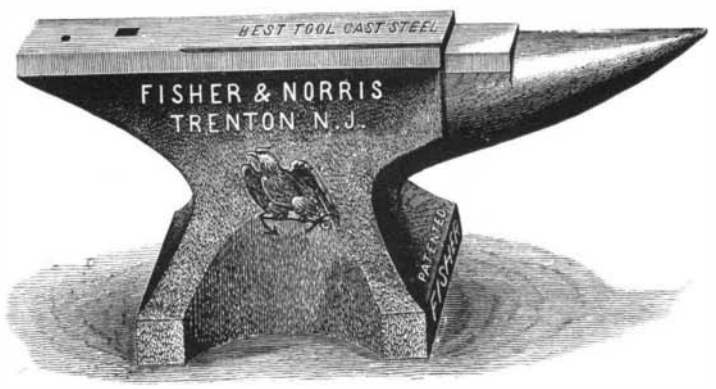
THE EAGLE ANVIL.

The Eagle Anvil Works, of Trenton, N. J., were established in 1843, and have been in successful operation ever since. The anvils made at these works have a gun metal body, and a face of Jessop's best tool steel, which is welded so perfectly to the body in the process of manufacture that it is impossible for the two to become separated. The face is planed perfectly straight, and hardened to such a degree that the hammer will make no impression on it, and it is stated that the face will remain true.

Every mechanic knows that the more solid any material used to hammer on is, and the less rebound to the hammer, the more effective the blow is on the work. Labor is lost just in proportion as the hammer bounds back. All wrought iron anvils throw the hammer back to a considerable extent; this is avoided in the Eagle anvil, and every pound of his helper's sledge hammer is effective, and the blacksmith himself can do more work and may use a lighter hand hammer. The complaint of deafness, so often occasioned by the ringing of the anvil, is avoided by using this anvil, which does not ring

These anvils took the prize medal at the Centennial Exhibition. One of the anvils shown was 5 feet long, 8 inches wide, and weighed 1,400 lbs., being the largest ever made in this country.

For further particulars address Messrs. Fisher & Norris, Trenton, N. J.



THE EAGLE ANVIL.

Plaster of Paris.

Plaster of Paris may be made to set very quick by mixing it in warm water to which a little sulphate of potash has been added. Plaster of Paris casts, soaked in melted paraffine, may be readily cut or turned in a lathe. They may be rendered very hard and tough by soaking them in warm glue size until thoroughly saturated, and allowing them to dry.

Plaster of Paris mixed with equal parts of powdered pumice stone makes a fine mould for casting fusible metals; the same mixture is useful for incasing articles to be soldered or brazed.

Casts of plaster of Paris may be made to imitate fine bronzes by giving them two or three coats of shellac varnish, and when dry applying a coat of mastic varnish, and dusting on fine bronze powder when the mastic varnish becomes sticky.

Rat holes may be effectually stopped with broken glass and plaster of Paris.

The best method of mixing plaster of Paris is to sprinkle it into the water, using rather more water than is required for the batter; when the plaster settles pour off the surplus water and stir carefully. Air bubbles are avoided in this way.

Effect of Tobacco Smoke on Photographs.

At a recent meeting of the Photographic Society of Berlin, Professor Duby gave a lecture, accompanied by specimens and experiments, on "Positives, their different Methods of Preparation." He presented a number of beautiful examples. Finally he undertook to show the practical working; but the paper, charged with bromide of silver, instead of yielding clear and beautiful prints as formerly, now gave only foggy, indistinct pictures, which at first could not be accounted for. Dr. Harnecker, however, suggested that the trouble was due to the tobacco smoke that during the lecture had filled the room. This conclusion was agreed to by all present, and the general opinion was that it would be quite impossible, under the circumstances, to obtain good prints.

Remarkable Salt Deposits.

Nature reports that recent borings made in different parts of North Germany have proved beyond denial that the assertion made by several eminent geologists, that a mighty deposit of salt stretches from the Lüneburger Heide to the coast of the Baltic, is perfectly correct. The deposit begins near Lüneburg, passes underneath the Elbe, and extends right across the Grand Duchy of Mecklenburg. Another branch goes in the direction of the Duchy of Holstein *via* Legeberg to Elmshorn and Heide. Borings made at Lübtheen, near Hagenow, by order of the Mecklenburg Government, have now reached a depth of 456 meters, and the thickness of the deposit of salt now reaches 130 meters; the basis, however, is not yet reached.

