flame brought to bear upon it. In many cases the skillful lead burner omits the strip of lead, and obtains a joint by fusing the two edges to be united; but it is only the skillful workman who can accomplish this, as,especially in thin lead, the edges as they approach fusion are apt to run away from one another instead of coalescing. It is always best to use the covering strip of lead, because it is easy to remove superfluous metal from the joint, and failure in the other process involves loss of time. In either case it is only by practice that the amateur or tyro can hope to succeed.

Similar processes are applicable in the case of the other metals. Thus brass may be burned together, by placing the parts to be joined in a sand mold, and pouring a quantity of molten brass on them, afterwards reducing the parts by means of the file, etc., to proper dimensions. The *sine qua non* is plenty of molten metal,made a trifle hotter than usual. Pewter is generally burned by the blowpipe or a very hot copper bit. In angles and where it is bent over sharp corners and in seams, one edge is allowed to stand over the surface of the other, and a strip of the same metal is then laid along the intended junction. The joint is then burned, as mentioned, by melting the surfaces and edges by means of a blowpipe or the hot soldering iron, and the superfluous metal is filed off, leaving the joint, if at an angle, looking as if it had been made out of the solid. The principle of the process is the same whatever be the mode in which it is performed; and when hot metal is used as the sole agent of heat, it is necessary to have plenty of it, and to see that the parts to be joined are clean. It is scarcely necessary to say that the autogenous method is the only proper method of remedying defects in castings, and, notwithstanding the trouble attached to it, should always be attempted with all metals for which it is applicable, and all articles in which it is possible. We do not suppose that trifling defects in iron castings will be remedied by this means, though there is no very great difficulty in accomplishing it, as flanges are often burned on to pipes and wheels; but with the more costly or easily worked metals, the practice of this process would be attended with advantage.—*English Mechanic.*

The Earth---Its Heat and Contraction.

Professor P. M. Duncan, F.R.S., recently delivered at the Royal Institution a course of lectures upon "The Grander Phenomena of Physical Geography." He pointed out that there is strong evidence that the earth is a solid body now cooling, because the deeper man can get in mines or in borings the hotter is the temperature, and if the temperature continues to increase at depths to which man cannot reach, in the same ratio that it does at depths which he can reach, a temperature of 3,680° would be found at a depth of 45 miles. At this temperature granites and lavas fuse. Assuming, then, the earth to be a hot body now cooling, as it cools the rocks must contract; moreover, those rocks which are rich in silica will not contract so rapidly on cooling as others, consequently herein is a source of change of shape of the earth. It is well known that surface changes are going on, that some large areas of land are in course of slow upheaval, while others are slowly sinking, and that at one geological period there was a great upheaval of the larger portion of the continent of North America. The globe, therefore, is cooling unequally. The radiation from some parts is greater than at others, so in this there is a further source of disturbance. Sir William Thomson has calculated that every year 92 horse power of work—for heat means work—is got rid of from every 247 acres of the surface of the globe. The dissipation of energy and the contraction of rocks not being uniform, the effect of these disturbing causes is to produce horizontal thrusts, which form mountain ranges by crumpling up the earth, for mountains are formed by this crumpling action, and not usually by direct volcanic or other upheaval. The changes produced by the contraction are slow, and there is every reason to believe that our present sea floors and our present continents are extremely old, geographically speaking, so far as their present forms are concerned. He said that the upper part of Snowdon consists of sea sand, fossil sea fishes, and volcanic ashes, all mixed together; in fact it appears to have been at one time in the same condition that the Bay of Naples is in at present, that is is to say,volcanic ashes fell into it and sometimes buried fish. The lower part of Snowdon consists of vast streams of old lava. At some geological period the crumpling action already mentioned took place below the Bay of Snowdon; consequently the bottom of the bay was elevated and became the top of the highest mountain in Wales. Rain,and rivers, and atmospheric changes then played upon it during the course of long ages, sculpturing out the beautiful mountain scenery which characterizes the Snowdon range.

Beef Steak Electricity.

The six Christmas lectures for juvenile listeners at the Royal Institution, were delivered by Dr. J. H. Gladstone, F.R.S. He chose for his subject "The Voltaic Battery." Most of the experiments and teachings were of course too elementary to interest the readers of these pages, but one of the experiments revealed a fact not generally known. He said that in daily life weak electrical currents are at work where their presence is often little suspected; for instance, supposing a person at dinner to have a silver fork in one hand and a finger upon the steel part of a knife held in the other, it follows that, when he plunges the knife and fork into a beef steak,two dissimilar metals are thereby placed in a moist conducting substance, consequently a voltaic circuit is formed and an electric current flows through the body of the individual between the knife and fork. To prove that this was really the case, he connected a reflecting galvanometer with the knife and fork by means of wires; he then proceeded to cut a beef steak, and the current thus generated deflected the needle of the galvanometer, so that the spot of light which it reflected was seen traveling along the screen by all the observers.

Steam Boat Poetry.

