

tary presentation. May every success attend your widely spread journal, and may her wings never grow less.

I am, gentlemen, yours truly,
Whitehall, N. Y. ROBERT IRWIN.

A Voice from the South.

The following letter is from a distinguished citizen of Mississippi, for whom we have recently taken a number of patents in this country and abroad:

MESSRS. MUNN & Co.,—Gentlemen: I have received all my European patents. You must allow me to express my sincere thanks to you for the manner in which you have conducted the whole business. I do, and shall, most cordially recommend you to all persons wishing to take out patents.

Fayette, Miss. D. HARRISON.

[It is a noticeable fact that the inventions submitted to this office from the South, exhibit a degree of novelty and practicability not formerly evinced from this section of our country. Whether it was the war that had sharpened the native genius of the South, or that these inventions emanate from Northern men located there, we are unable to state; but the fact is patent that many good inventions are coming from the Southern States.—EDS.]

Another Case in Point.

J. L. Alberger, Treasurer of the Ransom Siphon Condenser Company, Buffalo, N. Y., writes us as follows:

"We are under obligations for the clear and perfect manner you have illustrated our invention in your issue of Feb. 12th. Letters are pouring in from all parts of the country, and we conclude that everybody reads and appreciates the SCIENTIFIC AMERICAN."

A JOURNEY WITH A RAFT.

From the Building News.

The timber trade of Germany has often been described, but few persons have gone down the great and little rivers with a raft, encountering the various obstacles of this awkward navigation, and entering into the enthusiasm of the crew, who are neither landmen nor seamen, neither engineers nor sailors, but pilots and steersmen exclusively, who build their cabins as they go, and make their craft larger as the water it floats in deepens. We will not pretend to have made the voyage from the Black Forest to Amsterdam without a good many breaks, or, indeed, on the same batch of timber; but, having joined a woodland company at various points, and followed the trees of the mountains from their fall under the ax to the mighty saw mills of the Lower Rhine, we think a few sketches of our broken journey may be interesting to those who frame for use these gatherings from the German forests.

And, to begin, the ax-bearing population, which hews, and barks, and splits, is one of the most simple, regular, and devout in the whole world. It was a pleasure to be among them and their quiet, primitive, humble manners, as, in a state of independence, suggestive rather of a newly cleared settlement than of a region with a history older than that of most Roman camps, they offered the hospitality, made rich by welcome, of their sylvan dwellings—huts scattered apart, and not in villages—to the stranger, whose systematic inquisitiveness they are quite intelligent enough to understand. This agreeable novelty have we enjoyed, and, in describing it, premise that we are making a whole from a series of fragments.

First, among the firs that grow in gloomy masses from the center of Wurtemberg, across a hundred and twenty miles, and right through South-western Germany. In the earliest light of the morning, stalwart men, book and pencil in hand, are perambulating beyond all trodden paths, knocking at lowly doors, notching particular trunks, leaving messages and marks with the women and children—unless the last are already out collecting beech nuts or resin, and indicating thus the felling which is to be authorized during the day. These "masters of the wood," or stewards are, in general, fellows of Herculean mold, with skins like leather that has been tanned in Canadian tincture. Anon, the forest is alive, and clamorous with its own peculiar industry. The silver fir, one hundred and fifteen years old, so nearly as the surveyor may calculate, is coming down with an echoing crash. It is only pine, but we have seen it 130 ft. high, and nearly 7 ft. in diameter. In about two hours an average stem gives way, and swoops in a dead weight to the earth, there to be stripped of branch, bark, and foliage, which are burned or cut up as fuel, or converted into charcoal, while the "log" itself is prepared for transit to the sea—that is, if it be of proportions sufficiently noble. To be "Holland Wood," worth transport down, it must be 72 ft. long, and 16 in. wide at the narrowest extremity; but, being of this size, how to move it, until the carrying water current be reached? We saw this process four miles off the Euz, which is a prodigy of a stream. Fir trees, in parallel lines of three, are split, barked, smoothed, and soaked; then laid, like immense rails, down and round the slopes of the hills, conducted from the hewing ground to the banks of a river. When the river is full, and they are wet with rain, the lumber is laid upon them, and, impelled by a sudden push, away it glides, accumulating force in going—perhaps several miles; now leaping a precipice, then, shifting its course, and snapping like a match midway; again, getting into the dry bed of a torrent, which the foresters flush from an artificial lake, creating a tremendous cataract in half an hour; finally, arrested by dams or gratings before it commences the seaward journey, for the purposes of sorting and identification. Hitherto it has traveled alone, henceforth it is under guidance; and here, for a time, we join it.

