Gas from Wood.

Most of our readers are well aware that illuminating gas can be made from wood, by the use of retorts differing somewhat from those for coal, and that in several localities—the city of Philadelphia for one—such retorts have been used, under a patent, for a considerable period, actually manufacturing gas for use. One objection which has been urged against the use of wood gas is the separation of its constituents by their different specific gravities. On this and other points relating to this great experiment, the following extract from the Engineer's report for 1856 will be found of value:—

"Another year's trial of the cellular retort, for the production of gas from vegetable substances, has confirmed the results heretofore reported with respect to the quantity and illuminating quality of the gas thus obtained. As there seemed to be some doubt as to the permanency of this gas, it was thought worth while to test it in such way as would bring the question to a satisfactory solution. A considerable quantity of it (30,000 cubic feet) was stored in a gas holder by itself, and after remaining thus isolated several weeks was tested photometrically. It had not changed perceptibly, having retained its illuminating power as completely as coal gas under similar trial. With the present relative prices of wood and coal in the Philadelphia market, the cost of making gas from the former is somewhat the least, but the difference is not sufficient to justify the immediate abandonment of the latter. Should a commercial change occur, by which the price of coal should be again advanced to the high point reached two or three years ago, there might arise important advantages to these works and its customers from the ability to make the substitution of wood for coal. It will therefore be consistent with good policy to continue, as heretofore, the use of such number of wood retorts as can be supplied with that material without sensibly affecting its market price, particularly as their use is accompanied by some immediate profit and entails no extra cost for the contingent advantages it presents."

A very careful and accurate analysis and photometric examination of gas from pine and also from second growth oak, lately made by Professor W. Gibbs, of New York, and Dr. F. A. Genth, of Philadelphia, indicated the specific gravity of pine gas to be 0·663, and of oak gas to be 0·580. The specific gravity of gas from coal, according to Dr. Ure, ranges between 0 508 and 0·659, and that from oil between 0.818 and 1.175, the illuminating power being somewhat proportional to the density. The analysis by Messrs. Gibbs and Genth, is presented in a tabular form in the report of the Engineer, and gives results as follows:—

Of free hydrogen (a gas highly combustible and of great value for heating purposes, but yielding little light) pine gas contained 33 per cent, and oak gas 30 per cent. According to the experiments of Henry, an English chemist, who published a careful analysis of gas from the Wigan cannel coal, the quantity of free hydrogen in coal gas varies from 0 to as high as 60 per cent, depending on the length of time it is exposed to heat. As one of the principal features in the wood gas retorts, (Pettenkoffer's patent,) employed at Philadelphia, consists in circulating the gas for a considerable time through red-hot flues to complete the permanent union of its elements, the result deprecated by Henry, decomposition into its ultimate elements may take place to some extent.

Of light carburetted hydrogen, (a valuable illuminating constituent,) the pine gas contained 21 per cent, and oak gas 33. According to Henry, the quantity of this constituent in coal gas varies from 20 to 83 per cent, being least in that longest heated.

Of olefiant gas (the most valuable constituent in any illuminating gas,) pine gas contained 11 per cent, and oak gas 6 per cent. In the coal gas experiments referred to, this varied from 0 to 13 per cent, being least in that longest heated.

Of carbonic oxyd, (a kind of half-burned gas of little or no value as an illuminator, and quite poisonous if it is taken into the lungs,) pine gas contained 27 and oak gas 26 per cent. Henry's analysis showed coal gas to contain from 0 to 12 per cent, increasing with the time it was exposed to heat.

Of carbonic acid, (familiar to everybody,) pine gas contained 5 per cent, and oak gas none, while oxygen and nitrogen were present in too small quantities to be worth noticing. Henry makes coal gas contain none of the three last named.

The Engineer remarks that these gases were collected at the Ninth Ward works, and taken to New York for analysis, and that the results furnish a highly satisfactory explanation of certain curious phenomena which accompany the combustion of this gas.

The illuminating power as tested by these chemists was found to be over 26 candles for a five feet burner, but a subsequent series of photometric trials of wood gas, previously passed through a long pipe cooled to 15° Fah., gave an average of 18.3 candles from a burner consuming 4·3 feet per hour.

