

CRUTCHETT (Jas.) Woodward  
No. 3

UNIVERSAL REFORM IN GAS BILLS.

ATOMIC  
STEAM COAL GAS,

AT FROM

5 cents to 15 cents per 1,000 Feet,

FOR LIGHT AND HEAT,

Manufactured From

Refuse Coal Dust and Steam.

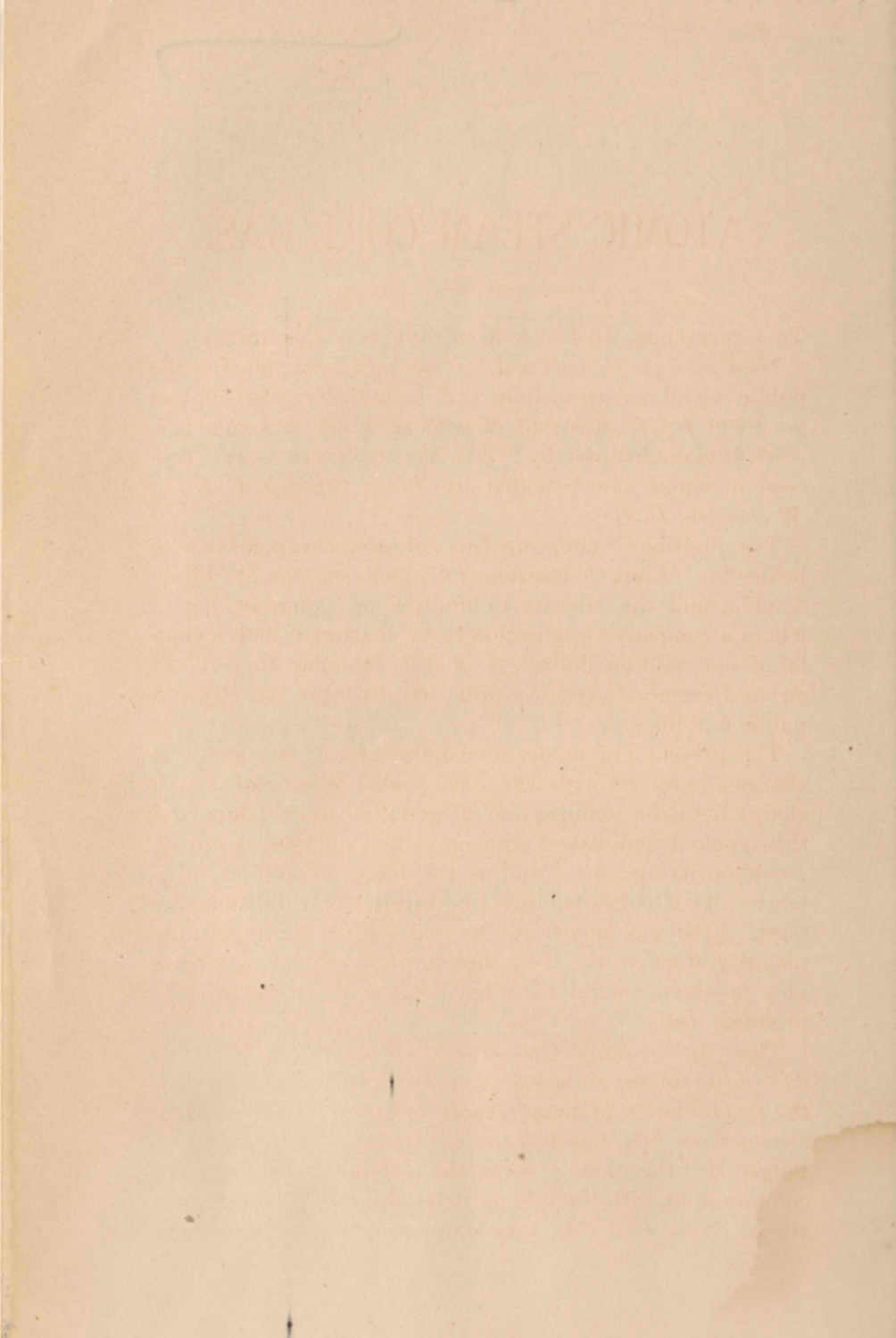


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Crutchett (James)

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# ATOMIC STEAM COAL GAS.