Now, in order to appreciate this sort of experience, you must remember what the Euz is.

The Euz is a small river, issuing from the mountains about fifteen miles above Wildbad, very rapid, very noisy, very irregular in its course, exceedingly shallow, crowded by enormous boulders, and interrupted by countless cascades. The problem, which would seem insoluble, were it not constantly solved, is, how to manage down this boisterous flood a raft several hundreds of feet in length, composed of tree trunks, each being enough for a sea clipper's mainmast, fastened together by osier twigs, which is to vandyke when the waters vandyke, stop when they fall, take leaps with them, shoot all the rapids, turn all the corners, and find its way, now to the Neckar, and next to the Rhine, and so into the general timber trade of Europe. We can testify that the adventure, for those who attempt accompanying the timber, is not luxurious. It is half swimming and half running. You feel as if riding, without being used to it, upon a tender behind a locomotive. The logs will not lie together; you are ankle-deep, if not knee-deep, in the stream; a false step may involve a merciless contusion; your upper clothing, although hung on a post, is liable to perpetual wetting, and every now and then your companions change. Let us confess that, in the good hamlet of Calmbach we quitted the raft, weary for a while of its romance, and suffered that portion, at any rate, of the summer tribute from the Black Forest to the carpenters' shops of Europe to go upon its voyage unblest. But, with a courage worthy of a better cause, we found ourselves, two days later, upon a like slippery and inconstant platform, which gradually grew longer and wider, until a more generous channel opened, and we left again on an inland excursion, only to rejoin on the Upper Rhine. Here the spectacle becomes a wonder. The raft resembles one of Sinbad's impossibilities; morning and evening it expands; it stops at a landing station, and lo! you might fancy that a town was on a tour, paying a visit to the village! It is no longer a raft; it is an island which you inhabit. Men are erecting huts upon it. There is one for you, with a bed and a stove, and a locker full of provisions. You go aft: nothing except the gigantic logs, trailing with the stream; you go forward, and only twelve helmsmen, with oars of Grecian shape, silent and steady, who will answer no question, but keep their eyes intent upon the piers of bridges, the quick curves, the well-known shoals, and with very good reason. For, supposing a timber raft to strike a bridge, the bridge would float away with it. Supposing it struck by a steamer, so much the worse for the steamer. Yet everything is not propitious to the "rafting master." A saying is current about him, that he should, before venturing, possess £30,000—£10,000 in the forest, £10,000 on the water, and £10,000 at the bank, to cover disasters. But that is an exaggeration. The commerce in timber is at once gigantic and profitable. It not only built Amsterdam—it built the very foundations upon which Amsterdam is erected; it supplies nearly the entire home industry of Holland; it is a source of competence to the poor, and wealth to the rich. The great rafting companies of Calmbach, Gernsbach, Phorzheim, Wolfbach, and Illbach, employ their thousand, and the demand continually increases. It would not be an adequate supply, were it not that the forest culture of this region is about as ignorant and faulty as can be conceived. A scarcity is, from year to year, dreaded, while the land under protection increases.

