MODERN SYSTEMS OF INDEPENDENT LIGHTING AND HEATING.[1]

II.—*Acetylene Lighting.*

ACETYLENE is now quite a familiar method of lighting country houses, and many early difficulties against which the system had to contend have been removed. Originally the gas could not be obtained in a state of purity. The impurities were apt to give rise to a slight "haze" or mist in the room, the odour of the gas was disagreeably evident, and in the early forms of generating plant sufficient care was not always taken to avoid mixtures of gas and air capable of giving rise to explosions.

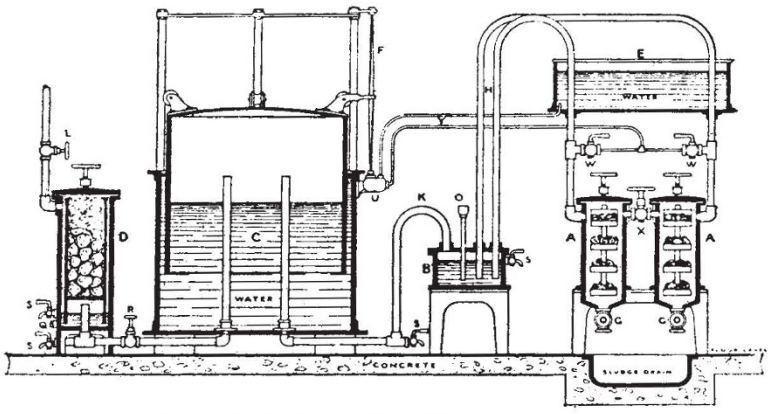

FIG. 1.—Sectional view of "Imperial" acetylene generator.

The careful purification of the gas, and the improved designs of the generators of to-day, have removed these defects. It is, however, now as ever, important for the householder who instals acetylene to purchase a good standard type of plant and to secure the very best workmanship throughout the installation. Acetylene, like petrol-air gas, is used to a great extent in remote situations, where expert assistance is not readily available. A cheap and inferior installation may therefore be a constant source of trouble and annoyance. Many reputable firms will undertake to execute any repairs within a given period after installation, thus making themselves responsible for the plant being in good order.

The acetylene plant is usually stored in a small outhouse, and the gas is led into the house through pipes in the same way as coal-gas; the piping, however, is usually very much smaller. It is impossible to describe acetylene generators in great detail within the space of this article, but it may be said they are divided broadly into "carbide to water" and "water to carbide," and into automatic and non-automatic types. Generally speaking, the addition of water to carbide is considered preferable, the water being so easily controlled. Automatic plants are now preferred for sustained lighting on a large scale.

The essential parts of an acetylene generator are as follows:—

(1) The generator proper, which contains the carbide. This is divided into compartments in such a way that the charge in one compartment is used up before the water enters the next. In modern installations duplicate generators are frequently used. By merely turning a tap either can be put into action, and in an emergency it is possible to continue supplying gas from one generator while the other is being attended to and recharged.

(2) The washer, which consists essentially of a piece of apparatus through which the gas passes on its way to the gas-holder, and is partly purified in doing so.

(3) The water-supply tank, which may be automatically controlled by the aid of a piston, actuated by a projection in the gas-holder, which in its descent admits more water as the gas becomes exhausted.

(4) The gas-holder, in which the gas is collected when it has passed through the "washer."

(5) The drier and purifier, by which the gas is finally purified on its way into the house for actual use.

In Figs. 1 and 2 these various parts are seen in a typical "Imperial" plant.

It is interesting to notice that while the nozzles of burners used for petrol-air gas require to be larger than those used with ordinary coal-gas, acetylene burners, on the other hand, must have a very small aperture. This is one reason why good methods of purification are necessary, as in the early days impurities sometimes led to the small apertures in the burner becoming choked with soot. Modern acetylene burners should last a long time. The smaller types merely employ a pin-hole, the large types (*e.g.* the "Roni") have a slot. A common arrangement is to have two twin burners, the flames of which impinge on one another. The ordinary range of consumption of acetylene burners is from $\frac{1}{8}$ to 1 cub. ft. of gas per hour, the usual pressure being about 4 in. of water. The efficiency is generally stated, but is usually taken as about 25–30 candles per cub. ft. of gas. One may expect to get, roughly, 5 cub. ft. of gas from 1 lb. of carbide.

Bunsen burners and incandescent mantles have been used with acetylene, but the general impression is

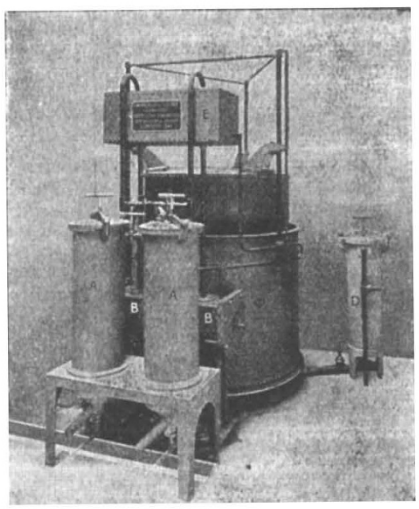

FIG. 2.—"Imperial" acetylene generator (general view).

A, Generator.
B, Washer.
C, Holder.
D, Purifier.