The conclusion at which these gentlemen arrive from their elaborate examination is, "that wood gas, in illuminating power, is fully equal to the average of coal gas." Our readers versed in the subject will be able to deduce their own conclusions from the figures given by these chemists, but we do not find them as favorable for the extension of wood gas as we had hoped. The subject is one of great importance, as there are many cities and factories where wood is far cheaper and bituminous coal much dearer than in Philadelphia. It is quite possible that a greater attempt has been made to give a good character to wood gas than to throw light upon the question of economy as to coal or wood being the cheapest gas producing agents. There is such a difference in the quality of coals for making gas that some kinds yield as much as one-third more gas to the tun than others, and yet the expense of making the gas is greater for the poor than the rich coal. Perhaps the Philadelphia gas works may be endeavoring to economise in the use of inferior coal, an extreme to which our gas makers are very liable.

Mechanics' Institutes.

Such institutions have done, and are now doing, much good in all the cities where they have been established and managed with spirit and discretion. Quite a number of these institutions are now in successful operation in the United States and England. In the latter country, at Blackburn, a famous manufacturing place, the members of the Mechanics' Institute lately gave a grand soiree, at which Sir Robert Peel presided, and made a speech, some parts of which are so good that we take pleasure in presenting them. He said:—

"This institution which we are now celebrating is called a scientific institution. It has what is called an engineering class—a noble effort those men are making in the right direction. The plan they adopt is the way in which they may be confident that they will succeed in their exertions. We are told that it is from mechanical skill and scientific invention that the great progress of our country has resulted. Let me observe that the present age in which we live is eminently practical. We have now done away with all the fine theories of the school of Voltaire and Diderot. Science is everywhere. When we want to travel rapidly by locomotion, it is the steam that carries us; when we want to send our communications of thought, it is the electric telegraph that gives wings to our ideas. Then recollect that this study of the sciences is only in its infancy. All these great advantages which we are reaping are matters which have only just been developed to the world. How ought we to exclaim when we see these benefits thrown upon us? We may justly exclaim 'O God! how glorious are thy works, thy thoughts are very deep. An unwise man doth not well consider this, and a fool doth not understand it.' (Applause.) Let us hope that this generation may know, as far as lies in their power, to understand and profit by these advantages, and we shall not fail to reap the manifold benefits of our knowledge.—Science is present with us in every branch of industry."

Stellar Distances.

For a long period astronomers unsuccessfully endeavored to determine the distance between the stars and the earth, and it is only within a comparatively short time that the interesting problem can be said to have been solved. The distance which separates us from the nearest stars is, according to M. Arago, about 206,000 times the distance of the sun from the earth—more than 206,000 times 95,000,000 of miles. Alpha, in the constellation of Centaur, is the star nearest to the earth; its light takes more than three years to reach us, so that, were the star annihilated, we should still see it for three years after its destruction. If the sun were transported to the place of this, the nearest star, the vast circular disk, which in the morning rises majestically above the horizon, and in the evening occupies a considerable time in descending entirely below the same line, would have dimensions almost imperceptible, even with the aid of the most powerful telescopes, and its brilliancy would range among the stars of the third magnitude only.

Fundamental Forms of Crystals.

The forms of crystalized minerals are various, and to the eye there often seems to be no relation between different crystals of the mineral. All their shapes, however, are but modifications of a few fundamental forms. There is perhaps no mineral which presents a greater variety of form than calc spar. *Dog-tooth* spar is one of its forms, and *nail-head* spar is another. The one is a tapering pyramidal crystal well described by its name; the other is broad and thin, and shaped much like the head of a wrought nail. Yet both of these crystals, and many others, are derived from the same primary forms. Crystals may be readily chipped off from this mineral in three directions, and these are found to be identical in their angles. They consequently have the same nucleus or essential external appearance.

Iron Wire for Baling Cotton.

An Alabama correspondent of the *Charleston Courier* argues warmly in favor of this mode of baling cotton. The principal advantage is that wire will not burn like rope. Cotton bound with wire can scarcely be made to blaze; and if a bale takes fire, combustion to be carried on at all, must be in a smouldering condition. The wire holds the cotton more firmly than rope, in a compact mass, so that air can scarcely reach the parts on fire. The danger from the devouring element being less, the insurance in store or on shipboard ought to be reduced. Wire also is cheaper and lighter than rope, and could afterwards be used in baling up goods, or for other purposes. It should be malleable and galvanized, to prevent the possibility of its rusting. Like rope, it can be adjusted to any sized bale, both in packing and compressing.

Bones as a Manure.

