



WATER FOR LIGHT AND HEAT.

It appears tolerably certain now that a comparatively inexpensive process in the manufacture of lighting and heating gas from water has been discovered, and that it is coming into extensive operation. The number of failures to produce gas from water at a rate which would be remunerative had led most persons to believe that such process would never be discovered. We are informed that the "Lowe Water Gas Process" was introduced at the town of Phoenixville, Pennsylvania, some years ago, and that it has been supplying it with from 5,000 to 10,000 cubic feet daily; that it has been introduced into Conshohocken, Penn., some two years ago, supplying it with 12,000 cubic feet per day, one man making the gas, collecting the bills and attending to the whole machinery; that it is in operation at Columbia, Penn., supplying 22,000 feet daily; that it supplied 200,000 feet daily to the town of Utica, though in January, 1875, the works were burned down; that within the present year it has been introduced into several mills in various parts of the country; and that at Kingston, Canada, works for the general use and supply of the water gas were being erected. Various other towns are about to construct works for the "Lowe Water Gas" production. In Manyunk, a suburb of Philadelphia, test works were constructed during the past summer, and went into operation on the 14th of August of the present year. Great compactness in the works, rapidity and cheapness in production seem to indicate that it is to be the illuminator of the future. The new works at Manyunk occupy only about a tenth of the area of the old gas works, and supply twice the quantity of gas, while the cost of twenty-candle gas delivered into the holder, inclusive of labor and interest on the investment, is admitted by the managers to be about 35 to 40 per cent. less than that of coal gas of sixteen-candle power supplied to the city. If the price of petroleum should be lessened, the cost will be still less. It appears that about three gallons of petroleum are sufficient to liberate from the water a thousand cubic feet of gas of twenty-candle power.

It appears from an article in the *Engineering and Mining Journal* that by the "Lowe process" gas for heating purposes can be made at an expense of not more than 15 cents per 1,000 feet, which would allow its sale to consumers at the rate of not more than 50 cents per 1,000 feet. Gas can be applied to smelting and other purposes requiring great heat, it is said, more economically than directly from coal. We are assured that not more than two or three per cent. of the heat generated can be utilized in crucibles and furnaces, though when the fuel is mixed with the material to be smelted, twenty, thirty, or forty per cent. has been realized. It is urged that the maximum of economy in heating is attained by admitting into the combustion chamber fuel ready to burn. When coal is used it has first to be converted in the chamber into gas, and then there is about thirty per cent. of nitrogen evolved which not only is of no use but actually prevents, as far as it can, so to speak, the heating process. Then for the purpose of heating houses, the price being sufficiently low, which at 50 cents per 1,000 feet it would seem to be, it would appear to be preferable to any other mode. Box stoves, base-burners, open grates, and all other known modes of heating will have to follow the tallow candles of former days into old curiosity shops and country houses. The good woman who manages such matters will only have to turn a faucet and apply a match, and in a few minutes the breakfast will be ready. No cinders, no ashes, no dust. Many of our readers will live to see these predictions realized. Man is a pertinacious animal, and keeps on tugging at difficulties till at last they find it of no use to resist further. So it was with steam, and so it is with water gas, and so may it yet be with many things which we now pronounce impracticable.

ORIGIN OF THE TRUFFLE.

The truffle is a species of underground fungus largely used in French cookery to give a peculiar rich flavor to meats. It comes principally from France, where it is always found in oak or beech woods, and can only be gathered through the agency of the keen scent of dogs or pigs especially trained to hunt for it. Both from the difficulty of obtaining the fungus, and from the fact that it is a delicacy highly prized by epicures, it brings in all markets a large price; and thus truffle hunting has long been a remunerative calling for the French and Italian peasantry. In appear-

ance, the truffle is a blackish mass, covered with protuberances, and weighing from an ounce to several pounds; when cut open it presents a marble appearance, and its reproductive portion (it is sexless) is found in the veins in the shape of minute sacs which never open, each containing several spores, possessing spine-covered or honeycombed surfaces.

