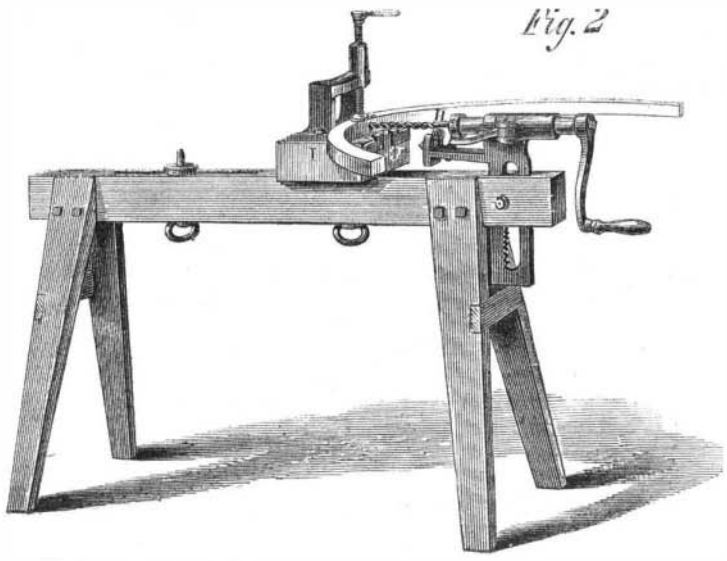
Improved Spoke Tenoning and Felly Boring Machine

Many small wagon makers and wheelwrights scattered about the country, will find the device here illustrated a great advantage to them, since much more work can be done with it and with less exertion than by the common way.

The arrangement consists in applying a small machine to a bench or horse, as shown in the engraving, placing the wheel with the spokes in close to it, and then cutting the tenon on each spoke with rapidity and accuracy. In detail the machine consists of a casting, A, having a mandrel with an expanding cutter, B, on the end which can be set to cut tenons of various sizes. The mandrel has a series of grooves turned in it, which receive a lever, C, formed to suit them. This lever projects, as will be seen, and is intended to feed the cutter up to the spoke.

By turning the crank, D, and at the same time grasping the projecting lever, the cutter will be revolved and fed up, thus forming a tenon in a short time. The leg of the casting, A, has a rack formed in it in which a pinion, not seen, works. This is to elevate the whole machine so as to suit different hights, and there is an adjustable rest, E, which accurately centers and holds the spoke while being acted on. In Fig. 2 the same machine is shown adapted to boring fellies, a bit being substituted for the cutter shown in Fig 1. There are stops on the adjustable rest at H, which the bit holder brings up against, thus limiting the depth of the hole. At the front of the vise block, I, which holds the felly are two guide irons, J, to keep the same in position when dowel holes are bored. These machines will be found very handy. The invention was patented by L. A Dole, on Oct. 31, 1865. Address Dole, Silver & Deming for further information, at Salem, Ohio.





DOLE'S SPOKE-TENONING AND FELLY-BORING MACHINE.

WESTERN STEAM BOILERS.

Mr. William H. Glynn, an engineer of Dubuque, Iowa, writes us to say that his experience, in regard to priming of Western steam boilers and the malproportion of them, accords with that of Mr. Schaeffer, which was recently published in the Scientific American.

Mr. Glynn states that he has frequently seen cylinders coated inside as if they were whitewashed—the result of priming; and, further, that many accidents also take place from the bursting of steam pipes. This, he thinks, takes place from a sudden checking of the water and steam, by the fall of the steam valve, which induces a sudden strain that the pipe cannot bear. He thinks priming is also caused, in many instances, by opening the throttle too wide, when the cylinder is cold. The steam will be condensed in the cylinder, forming a partial vacuum, which the water from the boiler naturally flows into. He also says that he finds no more trouble in keeping water in tubular boilers than in two flue boilers, if the former are clean.

A Spiritual Invention.