But we must go on with our raft. It is now a populous territory; it contains human abodes, magazines, altars, a Calvary, a miniature market, a dairy, and an overseer, who holds a strict eye over his inventory. We count beneath our feet 190 trees, all proper length and girth, loaded with shaped deals. Two or three nights spent—not, we confess, on the raft, but, more comfortably, ashore—aggrandise our raft, and the logs are beyond reckoning. The head man assures us, however, that they number about 6,000. The aggregate value is, at this time, about £4,000. Fresh raftsmen are on board; more skilful pilots are engaged; you tread an unyielding deck; the floor seems sound as mother earth itself. And, all the while, not a stick has been brought down except from a single district. We accept, gratefully, the help of a learned German economist, whose works have been gracelessly robbed by the guide-book makers in estimating the importance of this trade for one year:

575 oaks at	30 florins each.
2,089 stems of Holland at	46 "
2,000 stems at	23 "
800 do.	15 "
1,500 do.	12 "
25,000 stems of measured wood at	9 "
121,935 of common wood at	3 "
4,696 sawing blocks	4 "
180,946 of deals at	1 "
2,497 cords of fir wood for fuel at	9 "
6,671 pieces of timber at	4 "

—in all, about £80,000 in round numbers. The prices of the year were for the cord of 144 cubic feet (firewood):—oak, 17s.; beach, 10s.; fir, 5s. For building:—4d., 3½d., and 2d. a cubic foot. But in this estimate must be included the cost of the navigators, and, although they earn no more than sixteen pence a day, and this not all the year round, they are not to be lightly considered, arithmetically speaking. We have the bill of fare before us of a raft between the mountains and Dordrecht, and it reads like the menu of a city besieged. Cattle are actually kept and slaughtered on these mighty moving decks. Well, the company consumed in the interval we have mentioned, 5,000 lbs. weight of bread, 3,000 lbs. of meat, 2,000 lbs. of cheese, 50 sacks of dried vegetables, and 500 casks of beer. But then the voyage, only from Bingen to Dordrecht, though occasionally done in eight days, often lasts nearly as many weeks.

The timber in charge of these hungry pilots was worth

£24,000. It was one parcel out of many, representing a year's value of nearly half a million sterling. And there are reasons for calling this Holland wood. Holland has no forests worth speaking of, but it is a wooden country. Its cities—Amsterdam and Rotterdam especially—are built upon foundations of German timber; German timber is the mainstay of its dykes, and the material of its bridges; it has sunk whole forests in the bog, and the mystery is how they last so long without decaying. We were present, the other day, when, to facilitate an experiment in drainage, a shaft was attempted to be sunk through the rotten soil of the Zuyder Zee, and the workmen came upon a structure of piles that had been buried for upwards of two hundred years. They were nearly sound, and had simply been coated with pitch. Again, the Dutch build above ground, as under, with the oak and fir of the Hartz, and it is a proverbial saying among them that, in the course of time, they shall require every tree growing upon a German hill. But this is mere boasting. For every log floating down to Dordrecht, ten are chopped up and burned, or converted into scantlings, for use in the upper country. There it is wanted in immense quantities for barrel staves and boats, for house building and railway works, for endless miles of palisading, and a thousand forms of industry, from fortification to toys, in which the German artificer employs wood. This, however, is only by the way. Our principal purpose was to give a notion of what a voyage must be, and is, to judge from fragments, on a river raft. Up in the valleys it seems at first incredible that you should succeed in making any way at all. The load appears too ponderous for the slim stream of water to carry; every moment, while the force of the current continues strong, it threatens to get wedged in between the banks; now its tail hangs among tremendous boulder stones, while the foremost part is entangled in deviousness, out of which all methods of escape are invisible; then, after a few rainy hours, comes down a rush from the mountains, and the unwieldy mass, taking a fresh start, is guided along with indescribable dexterity, the men maneuvering with a perfect knowledge of every twist and shallow, every turn and obstruction, all the way. But, for any one unused to the navigation, it is a ridiculous series of small dangers and mischievous slips, there being no formidable depths, and the only real perils consisting in getting a fall with a weight so gigantic rushing down behind you, or in crossing the course of a rapid, and being dashed against the timber. On the Rhine, where the decks are, in a way, solid, there is no more difficulty in treading them than in pacing the Great Eastern; but here, on the Euz, the hold is like that on a greasy pole, and the transitions from one rate of speed to another are amazingly embarrassing. You might fancy yourself, for an hour, gliding through a trout pond; then the water is artificially raised by means of weirs and sluice-gates; suddenly, an escape is allowed, and masts enough for a dozen East Indian men go tumbling away together with a furious clamor, the pilots never flinching or doubting; but the poor, daring passenger, of whom they make no account, staggering about, and clinging here and there in utter helplessness—for him it is bliss to enter on a broader and more regular stream. But for him, also, there are privileges. He can go ashore; he can follow the course of the raft at an easy distance; he can get together a few planks and make an unsteady and rising-and-falling floor for himself; and he may feel perfectly sure that, in the event of risk, there will be plenty of hands held out. But, for all that, it may not be the wisest thing for the Princess of Wales, coming to Wildbad for a cure, to float knee-deep on a raft, when rheumatism is her malady, and Wildbad exactly the place to exasperate it—on a raft.

