extremely pure white light resembling the oxy-hydrogen light, and is the nearest approach in color and purity to sunlight of any known artificial light.

Acetylene, when made from expensive chemicals, was known to be very poisonous, but as made from lime and carbon it is proved to be less injurious than ordinary gases. Its strong pungent smell is a safeguard, as no one can remain in an atmosphere of it a sufficiently long time to be harmed. Moissan, of France, and others made exhaustive experiments with acetylene and coal gas on animals, and proved that coal gas was much more poisonous than acetylene.

Acetylene, when mixed with 1¼ times its volume of atmospheric air, becomes slightly explosive, and reaches its maximum explosibility with 12 volumes of air, decreasing till at 20 volumes it ceases to be explosive Coal gas reaches its maximum explosibility with 5 volumes of air, so that ordinary gas is more explosive than acetylene. Accidents and explosions reported recently have given the impression that the gas is very dangerous. Let us examine this feature. Take the case of the accident in Quebec last winter. An ingenious mechanic made his own dynamo, furnace and carbide; he was experimenting with the gas under pressure, to liquefy it so as to get it into the smallest possible space He had an iron pipe 8 inches long and 4 inches diameter, with cast iron ends, a pressure gauge at one end and a valve at the other He had reached a pressure of 360 lbs. to inch, and observing that the gas was escaping around the valve, he used a hammer to stop the leak, when a portion of the metal broke away and the gas escaping struck him in the eye, penetrating the brain and killing him instantly Ordinary air under similar conditions would have been as fatal. It was afterwards found that the iron ends were thin and porous and the wonder was that they stood the pressure There was no explosion; the coroner's verdict was "accidental death." The explosion at New Haven, Conn., 21st January last, was caused by men experimenting with liquid acetylene, under a pressure of 600 lbs. to the inch, and I presume all accidents reported might be traced to unauthorized parties experimenting with crude apparatus, and ignorant of the necessary conditions for safety

When I first saw acetylene gas in September, 1894, I felt sorry for the electric companies because I thought the gas companies would readily adopt the new gas and regain their former monopoly of lighting But I do not feel quite so downcast now, I realize that the margin of cost of production is not so great, and believe that gas companies will feel the competition equally with electric, unless they adopt the new gas for use pure, or as an enricher to their present output. It is said to be useful as an enricher for coal gas, but not so suitable for water gas. Prof. Lewes of England, one of the best gas authorities there, suggests that gas companies should distribute a low illuminating coal gas of about 12 c.p. through their mains for heating, cooking, etc., and that each place using illuminating gas be supplied with a cylinder of acetylene to be fed into the illuminating pipes in a certain determined proportion. By some such process as this, there remains a large field for coal gas.

The incandescent light has held first place for interior illumination on account of its steadiness, purity, coolness, and not withdrawing oxygen from the air nor adding noxious elements to it. Acetylene will divide this field with the incandescent bulb, as its flame has a temperature of 900 to 1,000 degrees C., while ordinary gas has 1,400 deg. C., but as only one-tenth to one-fifteenth of the quantity is used for equal light, its heating effect is slightly in excess of the incandescent bulb