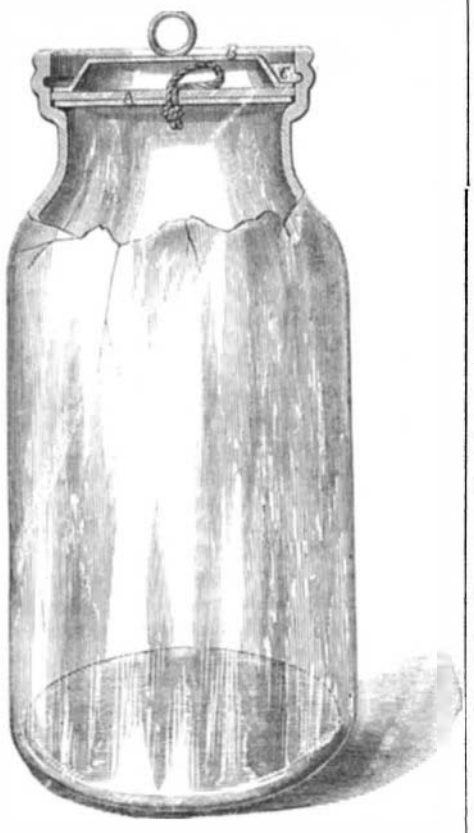
Mr. Frank Chase, of South Sutton, N. H., states that the blind fastener, illustrated on another page of this number, was revealed to him through Emma Hardinge, a spiritual medium, by the ghost of his uncle, a worthy mechanic sometime deceased. Acting upon the hint of Miss Hardinge, he made the fastening, which is certainly a good one, and if done by the spirits, as Mr. Chase claims, is certainly no discredit to their inventive genius. People often dream of valuable inventions, but they do not always turn out so well as they dream they will.

Album for Porcelain Pictures.

Mr. J. C. Spooner, photographist, of Springfield, Mass., has shown us a new album of his invention, designed for porcelain pictures. It has heretofore been impossible to preserve such pictures except in frames, for unless special care is taken the transparency of the picture, which gives it its chief value, is entirely lost. Mr. Spooner makes his albums with a glass front in one part of it, so that by sliding the picture back it can be readily held up to the light and sun and still be preserved from injury. Externally the album is handsomely finished and is so constructed that a number of pictures are alternately exhibited through the same glass.

CHRYSLER'S FRUIT JAR.

Many persons still use cement or wax in sealing fruit jars, and prefer that plan to others, as being certain under all circumstances. For this mode of closing fruit jars the cap shown in the engraving will prove a very convenient one.



It consists of a pasteboard disk, A, and a tin cap. B. The pasteboard fits tightly to the jar and is almost sufficient in itself to secure the desired end, but in addition to this the cover or cap, A, is placed on top and a small quantity of cement or wax poured in over it. This immediately runs into the groove, C, and makes a perfectly tight joint, while the air, pressing on the top of the cap with great force, keeps the pasteboard disk in close contact with the jar. By the use of the pasteboard the fruit is not injured, as is the case when brought in contact with india rubber, and no wax can enter the jar in sealing or unsealing. It is in all respects simple and reliable.

For further information address J. M. Chrysler & Son, No. 15 Pine street, Lockport, N. Y. Patented Nov. 21, 1865.

A SEVEN-TOOL LATHE.

The London *Artizan*, of April, gives an illustration of a new lathe for turning crank axles. All machinists know that there is a vast amount of work on these, and that it is necessarily slow and tedious. The body of the crank has not only to be cut out, but a vast amount of turning on the bearings beside. Where this is done on a common lathe the job is a long while in it, and both employer and workman get sick of the sight of it.

To expedite the process a lathe has been devised by Mr. Ramsbottom, of the Crewe Locomotive Works, England, which has a tool for every essential part. That is to say, the sides of both cranks are faced at once, making four tools and four slide rests at work on this part; the two bearings are also turned up at once, and one of the ends is faced, making seven tools at work at one time.

It is stated that these tools work well together, and that the workmen have no trouble in attending to them. Of course, since the lathe operates well, comment is superfluous, but it will occur to all practical men that axles cannot be true turned in this way, for the spring of the throw, in passing over, would be likely to cause the tools to jump into the bearings and mar them.

Most, if not all the crank axles in the Crewe Works are now made from Bessemer steel, and by another peculiar machine the throw of the crank is cut out from the blank in about ten hours, which is quick work.

M. Tardirel states, that if a perfectly smooth and polished plate of glass, ivory, or metal is caused to rotate with great velocity in a horizontal plane, it does not communicate its own motion to a highly finished ball which may be placed upon it.

[M. Tardirel need not have inconvenienced himself to have stated that.—Eds.

Good Idea.—On the *Chemin du fer du Nord*, tubular stays have been used for locomotive fireboxes to some extent, the escape of water through the stay showing at once that it has suffered from corrosion. These stays are made by drilling through the solid bar,