Adventures of a Diamond.

The Sancy diamond is for sale at a jeweler's in Calcutta just now. Here is the account the jeweler gives of it: "This diamond is of an almond shape, and weighs 60½ ruttie. The stone was found on the body of the Duke of Burgundy, and was afterwards, in 1470, bought by the King of Portugal. He afterwards sold it to Nicholas de Barly, Baron de Sancy, from whom it derives its name. Sancy sent it to the King as a present by the hand of a servant, who, being attacked by robbers, swallowed the stone, and after his death the stone was found in his body. It finally came into the hands of James II., of England, who sold it to Louis XIV. for 25,000*l.* Its almond form, completely faceted over (a mode quite unknown then or at any other time in Europe), indisputably proves that it was an Indian-cut stone. In the French revolution it disappeared for some time; some years later it was sold to Prince Paul Demidoff; and now, after a strange series of vicissitudes, finds its way to Calcutta.

MEN of genius have had so frequently to struggle under poverty, that certain individuals seem to think that in order to advance science it is necessary to keep the workers therein poor. We are told that the authorities of the South Kensington Museum, London—some of whom receive thousands of dollars annually for simply signing their names to papers they never even examine—are cutting down the emoluments of the science teachers. It is said that this course has caused great dissatisfaction among the teachers; but "dissatisfaction" we think is hardly the proper word; their pay was formerly so low that now they must be giving utterance to the last despairing groans of death from inanition.

THE rise of sap in trees and plants has been explained on the principle of capillary attraction, but M. Becquerel considers that electricity is an acting cause. A capillary tube that will not allow water to pass through it does so at once on being electrified, and he considers that electro-capillarity is the efficient cause of sap traveling in vegetable life.

Improved Photoscope or Panorama Album.

Photographs are now so common, cheap, and durable that it is desirable to have something more convenient than the common photograph album for their classification, preservation, and display.

The invention we herewith describe and illustrate is designed to do this permanently, and to that end is constructed of metal and glass only.

It is a sheet metal box with a glass top and bottom. Fig. 1 shows it in perspective as mounted on a suitable stand. The box is composed of two similar rectangular inclosures, one of which slides into the other. Across the middle of the interior of the box there is a partition composed of two pieces of sheet metal, one of which is soldered to one portion of the metallic case, and the other to its counterpart, as shown in the sectional view, Fig. 2. These pieces lap each other as shown in Fig. 2, and are so made as to leave the thickness of two cards between the glass and the edge of the partition.

To the under side, and at one end of the glass top and bottom, are cemented narrow strips of glass, extending from the end of the case to within a short distance of the partition, as shown in Fig. 1; the ends next the partition being beveled off.

At each end of the box there is a thumb-screw for adjusting the size of the box to any number of cards. These thumb-screws are turned down when the instrument is not in use.

A number of cards—always an odd number—being cut to fit the chambers formed by the middle partition; if we suppose—say twenty-five, to be put into the chamber having the glass strips above described on the bottom side, and twenty-four in the other chamber, the pile of cards in the former will be higher than that in the latter chamber, so that there will be one card above the partition. If now the box be lifted and slightly inclined so that the end having twenty-five

bolt and yoke, completely corroded away, and the surrounding parts greatly weakened. These cases show the necessity of stopping all leaks about boilers at once; the work of corrosion is so insidious and one never knows the danger they may be exposed to. Two safety-valves corroded first in their seats, and need no comment to show that there was careless management.