Taking the theoretical E.H.P. necessary to produce one ton of carbide as 3,000 h.p hours, and using the same for a supply of electric light by incandescent 4 watt lamps, we have the following: $3{,}000 \times 746 = 2{,}238{,}000$ watts $\div$ 64 gives 34,970 16 c.p. lamps for one hour, or 1,453 burning 24 hours continuously. The same power equals one ton carbide, which burned in ½ foot burners gives 31,500 16⅔ c.p lights, or 1,313 burning 24 hours. This gives a margin apparently in favor of electric lighting, but you cannot use all your electric lights at the source of cheapest production, nor run a continuous even load for 24 hours, but have in addition to sustain losses in distribution more than proportional to the distance conveyed; also lamp renewals. With the carbide it is different; it can be made at the place of cheapest production on a constant load night and day, and a small sum transports the carbide to any place desired, where it can be used to its full power without loss. Figure out for yourselves the problem of transmitting electric current for use 10 to 100 miles from source of production and transporting carbide by freight the same distance, and the comparison will be largely in favor of carbide. Hence, for using in close proximity to the power house on a steady even load day and night, the cost will be about the same if power costs the same, but as that is not practicable in electric lighting, the margin is in favor of carbide, but not to such an extent as to seriously hurt the electric companies employing the best apparatus under the most improved conditions, as may be found in large cities, but it is possible in small towns where the best and most economical conditions cannot be obtained and a thorough manager secured, electric lighting may suffer. The ease of distributing this gas is remarkable. Owing to its high illuminating power, very small main pipes may be used, and as frost does not affect it the pipes need only be laid below the surface, so that little or no expense need be incurred in piping a town If the cost of mains equals cost of poles and wires, the central station or gas house only requires a small tank for a generator and a gasometer of a suitable size, as compared with engines, boilers and dynamos running when only one light is required.

In the discussion which followed the reading of this paper a number of points were raised by the members. The cost of waterpower at $5.00 per annum per h.p. was thought too low, as $20.00 is charged by the Niagara companies. The fact that coal gas is not so extensively used as water gas, with which acetylene cannot be used as an enricher, seemed to throw some doubt on its value for that purpose.

CANADIAN SOCIETY OF CIVIL ENGINEERS.

SUMMER MEETING.

TORONTO, Wednesday, June 17th, 1896.

The meeting convened at 11 o'clock a.m., in the lecture room of the School of Practical Science, Queen's Park.

On motion of J. D. Barnett, seconded by A. F. McLeod, Col. Sir C. S. Gzowski took the chair.

Sir Casimir Gzowski said he was very grateful for the honor done him, but regretted that he had lost strength to an extent that prevented him from doing any mental work. His love for the Society was as strong as ever it was. (Applause). Anything that he could do for its welfare he would be only too glad to do, as he had tried to do from the very beginning. As one of the oldest engineers in Canada, his whole heart was for the success of the Society. (Applause)

Mr. Jennings, on behalf of the local committee, announced the programme of entertainment that had been provided for the delegates. By the courtesy of the Niagara Navigation Company and the Niagara Falls River and Gorge Railway Companies, delegates would be enabled to visit Niagara and see the immense hydraulic works there. The Toronto Street Railway placed cars at the disposal of the members. The bicycle works of the Lozier Company at West Toronto Junction would be visited. The mayor and city council would take the members on an excursion about the harbor The Toronto Athletic Club extended the privileges of the club to the visiting engineers. The Owen Sound Cement Co. expressed a desire to entertain any members who might visit the works, as also did the General Electric Co., and the Central Bridge Co., of Peterboro.

Prof Galbraith announced that the School of Practical Science would be open and experiments carried on in many of the departments during the visit of the society.

The Secretary said the business of the session was the discussion of the Acts of Incorporation.

The chairman, Sir C. S. Gzowski, feeling unable to preside, J. D. Barnett took the chair.

Mr. Macdougall said the members were aware that prior to the last annual meeting a draft of the proposed Acts of Parliament were prepared and submitted to the members for their consideration. These were voted upon at the last annual meeting, with the result that by a very large majority the society determined to accept those draft Acts. The original bill was in two parts, one to be passed by the Dominion Parliament and the other to be passed by each of the provincial legislatures, the object being the formation of the civil engineers into a close corporation. The Act was passed in Manitoba in March of this year, but there has not yet been time to submit it to any of the other provincial governments. The whole question of the admission of members to the profession, whether by ballot as at present, by examination, as is done by the Medical Council, or by both, as is done by the Society of Land Surveyors, was fully discussed. The many difficulties in the way of the society in securing a uniform series of Acts in the different provinces were recognized, but under the able generalship of Mr. Macdougall the society has already made great progress, and the outlook is favorable for further advances.

The evening session was devoted to an examination of the various departments in the School of Practical Science, and watch-