When the plant is in action water flows from the tank E into the generator A through the valve U. The acetylene thus produced passes through the washer B into the bell at C, causing it to rise. When the holder is about half full the control tap is automatically turned off and no more gas is generated. As the gas is used up the bell falls and turns the tap on again so that gas is generated once more. This automatic action continues until the carbide is exhausted. Meanwhile the gas generated passes out through the purifier D into the pipes. By closing one of the taps W either of the two twin generators can be put out of action. The sludge is run out through the cock G, and the drain pipes SSS serve to run off any accumulated water.

[1] Continued from p. 524.

that the gain in efficiency is offset by the comparatively short life of the mantles.

Acetylene installations have been widely used for country houses, for country railway stations, etc.; in fact, in similar circumstances to petrol-air gas. The comparative advantages of the two systems have been the subject of much discussion. The fact that there are opportunities for both seems to be borne out by the practice of several firms who are prepared to instal either system.

The following might be taken as a very rough indication of the cost of installations :—

Size of installation	Cost of plant £	Total cost of installation £
30 lights ...	30–40 ...	75–120
50 ,, ...	50–60 ...	130–160
100 ,, ...	75–90 ...	180–250

Here, again, allowance must be made for the very variable item of fixtures, on which a large sum may be expended if artistic effects are in demand. Prices will also be found to have risen somewhat during the war.

FIG. 3.—Portable acetylene lamp of very simple construction; requires 1 lb. of carbide and is stated to give 50 candle-power for eight hours.

A special province for acetylene lighting is in connection with portable lamps, some of which are of very ingenious and attractive design. Lamps of this kind are in demand for temporary workshops and construction work undertaken during the night time, a type of apparatus much used for the latter purpose being the acetylene flare and generator, which is equipped with a parabolic reflector designed to concentrate the light over a small area. (Shortly before the war a large number of these flares were introduced into the Pantheon, Paris, on the occasion of the bicentenary of Jean Jacques Rousseau. It was only just before the performance that the organisers suddenly realised that there is neither gas nor electricity in the building.)

In Fig. 3 is shown a very handy form of portable lamp recently introduced by the Thorn and Hoddle Acetylene Co. Its characteristic is extreme simplicity. All that is necessary is to throw a charge of carbide into the inner vessel, pour some water into the outer can, and light up. There is no cock attached to the lamp, and this enables the gas consumption to be automatically balanced by the inlet of water through a special valve. The lamp is very strong, and can be carried in the hand, stood up beside the work, or hung from the roof or wall. It is said to be now very widely used for military purposes.

Acetylene, like petrol-air gas, can be used for heating and cooking with small stoves consuming from 1 to 6 cub. ft. per hour, but is not recommended for use on a large scale. It would, however, be useful for laboratory work. Another application of acetylene which sometimes comes in handy in this connection is its use, in connection with oxygen, for welding purposes. For this purpose tubes of dissolved acetylene are sometimes used. The gas is dissolved under pressure in acetone, and is evolved when the pressure is relaxed. Such cylinders can be very readily detached and sent off to be refilled, a newly-charged vessel being substituted.

THE BRITISH MYCOLOGICAL SOCIETY.

THE Transactions of the British Mycological Society for 1914 (vol. v., part 1; May, 1915; Worcester: E. Baylis and Son) contain a number of interesting articles. Prof. A. H. R. Buller's presidential address on the fungus lore of the Greeks and Romans shows the various ways in which fungi attracted the attention of the ancients. Those who are adverse to the idea of our various edible kinds of fungi being considered a valuable source of food will note that Dioscorides was so suspicious of all edible fungi (although these were consumed in large quantities by the Greeks and Romans) that he recommended the taking of an emetic after the eating of any kind. Pliny, in referring to the rust of cereals, which he calls "the greatest pest of the crops," says that it may be averted "by fixing branches of laurel in the fields." Such kinds of belief die hard; the present writer can recall that when, a few years back, the American gooseberry-mildew first invaded Kent, a prominent fruit-farmer announced his intention of planting a hedge of Eucalyptus to ward off this new pest.

Miss Gulielma Lister, well known as the monographer of the Mycetozoa, publishes an account of the Japanese species collected during the past eight years by Mr. Kamagusu Minakata. The species new to science are illustrated with the beautiful and faithful drawings characteristic of Miss Lister's work. Mr. Minakata, moved primarily by a sense of their national importance, has protested against the demolition of the ancient Shintoist temples. The sacred groves of ancient trees round these temples have proved an excellent "hunting-ground" for Mycetozoa. So vehement on one occasion was his opposition that it led to his being put into prison for eighteen days; this was not wholly wasted time, however, since he was able to collect a species of Stemonitis "on an old post in the gaol."

Mr. J. Ramsbottom contributes a very useful summary of recent work on the cytology of fungus reproduction, and in a separate note points out that the "*guttulae*" in spores of the Discomycetes—a feature commonly introduced into the diagnosis of species—disappear in sections mounted in glycerine. Biographical accounts of the late Dr. M. C. Cooke and of the Rev. W. L. W. Eyre are also given by the same author.

Mr. C. K. Sutherland describes some new genera of marine Pyrenomycetes.

One of the activities of the society is the holding annually of "fungus forays" in the spring and autumn; those held in 1914 led, as in previous years, to the discovery of fungi new to Britain. It is satisfactory to find that care is taken to obtain a critical determination of all the species collected. The collection of *Fusicladium dendriticum*—the cause of the destructive disease known as apple "scab"—on *Pyrus torminalis* suggests that some of the fungous "pests" of the fruit-grower may—like some of the insect pests—emerge from woods which often neighbour fruit-farms.