At a meeting of the Institution of Engineers and Shipbuilders in Scotland, held in Glasgow, on Wednesday, December 4, 1867, Mr. J. A. Napier, F.R.S., submitted the following verses, written by Wm. Muir, saddler, Kirkintilloch, March, 1803, "on seeing the new-invented Steamboat pass through the great Canal, dragging two vessels behind it fully loaded."

THE STEAM BARGE, OR NAUTICAL NOVELTY

When first by labor Forth and Clyde
Were taught o'er Scotia's hills to ride
In a Canal long, deep, and wide,
Naebody thocht
That winders without win' or tide
Would e'er be wrocht.

To gar them true that boats would sail
Thro' fields o' Corn or beds o' Kail,
An' turn o'er Glens their rudder's tail,
Like weathercooks,
Was doctrine that would needed bail
Wi' common folks

They ca'd it nonsense, till at last
They saw boats travel east and wast,
Wi' sails and streamers at their mast,
Syne, without jeering,
They were convinced the blustering blast
Was worth the hearing.

For mony a year, wi' little clatter,
An' naething said about the matter,
The horses hauled them through the water
Frae Forth to Clyde;
Or the reverse, wi' weary splatter,
And sweaty hide.

Then wi believed, poor silly bodies,
Wha' naething ken o' learned studies,
That horses' hoofs and hempen woodies
Best still to draw them;
An' cursing callins clad in dudies,
To swear and ca' them.

But little think wi what's in noddles,
Whar science sits an' gapes and gudles,
Syne darklins forth frae drumly puddles
Brings things to view
That the weak penetration fuddles,
O' me an' you.

For lately we have seen a lighter,
An' in her doup a fanner's flighter,
May old boat-haulers a' gae dight her,
Black sooty vent
Than half a dozen horse she's wighter
By ten per cent.

Wi' something that the learned ca' steam,
That drives at heughs the wa'ken' beam
O' huge engines to draw coal seam
Or carry hutches,
She in her breast swells sic a feum
As has few matches.

By it she through the water plashes,
An' out the stream behint her dashes,
At sic a rate baith frogs and fishes
Are forced to scud,
Like ducks and drakes amang the rashes,
To shun the mud.

When first I saw her in a tether
Draw twa sloops after ane anither,
Regardless o' the win' an' weather
Athwart her bearin',
I thought frae h—ll she had come hither
A privateering;

An' that the pair she had in tow
Were prizes, struck me, sae I vow:
I cried when fixed to their prow
I saw her cable—
"In Satan's furnace now they'll bow
Amang the rabble."

It was sae odd to see her pulling,
An' win' an' weather baith unwilling,
Yet d—l may care she onward sculling,
Defy'd them baith,
As constant as a mill that fullin'
Gude English claith.

Can o'er, thought I, a flame o' reek,
Or boiling water's cauldron smeek,
Tho' it war keepit for a week,
Perform sic wonders,
As quite surprises maist the folks
O gazing hunders?

But facts wi canna well dispute them
Altho' wi little ken about them;
When prejudice inclines to doubt them,
Wi' a' her might,
Plain demonstration deep can root them,
An' set us right.

Or lang gae now wi' whirligigs,
An' steam engines will plough our rigs,
An' gang about on easy legs,
Wi' nought to pain us,
But flit in tethers, needlessna
That us'd to hain us.

Braw news indeed for man and beast,
They'll then hae nought to do but rest,
An' on their former labors feast,
Wi' cheerful hearts,
When thus they see warm steam insist
To play their parts.

[The boat referred to, we presume, was the Charlotte Dundas, built by William Symington, a native of Falkirk, for whom the honor of first applying steam to navigation is claimed.]

NEW BOOKS AND PUBLICATIONS.

BETON COIGNET: A Description of the Material and its Uses in France and America. Published by John C. Goodridge, Jr., New York and Long Island Coignet Stone Company, Third Avenue, near Third Street, Brooklyn, N. Y.

Engineers, builders, and architects will find in this pamphlet complete information regarding one of the most successful artificial stones now manufactured. The work comprises a large number of valuable reports upon practical tests of the material, prepared by well known experts, and also the specifications of the ten patents under which it is made. A profusion of excellent engravings of completed structures, in which the béton Coignet is used, embellish the text. An advertisement of the pamphlet will be found on another page.

THE PROGRESSIVE SHIP BUILDER. By John W. Griffiths, Editor of the Nautical Magazine, etc. etc. Illustrated. Published by the Author, New York, P. O. Box 5125.

This is the first volume of an extended treatise upon ship-building, which inasmuch as it embodies the results of the author's experience of fifty-two years in the art, cannot but be of great practical value. Certainly, a work which aims to circulate broader ideas regarding a calling which (though one of the noblest, and at the same time one which our great seaboard, it might be thought, would render one of the first to the country in industrial importance) has of late assumed proportions far too inconsiderable deserves an honest welcome. The book is written in clear and plain language, and is copiously illustrated. It will doubtlessprove a useful contribution to literature on the subject.

