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SCIENTIFIC AMERICAN SUPPLEMENT

No. 548.

For the Week Ending July 3, 1886.

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THE ILLUMINATING GAS INDUSTRY.

To one who has been familiar with the gas industry of this country for the last twelve years, the changes which have taken place in it are very remarkable. They have affected not only the manufacturing processes, but the business standing. While the technical part has advanced, the business has changed from one of the most conservative industries to one of competition. Twelve years ago, almost all the gas used in the world was made from bituminous coal. From 9,300 to 9,600 cubic feet per ton of 2,240 pounds was considered good practice. From retorts about twenty inches in width, a daily yield varying from 5,500 to 6,000 feet was looked for. At about that period, naphtha gas began to occupy some attention, and a series of many experiments was inaugurated, and even to-day that series continues. Every few months the subject would come up, and the proposal to put in naphtha works would be received by the companies. As a rule, gas engineers were violently opposed to any departure from the old process with which they had so long a familiarity, and any attempts to introduce naphtha gas were resisted by them most strongly.

In New York city a break was made by the Municiple Gas Co. Under Tessie du Motay's process they began making water gas carbureted with naphtha. After many and very expensive experiments, processes, and failures, they began to supply a large number of consumers, and naphtha gas in New York was a fixed fact. The Mutual and Metropolitan companies also began to use the same substance, and naphtha was consumed in enormous quantities. The old New York Gas Light Co. adopted the Tessie du Motay process, and while allowing their coal gas furnaces to stand, abandoned their use. This company was always considered one of the most conservative, and their adoption of the new process told much in its favor.

Two things have made water gas a success in this country. One is the cheapness of naphtha. Owing to the immense development of the petroleum industry, naphtha was becoming a drug on the market, and the oil companies are glad to dispose of it at a nominal price. The other factor is anthracite coal. This fuel is peculiarly suited for the water gas process. Other coals can be used, but cheap naphtha is almost a *sine qua non*. Everything depends on a supply at low prices. A rise of three or four cents per gallon would be a very serious matter. But for the present, naphtha, it may be assumed, is not about to double in price.

Coal gas engineers were stirred up by this rivalry, and tried to improve their process. Retorts of larger size were used, sometimes as much as 36 inches wide. For many years the idea had prevailed that coal should be distilled at a low red heat. This theory was abandoned, and every effort was made to get as high a heat as possible consistent with the preservation of the retorts. New furnaces were invented, of the regenerative or gas burning type. Siemens' furnace was used extensively on the continent of Europe, but in this country simpler modifications of it were more popular. By these means the yield of gas per ton of coal was brought up to 12,000 cubic feet, and the yield per retort was doubled. This indicates a remarkable revolution, due to the inventors' work of the past fifteen years. To realize what the work has been, the *Patent Office Gazette* should be consulted, and the number of patents in gas should be noted. The number is very great, the class is one of the most important and largest, and the work is still in progress. The lesson incidentally disclosed is of practical interest. By the labor of patentees, the production of gas at a low price has been made possible, and the consumers of New York alone are saved five millions of dollars per annum. It is a good illustration of the policy of protecting inventors.

This competition with water gas has permanently cheapened coal gas, and the reduction in cost has been favored by the low price of coal. Naphtha is still supplied in limitless quantities, while natural gas has usurped the field throughout the oil regions. How long the petroleum gas industries will last is uncertain. Professor Leslie has announced his belief that sooner or later the decline will come. It is hard to believe that gas can continue to pour out of the earth at many atmospheres of pressure for all time. But the work has been done, gas has been cheapened, and will never again cost as much to make as it has in the past. Even if petroleum should become scarce, the coal gas works are in better condition than ever, owing to the stimulus of competition and invention.

In this city, after a fierce struggle for supremacy, the principal companies formed a pool, and so raised the price of gas. The next move was a permanent consolidation, which brought together five of the old competitors. But as opposition still existed, the price was kept reasonably low. Within a few weeks, the legislature reduced the price still lower. A few days ago a new company applied for a charter, with a still lower limit of price. On the 22d of the present month, the Attorney-General is to consider the propriety of instituting proceedings for the annulment of the consolidation. The legislative lowering of price means a reduction in receipts for this city of nearly three millions of dollars per annum.