Numerous attempts have been made to cultivate these fungi, but with little or no success. Regarding their early development, comparatively nothing has been known, and the spawn or vegetative portion, which in the case of the mushroom is readily obtained, allowing the cultivation of that fungus to any degree, has not yet been definitely found in the truffle. Sprinkling the earth with water, in which the parings of truffles have been steeped, has resulted, it is stated, in producing them; and they have likewise been obtained by the slow process of planting calcareous soil with acorns, and waiting for the saplings to reach a few years' growth, when the truffles could be gathered among the roots. Still no practical method of cultivating the truffle is in existence; and since they are found completely isolated from anything which could produce them, we are left in the dark as to how they are originated, or at best with merely the supposition that at an early period of their development, they are parasites of the tree roots, or the theory that, like oak galls, they are due to the stings of insects. This last conjecture, however, arising from the fact that truffles are attacked by dipterous insects, like other nitrogenous cryptogams, has been refuted by the entomologists.

A very curious and recent experiment by M. Brefeld throws some new light on the subject, and may lead to the long sought method of cultivation. The *penicillium glaucum* is the well known green mould which appears on bread and cheese, and which owes its name to the fact that, in free air, it consists of chaplets of spores, in brush form, connected to a stem or pedicle. The mode of reproduction of this mould depends on the medium in which it exists. Now, by placing the *penicillium* in a closed vessel with very little air, M. Brefeld has obtained nodules which, after being buried in moist sand, fructify with internal asci which do not open. That is to say, they are produced in a manner analogous to truffles. The asci, we may explain here, are the little sacs in which the spores are contained, and are found in many complex forms of fungi, which build up a special organ called the *peridium* to hold these sacs.

It will be seen from M. Brefeld's discovery one aerial, or *penicillium*, the other existing when partially deprived of air, or tuberculous. The truffle through its subterranean location is always in confined air, present besides in limited quantities, and in that state is sexless. Now it remains to find its aerial form, to discover the peculiar *penicillium* which placed under the conditions noted will produce, for its nodule, a truffle.—*Scientific American*.

BURSTING OF BARK.—It is not uncommon in the spring to find free growing young nursery trees seriously injured by a splitting and separating of the bark near the ground. The slit will be 2 to 4 inches long, and the bark is often loosened to the extent of one-third of the circumference. As the lips of loosened bark dry, they gape open more and more, leaving the surface of the wood beneath fully exposed to dry wind, wet and decay. This injury is usually, but mistakenly, spoken of as a "sun-scald"—an effect of hot sunshine suddenly thawing a frozen stem. But it is often seen on the north and east, as well as on the south and west sides of the stem. It is evidently caused by the expansion of the watery sap of the cambium, on being converted into ice. It is never seen on trees from which the leaves have nearly all fallen, and this is because the leaves do not fall until the flow of sap has subsided, and the new wood begins to harden and dry to the condition of its winter rest. Although we often do not see the hurt until it becomes very obvious in the spring, by gaping open, it takes place only in the fall, at the time of the first keen frosts, and as already said, only late growers, which retain their leaves late, are liable to it. The apple (of such sorts) shows it most frequently, probably because its bark is not very tough or elastic. The cherry is often a severe sufferer. If the damage occurs as early as in October, we often find in the spring that it has been repaired by a natural exudation of prepared sap, so that the exposed wood has been sealed over by a very thin brown film of cambium tissue, which, although not finished smooth and varnished like the completed bark, yet answers its purpose of protection to the wood, against losing moisture from within or receiving too much moisture from without. It is like the thin and scarcely perceptible film which oozes from wounds made by pruning in September, or early October, and which prevents the face of the cut from cracking in fissures, such as are seen on wounds made

by winter pruning if left long unprotected by a waterproof coating. All that is necessary to save trees affected by the splitting and separating of the bark is to look for the cases in November, tie the bark down, and cover with earth, or with a strip of wax, like a wound made in grafting.—*Cor. Country Gentleman*.