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TO CAPITALISTS, BUSINESS MEN, AND GAS CONSUMERS:

*Good pure gas for light and heat can now be supplied to the public by all gas companies and manufactories at 50 cents per 1,000 feet for light and 30 cents per 1,000 for heating purposes, if manufactured by "THE ATOMIC STEAM COAL" process, invented and patented by James Crutchett, C. E., of Washington, D. C.*

The question of adopting this new and cheap gas is now before the "Joint Committee of Councils on Gas," of Philadelphia, and the District Committee of Congress, before whom a company's application to be chartered, with a capital of one million dollars, is on the calendar to be acted on in December early, as promised, to light the city and public buildings, &c.

The present old mode of manufacture of coal gas is to charge the retorts with 200 to 300 pounds of best coal at each charge, let it be confined and heated four to six hours, and thus cooked and baked into coke, tar, and gas, requiring much purifying; the result is the large amount of nine-tenths ( $\frac{9}{10}$ ) of coke, tar and impurities are made and one-tenth ( $\frac{1}{10}$ ) of gas only from the coal put in the retorts, the majority of gas-works less; therefore the coal-gas works, as now operated, should be called coke and tar works as to products made.

The "*Atomic Steam Coal Gas*" is made from *refuse coal dust* of the mines, a nuisance, for which there is no market, the accumulation of many years; reduced to smaller particles, and as dust, injected into a furnace, with steam so arranged that the steam absorbs the carbon (of the coal dust) commingling with the fine particles and thus produces good *Atomic Steam Coal Gas*, very simple, rapid and permanent.



The more dust, oil, saw-dust, or other cheap carbonaceous material combined with steam makes it of greater illuminating power than necessary for heating purposes, but suitable for uses of *light, heat, power* and other purposes, and thus takes the place of coal, wood, or steam, at *half or one-fourth the cost* of other fuel, thus avoiding the handling of coal, wood, ashes, dust, and smoke: *being clean, safe, rapid for use* or disuse, *saving time, labor, risk*, and many inconveniences where heat, cooking, &c., are needed.

The modern analytical chemist and scientist are pleased to find happy solutions of perplexing problems, which have existed in chemistry and compounds, until quite recently unexplained in chemical works, and these of the highest importance in respect to *heat, light, color, power, destructiveness*, &c. These difficulties have arisen from not knowing that qualities and properties of all things of a compound are varied by the *forms and structure* of the elements composing such compounds; as also by the *grouping of the parts* together, making *other resulting compounds* or body, which is found to be the law of permutation, and, most important, are the qualities varied by being grouped and mixed together under much higher temperatures than heretofore known in practical manufacture and composition.

Allow me here to give some explanations of the workings by which the reader and scientist may be led to understand more of the proximate cause and relations by which the *atomic process* with steam is brought to generate and be compounded as a pure, permanent gas, at such an astonishingly low price and adapted to so many uses.

It is questionable if any regularly employed gas inspector in the United States knows these truths, theoretically or practically; hence their ignorance of the qualities of the compounds of carbonic oxide as developed by coal and wood combustion in the well known open and healthy fire places in a room as well as the combustion of gases containing them as made by the *Atomic Steam Coal process*.

In *Cooke's New Chemistry*, page 220, he says "*Every mole-*

*cule* has a definite structure. It not only consists of a definite kind and a definite number of atoms, but these atoms are arranged or grouped together in a definite order, and almost all the great chemists of the world are at this moment engaged in *investigating this very problem.*" Also at p. 244, "It appears that the qualities and chemical relations of a compound are determined *fully as much by the structure* of its molecules as by the nature of the *atoms* of which the molecules consist." Again, p. 290, "These facts are the *first glimpses of some great general truth.*" An element exists among compounds in *allotropic* states, when under different circumstances they assume different states and become possessed of *different properties*; such are carbon in its three states, coal, charcoal, and diamond, &c. Modern science boldly declares that differences in *qualities* are due to a change in the *molecular arrangement of the atoms*, or, as may be said, to a change of form.

Miller, a recent writer on the subject, says, page 119: "Whatever may be the causes which thus influence molecular arrangement, the particular arrangement has a *very material influence* in modifying the *physical properties of the body.*"

Liebig says, in reference to the same class of facts that, "in chemical combination, the ultimate atoms of bodies are arranged side by side in a certain order, and the properties of the compound *depend entirely upon the order.* If they are made to change the place—their mode of arrangement—they combine again in a *different manner*, and another compound is formed *with totally different properties.*" To the same great chemist is awarded the honor of being the first who recognized the truth that the distinctive character of a compound might be effected by the *grouping* (arrangement or mixture) of its atoms. Notwithstanding it is but recently that chemists and scientists have been able to see these facts in a practical way, the great Swedenborg, in his works on chemistry, anatomy, and mineralogy, and the greater works of Arcana Cœlestia and others, gave the *first* and fine illustration of the



science and arrangement of atoms and their combinations, spiritually as to man in the higher and primary degree, and as derived therefrom by the Divine science of correspondences to things natural and material; therefore *he was a century ahead of modern science* in his careful and specific explanation of this important subject. (See his Explanations, A. C., 7236, 6690, 7236, 9079, 1055, 5530, and T. C. R., 37, and many others.)

