sure on the retorts at a minimum, and also to drive the gas through the various clearing appliances and into the gas holder.

The gas, then, after it passes through the hydraulic main, flows along the "foul main" into the condenser, in both of which more tar and ammoniacal liquor are condensed. It then has to pass through washers and scrubbers where the remainder of the tar and ammonia are extracted, as well as some of the impurities, such as carbon dioxide and hydrogen sulphide.

The next step is to purify the gas, and this is done by means of lime or oxide where the remainder of the carbon dioxide and sulphuretted hydrogen are removed.

The gas, after passing through the various processes of purification, is stored in a gas holder and delivered to the cities as it is required.

There is another process by which gas can be manufractured, and that is by means of coke ovens where a large quantity of coal is distilled at one time.

The gas obtained from lignite by any of these methods will be equal to about two-thirds of the heat value of first-class coal gas, but much less so far as illuminating power is concerned. But in these days gas is not consumed in old-fashioned flat flame burners. It is burned in mantles which are heated to incandescence, thus causing the rare-earths to give off the brilliant light which we all know. Lignite gas used in this manner will yield a fair amount of light, and if desired, can be so enriched as to give any candle-power. The principal aim of gas engineer is to supply good and cheap heating gas. In many places in Europe coal-gas is now supplied of practically the same heating value as that to be obtained from lignite, because it is cheaper to make.

In the United States two-thirds of the gas supplied is made by another process, namely, the carburetted water gas. The plant for making this gas consists of generators which are similar in many respects to producers. Regenerators, which are chambers filled with checker or baffle brickwork, are in duplicate. The generators are heated to incandescence by means of air blast; the gas passes up out the regenerators, where they are burned, and the brickwork raised to a very high temperature. Steam is then admitted into the generator and in passing through the hot fire in the producer and then through the regenerators, it is converted into its component parts, namely, hydrogen and oxygen. The latter combine with the carbon to form carbon monoxide and the hydrogen is made free. Thus two gases are obtained, hydrogen and monoxide, which have higher values than producer gas, but not much lower than lignite gas. With gas producers, however, the process is continuous, whilst with water gas plant, owing to the fire being cooled by the injection of steam, it is intermittent.

The water gas burns with a blue flame and will yield no light, but oil is carburetted by volatilizing and fixing it and this raises its lighting power to that of the best coal gas.

Although examples of the production of water gas by consuming lignite is not yet to hand, there does not appear to be any reason why it should not be as feasible as when using coal. Until further information is collected, it will not be wise to dogmatize on this subject.

Reference might here be made to Bonecourt surface combustion. Gas is made to pass through a porous plate of, say, fire-clay, and is ignite on the outer side. The flame is of the ordinary white kind you see when burning coal gas. Then air is admitted with the gas and the flame alters in appearance and finally disappears, but gas continues to be consumed, maintaining the surface white-hot, whilst the inner surface remains cool. This form of heating can be applied to grilling, evaporating, etc.; the latest domestic application is to toast a few million pieces of bread per day in large cafés. This system can be applied for industrial purposes, for instance, it can be used to welt lead, to heat crucibles, muffled furnaces. The heat obtainable can be made so intense that it is difficult to find a material that will withstand it.

Steam boilers can be heated by this method, and when gas is made available it may be used to heat hot air, steam or hot water boilers for house warming.

What appears to be a simple adaptation of surface combustion is an arrangement for fitting ordinary drawing-room or other fireplace with a gas fire. The gas in this case passes through a bed of loose sand or granulated substance and the gas burns on the surface as already described.

This method of consuming gas results in high efficiency and economy.

Much is heard to-day of cooking by electricity and, as an incidental feature of this paper, it may be interesting to make a simple comparison.

Electricity sold at, say, 3 cents per kilowatt, having a heat value of 3,400 B.t.u., which equals 113,300 units for each dollar, and allowing an efficiency of 75 per cent., then the available heat is about 850.00. Coal at $7 per ton, having a heat value of, say, 10,000 B.t.u. per pound, will give 2,860,000 heat units for one dollar, but as the efficiency in this case is as low as two per cent., then the available heat is 57,200 per dollar.

Artificial lignite gas, sold at, say, $1 per 1,000 cubic feet, having a calorific value of 450 B.t.u. per cubic foot, will theoretically yield 450,000 heat units per dollar. The efficiency in this case is about 25 per cent., so, only 110,000 units are obtained per dollar. If Bonecourts system is applied, then the efficiency will be, say 50 per cent., in which case the heat value available will be 220,000.

The comparison will consequently be:—

Electricity at 3 cts. per kw.....	85,000	heat units per dollar
Coal at $7 per ton.....	57,200	,, ,, ,,
Lignite gas at $1 per 1,000 cubic feet	110,000	,, ,, ,,

The water, which is condensed from gas and the additional quantity used for washing gas, contains ammonia This ammoniacal liquor is distilled and the ammonia drawn off and passed over acid.

The product, sulphate of ammonia, is an excellent fertilizer, and can also be used for rendering wood less inflammable. Ammonia is also used in connection with refrigerating plant, and by another process is used for the manufacture of explosives.

Having disposed of the question of developing power by steam producer-gas, lignite-gas and water-gas, we may now turn our attention to briquetting of lignite.

This is not so easy of solution. In raw lignite, one-third of its weight consists of water, and when it is air-dried, about one-half of the water is evaporated, but the lignite breaks up or crumbles and in that condition it is not so easily handled. Stokers object to it because it means more labor in firing and needs more careful watching. This can be obviated by using mechanical arrangements. Steam users object because at present full steaming capacity of the boilers are not secured, and there is more loss due to the small particles falling between the fire bars. This may be improved upon by installing lignite consuming furnaces. Householders object because it is too flashy when burned, and requires more attention, and this can be improved by using briquettes.

In this province we have no available asphalt supply; there are no gas works to provide coal-tar-pitch; but it is quite possible to utilize local material which will answer as agglomerations or binders for making briquettes.

If a lignite gas works is installed, some distillates from the tar, such as pitch, paraffin, wax, etc., may be useful.