HOW A NEW YORK GIRL "DID SUMS" IN HER SLEEP.—Jennie Lawson is a member of the second class in the Eighteenth Street female grammar school. Friday last, a number of arithmetical examples were given out for solution, but three of them, in percentage, requiring long processes of division, resisted all Jennie's efforts to secure the correct answers. This circumstance seemed to distress the child, and, after working through them again and again without success, she went home determined by persistent effort to find out where her error was, and she continued to strive until long after the rest of the family had retired. Toward midnight, her mother, who slept in an adjoining room, called to her daughter that she had better go to bed, lest she should be late in rising the next day. The girl at once retired, and in a few moments was fast asleep. About an hour afterward, Mrs. Lawson was again awakened by a sudden noise in her daughter's bed-chamber, which was then in entire darkness. She called, but, receiving no answer, arose to see what was the matter. Jennie was sitting at her desk, and had apparently just completed some work on her slate, the noise having been made by the falling of a ruler from the table to the floor. The girl was fast asleep. Mrs. Lawson did not wake her at that time, and on the following day it was afternoon before the girl could be roused from the deep sleep in which she seemed to be. Upon awakening, Jenny spoke of the problems, and expressed her intention of making a further trial at their solution. Upon getting the slate she found them completely solved in her own hand, each line neatly ruled, and the figuring without the slightest error. At this she was greatly surprised. Her last knowledge of the puzzling examples was of leaving them unsolved on the night before. Of her performances in her sleep she knew when awake absolutely nothing, and her mother not having mentioned the incident left her the more bewildered. Yesterday, the girl brought the work to school and related the incident attending it to her teacher. The room was entirely dark, the girl soundly asleep during the working out of her last example. She had never before had any of her relatives been so affected.—*New York World*.

A WONDERFUL TREE.—From Bahia Consul Morgan sends a translation from a book published by the Inspector of the Custom-house of that port, in which it is stated that the consumption of a century would not exhaust the supply of india rubber. The inspector gives an account of a remarkable tree, the *Carnauba* palm, which grows in Brazil without any culture, and it is so hardy as to flourish in the most prolonged drought, and has often served at such times as the means of support to the population of more than one province. The top, when young, is an appreciable and nutritious article of food; and from this tree also wine, vinegar, and a saccharine matter are extracted, as well as a kind of gum similar in its taste and properties to sago. From the wood musical instruments are made, as also tubes and pumps for water. The delicate fibrous substances of the pith of the stalk and its leaves make a good substitute for cork. The roots have the same virtues as the Sarsaparilla. The pulp of the fruit is of an agreeable taste, and the nut, oily and emulsive, is roasted and then used as coffee by many persons. From the trunk are obtained strong fibres, and also a species of flour similar to maizena, and a liquid resembling that of the Bahia cocoa-nut. From the dried straw are made mats, hats, baskets, and brooms, and large quantities of the straw are exported to Europe for the manufacture of fine hats. Finally, from the leaves is produced the wax used in the manufacture of candles; and the export of this wax exceeds 162,000 a year in value. The inspector suggests that perhaps in no other country can there be found a plant applied to so many and varied purposes.—*Times*.

DRESDEN HOUSES.—A correspondent of the *Churchman* says: The south end of Dresden is the more fashionable portion of the city. A few years ago it was a dreary waste, but room had to be made for the stream of strangers that came pouring in from all parts of the world, and, in a brief space of time, houses like palaces sprang up from the desolate ground. But fine as Dresden houses are, I am afraid Americans, with their notions of home comfort, will never take kindly to them. All are of immense size, usually over 100 feet square, and on every floor or *etage* two to four different families live, so that there is nothing of seclusion or privacy in them. Across from