The above references are simply made to show that the *principles of size, form, and combinations of atoms* producing various and different compounds from primitive elements composing them, and different results obtained thereby than heretofore known, the same being further effective and made more available and perfect by the use of the *highest heat* of the furnace, [which melts all metals.] To be brief, in this circular, all the primary elements needed to produce a *gas for light, heat, and power* are CARBON, HYDROGEN, and OXYGEN. The carbon forms coal, the refuse dust is the cheapest carbon known. Oxygen and hydrogen form *pure water*, is cheap and abundant also. These are combined together in the furnace in the manner described by the Atomic Steam Coal process, and manufacture the pure gas at the low prices mentioned.

It is for the gas consumers and the public to act in the matter if they want gas for light, heat, and power at *fifty cents to one dollar* per 1,000 feet, or generate it themselves at the *still lower prices* of cost. The gas companies will charge their present high prices until *compelled* to sell at less, they have not *mind clear enough* to examine into the true principles and cheap results, even to themselves, much less to the public. But few gas engineers know anything of chemistry as scientists, &c., and are loth to be disturbed in the manufacture of coal gas, coke, tar, &c., as fifty years old. They do not understand that good illuminating gas can be made out of *water and coal dust*, and so pure; and as water is pure hydrogen and oxygen, contains no sulphur, ammonia, or other poisonous gases requiring lime purification, &c. By

the old process gas engineers think it well if they get ten thousand feet of gas from a ton of coal, but by the *atomic process* there is carbon enough in one ton of coal, properly mixed with steam, to form and carburet from fifty thousand to over two hundred thousand feet of gas for light or heat, *but no coke, tar, &c.*

For a long time I have offered the use of the Atomic Steam Coal manufacture to the Corporation of Philadelphia and the Washington Gas Company, *free of royalty* to myself, on condition that they manufacture it and supply the public at 50 cents per thousand feet for light and 30 cents per thousand feet for heating and other purposes, and appropriate one-tenth of the profits to support a new charitable need in the cities for the *free use of the public*. The Washington Gas Company declined, wishing to keep their prices up, their shares of stock of \$20 par value has been advertized in the American Gas Journal as being worth \$240 per share, \$230 offered, and so for a long time. Congress has taken the matter up, a new company formed of one million capital to introduce the Atomic Steam Coal Gas, and is on file with the District Committee, the Gas Company doing all they can to oppose it and thus keep up the *necessaries of life* of heat and light at 4 to 8 times higher than it should be supplied at.

The Corporation of Philadelphia referred the offer to the "Joint Committee of Councils on Gas," where it has lain several months, the Gas Trustees desiring not to be disturbed with the old process of making coal gas, as the present price of over two dollars per thousand enables them to manipulate, with the employment of about two thousand persons, and the three to four million dollars per annum *paid them by gas consumers*, gives them means of *operating for persons they think best, to their interest*, to fill all members of the the corporation and city officials, &c.

I have been advised therefore, under these circumstances, which prevail similarly in other cities, to let the *men of reform* and those wishing to invest capital in the cheap "*Atomic*



*Steam Coal Gas*" manufacture for their own and the public benefit of this now important necessity to do so.

As hydrogen is the *great volume or bulk of water* and of the lightest gravity known, it requires nearly  $2\frac{1}{2}$  *cubic feet to weigh one ounce*—by comparing the amount of carbon with hydrogen to make illuminating gas equal to illuminating power of 15 candles, we may see how much gas can be carburetted by one ton of coal dust. As bituminous coal generally used is composed of 75 to 80 per cent. of pure carbon the balance is of hydrogen and other gas, residuums of earth, &c.

