Cost of wood distilled (2,000 lbs.)	$4.00
Cost of coal burnt $\frac{867 \times 4.50}{2,240}$	1.74
Or, for 22,220 cu. ft.	$5.74

From this gas we get the following returns, on the basis of prices which existed in Three Rivers:—

22,220 ft. of gas at $1.00 per M.	$22.22
Charcoal $\frac{90 \times 14.00 \times 390}{100 \times 2,000}$ or	2.46
Charcoal $\frac{10 \times 8.00 \times 390}{100 \times 2,000}$ or	.17
	$24.85

Deducting from which the cost of the gas for fuel, we have a net profit from the gas made from a ton of wood, $19.11.

A comparison of the heat efficiency of both processes will reveal the fact that it is much greater in the case of the coal than in that of the wood. This is due to the fact that in the Riché wood process, a large amount of steam and hydro-carbons present in the wood absorb a large amount of the available heat for their transformation into fixed gases.

The fact remains, nevertheless, that the ton of wood yields 7,110,000 British thermal units available in the gas, whereas the ton of coal only produces 6,000,000.

Without going too deeply into minor details, it may be added that in Three Rivers, where conditions, though favorable in some cases, were otherwise costly enough to overcome in other respects the general expenses attaching to the manufacture and distribution of the gas were approximately as follows:—

	Cost per M. (Cents.)
Fuel for a make of 40,000 ft.	12.77
Labor for a make of 40,000 ft.	11.11
Maintenance retorts (labor and material)	10.92
Maintenance mains, etc.	6.85
Interest on capital invested	25.65
Sinking fund of 1 per cent.	5.13
Salaries, rents, etc., etc.	22.50
Cost of gas delivered to consumers	94.93

This price being established for gas made from wood, a comparison of the composition of lignites, peats and woods will bring out the striking similarity in the chemical composition of all three products, and make it easy for the lay mind to realize that the gas obtained from one of the products is the same as that obtained from the others, when treated by the same process.

The following table gives the average products obtained from each one of them by distillation, after they have been dessicated at a temperature of 200° C.:—

	Lignites.	Peats.	Woods.
Fixed carbon	39 %	30 %	22.3%
Gases by distillation	30	36	33.4
Tars	5	7.5	8
Acid liquids	15	14.5	33.6
Ash and sundries	11	10.5	2.7
Nitrogen	..	1.5	..
	100.0%	100.0%	100.0%

Now, taking the gaseous contents alone, shown in the above component parts, we get further evidence of the great similarity of the three products from the point of view of their gas-producing capacity. The following table, giving the per cent. composition of these gases by volume, makes this plain:—

Comparison by Volume of Gaseous Products of Distillation

	Lignites.	Peats.	Woods.
C_2H_4	4 %	2.5%	......
CH_4	19 %	7.0%	13.102%
HC vapors	1 %	1.5%	1.572%
H	31 %	40.0%	32.599%
CO	26 %	30.0%	23.794%
CO_2	15 %	14.0%	26.939%
Nit.-O, etc.	4 %	5.0%	1.994%
	100.0%	100.0%	100.000%

Now, taking as a sample, some Cardiff colliery lignite, for instance, carrying 20% humidity and 40% fixed carbon, in addition to its gaseous content, this sample will give exactly the same gas as product of its distillation by the reinverted process as wood does.

Approximately, also, the same quantity of lignite as of wood, will suffice to yield the 1,000 cu. ft. of gas, being in this instance about 150 lbs. instead of the 39 lbs. coal and 90 lbs. wood previously used.

This will give us $\frac{150 \times 1.50}{2,000}$ or 11.25 cents per M. as the cost price of the gas, where this lignite is worth $1.50 per ton of 2,000 lbs.

The value of the coke obtained will vary, of course, with the nature of the lignites used, but its value in any event will always be that of a good carbon fuel, which, figured on the basis of a price proportionate to that of the lignite for its own calorific value, will give us in this case $\frac{1.50 \times 15,000}{8,767}$ or $2.65 per ton of 2,000 lbs., if we allow 8,767 British thermal units as the heating value of the lignite and 15,000 as that of the coke made.

When distilling peats, it will not be possible to apply the reinverted distillation process in a single closed retort; it will become necessary to distil the material in one retort and send the products of distillation over red-hot carbon of some kind, which will have to be provided in a separate retort. This is due to the fact that the product of the carbonization of peat is simply a powder which will neither stand up sufficiently well in the retort nor allow the gases coming from the distillation to pass through it.

It is sincerely to be hoped that such a simple, cheap and convenient industrial application of three fuels so abundant in our country, will not be entirely overlooked, especially after recent developments in the coal business have revealed in such a striking manner how utterly dependent we are on our neighbor's good-will for our supplies of coal.

In a lecture entitled "The Economics of Bridge Design," Dr. J. A. L. Waddell, at the School of Engineering, Kansas University, said the question of what is the economic limit of length of simple-truss spans as compared with cantilevers is still a moot one. Professors Merriman and Jacoby place it in the neighborhood of 600 feet, but the speaker had occasion to compare simple-truss spans of 700 feet and 800 feet with the corresponding cantilever structures, and had found the former more economic. The continuity of cantilever spans in resisting wind loads lowers the requirements for minimum width from one-twentieth to about one-twenty-fifth of the greatest span length, and hence, because of substructure considerations, gives an advantage to the cantilever type that in certain extreme cases more than offsets its disadvantages of greater weight of truss metal.