Those who have the care of boilers cannot be too attentive

There is a small device in the top of the spindle for taking up the backlash and preventing a break when the tool comes through the bottom of the piece drilled.

These drills are back geared, have steel spindles, self-oiled bearings, and power feed.

The castings weigh from 1,500 to 4,500 pounds, and are sufficiently heavy and strong to prevent spring.

Specimens can be seen at S. A. Wood's machinery depot, 91 Liberty street, New York, and at Rhode Island Locomotive Works, Providence, R. I. These drilling machines are manufactured by the Assonet Machine Company, at Free-town, Mass. Address Thomas G. Nichols, Treasurer.

Missouri Tin.

About two years ago considerable interest was manifested in regard to the discovery of very extensive deposits of tin ore in this State, and land owners and speculators were accused of having the "Tin Fever." Weeks and months were spent by prospecting parties, and all the tin lands that could be purchased at reasonable rates changed hands. One company was organized, and invested about \$80,000 in tunneling the hill and in work preparatory to the erection of a furnace. But their work has been stopped for several months—whether from want of capital, or energy and enterprise, we are not informed. Meanwhile, they have discovered tin ore in California, which is said to be inferior to the Missouri ore, and we now see by a California paper, that "The first article of tinware manufactured from tin mined in the United States has just been completed in San Fran-

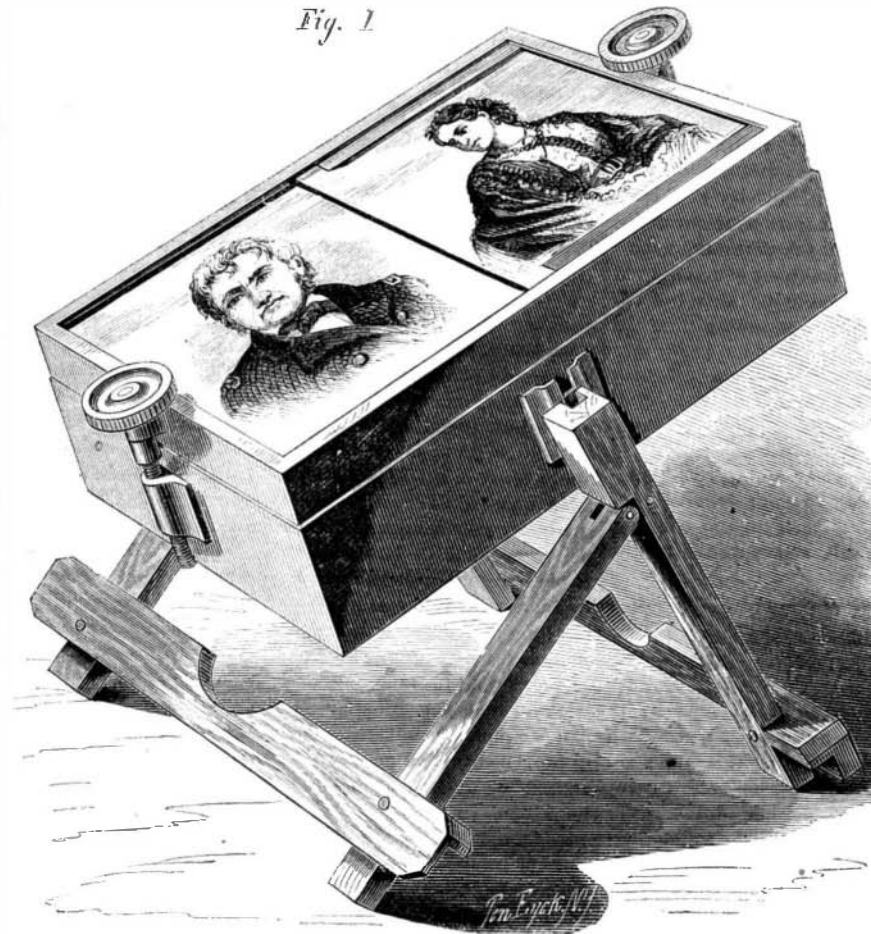
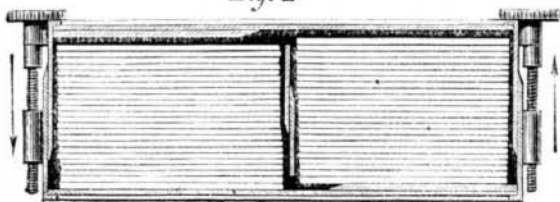


