Science and Art.

Ammonia; to make it in Iron Works.

The following, from the London *Mining Journal*, is worthy of consideration by our iron manufacturers:—"The vapors which escape from iron blast furnaces may be regarded simply as the atmosphere highly charged with carbon, or as a mixture of carbonic oxyd, cyanogen, and nitrogen. When steam, at a sufficiently high temperature, and air excluded, is mingled with these gases, the oxygen of the steam decomposes the cyanogen, and converts the carbonic oxyd into carbonic acid, while the hydrogen and nitrogen combine to form ammonia; thus carbonate of ammonia will result; but as it may prove difficult to condense this effectually, if the vapor of ammonia were conveyed into a chamber charged with an insoluble lumpy material, so arranged that the ammonia, in ascending, would come in contact with the cold solution of salt trickling down, carbonate of soda and muriate of ammonia might be at once obtained. If, however, an ample supply of sulphate of iron could be procured, it would be more advisable to fix the ammonia by means of sulphuric acid expelled from sulphate of iron, because at the same time, pure oxyd of iron would be produced, which would prove valuable in the subsequent forging of iron. Alkali refuse should be composed of sulphuret of calcium and coke dust. When this is acted upon by steam with sufficient heat, the oxygen of the steam converts the calcium into lime, while the sulphur and hydorgen pass off as sulphuretted hydrogen. When the latter is mingled with the vapors from a dense purely carbonaceous fire, consisting of carbonic oxyd and nitrogen, the latter combines with the sulphuretted hydrogen, and forms sulphuret of ammonia. If these vapors are then partially cooled down, and a large quantity of cold air admitted, the carbonic oxyd becoming carbonic acid, combines with the ammonia, and disengages sulphur; thus carbonate of ammonia and sublimed sulphur might be obtained. If, on the other hand, the heat of the vapors is maintained, and a large quantity of heated air thrown in, the sulphuret of ammonia is converted into sulphite, which rapidly passes into sulphate of ammonia, by means of which more salt may be decomposed; and thus alkali refuse may be brought to yield sulphate of soda, muriate of ammonia, and carbonized lime dust. This latter material will be valuable in agriculture; it should be worked into the land when preparing it for seed, muriate of ammonia being afterwards applied to the growing crop, when the first shower of rain will carry it into the soil, when carbonate of ammonia will be disengaged in direct contact with the root of the plant. By treating gypsum as sulphate of lime, with small coal and high heat in a reverberatory furnace, it would be reduced to sulphuret of calcium, and may, by a similar mode of treatment, yield the same product as alkali refuse. T. H. Leighton."

