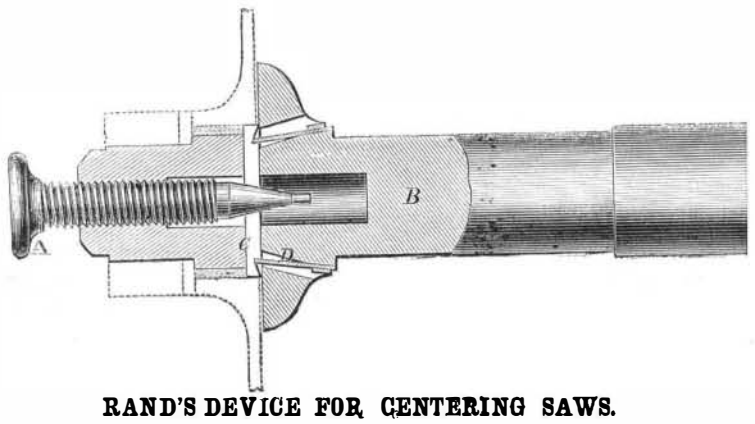
### Improved Device for Centering Saws.

The holes in circular saws are not always the same size. When it is necessary to purchase a new one or use one of smaller diameter than is generally employed, it is often found that the saw mandrel is too small, so that the saw runs untrue when made fast.

This invention is intended to obviate that difficulty by furnishing a method to center them truly at all times. In the engraving A represents a screw which has a conical end; this screw passes through the end of the arbor, B, which is hollow. In the arbor are three slots which receive dogs, C; these rest on the screw at one end, and are fitted with springs, D, to hold them at all times. It is easy to see that when the screw, A, is forced in the dogs will be driven out from the center equally in all directions, and thus afford an accurate and reliable means of adjusting the saw.




RAND'S DEVICE FOR CENTERING SAWS.

The invention was patented by W.T. & L.H. Rand, through the Scientific American Patent Agency, Dec. 12, 1865. For further information address them at Manchester, N. H.

### THE SECOND LECTURE OF PROFESSOR DOREMUS'S COURSE.

At the second lecture of Professor Doremus's course the Academy was more completely filled than at the first, several persons standing in the aisles.

LIGHT.

The subject of the lecture was light. After speaking of the natural light of the sun, the modes of producing artificial lights were discussed at length. All these are various plans of heating some solid body to a very high temperature. Gases, however highly heated, emit very little light. When any substance is burned, if the product is wholly and immediately gaseous, little light is produced, while if the product of combustion is solid, the burning is accompanied by a great production of light. To illustrate this, some sulphur was burned in a jar of pure oxygen gas; the product of combustion in this case is a gas-sulphurous acid—and the flame was very dull. A coil of iron wire was then heated at the end and plunged into a jar of oxygen, when it burned with scintillations so brilliant that they were painful to the eyes. The lecturer explained that the product of combustion was a solid—the oxide of iron—and he called attention to the fact that the jar was reddened by the fumes. The bottom of the jar contained a bed of sand, covered by water to a depth of five or six inches, and as the white-hot pellets of the oxide of iron dropped into the water they continued red hot until they reached the bottom. In explanation, it was stated that each pellet on entering the water immediately became surrounded by an atmosphere of steam, which preserved it from contact with the liquid.

OUR COMMON LIGHTS.

All our light in ordinary use comes from intensely heated carbon—generally by burning carbon in connection with hydrogen. Illuminating gas is carbureted hydrogen, and the products of its combustion are steam and carbonic acid. As both of these are gases, how is it that great light is produced—light being emitted in any considerable quantity only from solids? We may burn gas so that the flame will be very dull; it is necessary only to mingle it, before burning, thoroughly with air, so that combustion will take place throughout the volume. When it is burned from a jet in the usual way, the combustion goes on only on the outside of the issuing stream, and the hydrogen is burned first, thus decomposing the gas, and leaving the carbon momentarily in the solid state. This solid carbon is highly heated by the flame, and from it, while in this condition, is emitted nearly all the light of the jet. So soon as the hot carbon passes outward from the body of the flame and comes in contact with the air, it also is burned, combining with the oxygen of the atmosphere to form carbonic acid.

THE CALCIUM LIGHT.

When hydrogen and oxygen gases are burned together, though the heat is the most intense of any that man can produce with the single exception of the electric current, the product of the combustion being water, in the gaseous form of steam, the light emitted is very feeble, but if into the flame we introduce any solid which will remain solid at the intense heat of the flame, it glows with a dazzling light. Nearly all said substances are either fused or evaporated by the oxy-hydrogen flame, but there are a few that will resist even its intense heat, and the most convenient of these is lime. As lime is the oxide of the metal, calcium, the light thus produced is called the calcium light.

Two calcium lights, prepared by Dr. Grant, of New York, a man who makes a business of exhibiting them, were then lighted, and the parabolic reflectors were slowly turned around, so as to throw the parallel beam into different parts of the house. It was curious to see the universal dropping of heads, or raising of hats and handkerchiefs, to shield the eyes from the intolerable brilliancy of the shining bit of lime.

THE ELECTRIC LIGHT.