Fig. 2



BROWNLEE'S IMPROVED PHOTOSCOPE.

cards shall be uppermost, a card will slide across the partition on that side which is inclined under, and by turning the case so that the other end shall be uppermost, a card may be slid from the second chamber back again to the first, so that each card in the case may be successively brought to view.

The cards are each made up of two photographs with their backs pasted together, in such a way that a uniform thickness may be secured.

In order to do this the cards are sorted and arranged in small lots, until the proper thicknesses are secured. They are then numbered as a guide for pasting and also for cataloguing.

The instrument could be employed as a children's toy, using, instead of the photographs, letters or figures, or toy pictures. The cards might be made of sheet metal, and the same principle might also be extended to clock dials.

The stand which supports the instrument can be folded together so as to occupy very little space.

This instrument was patented, through the Scientific American Patent Agency, November 23, 1869, by George Brownlee, of Princeton, Ind., who will negotiate for the sale of the patent, and who may be addressed for further information.

The Hartford Steam Boiler Inspection and Insurance Company.

The Hartford Steam Boiler Inspection and Insurance Company makes the following report of its inspections for the month of December, 1869:

During the month, 341 visits of inspection have been made; 575 boilers examined, 492 externally and 192 internally; while 57 have been tested by hydraulic pressure. Number of defects in all discovered, 341, of which 30 were regarded as dangerous. These defects in detail are as follows:

Furnaces out of shape, 16; fractures, 34—1 dangerous; these too often result from urging the fires too fiercely, especially when "getting up steam" from cool boilers. Instances are known where furnaces or fire-boxes have been badly distorted by carelessness of this kind, and in internally fired boilers the tubes or flues heat more rapidly than the surrounding shell, and expand at a much greater rate. When boilers have been allowed to cool, the next time they are worked the firing should be slow and moderate at first, so that the heat may be diffused gradually, and the evil arising from undue expansion and contraction prevented as far as possible.

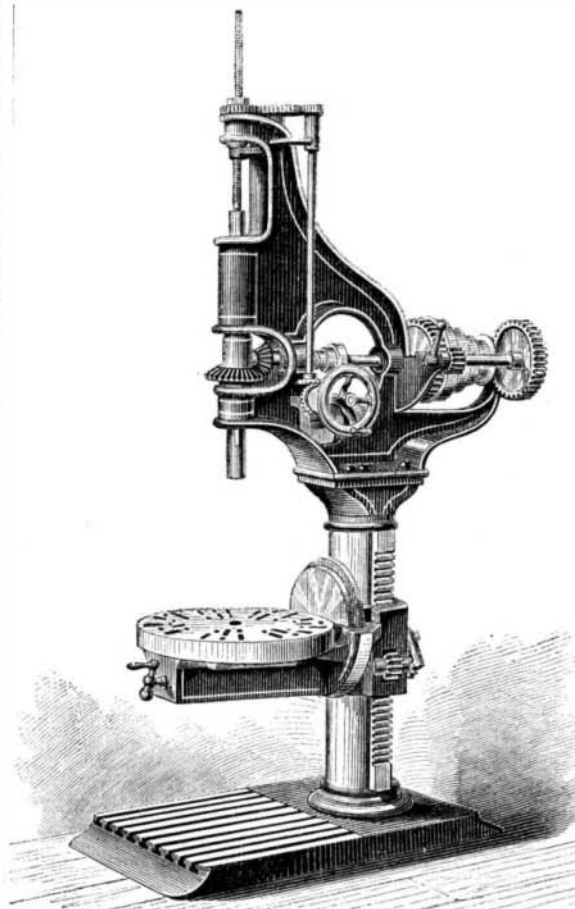
Burned plates, 33—4 dangerous; blistered plates, 36—5 dangerous; incrustation and scale, 73—7 dangerous; external corrosion, 19—3 dangerous; internal grooving, 5; water gages out of order, 8; blow-out apparatus out of order, 3—1 dangerous; safety valves out of order and overloaded, 22—4 dangerous; steam gages out of order, 40—2 dangerous, varying from 5 to + 25; boilers without gages, 2—2 dangerous; cases of deficiency of water 1—1 dangerous; insufficient staying, 2 cases.