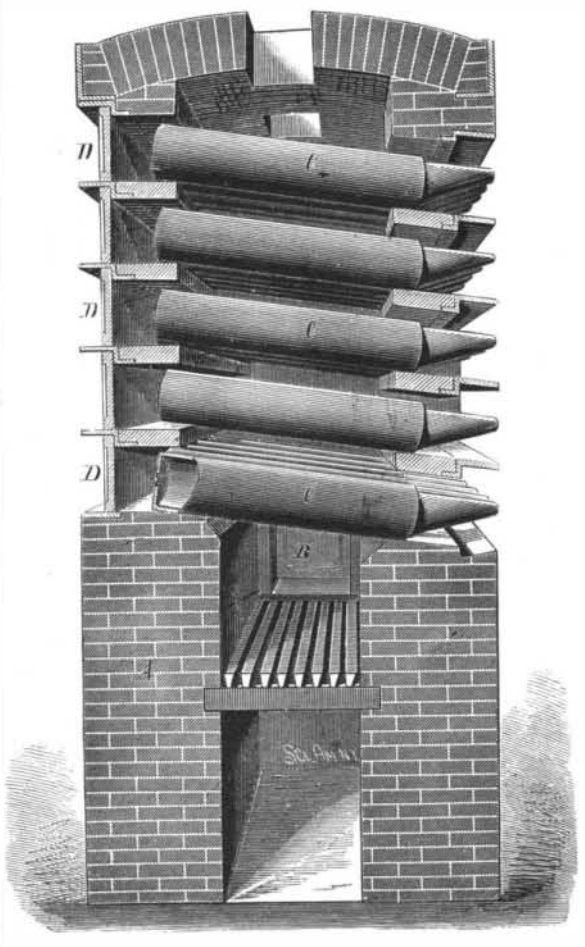
The Basis of Matter.

In the *Chemical News* for November 15, Mr. Norman Lockyer announced the discovery of the compound nature of the chemical elements. The claim had already been communicated to the Paris Academy of Sciences, through the venerable chemist, M. Dumas, who observed that the discovery was the result of three years' assiduous research, in which Mr. Norman Lockyer has, with the greatest care, compared the spectra of the chemical elements with the solar spectrum and other luminous celestial bodies. In the private letter to Mr. Dumas, accompanying his note to the academy, Mr. Lockyer announced that he would shortly send the photographs and other details necessary, which would carry conviction to the minds of the members of the Academy.

Speaking of the discovery, a London paper, evidently well informed with regard to Mr. Lockyer's work, remarks that the eventual dissociation of the so-called elements was confidently contemplated by Faraday nearly 30 years ago, and it is not too much to say that the expectations entertained by that eminent man gave a stimulus for work in the laboratory which has never been lost by those who were privileged to be learners or fellow laborers with him. Since Faraday's time, the whole question of the physical constitution of the universe, and especially the particular manner in which creative power may have gradually elaborated the present cosmical order of things, has been investigated with a zest, and, it may be added, with facilities for discovery, which have lent a greatly increased interest and importance to inquiries into the elementary and primal forms of matter. The apparently well grounded belief that the heavens afford to the view of the astronomer the process of world making in its various stages has done much of late years to encour age the particular branch of research which now seems to be yielding such extraordinary and valuable results. Mr. Lockyer believes that, in spite of the multiform aspects of the world in which we live, there is but one form of matter which is truly elementary. The primal element is presented to us in the shape of hydrogen. It is not a little remarkable that the nature of hydrogen should have been a question to which the leading French chemists have recently been devoting their energies. It is now well known, thanks to M. Pictet and his French colleagues, that hydrogen, in its gaseous form, can be, and has been, reduced to a liquid condition. Mr. Lockyer himself has arrived, by means of the spectroscope, at the conclusion that hydrogen can no longer be regarded as a simple element. Further, he believes he has proved that hydrogen is the one body of which the various metals and earths that have hitherto constituted the chemist's catalogue of elements are composed.

FURNACE FOR SPELTER AND WHITE OF ZINC.

The annexed illustration represents a furnace for a new process for the treatment of zinc ores, by which both spelter and white of zinc are obtained from the same charge, thus avoiding the loss of metal left in the refuse, and expediting the time necessary for a complete exhaustion of the charge so as to make it possible to charge several times during twenty-four hours.



DR. LUMAGHI'S ZINC FURNACE.