The coal gas of Philadelphia and many other places is composed of one of carbon and four of hydrogen, by weight, chemically expressed  $C_1 H_4$ , making thus five portions, of a gravity of .413 in proportion to air 1000, requiring near  $2\frac{1}{2}$  *cubic feet to weigh one ounce*, av.: therefore as it requires one ounce of carbon to four ounces of hydrogen, &c., in weight; as 4 ounces of hydrogen forms 10 feet of gas ( $2\frac{1}{2} \times 4$ ) which require one ounce of carbon to give the illuminating power,  $C_1 H_4 = 10$  feet in volume, [these proportions are strictly correct,] as 16 ounces make one pound 12 ounces thereof equal to 75 per cent. of carbon; therefore 12 *ounces of carbon* will carbonize 120 FEET OF HYDROGEN GAS; then 2240 lbs., [one ton,] will carbonize 268,800 CUBIC FEET OF GOOD ILLUMINATING GAS from the hydrogen of steam as manufactured by the "*Atomic Steam Process*, taking up all the carbon, making *no coke, tar, &c.!!!*

It is well known the uses of steam for heating houses, &c., but if extended from house to house the steam condenses considerably, as well as wastes from leakage and pressure, beside rendering wood-work inflammable, in time, if too near. Cheap gas suitable for towns or large establishments avoids condensing in pipes, being of little pressure, less escape, no danger from nearness to woodwork, gives heat only at the places wanted, with *cheap heating apparatus*, whether for heating or cooking, also so much cheaper than all other gases, steam, coal or wood. It is light and fuel from water and refuse coal dust, &c.



The public and gas consumers should not any longer be charged *two to four times as much* for gas as can be supplied, and yield a profit of from 10 to 20 per cent. above the cost of gas, beside keeping a proper plant in good condition. Another equally important consideration is the fact that if gas is used as fuel at the low rates stated, *about ten times as much* gas would be used for heat as now used for light, and gas lights used *more freely also*.

Among the fourteen gas works in operation in the United States using portions of the new process of steam and carbon, as patented by me, are the Municipal Gas Light Company, of New York, manufacturing about 500,000 feet per day, lighting up the Standard, Fifth Avenue, Buckingham, Union Square and Park Theatres, and Delmonico's, Windsor, St. James, Fifth Avenue, Buckingham, Metropolitan, St. Nicholas, Parker and Prescott Hotels, and numerous other prominent establishments. For description of which see the *New York Sun*, of April 1st. New works in Baltimore, Indianapolis, &c.

The same is used in the State Hospital, on the Hudson River, N. Y.

*The Cost of Gasses for Material, Labor, &c., in the United States, are as follows :*

Coal Gas, \$1.00 to \$1.50 per thousand feet.

Coal Oil and Water Gas, 50 cts. to 70 cts. per thousand.

*Atomic Steam Coal Gas*, 5 cts. to 15 cts. per thousand.

The electric lights are not adapted to small lights. The smallest being equal to about 20 gas burners, require attention constantly to replace the consuming points, each burner being an apparatus. The cost is about the same as coal gas for equal light, very liable to extinguish and injurious to sight.

Therefore those of capital and the public are invited to organize at Boston, New York, Philadelphia, Baltimore, Cincinnati, St. Louis, San Francisco, and other places, as

CENTRES; organize and *manage among themselves* to introduce the *Atomic Steam Coal Gas* everywhere, where possible, for the benefit of the public at the prices named, the charity to be also managed by committees in their cities for general benefit, and a limited dividend of about 10 to 20 *per cent.* for *their investment*. If the gas is sold at 50 cents per thousand and less, similar to my offer to the corporation now being considered, *I charge no royalty*; if charged from 50 cents upward to one dollar per thousand, I take a small royalty or per centage, and devote it to the support of the charity, and a portion for my own uses for further improvements, if Providence sees fit, for He alone is the source and cause of all improvements, as mankind are adapted to receive it.

The want of light and heat in cities, towns, manufactories, &c., has become a *necessary, next to food and raiment*, and the supplying thereof to the public at as *cheap a rate as possible, similar to necessary food*, becomes a primary and moral duty to be performed by capitalists and corporations for the benefit of mankind, as well as assisting in the manufacture and industries of the community and country. The investments should be managed by themselves with these considerations. Speculators for office and gain without labor and use should be discouraged in the management of such central organization or separate works.

By limiting the dividends on capital of such works, to say 10 to 12 *per cent. per annum*, &c., the large surplus should be applied to reduce the principal invested until the prices of gas be gradually reduced to near *the cost price of the manufacture* before mentioned.

Works which actually cost say \$100,000 should not be *watered* to represent two or three hundred thousand dollars, *which is now done*, and then even sold at from *one hundred per cent. to over one thousand per cent. above the par value*. (See the American Gas Light Journal quotations several months past.)

There are about *five hundred million dollars* invested in gas works in the United States: the real value of the works, in



many instances, are not one-fourth of their nominal value, yet on which such, *large dividends are paid*, almost universally.