Of the cases of external corrosion, one was found where the sheet was corroded for 2½ feet, so that a light tap of the hammer would penetrate it. This boiler was bricked in, and the evil arose from a leak in the joints. We not unfrequently find cases similar to this, though not in the same degree. Another case, two boilers were found with hand hole plates,

to their duties. All the parts and appliances of the boiler should receive frequent and careful attention, and it should be the pride of every engineer and fireman to have everything in his care neat and in order.

IMPROVED PATENT VERTICAL DRILL.

This machine differs from the original drill, patented by N. P. Eddy, April 24, 1866, patent No. 54,248, in this important particular, that the drilling table turns (from a horizontal to a vertical or intermediate position) on a center in the plane of its face.



There are five different independent motions of the table; namely:

- 1st. Turning, as above described, for angular drilling.
- 2d. Turning on its own center while in any position.
- 3d. Sliding to or from the post.
- 4th. Raising or lowering on the post.
- 5th. Turning around the post to bring the work in place, or to be out of the way while using the platform table.

By means of these motions a piece of metal once fastened to the table can receive the drill in any direction without being removed from the table.

cisco."

Numerous assays have been made of this ore by chemists and assayers of national reputation, who have repeatedly stated here that the ore will yield from 3 to 5 per cent of pure tin; yet, when they reach the Atlantic cities, where the tin importers hold sway, they fail to find tin in paying quantities.

Chemical analyses and assays are not wanted now; but, instead, we need a furnace to smelt the prepared ore and produce the pigs and bars of tin. A test furnace need not be very expensive, and this question, if decided affirmatively, will be of the greatest importance to this city, State, and the whole nation, as the importation of foreign tin into the United States now amounts to from five to six million dollars annually, and is constantly increasing. Who can say that the practical investigation of this subject will not prove as satisfactory as the experiments in smelting iron with our native coals?—*The Iron Age.*

Recutting Files with Acids.

By request, we republish the recipe for recutting files with acids, as patented by Albert I. Ferguson, of Sharon, Pa.:

"The files must be thoroughly cleansed in warm water containing a small quantity of potash, which readily removes any grease or dirt from them. After the files are thus cleansed, they must be washed with warm water and dried by artificial heat. Next, place one pint of warm water into a wooden vessel, and put into it as many files as the water will cover. Then add two ounces of blue vitriol, finely pulverized, and two ounces of borax, well mixed, taking care to turn the files over, so that each may come in contact with the mixture. To the above mixture now add seven ounces of sulphuric acid and one fourth of an ounce of cider vinegar, which will cause the files to assume a red appearance at first, but they will, in a short time, resume their natural color. Then they must be removed, washed in cold water, and then dried by artificial heat. When dry, they must be sponged with olive oil, wrapped in porous paper, and laid aside for use."

WHO MADE THE CARDIFF GIANT.—T. Mohrmann, of 146 North Water street, Chicago, writes to the *Chicago Tribune* that he and an assistant cut the Cardiff giant from a block of gypsum provided for the purpose. He further states that George Hull, formerly one of the owners of the giant, agreed to pay \$150 for the work, which he has neglected to do, and hence Mohrmann does not feel bound to keep the secret. He adds that both himself and the assistant spoken of, will make affidavits as to the truth of his statement.

A BALTIMORE gentleman has converted the roof of his stable and carriage-house into a garden for the purpose of growing ornamental plants. Water is conducted to the top of the building by means of pipes, for convenience of watering the flowers in dry seasons, and to supply a fountain which he contemplates erecting in the center of the garden. Many of the inhabitants of large cities would find a similar utilization of the flat roofs of buildings a source of pleasurable, healthful, and instructive recreation.