

ever, producer gas had been piped over a wide area for several years, and the undertaking now appeared to be on sound financial ground. The suction producer working on coke or anthracite coal had a very definite position for small plants in remote districts, where it formed a cheap and reliable source of power.

Taking the question of producer gas as a whole, it looked as though it would always have a definite use, but only a limited application, more especially in a country like Great Britain, where in time it would be possible in most parts to obtain electricity cheaply in bulk, and when this was the case no other source of power need be considered.

The case of coke ovens readily fell into the same class as the retorted gas, the only difference being that to obtain coke capable of carrying the weight of the iron in the blast furnace, the temperature of carbonization must be high—1,200 deg. C., and the period long—24 to 30 hour; thus the tars were poorer from being more split up, and the cost of repairs to the ovens was considerably higher than on a gasworks retort. As hard coke must be made, the place for it was in conjunction with the ordinary plant, so that the by-products might be readily worked up.

Discussion.—Mr. W. M. Mordey said that Prof. Burstall had held out little hope that the gas turbine would be a practical tool in the near future, but there was one solution which occurred to him, viz., the adaptation of the Humphrey gas pump with a water turbine, allowing the water to drive a dynamo. The overall efficiency of the Humphrey pump in water horse-power was said to be something like 30 per cent., which was very high, and if the pump could be used in conjunction with a water turbine which had an efficiency of about 85 per cent., an overall efficiency of the combined pump and turbine of 25 per cent. would be obtained. Such a solution would very much simplify the problems now presented by the gas turbine and provide at the same time a direct means of driving a dynamo by a simple rotating motor. This method would give an efficiency as high as any large gas engine would give in continuous work in a much more simple manner.

Dr. J. S. Owens, dealing with the suggestion of the carbonization of coal at high temperature in order to get all the possible by-products, said that this produced a coke which was unsuitable for domestic use. Coke would not burn well unless there were a certain amount of volatile matter left in it, and such coke gave a very unpleasant-looking fire. With reference to the loss of nitrates from coal, recent experiments on the deposit in London had shown that the soot and dust falling on a given area measured in three or four places in the city was six times as great as in the suburbs. The total deposit was 500 tons per square mile per annum. On the general question of the utilization of oil, gas or solid fuel, we were apt to forget that very much of the prosperity of England depended upon the utilization of its coal supply, and it seemed to him that we should almost eliminate—except as an academic question—the utilization of oil other than the oil derived from our own coal, because otherwise we would be cutting our own throats.

Prof. Burstall, in winding up the discussion, said he had not said anything about the Humphrey pump, because he did not think it could be made in sufficiently large sizes to warrant any application of the sort suggested. With regard to the coke mentioned by Dr. Owens, he did not wish it to be assumed that the method he had indicated would be the same as was at present

employed in gasworks. Gasworks at present were terribly handicapped and did not do what they could if they were free from Acts of Parliament which saddled them with penalties not imposed upon any other industry. If the coal were burned in a retort at a temperature of from 800 to 1,000 deg. C. and means taken by which the gas and tar were at once removed, they got a substance which was quite unlike gas coke, because gas coke was usually quenched in water, which was quite wrong. If the coke were placed in a closed vessel and cooled by conduction alone on the Montreal system, a coke would be obtained which would burn perfectly and which gave a very bright and clear fire. The only difficulty with it was that it burned away more quickly than was desirable. It was possible to regulate the products by altering the pressure and temperature inside the retort more than the majority of people were disposed to think, and it really was a question of what happened to be the most valuable product at a particular time. The best results were 14 gallons of tar, from 2 to 2½ gallons of light spirit suitable for motor-car work, and 3 to 4 gallons of fuel oils suitable for Diesel engines, so that a very large proportion of useful substances could be obtained without sacrificing anything.

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For repair purposes a floating dock was sent out from England capable of lifting 25,000 tons and repairing a ship 700 feet in length.

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For the walls of this slip and for adjoining machine shops and factories, approximately two thousand concrete piles are being used.

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