The contrast between the present time and a period ten or twelve years back is very great. Then, each company in New York had its own district, with only one general competitor. All through the country each company possessed a substantial monopoly. Now, the struggle so familiar here extends everywhere. The smaller cities have opposition companies, and both coal gas and water gas are made in many of them.

It seems at present as if enough had been done by the legislature. It has forced gas down to a barely remunerative price. It is now sold at a rate at which none can complain. If the breaking up of the consolidated company is executed, it is doubtful if any change in price will be brought about. The experience of pooling that extended over several years showed the efficacy of such a method of dealing with the subject, and, in the event of the disbanding of the consolidated gas company, would probably be again resorted to.

PHOTOGRAPHIC NOTES.

Potash and Soda Developers.—Before the Society of Amateur Photographers in this city, Mr. H. J. Newton stated that the following formula had yielded him excellent negatives. Each solid ounce contains 480 grains:

No. 1.

Water	32 ozs.
Carbonate of soda (crystals)	3 "
Carbonate of potash	3 "

No. 2.

Water	32 ozs.
Sulphite of soda (crystals)	3 "

One ounce of developer is prepared as follows:

No. 1	1 drachm.
No. 2	7 drachms.
Dry pyrogallic acid	2½ grains.

In case a dozen 6½×8½ plates are to be developed, 10 ounces of the developer can be mixed at a time, which will keep good for a day or two. One plate after the other can then be developed with great uniformity in the same solution. If a plate is underexposed, from 3 to 6 drachms of No. 1 should be added. More intensity is gained by the addition of pyro. Overexposure is remedied by the use of a very small quantity of No. 1.

Ripley's Soda Developer.—A formula which produces clear, brilliant negatives has recently been devised by Mr. Geo. H. Ripley, of Brooklyn, N. Y., also a member of the N. Y. Amateur Photographer's Society, and is prepared as follows:

No. 1.

Water (distilled)	20 fl. ozs.
Sulphite of soda (crystals)	5 ozs.

Dissolve, filter, and add slowly enough sulphuric or nitric acid to make solution slightly acid. Test with blue litmus paper.

Pyrogallic acid	1 oz.
Distilled water, to make the whole measure	30 fl. ozs.

No. 2.

Water	20 fl. ozs.
Carbonate of soda (crystals)	2 ozs.
Water, to make the whole measure	30 fl. ozs.

Weights given are based upon 480 grains to the ounce.

To develop a normally exposed 5×8 plate, take 1 oz. each of No. 1 and No. 2. The developer has the property of remaining remarkably clear, and may be used repeatedly, if properly stored in a stoppered bottle. The directions concerning the manipulation of the developer for obtaining different effects and counterbalancing errors in exposure are as follows:

If the plate is *underexposed*, or should show too great contrasts, transfer, *without washing*, to another tray containing solution No. 2. When the detail is well started, return the plate to and finish in the mixed developer.

If the plate is found to be overexposed, add to the mixed developer a few drops of the following solution:

Water	1 oz.
Bromide of ammonium	50 grs.

To obtain soft effects, the quantity of No. 1 should be reduced. For use upon slower plates, such as are employed in the making of transparencies, a special solution is prepared as follows:

Sulphite of soda (crystals)	3 ozs.
Citric acid	60 grs.
Bromide of ammonium	30 grs.
Water	28½ ozs.

The developer is formed as follows:

No. 1	½ oz.
No. 2	½ oz.
Sulphite and citric acid solution	½ oz.

The Cause of Pneumonia.

Referring to our recent editorial on ozone and pneumonia, a subscriber suggests that one cause of the prevalence of the disease is to be found in the almost universal custom of keeping houses, stores, and factories at such a high temperature that the change experienced on passing to the cold atmosphere out doors is more severe than delicate persons can subject themselves to without danger. Overheating and the want of sufficient ventilation are undoubtedly responsible for much sickness.