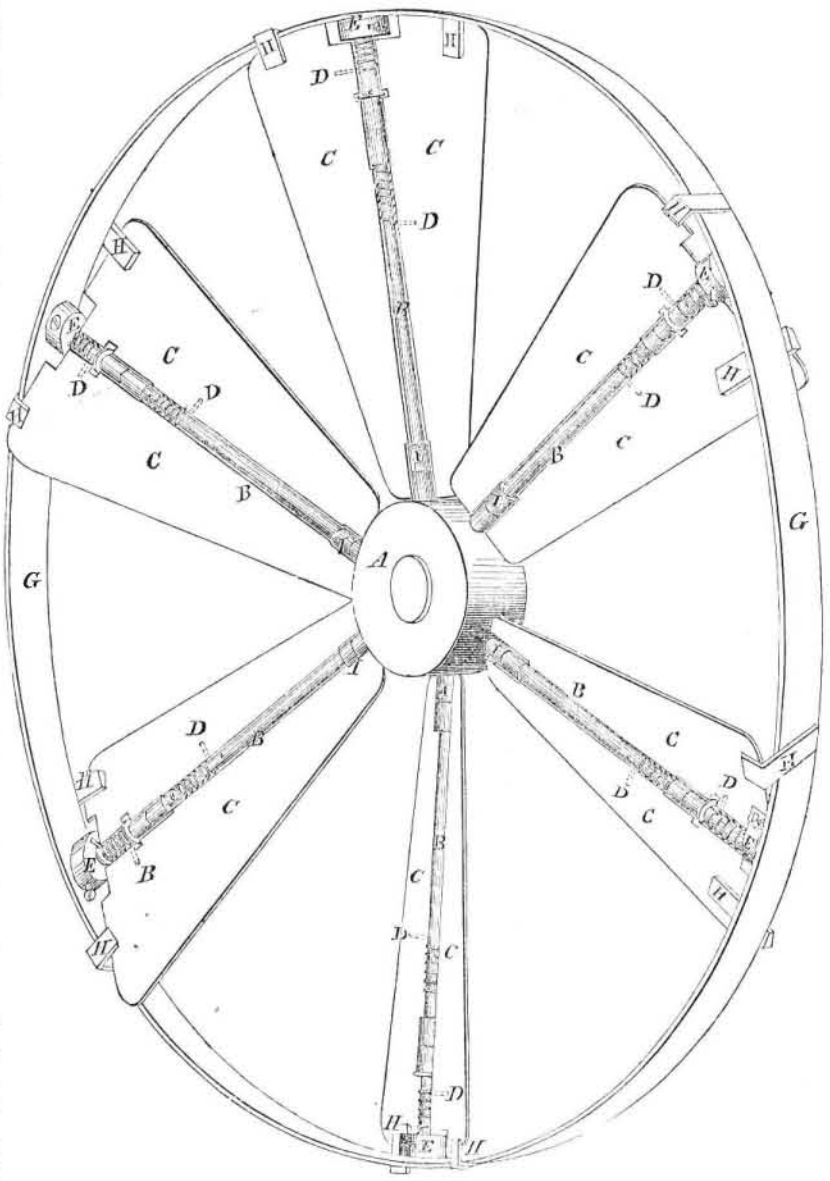
Cast Steel.

In manufacturing the commoner descriptions of steel, particularly cast steel made from English iron, oxyd of manganese has been largely used; its use produces malleability to a common metal, and the effect upon the steel during the operation of melting has been a subject of much speculative discussion amongst scientific men.

I find no alloy of metallic manganese with steel, and certainly the very small quantity of carbon which the oxygen of the manganese takes up, affects the degree of hardness very slightly.

I have examined this interesting matter, and in doing so I have set up no theory of my own, but I have carefully examined the scoria or slag produced, when oxyd of manganese was used, and when it was not; the metal also has been carefully weighed before and after melting. In my experiments I used English iron, which is so coarsely manufactured that it is mixed up with much deleterious matter. In more nicely investigating this subject I used a Swedish iron, which contained a large amount of silicate of iron. I charged two crucibles with this Swedish metal properly converted into steel, each 30 lbs. Into one I put 3 per cent. of oxyd of manganese—into the other nothing. Both crucibles were in one furnace, and melted down in about the same length of time. In that crucible centaining the oxyd of manganese I got more slag and a little less metal than in the other. The ingot melted with manganese drew very sound under the hammer; the other was filled with cracks. On an examination of the metal and the slag resulting from each crucible, I found that the oxide of manganese had attacked and dissolved all the silicate of the metal it could find, as the metal melted, and converted it, with other deleterious matter, into a glassy slag, which is very fluid. The steel being thus freed from these noxious matters, is precipitated by its own gravity, and the molecules of metal coming in closer contact by the removal of the foreign matter which before more widely divided them, the metal becomes very malleable under the hammer.—[C. Sanderson.

ELGAR'S PATENT COMPENSATING WIND WHEEL.



The annexed figure is a view of the compensating wind wheel of J. Elgar, of Baltimore, Md., for which a patent was granted on the 10th of July last.

The wheel is made entirely of iron. A is the cast iron hub, in which are inserted the arms, B, of wrought iron. G is the rim, made of flat wrought iron, and in this the outer ends of the arms are inserted by being tennoned in screw nuts, E. C C are two wings on each arm, B, they are made of sheet iron; for a ten foot wheel they are four feet long and two feet wide at the outer end. They are hung by hinges of strap iron to the arms near their outer ends, and rest on washers and pins, I, on their inner ends, and against collets at their outer extremities. D D are two spiral springs made of steel wire, and secured as shown to each arm. One spring is made much stronger than the other, each is coiled loosely about four inches in length, and has a tail about seven inches long pressing against the back of a wing. H H are stops on the rim of the wheel—one for each wing.