our *pension*, in the cellar, a shoemaker, an umbrella mender, and the followers of half a dozen various crafts, do their work, and bring up their families. On the *parterre*, the floor level with the pavement is a goodly sized grocery store; on the first *etage* an Austrian countess lives in very elegant style; on the second and third *etages* several middle class families, such as shopkeepers and clerks, reside; while the fourth and fifth are inhabited by a large colony of *droschky-drivers*, *schneiders* and laboring men. The roof, when the house is fully tenanted, I am told, covers 200 different human beings of every grade in the social scale. Is it a wonder, then, that to us who are brought up from childhood to regard our homes as our castles, Dresden houses will always appear as so many barracks or caravan-series.

BUDDHA'S RAYS.—This name is given by the natives of Ceylon to the appearance of broad beams apparently of bluish light which sometimes extend from the zenith down to the horizon, where they converge. The spaces between them have the ordinary illumination of the rest of the sky. This effect is supposed to be due to the different temperatures of the air at various levels. The upper air is colder and denser, and the rays of light are refracted downward. A similar explanation is given of a remarkable appearance seen at Adam's Peak, Ceylon. This mountain rises abruptly from a low country to the height of 7,200 feet above sea level. The phenomenon consists apparently of an elongated shadow of the mountain projecting westward to a distance of about seventy miles. As the sun rises higher it rapidly approaches the mountain, and appears at the same time to rise before the observer in the form of a gigantic pyramid of shadow. Distant objects may be seen through it, so that it is not really a shadow on the land, but a veil of darkness between the peak and the low country. It continues to rapidly approach and rise, until it seems to fall back upon the observer, like a ladder which has been reared beyond the vertical, and the next instant it is gone. In this the air of the mountain top is colder and denser than that of the valleys, but as the rays of light are above instead of below it, the refraction is upward, producing the effect of darkness from the loss of rays which would otherwise come to the observer's eye.—*Galaxy*.

—The *London Observer* says that aerolites have lately attracted unwonted attention, owing to one of them having fallen in a country where the fall of meteoric stones from the skies is almost as common as the shower of stones and other missiles hurled by the playful youths of London from railway bridges at passing trains. In the Mysore provinces the fall of aerolites is, says a Bangalore paper, common enough; and Mr. Heynes, in his "Statistical Fragment on Mysore," drawn up in the year 1800, states that "masses of immense size are said to have fallen from the clouds at different periods." In the latter part of Tipoo Sultan's reign it is on record and well authenticated that a piece fell near Seringapatam of the size of an elephant, which, by the Sultan's officers, was reported to produce the effect of fire on the skin of those who touched it, a comparison naturally made by persons ignorant of the sensation of extreme frigidity. It is stated that two days elapsed before it was entirely dissolved, during which time it exhaled such a stench as to prevent people from approaching it. This account is in the public record of Tipoo's reign, from a gentleman of the greatest respectability of character, and high in the civil service of the honorable company.

SURGERY FOR DOMESTIC ANIMALS.—Farmers should know that a broken bone may be set and the injury cured in a dumb animal, as well, considering their different natures, as in a human being. I once saved a young horse which got well and strong after his hind leg was broken; and not long ago had a year old heifer which got her hind leg broken above the hock joint. The steer that broke it chased her over the bars, and the broken bone projected through the skin some inches. I got her into a pen well provided with litter, and set the bone as well as the circumstances would admit, and splinted and bandaged it up, and in six weeks it was apparently as well as ever, with the exception of a small callus at the place where broken. The animal may now be seen at my place.—*Cor. Maine Farmer*.

STONEHENGE.—Quite recently a party of civil engineers proceeded to this spot, and were engaged for four or five days in taking most elaborate measurements of the structure, as well as making astronomical calculations. The results of their exhaustive survey have been very striking, astonishing, it is said, none more than the savants themselves, and leave not the least doubt about the solar references of the structure; and, further, that it was undoubtedly erected as a temple of the sun.—*The Builder*.