ACETYLENE GAS: ITS POSSIBILITIES.

THE INVENTION OF A CANADIAN.

VERY complete and accurate information concerning the new acetylene gas is furnished in a recent report of the Ontario Bureau of Mines. The report states that the process of the economic production of calcium carbide and acetylene is the most promising discovery that has been made in recent years for the supply of light and fuel.

The inventor, Thomas Leopold Willson, is a Canadian, having been born at Princeton, Ont. The materials used are common lime and carbon—in any form—hard or soft coal, coal dust, petroleum, tar or peat. These are treated in an electric furnace, and Mr. Willson is confident that where electricity can be generated with water-power, the cost of manufacturing calcium carbide brings it easily into competition with other materials from which fuel and light are obtained, and that a plant erected near a great water-power like that of Niagara Falls will supply a continent at a figure with which coal gas cannot compete. The power of Niagara is ample for almost any conceivable requirement; while it is alongside a mountain of limestone, and coal dust or culm can be had at little more than the cost of hauling from the mines of Pennsylvania and Ohio. Arrangements are already being made to procure electrical energy for this purpose from the falls on both sides of the Niagara River from the company which controls the power franchise at the falls; so that it is probable that the carbide will soon be manufactured on a commercial scale in both Canada and the United States.

THOS. L. WILLSON

The carbide, containing 40 parts by weight of the element calcium, which is the basis of limes, and 24 parts by weight of carbon, will be cast direct from the electric furnaces into rods, or cylindrical cartridges. One of these, 12 inches long and one and a quarter inches in diameter, will weigh a pound, and render five cubic feet of gas when simply subjected to the action of water, which is allowed to drip upon it slowly from a pipette or dropping tube. The oxygen of the water combines with the calcium of the carbide to form lime, while the hydrogen of the water unites with the carbon of the carbide to form acetylene. Owing to the great richess of the gas, it can only be used in flat flame burners, in which it emits a light greater than any other known gas; its illuminating value, figuring on a consumption of five cubic feet per hour, being no less than that of 240 candles.

The possibility of liquifying acetylene by moderate pressure permits enormous volumes of gas to be compressed into the liquid state in small wrought iron or steel cylinders, from which it may be fed slowly through burners. This quality promises to make it of the greatest possible value for floating buoys, and also for portable lamps, where there is no ordinary gas supply. In this way it would take the place of the illuminating product of petroleum, and thus offset the alleged exhaustion of the oil fields. In that event the value of the new discovery might be so great as to be beyond computation.'

Recently an exhibition of the new acetylene gas was given in the city of Hamilton by Mr. G. Black. The following are the facts stated by him concerning this new illuminate:—

Acetylene gas is obtained from calcium carbide by the addition of water. This carbide, which readily decomposes water, is a combination of lime and carbon in the form of coal, coke or charcoal, fused together in an electric furnace.

Acetylene gas is not a new substance, but was one of the rare laboratory products until Mr. T. L. Willson accidentally discovered how to produce calcium carbide cheaply in large quantities. He was experimenting at his aluminum factory in North Carolina in 1888 with different forms of carbide, when he produced this substance, and not being what he was looking for, he dropped it into a pail of water standing near, when gas of a most peculiar odor was evolved. A lighted match completed the experiment and led Willson to follow up his discovery with golden results.

Acetylene gas (C. 2 H. 2) contains 92.3 parts of carbon and 7.7 of hydrogen in 100 parts.

Calcium carbide (Ca. C2) has a specific gravity of 2.62 and contains 62.5 parts of calcium and 37.5 of carbon in 100. It requires 87½ lbs. of lime and 56½ lbs. of carbon to produce 100 lbs. calcium carbide. The residue, 43¾ lbs., is carbon monoxide. This latter contains 18¾ lbs. of carbon and 25 lbs. of oxygen.

100 lbs. calcium carbide, with 56½ lbs. of water will produce 115.62 lbs. of slacked lime and 40.62 lbs. acetylene.

Calcium carbide is not inflammable, and may be exposed to the temperature of a blast furnace without melting; but when placed in water each pound will generate over 5½ (5.892) cubic feet of gas.

The gas may be liquified by suitable pressure, and solidified by a pressure of 600 lbs. to the square inch. Carbonic acid requires 900 lbs. pressure to solidify.

Each pound of the liquid at 64° produces 14½ cubic feet of gas, or a volume 400 times larger than the liquid. This gas gives about 50 candle power per foot, or about 12½ times as much light as ordinary gas.

At Mr. Willson's factory in North Carolina he states that the carbide can be manufactured to cost about $20 per ton, but as his power is limited and his limestone and coal have to be brought from a distance, he states that by manufacturing where he can get a large amount of cheap water power, as well as limestone,