The object of this wheel is to afford a means of self-regulation or goverment in the wheel itself, by the combined and reciprocal action of the wind and springs upon the wings. It will be observed that there are two wings hung by hinges on their inner edges to each arm, B, of the wheel, and that they are thus independent of one another. They can revolve within certain limits, and are kept up against the stops, H H, in their proper angle to the wind in plane with each other by the coiled springs pressing on their backs. Those wings which, in the rotation of the wheel, are aft of the arms, are held up to their work by the outer springs, D, which are so strong that they yield only in cases of high winds, to relieve the wheel from too great pressure. In common winds they are stationary, and furnish the means of a constant power to propel the wheel. Those wings forward of the arms in the revolution of the wheel, are held up to their stops in light winds by the weaker inner springs, D, which yield easily when the wind grows stronger. Every degree of movement of these wings back brings them nearer into the plane of the wheel, and thus lessens the power of the wind to produce rotation in the wheel, and when they are forced into the plane of the wheel, their effective power is neutralized. [This result is only produced by a force of wind sufficient to propel the wheel at a proper speed by the stationary wings alone.] As the strength of the wind increases, these wings are forced back beyond the plane of the wheel, and then become a retarding power; and when impelled to an angle equal to that of the stationary wings, with the plane of the wheel, it is brought to a state of rest. When the wind falls or lulls, the wings are restored by the springs to their former positions, and the wheel again rotates—thus being self-acting and regulating. This wind wheel revolves with nearly a uniform velocity, even when the wind is very fickle or flawy. From its safety in storms and steadiness of motion, it is well adapted for grinding grain, &c., and for pumping water at railroad stations, for which purpose it is now applied, and with satisfaction.

More information respecting it may be obtained by letter addressed to the patentee.

Artificial Stone.

Chalk either in lump or in paste steeped in a solution of the silicate of potash (fine sand boiled in a strong caustic lye,) absorbs a considerable quantity of silica. It acquires a smooth appearance, close grain, and yellow color. The stone thus prepared takes a fine polish and hardens by degrees from the surface to the interior. This process may be advantageously applied to making moldings and delicate ornaments of sculpture.

Ancient monuments of calcareous stone may be preserved by washing them with the silicate of potash.—[London Artisan.

Use of Salt in Cooking Vegetables.

If one portion of vegetables be boiled in pure distilled or rain water, and another in water to which a little salt has been added, a decided difference is perceptible in the tenderness of the two. Vegetables boiled in pure water are vastly inferior in flavor. This inferiority may go so far, in the case of onions, that they are almost entirely destitute of either taste or odor, though when cooked in salted water, in addition to the pleasant salt tastle, a peculiar sweetness and a strong aroma. They also contain more soluble matter than when cooked in pure water. Water which contains 1·420th of its weight of salt is far better for cooking vegetables than pure water, because the salt hinders the solution and evaporation of the soluble and flavoring principles of the vegetables.

Chinese "Packfong" (similar to our German silver) according to Dr. Fyfe's analysis, is said to consist of

40·4 parts of copper 25·4 parts of zinc 31·6 parts of nickel 2·6 parts of iron	equivalent to	6 ozs. 7 drs. full. 4 ozs. 1 dr. full. 5 ozs. 1 dr. nearly. 7 drs. nearly.
100·0 parts.		16 ozs. 0 dr.

Literary Notices.

Putnam's Monthly—This sterling original magazine for this month contains some excellent articles. The first is on the "Portraits of Washington," and is a very interesting sketch of the painters who have transferred the likeness of Washington to the canvas. There are few great men who have had so many likenesses taken. An article on "Life among the Mormons" is enough to thrill every heart with disgust for that iniquity. Dix & Edwards, No. 10 Park Place, publishers.

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