

Acetylene Gas.

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(Concluded).

Acetylene in a gaseous form, at ordinary pressure, is not explosive in any sense, except as referred to above, when mixtures with air become ignited. So important is the correct understanding of the exact facts in this matter that, even at the expense of some repetition, it should be clearly understood that Acetylene gas, not compressed, cannot be exploded, detonated, or otherwise set off in any manner whatever that could warrant its being called explosive. A lighted candle plunged into it will be extinguished, setting fire to it, of course, when it comes in contact with air, for air is necessary for its combustion; but no combustion or explosion can take place in the midst of a body of the gas. Even a fulminate cap exploded in the gas will not propagate a wave of explosion to any perceptible extent whatever, nor will an electric spark in an atmosphere of the gas cause any injurious or dangerous result whatever, except such as would result from lighting any other gas in the same manner.

It has been supposed that the copper compound might be formed by the action of the gas on copper or brass containers, pipes, parts of apparatus, fixtures, etc. But careful investigations, during which Acetylene gas has been allowed long contact with brass and copper, under more varied and trying conditions than would be likely to exist in practice, have been repeatedly and laboriously carried out, and the idea that such conditions can result in the accidental formation of dangerous substances has been entirely set aside as disproved.

But Acetylene is condemned in advance, said to be poisonous, when it is not so, while we go on complacently using a city gas which exceeds Acetylene in poisonous character almost as much as arsenic exceeds salt. City gas supplies in America run as high as twenty per cent. of carbonic oxide.

In one of Gréhan's experiments upon dogs, a mixture of twenty per cent. of Acetylene with air inhaled for twenty-five minutes did not seem to trouble the animal. A dog breathing a similar mixture of illuminating gas containing only one per cent. carbon monoxide, quickly showed convulsive movements, and died after ten minutes.

Everything considered, though prejudiced against it at the outset, and absolutely and purely disinterested at present, after much careful study and feeling the responsibility of being called upon to furnish an unbiassed opinion in this matter, the writer believes that the use of Acetylene gas for the illumination of rural homes, provided it is generated from good carbide, in a first-class apparatus, and all reasonable regulations followed, is no more fraught with danger at the present day than any available method of illumination by gas, or electricity, and less so than the usual employment of petroleum.

As an illuminant, Acetylene surpasses in lighting power and economy all other illuminants known; when burned at the rate of five cubic feet per hour it produces light equal to two hundred and fifty candles, whereas, the best illuminating gas made from coal or water gas, rarely exceed twenty-two candles for each five feet

burned per hour. 'Your Philadelphia city gas is rated at from nineteen to twenty candles. Acetylene gas will, therefore, produce twelve and a half times more light if the same quantity be consumed, or one thousand cubic feet of Acetylene gas will give you the equivalent in lighting power of twelve thousand five hundred cubic feet of your city gas; it has, therefore, twelve and a half times the value.' These were the words of Wilson and Suckert, quoted from their paper before the Franklin Institute, March 17, 1895, and, though that was one of the earliest recorded statements from persons who can be regarded as authoritative, later research has not had occasion to greatly modify their figure.

Controlled by a suitable burner, the flame of Acetylene is absolutely white and of intense brilliancy. In quality, it is the nearest approach to daylight that we know. Its spectrum closely resembles that of sunlight, and consequently all colors appear the same as by daylight, instead of being distorted as by gas light, candle, oil, or electric light. This property renders it very desirable for ordinary domestic purposes, and also adapts it admirably to photographic and similar uses.

Acetylene, in producing the same candle power, impoverishes the air one-fourth as much, and pollutes it also one-fourth as much as illuminating gas. The calculation of Professor Lewes and other authorities are still more favorable than are these figures.

Acetylene machines have presented to amateur inventors an attractive field, both because of the obvious usefulness of these generators, and because of the readiness with which new ideas in feeding carbide and water, one to the other, can be devised. Thousands of people from all walks of life have planned new forms; among them are butchers, priests and bakers.

It is essential to emphasize the matter of cool generation as one of the utmost importance in Acetylene manufacture. The function of the generator is in principle a simple one. It has to provide for the bringing together of the water and the carbide, wash and purify the gas, store it to such an extent as may be necessary, and deliver it to the pipes for distribution. The more nearly the generator conforms to the simple experiment of dropping a little carbide into a large volume of water, the more efficiently will the heat be distributed and the more perfectly will 'cool generation' be accomplished.

In the experiment of dropping a fragment of carbide into a tumbler of water, the heat of the reaction is so absorbed by the relatively large body of water, that overheating does not occur at any point. But reverse these conditions by allowing water, in limited quantity, drop by drop, to fall on a lump of carbide and you bring about the overheating of the resultant gas.

And Professor Lewes, English chemist and illuminating gas authority, wrote early in 1898:

'With water kept in excess, it is impossible for the temperature to rise above the boiling point of water, and, under all conditions, this class of generators yields the purest gas, as the Acetylene, having to bubble through lime water, formed in the generator, is washed free from most of its impurities.'