The furnace wall, A, incloses the combustion chamber, B, and supports the retorts, C. The furnace is built after the plan of the Belgian furnace with openings in the rear as well as the front, each retort, C, having a hole in the butt end which is luted during the process of making spelter. The openings at the rear of the furnace are protected by doors, D, lined with fire clay, and are luted to confine the heat while making spelter.

When the most abundant flow has been obtained and the flow of spelter begins to slacken, the doors at the back of the furnace are opened, the luting at the butt end of the retort is removed, and by the introduction of a metallic funnel lined with wire gauze deep into the condensers, a light draught of heated air is sent through the charge sufficient to keep up the combustion of the coal left in the retorts, which being by this time thoroughly incandescent, will give out the cleanest white of zinc, while the spelter, being mostly from first drawings, will also be of better quality than if it had been overheated for a long time, as in the old process.

By this process all that the ores contain is obtained in the shape of spelter and white of zinc, and the labor of discharging and cleaning the retorts is greatly facilitated by the coal in the retorts being consumed in the making of white of zinc. Poor ores, such as could not be worked in the old way (although they often yield the purest spelter), can be worked profitably by this process, as they are exhausted in so much shorter time. Light carbonate can be charged profitably four times in twenty-four hours. It is stated that zinc ores, intimately mixed with lead or other metals, may be successfully treated in this furnace by working out the spelter from the upper end of the retorts, while the lead and other fixed metals will be gathered at the lower end ready to be tapped when the operation is over. The inventor says that the ordinary furnaces can be easily altered so as to work on the improved plan. We are informed that this furnace is in successful operation at the inventor's works.

Patented through the Scientific American Patent Agency October 23, 1877. For further particulars address Dr. Octavius Lumaghi, Collinsville, Ill.

New Agricultural Inventions.

Mr. Henry E. Walker, of Fountain, Minn., has invented an Improved Machine for Removing Cockle-Seed, Wild Buckwheat, and other impurities from seed-wheat after it has been passed through an ordinary fan-mill and cleaned as much as it can be cleaned by such mills.

An Improved Cotton Hoe has been patented by Mr. E. H. Rogers, of Boley Springs, Ala. This is an improvement in that class of hoes which are used for cultivating and thinning out young cotton-plants. It consists in attaching three independent blades to one handle or helve by means of three independent arms.

Mr. Reuben B. Eubank, Jr., of Miami, Mo., has patented an improved Hay Raker and Stacker, which will rake up the hay after the mower, carry it to a basket or receiver until a sufficient quantity is gathered for a shock or stack, and then permit the basket to be emptied to form a stack at the desired place.

An improved Potato Digger has been patented by Mr. Hiram Strait, of Troy, N. Y. This is an improvement in the class of potato diggers in which the soil is opened by a share, and the tubers are separated from the soil and thrown out upon the surface by vibrating fingers.

The New Vault.

The new vault in the United States Sub Treasury, in this city, lately described by us, which has been prepared for the storage of silver dollars, is forty-eight feet in length, thirty feet in width, and 12 feet in height. If every available inch should be packed solidly with 412½ grain dollars it would hold not far from forty million dollars. Every one knows that silver is bulky, but few persons are aware how bulky it is. A bag of 1,000 412½ grain dollars weighs 59 3-16 pounds avoirdupois. Accordingly one hundred thousand of these dollars weigh not far from three tons. If a merchant or banker having a payment of $30,000 to make is compelled by circumstances to pay with silver dollars, he would need a vehicle as strong and as large as an ordinary coal cart (made to carry a ton of coal) to transport them, and if this should be heaped up, no more than 32,000 silver dollars could be loaded on it.

A Novelty in Illuminated Dials.

Apropos of illuminated watch faces and clock dials, to which attention has recently been directed, M. Recordon, of Paris, communicates the fact to one of our French exchanges that two years ago he took out a patent for, and has since been manufacturing, illuminated dials on an entirely different principle from those produced by the use of chemicals. His device is this: A Geissler tube containing a gas which gives a brilliant light is placed on the dial; a battery about the size of a thimble is attached as an ornament to the watch chain, and a miniature induction coil is also hidden in the latter. When it becomes desirable to consult the watch in the dark, a spring is pressed, the current passes into the coil, then into the Geissler tube, and illuminates the dial. The portable battery used for this purpose is that of Trouvé, which, in a small compass, has considerable strength. Reduced to the size of a thimble, it is still sufficiently strong in its action to last a year. M. Recordon also applies the same principle to the illumination of clock faces.