HYDROGEN GAS AS A FUEL FOR DOMESTIC PURPOSES.

We have never had any faith in the various plans which have been proposed to use hydrogen gas, obtained from the decomposition of water, for purposes of illumination, because it is well known that the combustion of hydrogen gas produces scarcely any light. On the other hand, it is eminently adapted for heating purposes, as it generates more heat in burning than any other substance in nature. It has also other properties which render it peculiarly suitable for heating dwellings, for cooking and other domestic uses. The product of the combustion being pure water, it is remarkably cleanly, depositing no soot; neither does it generate any gases deleterious to health.

If hydrogen gasworks were established in the upper part of the city, and the pipes lead into the dwellings, our citizens would be supplied with the most luxurious and convenient fuel that it is possible to imagine. For warming the parlors, a series of jets would rise at any desired point through the floor, and when a fire was needed it would be lighted by a match as readily as illuminating gas. The amount of fire would be regulated by a stop-cock, and could be left burning through the night in as small a jet as desired. There would be *no* smoke, and with a small fire no chimney would be needed; but a large fire would probably produce so much vapor that it would collect on the windows and be otherwise inconvenient, so that it would be well to provide for carrying off a portion of it. This might be done by a silverplated pipe, or by having the fire in front of the grate or opening into the chimney.

The advantages of this fuel for cooking would be even greater than those which it possesses for warming apartments. The outsides of the pots and kettles would remain perfectly clean, and free from soot. The fire could be arranged at just the most convenient hight from the floor, with an iron or porcelain table beneath it to place the kettles upon, and none of these surroundings would collect any soot or be discolored by smoke. The fire could be kindled instantly, and regulated to give any degree of heat required. Several jets might be used, each furnished with its own stop-cock, so that one vessel might be kept simmering just below the boiling point, while another was boiling, and while a third jet, hotter still, was roasting or broiling meat. Numerous other conveniences resulting in the use of this cleanly fuel will suggest themselves, and we pass to a consideration of its cost.

The cheapest mode of obtaining hydrogen gas at present known, is by the decomposition of water by the process of blowing steam into a vessel filled with either red hot coke or charcoal. On page 280 of Vol, III., we illustrated an apparatus in use in the city of Narbonne, in France, for the production of large quantities of hydrogen by this process. An atom of water is composed of an atom of hydrogen, which we will represent by a large O, and an atom of oxygen, which we will represent by a small o, chemically combined together thus, Oo. If water is evaporatad and heated to a pressure of about two atmospheres, and then brought in contact with red hot coke, it is decomposed, one atom, C, of the carbon of which the coal is principally composed, combining with an atom of the oxygen of the water to form an atom of carbonic oxyd, Co, and setting the hydrogen free.

If an atom of hydrogen weighs 1, an atom of oxygen weighs 8, and at atom of carbon 6. Hence, 6 lbs. of coal will produce 1 lb. of hydrogen and 14 lbs. of carbonic oxyd. But if each atom of carbonic oxyd is brought again in contact with steam, it will decompose another atom of water, taking its oxygen to form an atom of carbonic acid, CoO, and setting an atom of hydrogen free. Hence, 2 lbs. of hydrogen may be produced from every 6 lbs. of coke. As substances, in burning, generate heat in proportion to the amount of oxygen with which they combine, and as 2 lbs. of hydrogen combine with 16 lbs. of oxygen, and 6 lbs. of carbon, burning into carbonic acid, combine also with 16 lbs. of oxygen, it follows that the same amount of heat would be obtained from hydrogen that would be obtained by burning the coke employed to decompose the water and procure the hydrogen, provided there was no change of physical condition. But as carbon is solid, a large portion of the heat produced by its combustion is absorbed in giving it the gaseous form; while the hydrogen, being a gas, yields up all heat resulting from its combustion. But there is an additional consumption of coal in heating the steam to the temperature at which decomposition takes place, in driving the engine to blow a blast of air in the coke to keep it burning, and by combustion with the oxygen of this air. There is also waste of heat by radiation, by the cooling of the heated gases, and in other ways. But it is probable that all of this loss is more than counterbalanced by the economy in using the fuel as compared with other fuels. In an ordinary grate or kitchen range, probably more than nine-tenths of the heat goes up the chimney. The waste of heat by both systems is so large, and so difficult to measure, that the comparative cost can be ascertained only by experiment; it seems probable, however, from the data which we posses, that hydrogen gas will prove to be not only by far the most convenient, cleanly and healthful of all fuels, but also the most economical.

POISON BY LEAD PIPES.

On another page will be found an account of some observations made by Mr. J. R. Nichols, of Boston, on the corrosion of lead in water pipes, to which we invite attention. There is no subject of more importance, especially in cities possessing the inestimable blessings of waterworks, than this. All the salts of lead are extremely poisonous, and, like all the metallic poisons, they accumulate in the system, and, consequently, however slowly they may be introduced, whenever the quantity taken becomes sufficient to act as a poison it will manifest its effects.

The most common form of disease resulting from lead poison is neuralgia, or ethralgia, as it is specifically called. It attacks all parts of the system, though very rarely the head. When its seat is the stomach, it is the painter's colic, caused among painters by the absorption of white lead through the pores of the skin.