A late number of the *Country Gentleman* has an elaborate article by Levi Bartlett, of New Hampshire, on bone manure. He concludes that there is no other manure whose effects are so lasting as an application of ground bones. Besides the increase of crops he says it supplies phosphate, which the grasses generally lack, on old and long grazed fields in New England, and the want of which, cause what is called "bone disease" in cattle. Mr. W. recommends that the bones be pounded, and thus broken to pieces, boiled or ground, and then spread evenly over the soil, and mixed with it. He has a field that was thus dressed years ago, and the effect is yet very perceptible on clover.

Cure for Hydrophobia.

Receipt.—First dose, 1 oz. of elecampane root, boiled in 1 pint milk until reduced to a half pint. Second dose (to be taken two days after the first,) 1 1-2 oz. of elecampane root boiled in 1 pint of milk, boiled as the first. Third dose, the same as the second (to be taken two days after); in all three doses.

The above was sent to the New York *Tribune* by J. W. Woolston, of Philadelphia, as a cure for the above terrible disease, and he states that he has known it to be perfectly successful in effecting a cure in twenty cases.

Notes on Science and Foreign Inventions.

High Farming.—Mr. F. Mechi, whose name is associated with the first triumphs of American reaping machines in England, which occurred on his farm at Tiptree, has recently written a little work called "How to Farm Profitably," in which he disposes, in a good humored manner, of all those who have taken grounds against *high farming*. He says:—

"I have often been much amused by the compassionate look and manner in which my friends inquired after my doings at Tiptree. The translation of these sentiments is this: 'Mr. Mechi, you are kindly losing money by your experiments to oblige the country, and we ought to feel grateful to you.' But I sternly ejaculate that what does not pay in agriculture is not an improvement. The fact is, for several years I have been deriving a most gratifying return for my expenditure, and it is of a very enduring and continuous character, but the world does not believe it."

Agriculture Improving Climates.—The London *Engineer* says:—"Drainage and shelter are the principal works which have hitherto been instrumental in improving the climate of this country; and the change which has been effected by them in some districts is such, that vegetation is now further advanced in April than it formerly was on the 1st of May. In other words, the climate throughout the year is not only greatly improved, but vegetation in spring is from fourteen days to a month earlier, while results in harvest are still more favorable for the husbandman."

To Cure Egg-eating Hens.—The following method was once adopted with success by a correspondent of the London *Cottage Gardener*:—He took a partially-eaten egg from the nest, and substituted in place of the yolk mustard mixed with water of a similar consistence. He then replaced the egg in the nest, and supposes the bird did not approve of the flavor, as he has not lost an egg since.

Pearl Fishery in the Persian Gulf.—Since our recent notice of successful pearl hunting near Paterson, N. J., new discoveries of pearls have been made in other creeks. The fishing of such pearls is an easy task, in comparison with that of the Arabian pearl divers at Bahren, on the Persian Gulf. The creek pearl fisher performs no diving operations. Provided with a pair of long india rubber boots, a spade, and a knife, he hunts his pearl without danger of drowning or ducking. The Arabian pearl fisher, on the other hand, has to dive down into the deep sea in order to secure the much prized baubles. In a nude state, with his feet resting on a huge stone attached to a rope fastened to a boat, his nostrils compressed with wooden pincers, and a basket slung around his neck, he is rapidly lowered by his companions; his feet barely touch the bottom ere he is off the stone, which is rapidly hauled up, and another diver occupies it, while the one who first went down is fast filling his basket with pearl oysters. Up he comes, empties his basket, takes three or four deep inspirations, and down he goes again, continuing this for several hours daily. It is a fast life and a wet one. The poor Arab diver, racked with rheumatism, finds an early grave. The pearls of the Persian Gulf are the most beautiful in the world; and it is something remarkable, that springs of fresh water are generally found at the bottom of the sea, where the pearl oyster is obtained.

Prize for an Essay on Marine Engineering.—The Paris Academy of Sciences offers the extraordinary handsome prize of 6,000 francs for the best essay "On the application of Steam to the Navy." The essays must all be sent in prior to the 1st of November next. This prize ought to be sufficient to tempt the most able marine engineers to make an effort to gain it.

Gas Works.—From the yearly return of gas works in England, we learn that the average price per 1,000 cubic feet is 4*s.* 9*d.* sterling, or a little more than one dollar. The average amount of gas obtained for a tun of coal is 7,980 cubic feet. Every five cubic feet of gas consumed per hour gave a light equal to 9·62 sperm candles weighing six to the pound; in other words, 1,000 cubic feet of gas, at the low price stated, gives a light equal to 1,924 sperm candles

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