THE MICROSCOPE AND ITS REVELATIONS. By William B. Carpenter, M.D., LL.D., F.R.S., &c. Illustrated with twenty-five plates and 449 wood engravings. Fifth Edition. Lindsay & Blakiston, Philadelphia, Pa.

This is a thoroughly revised edition of probably the best, certainly the most exhaustive, work on microscopy extant. The book is eminently practical; and for this reason, perhaps above all others, we can heartily commend it to students—while the very distinguished position of its author in the scientific world is an ample guarantee that nothing, in the already wide though constantly widening field through which he aims to conduct the reader, has been omitted or slighted. His endeavor clearly is throughout to make the student investigate for himself, or, to quote from the preface, "being satisfied that there is a large quantity of valuable microscope power at present running to waste," he hopes to direct this power to more systematic labors. The original work included chapters on the principles and construction of the microscope, accessory apparatus, management of the instrument, collecting and mounting of objects, and elaborate description of microscopic forms of life. These general topics in the volume before us have been brought down to the latest dates, and descriptions have been added of the newest inventions as well as discoveries in the science. The publishers deserve much credit for the excellent appearance of the very numerous illustrations, as well as of the book in general. Price $5.50. For sale in this city by D. Van Nostrand.

We have recently received an exceptionally handsome chromo calender from Messrs. Schumacher & Ettlinger, of Nos. 13 & 15 Murray Street, in this city. The work, which is a neat flower design representing a fan, is executed in gold and a variety of brilliant colors, making it a very attractiv show card.

DECISIONS OF THE COURTS.

Supreme Court of the United States.

THE RUBBER TIP PENCIL COMPANY, APPELLANT, *vs.* SAMUEL E. HOWAR HENRY SANGER, MICHAEL SNOW, AND RICHARD BUTLER.

[Appeal from the circuit court of the United States for the southern district of New York.—October term. 1874.]

On the 23d of July, 1867, James B. Blair, claiming to be the original and first inventor or discoverer of "a new and useful rubber head for lead pencils," received a patent for his invention. He claimed "as a new article of manufacture an elastic erasible pencil head made substantially in manner as described." The "nature of his invention," he said, was "to be found in a new and useful or improved rubber or erasive head for lead pencils, etc., and consists in making the said head of any convenient external form, and forming a socket longitudinally in the same to receive one end of a lead pencil or a tenon extending from it." "This socket is to be cylindrical or of any other proper shape. Usually, the inventor says, he made it so as to extend part way through the head, but, if desirable, it might be extended entirely through. It must be within one end, but any particular location at the end is not made essential. This clearly is no more than providing that the piece of rubber to be used must have an opening leading from one end into or through it. This opening may be of any form and of any extent longitudinally. The form, therefore, of the inside cavity is no more the subject of the patent than the external shape. Any piece of rubber with a hole in it is all that is required thus far to meet the calls of the specifications, and thus far there is nothing new, therefore in the invention. "The small opening in the piece of rubber not limited in form or shape was not patentable, neither was the elasticity of the rubber. What, therefore, is left for this patentee but the idea that if a pencil is inserted into a cavity in a piece of rubber smaller than itself the rubber will attach itself to pencil, and, when so attached, become convenient for use as an eraser?

An idea of itself is not patentable, but a new device by which it may made practically useful is. The idea of this patentee was a good one, but his device to give it effect, though useful, was not new. Consequently he took nothing by his patent.

The decree of the circuit court is affirmed.

John S. Washburn, for appellant.

F. H. Betts and *S. W. Kellogg*, for appellees.]

Mr. Chief Justice Waite delivered the opinion of the court.

United States Circuit Court.---Northern District of Illinois.

JOHN M. TURNBULL *et al.* *vs.* THE WEIR PLOW COMPANY.

[In equity.—Before Drummond, J.]

This was a bill for an injunction to restrain the alleged infringement of letters patent for an improvement in Cultivators, granted to Thomas McQuinston, October 18, 1859, and reissued May 16, 1871, and for an account.

McQuinston having in the year 1860 assigned away the exclusive right under his patent in and for the counties of Warren and Henderson, in the State of Illinois, and having, on the 18th day of November, 1870, and prior to the recording of such first deed, executed a second assignment, conveying to another party "all my [his] right, title, and interest in and to the said letters patent in the following described territory" (in which was included the State of Illinois), "* * * as fully and entirely as the same would have been held and enjoyed by me [him] if this assignment had not been made:" *Held:* That, as there was an interest left in the patentee's hands upon which the second assignment could fairly be said to operate independently of that embraced in the first deed,this last assignment was valid. *Held* also, that the first assignment was operative, and that a plea to the bill, setting up the second assignment in bar of complainant's right of action, they claiming by virtue of the earlier assignment, must be overruled.

The provisions of the 36th section of the Patent Act of 1870, with regard to the recording of assignments of patents, are substantially the same as those of the 11th section of the act of 1836, as construed by the courts.

[*William Marshall, James L. High*, and *R. Mason* for complainants.

West and Bond, for defendant.]