If a piece of zinc and a piece of platinum be partially immersed in a vessel of dilute sulphuric acid, and their outer ends be connected by a metallic rod or other conductor of electricity, the zinc is gradually oxidized, and at the same time a current of electricity starts from the zinc plate, passes through the fluid to the copper, and thence flows around through the metallic rod to the zinc again. This was discovered by Dr. Volta, an Italian physicist, and is therefore called a voltaic circle.

If the metallic rod be of sufficient size to freely conduct all the electricity generated, no heat or light is emitted; but if in one portion the rod be made so small that the whole current cannot pass, then this small portion is heated, and if it be made sufficiently hot, light is produced. If the heated rod be of a metal which at a high temperature has a strong affinity for oxygen, it will, of course, be rapidly consumed, but a platinum wire may thus be kept glowing for many hours.

Upon the front of the stage was an apparatus having a point of carbon connected with one pole of a powerful voltaic battery, while with the opposite pole was connected a wheel with radiating spokes, the several spokes being armed with different kinds of metal. This wheel was turned so as to bring the copper spoke in connection with the carbon point, and was then slightly withdrawn so as to make a short break in the circuit between the carbon and copper. Both were quickly heated to a high temperature, and the copper was burned with a dazzling green flame. Iron, zinc and other metals were consumed in the same way.

Finally, the spoke of the wheel bearing a carbon point was turned in contact with its fellow carbon of the opposite pole, and then slightly withdrawn, when the space between the two was instantly spanned by the arch of the electric light; before the unequaled brilliancy of its glow the gas jets of the Academy became of a yellow, sickly hue, and the two calcium lights "paled their ineffectual fires."

THE ELECTRIC LIGHT UNDER WATER.

To show that the light was produced, not by the combustion of the carbon, but by its being intensely heated, the light was exhibited in a vacuum. The points were so arranged that they could be covered by a bell glass, the air was then exhausted by an air pump, and when the connection was made, the same brilliant effects followed.

The points were also connected in a jar of water, but this had the effect somewhat to dim the light.

The lecturer explained that the light comes mainly from intensely heated particles of carbon, which are carried over by the current from the positive to the negative electrode—wasting away the power of the former and increasing the size of the latter.

A MONOCHROMATIC LIGHT.

The large, shallow, leaden tank in front of the stage had been covered to the depth of an inch with salt—the chloride of sodium. This was now sprinkled with about two gallons of alcohol from a watering pot, and the alcohol was set on fire. The colorless flame of the alcohol received a single yellow hue from the sodium of the salt. The gas lights had been previously turned down, and as the yellow ray of the salted flame fell upon the face of the lecturer, his countenance ceased to send forth the colors of life, and became of a cadaverous aspect; the same strange change came also upon the looks of the audience, and the great Academy seemed to be filled with the faces of the dead.

THE MAGNESIUM LIGHT.

While the lights were still turned down, a coil of magnesium wire was lighted. As the pure, white light of this flame is made up of all the blended rays of the sunbeam, when it fell upon the faces of the people, their ghastly hue was changed, as by a miracle, for the glow of life and health.

ALL LIGHT ORIGINALLY FROM THE SUN.

In conclusion, the lecturer reminded his audience that as our ordinary lights are obtained by burning carbon, and as this carbon has been separated in the leaves of vegetables from the redundant carbonic acid of the atmosphere by the decomposing force of the sunbeam, it is the statement of a fact to say that all our light comes originally from the sun.

### English Workmen Coming to America.

A foreign cotemporary says:—"The mania for emigration has again set in among the colliers and iron workers of South Wales, and the effects of the movement are beginning to be seriously felt, more especially by the colliery proprietors. Those who are induced by glowing descriptions to leave constant employment and good wages, and break up their homes, to seek new spheres for their labor in the States, are hardy, industrious men, who from long experience have become what may be called skilled colliers. These are the men that the district can ill afford to spare, especially at the present time, when the coal trade is so active, and their departure in such numbers will not only prove inconvenient but a positive loss to the employers of labor, inasmuch as it will take the hands brought in to supply the vacancies caused by the exodus a very long period to become proficient in their new avocations. In addition to the large numbers that have emigrated since the fine weather set in, upwards of sixty families left Aberdare for New York a few days since, and others are preparing to follow from different parts of the district. It is a matter of regret that industrious men should by false representations and delusive hopes, which have so often been exposed, be induced to leave their native homes to seek employment in America, where they will have to toil harder and be less remunerated in proportion to the cost of the necessaries of life."

[It is a matter of regret to us to pay $12 per tun for coal where it ought to cost but $8 or $9, and be told that from the high wages paid to miners it is impossible to sell it for less.—EDS.

### Sharp Shearing.

Mr. Morrill, from the Committee on Ways and Means, has reported a bill in the House to levy on all horses, mules, cattle, sheep, hogs and other live animals imported from foreign countries, a duty of 20 per cent *ad valorem*. He understood that the Canadians were sending sheep over the border, and having them shorn on this side, so as to evade the duty on wool. It is generally admitted that Yankees are *par excellence* sharp in doing things, but it must be confessed that our provincial neighbors have got the inside track this time.