The form of the disease coming next in frequency is paralysis. When this attacks the muscles of the forearm, as it is very apt to do, it causes the "wrist drop," so common among painters. One curious law of lead paralysis is that it affects only the extensor muscles, those which straighten out the limbs; the flexors, the muscles which draw up the limbs, remaining in normal vigor.

Besides these, there is a dismal train of diseases that tread in the footsteps of this insidious destroyer, and we have no doubt that if all the persons in our cities, who are suffering from lead poison, were aware of the cause, it would make a very great stir in the community. Probably one great reason of the want of faith in the existence of lead poison and consequent apathy with which the subject is regarded, is the fact that only a portion of the persons who take lead into their systems ever suffer in any way from its effects.

We have long regarded the fact of the salts of lead being insoluble in any particular water as entirely inconclusive in regard to the safety of employing lead pipes for the conveyance of such water. Clay is insoluble; but if a river runs over a clay bed, the water becomes loaded with the mineral, held in mechanical suspension. Chemists, in making their experiments, place a bit of lead in the water, let it lie awhile, and then take it out, and under these conditions none of the lead will remain in the water unless the metal is actually dissolved. But the case is entirely different when water is driven under a high head, with great velocity through a pipe. The feathery particles of the mineral are then washed off and mingled with the water, passing as certainly into the system as if they were dissolved. The statements of Mr. Nichols will be found well worth perusing.

VENTILATION IN HEALTH AND SICKNESS—HOSPITALS.

Professor Pepper delivered a lecture recently at the Marylebone Scientific Institute, London, on ventilation, in which he explained a novel mode of effecting this by an invention which has been patented in England. Thei nvention consists in a series of folds of fine wire gauze, fastened to the top of the upper sash of a window, and made to fold up, so that when the window is closed the gauze is not seen. When, however, ventilation is required by the admission of fresh and the exit of foul air, the top of the window is opened, and the wire gauze screen comes down as much as is desired, thus affording egress for the vitiated and a gentle influx of pure air. The wire guaze frames attached to folding sashes employed in American dwelling houses during summer afford the same facilities for ventilation, but the English mode appears to be more simple and less expensive, and it may be attached to any balanced window sash.

In sick chambers, hospitals and sleeping apartments, a large supply of fresh air is required; but a strong current should always be avoided. The best way of admitting air into such places is by dividing it into numerous fine streamlets, such as through the wire guaze curtains.

Typhoid fevers in the camps of armies are principally due to sleeping in close tents, where a sufficient supply of fresh air is not admitted. Soldiers who bivouac in the open air, with the blue canopy of heaven over them for a tent, never take the typhoid fever. Typhus fever first broke out in Europe, during the retreat of Napoleon's army from Moscow. It originated in the hospitals, which were filled with the sick and wounded soldiers. These places were not sufficiently ventilated, and the atmosphere in them became fetid; the fever became a plague, and scourged almost every city in the Old World.

WELDING STEEL COLD.

It is well known that lead may be welded in a cold state. If a leaden bullet be cut in two parts, and the bright surfaces be immediately pressed together before they have time to oxydize—a slightly twisting strain accompanying the pressure—the pieces will adhere together as firmly as before they were cut.

Mr. Rowell, of this city, gives us an account of steel being welded by a similar process. At the Metropolitan Mills, 267 Cherry street, seven run of stones are driven from a drum on a vertical iron shaft which is ten inches in diameter and fifteen feet in length.

This shaft is supported by two or three plates of steel, formed in circular disks, and revolving one upon another, so as to divide the motion of the shaft between them, and diminish the velocity of the rubbing surfaces. The plates, by their revolutions, of course become worn, so that their flat surfaces coincide throughout, and these surfaces are perfectly bright.

Now Mr. Rowell says that occasionally the great weight of the shaft presses out the lubricating material from between two of the plates, and that when this occurs, the plates are welded together; or, at all events, adhere so firmly that it is impossible to separate them by means of a cold chisel and sledge.

FLAX COTTON—PREMIUMS.—The Rhode Island Society for the Encouragement of Domestic Industry offers a premium of thirty dollars for a bale of not less than fifty pounds of the best prepared flax cotton, fit for use on cotton machinery, accompanied with a statement of its culture, production and preparation, including cost of the various processes.

A premium of twenty dollars for the second best bale of the same on the same conditions.

The bales to be delivered at the rooms of the Society on or before Sept. 11, 1861, at Providence, R. I.

We hold these to be important prizes, not on account of the sums offered, as these are small, but for the interest which should cluster around the efforts made to stimulate this branch of industry. The advertisement of the above society will be found on another page. We hope our readers will circulate it among our farmers.

AT the close of a meeting of the Ethnological Society, recently held in London, M. de Chaillu, the French-American traveler in Africa, of gorilla celebrity, having taken offence at some remarks made by Mr. Malone, stepped up to him and held his fist in his face, demanding how he had dared to speak of him as he had done, and finished by spitting in his face. The police were called in, and the gorilla-slayer was bound over to keep the peace.

RIFLEMEN'S BELTS.—To polish enameled leather, take half a pint of the best cream, a quarter of a pint of linseed oil, make them each lukewarm and then mix them well together. Having previously cleaned the leather, rub it over with a sponge dipped in the mixture; then rub it with a soft dry cloth until a brilliant polish is produced.