

and so to say, sensational of the whole process of gas making, is as follows: Along each side of the row or range of furnaces is a line of railway. At each end of each retort is an iron door. When, as already stated, the coal has been cooking in a red hot or incandescent state for 28 hours, more or less, according to quality, the door at the rear end of the furnace is opened; a powerful hydraulic ram moving on wheels along the rear track, just alluded to, thrusts a strong iron plate adapted to a movable axle or horizontal plunger against the rear face or end of the mass of coke to be expelled. This prism of red-hot coke, if nothing were provided at the opposite or front end to receive it, would of course fall to the ground, the front portion as pushed forward breaking off from that behind it in the same way as the protruding portion of a glacier breaks away from the parent stock and falling into the sea floats away in the shape of so many icebergs. It would then have to be removed by shovels and hand labor and thus slowly charged into the railway trucks ready to receive it. But anything like such delay would jeopardize the whole process of cheap gas production. No, there is no such slow-going process of manipulation tolerated here; everything has to be done in a minute or two, and so it is—the speeding of the coal on its way from the vessel to the works is the delay of a minute or two—the feeding of the retort is done in a minute or less, and now the emptying out of its contents has to be as speedily performed. The ram alluded to thrusts out its thirty-foot arm and pushing hand in a minute of time, or not much more, and to receive the falling mass, a railway truck, platform or box car is made to run alongside, receives the red-hot mass as it disintegrates, into an iron cradle or receptacle of the full length of the car and say some 8 feet in breadth, tilted up high on the receiving side and at such a height from the ground on the opposite side as to be able, while passing alongside an empty railway truck on a siding, to dump its contents therein by a simple and partial motion around its rotating axle, as with a dumping cart or snow van; the red-hot coal coming from the furnace having water thrown upon it as it falls into the first car, and from the one into the other, to reduce its heat and render it bearable by the manipulators who have a hot time of it during the process.

The gas holder at these works is over 198 feet in diameter; its height is 229 feet, partly above and partly below ground, as usual, working in four lifts in the way that the first eye tube of a telescope pulls out the second, and the second the third. Its capacity is five millions of cubic feet. The works are now using daily about 1,500 tons of coal, the output being some 4,000,000 feet of rich gas, 5,000,000 feet of poor gas, 1,100 tons of coke, 75 tons of tar, and 20 tons of sulphate of ammonia.

The mains are now laid, the larger or principal ones for the conveyance and subsequent distribution of the poorer gas for heating purposes, and when turned on and used for domestic cooking and heating, ashes and the ash bin will become a thing of the past, and no more space in cellars or tenements will have to be reserved for or taken up by the usual yearly requirements of from 10 to 20 tons of coal. Nothing thereafter but the essence of the coal will be used and the gas for heating will be turned on or off as for illuminating purposes. It is a foreshadowing of my conclusion of ten or twenty years ago, that it must come to this in the end.

For THE CANADIAN ENGINEER.

BROCKTON, MASSACHUSETTS, SEWAGE DISPOSAL WORKS.

BY C. H. RUST, CITY ENGINEER, TORONTO.

On Friday, February 2nd, 1909, several members of the Canadian Society of Civil Engineers, accompanied by Mr. Barnes, city engineer of Medford, went to Brockton, Mass., to visit the sewage works. We were met at the station by Mr. Felton, city engineer, who went with us to the works. Brockton has a population of about 40,000, the average quantity of sewage per day being between 600,000 and 700,000 gallons. The sewage is pumped to a height of thirty feet, the main being three miles in length. The separate system is in use. The sewage is treated by intermittent filtration, the municipality owning about thirty acres. About fifteen acres are used at present of which seven and one-half are under-drained. The filter beds are one acre each. At present they are experimenting with stale sewage, the sewage being allowed to stand in the mains for some hours, acting somewhat as a septic tank. The result appears to be very satisfactory. The effluent, which is discharged into a cranberry marsh, through which flows a small creek, had every appearance of being more pure than the water in the creek. There is a well-equipped chemical laboratory at the filter beds. Mr. Felton explained that they were now furrowing the beds as being more satisfactory.

The annual cost of labor, including the services of a chemist, will this year be about \$2,500 or \$2,600. Only two laborers are employed, who live close to the beds. At present corn is grown and last year about \$300 worth was sold. Fruit trees have also been planted and appear to be flourishing. At the time of the visit the weather had been very cold and ice had formed on the surface of the beds, but the working of the beds was not interrupted in the slightest degree. At Brockton, experience shows that the stale sewage is easier to filter than the fresh. The rakings from the sludge beds are now eagerly sought for by farmers in the vicinity.

SOUTH AFRICA, ITS PEOPLE AND TRADE.

CAUSES OF THE BOER WAR.

ARTICLE V.

(Continued from last issue).

When the question of sending a Canadian regiment to help Britain in South Africa was discussed lately, one of our politicians asked, "Why should we entangle ourselves in Great Britain's foreign wars, and why should we spend our money and blood in those far-away places?" In the first place, this is not a foreign war. From an Imperial standpoint it is very much a domestic war. It is not merely a matter of the ill-treatment of our fellow-subjects in the Transvaal, but whether we are to abandon our fellow-colonists in the Cape and Natal to a misrule comparable only to that of the Turks in Armenia—whether, in short, we are to lose or hold our Empire in South Africa. The Cape, be it remembered, is the halfway house to India, to our possessions in China, to Australasia, and to the smaller islands of the Eastern Hemisphere. If it had not been for the possession of the Cape and the ability of Great Britain to send reinforcements thence to India, during