be converted into carbonate before the massicot is much affected. Another fact is, that white lead and oil combined with so much energy, that if linseed oil be poured upon a large quantity of white lead, and the mass be left undisturbed for a few hours, the temperature will become so elevated, as to carbonize the oil, and render the whole perfectly black. It seems also not generally known, that white lead possesses the power of destroying the colouring matter of linseed oil. If sulphate of barytes be mixed with one portion of oil, and white lead with another portion, the latter will appear comparatively white. If the two mixtures be allowed to remain for some days undisturbed, a quantity of oil will gradually rise to the surface of both. In the former, the supernatant oil will have undergone no change—in the latter, the oil will be nearly deprived of colour, and will have acquired the degree of rancidity, termed by painters, fat. The colouring matter has not combined, as might have been expected, with the white lead, for if this be dissolved by the agency of a weak acid, the disengaged oil will also be found to have been bleached. A large quantity of white lead is required to produce this effect, and the precipitated carbonate is less efficient than the white lead of commerce.

Athenæum.

On the best means for Burning Gas for Supplying Heat. By SIR JOHN ROBISON, K. H., Sec. R. S. E., M. S. A.

When carburetted hydrogen gas is employed in procuring heat, it is seldom required that it should at the same time give out light; the combustion may therefore be managed in any way which may be convenient, without seeking to preserve the illuminating power.

It appears to have occurred about the same period to the late Dr. Duncan and to myself, that, by passing a current of gas mixed with atmospheric air through a wide vertical tube having its upper end covered by a diaphragm of wire gauze, and by kindling the mixture as it escaped through the interstices of the wire cloth, a convenient stove might be formed for culinary purposes. Dr. Duncan applied some small apparatus on this principle to pharmaceutical operations in his class room; and I had my kitchen furnished with a range of large stoves which were intended to supersede the use of French charcoal stoves in various culinary processes. In both cases the success has been perfect, and the same principle has since been adopted with advantage in a variety of processes in the useful arts, where this neat and cleanly method of applying heat has rendered it a valuable acquisition to the workshop. The form of the apparatus may be varied in any way to suit the particular process to which it is to be supplied; as all that is essential is, that a current of the mixed gas and air shall rise through wire cloth, and that the proportion of gas to atmospheric air shall never be so great as to allow of the flame becoming yellow, as with this precaution, the combustion of the carburetted hydrogen will be complete, and no deposit of soot will take place on cold bodies when set over the flames. The proper quantity of gas in the mixture is easily determined by the stop cock belonging to each stove.

For ordinary culinary purposes, the cylinders may be 30 inches long, and 3 to 4 inches diameter, and the wire cloth for the tops should have about thirty-wires to the inch. That which is manufactured for safety lamps answers well for this purpose.

Whenever, from accidental injury, or decay, a hole takes place in a

diaphragm, it is no longer possible to use it, as when lighted, the flame passes through the fracture and communicates with the jet at the bottom of the cylinder, which then burns like an ordinary gas light, and like it, would blacken the surface of any cold body presented to it. The wire cloths, if not broken through by violence, will last for months, although in daily use, and if covered by a layer of coarse sand, or pounded limestone will continue serviceable for an unlimited period.

When more intense heat is required than is attainable by the unaided combustion of the mixed gases, recourse may be had to various forms of blow pipes; and when a large volume of such flame is to be employed, the current of atmospheric air may be urged by double bellows. A very efficient apparatus on this principle is to be seen in the laboratory of Dr. D. B. Reid.

It is to be regretted that such applications of gas are not more generally known and introduced into workshops, as there are numerous processes in the arts in which they would afford facilities to the workman which he can scarcely command by any other means; for example, in the hardening of steel tools, it is well known that a piece of bright steel when heated to redness in a forge, or muffle, is subject to oxidation, and that a black scale remains after hardening, which it is difficult to remove without some injury to the work, as in the case of a screw tap; whereas, if the same piece of steel be heated in a flame of the mixed gasses, where there is no free oxygen to attack its surface, it may be *made and kept* red hot without any injury to its finest edge; it will be discoloured, but without losing much of its polish. The artist has also the advantage of a distinct view of the article while it is being heated, and the power of withdrawing it from the flame the moment it has acquired the proper colour, which in the hardening of cast-steel cutting tools is of great importance.

Many attempts have been made to apply carburetted hydrogen and pure hydrogen gases to the purpose of warming buildings, and a variety of forms of stoves have been proposed, on the understanding, it would appear, that, by applying the flame of the gas to metallic bodies, an increased degree of heat would be communicated by them to the atmosphere around them; a little consideration will show, that however the *distribution* of the heat may be modified by such contrivances, there can be no increase of the heating power; and that when a certain measure of gas is fairly burned, the heat evolved into the apartment will be the same whether the flame be disposed as a light or made to play against metallic plates, or other combinations of apparatus. In all cases where the products of the combustion are allowed to mix with the atmosphere of the apartment, without provision being made for carrying them off by ventilation, the effects of such processes must be more or less deleterious to health according to the proportion these products bear to the mass of air they mix in.

On the whole, it may be assumed that this mode of heating apartments is the most expensive, the least efficient, and, excepting that by Joyce's charcoal stove, the most insalubrious that can be resorted to.

Lond Mech. Mag.

*On the Application of Electro magnetism as a Motive Power: in a letter from Prof. P. FORBES of Aberdeen, to MICHAEL FARADAY, D. C. L., &c. &c.**

King's College, Aberdeen, Oct. 7, 1839.

My dear Sir,—Having seen a notice from Mr. Jacobi sent by you to the London and Edinburgh Philosophical Magazine,† regarding the success of

* Communicated by Dr. Faraday. † See L. & E. Philos. Mag. for Sept., p. 164.