Incorporated companies to manufacture and supply gas in cities, towns, &c., *have not paid any bonus* or sums of money to aid the places where works are established; therefore they have *no claim* on the places and public by which they can keep up *exorbitant prices for gas*, and prevent another party from supplying such places at from *half to one-fourth*, or much less prices. Contracts made years in advance to sell gas at much more than it can be made and supplied at *is illegal as well as unjust*. Light and heat is a *public want and necessity*, law and equity will aid in procuring it at the lowest rates when wanted.

Companies charging extortionate rates *can be condemned as nuisances* to be removed, or if the public need the gas works, *can be acquired* as needs, to be paid for at its *assessed value*, as materials, &c., and thus *converted to public uses*, like real estate for public roads, &c., or for the public better use, for cheaper and better gas, for light, heat, &c.

The "Atomic Steam Coal Gas" is generated and manufactured with *more rapidity* than the old modes, the mass of coal not being confined four to six hours in retorts to make coke and tar. The Atomic Steam Gas is made as fast as steam, therefore does not require so large gas-holders, tanks, purifiers, &c., to store up, as retort modes, making slowly; &c., the same applies to the purifiers. Gas from water, steam being pure, requires only the proportion of purifying as to the amount of coal used, so also the less cost of works, space, &c., are needed by the new mode.

Another desirable consideration is the labor to manufacture *Atomic Steam Coal Gas* is much less, as shown by the Engineering and Mining Journal and others referred to in accompanying circulars, thus avoiding the *cruel labor* of withdrawing the charges of *red hot coke from retorts*, handling and removal of the same—tar, ammonia, &c. The generating apparatus for atomic mode can be erected in place of the retorts of the old mode, taking less room, without dis-

turbing anything from the hydraulic main, the same pipes, gas-holders, tanks, meters, &c., sufficing.

An important consideration, also, all gas plant of metal, pipes, &c., required, are about *one-third less cost now than ever*, thus being favorable to erect new works or estimate the value of works now erected.

I have been engaged in the manufacture and study of gas for more than forty years; was early instructed by *Professors Brand and Faraday* at the Royal Institution in London, the same being kindly offered for my use in the business and accepted. Over thirty years since I lighted the *United States Capitol and the City*, other cities and places before and after this period, have the testimonials and certificates thereof in writing and the journals of the period; studied, operated, and spent largely in trying to effect the results long wished for by the highest chemists and experts, of *converting water* (steam) into their *original elements of hydrogen and oxygen*, and their *combination with carbon* in the best manner for illuminating and heating gas;—Providence has enabled me to find it by adopting carbon in the minutest form, size, and variety, as explained and patented, by which means the finely divided particles of carbon are still further subdivided and shaped by most intense heat, steam, also, in this condition has the *strongest, intense avidity for absorbing carbon*, and thus is combined the three original elements of *hydrogen, oxygen and carbon*, and the gases become thoroughly carbonized and fixed for the uses of light, heat, power, &c., for the services needed:—and happy may the person be who may be able to procure these great uses from any cheaper source and more convenient material than REFUSE COAL DUST AND WATER! To all fond of progress and its uses I would say, cheer up and apply these blessings of providence to public use without delay and not longer be held in bonds by greedy and ignorant corporations, too deaf to hear truth and too blind to see good things offered them, but to gratify themselves they attempt to withhold the benefits from the people.

The gas consumers of Philadelphia are now paying *from six to ten thousand dollars per day* more for gas than they



should, (depending on the length of days,) *New York also about double that amount*, and other places in proportion. Still another important consideration of the future is, as gas is made and sold cheaper, the quantity used for fuel, power, &c., will probably be *ten times as much as for light*. Other industries will be started and benefited, bringing into use new manufactures, business, and comforts. Let us look ahead, do right, and persevere in reform improvements.

Now, gentlemen of business, capital, merchants, engineers, trustees, and all interested in this great reform, meet and consult together. You know that the steamship, locomotive, or telegraph would not put *themselves* together for man's use. Men have to organize and co-operate to do these things. I have offered the use of the *Atomic Steam Coal Gas* manufacture to gas companies and for the public benefit. As shown, they do not want to change the old process or prices. *It shows their status* in all respects. The public must now organize. Those who first do so will realize the first returns freely in bonuses and dividends; then the public will receive the great benefits thereof also.

Reference is respectfully made to the accompanying circulars and pamphlet on the subject by which you will appreciate this immense improvement awaiting the public benefit. For the great reform please suspend this circular in this business office, or let it lie on the public table for the information of the public. Being of much interest to all, like good books and truths, circulate them.

To aid gas reform for heat and light, by invitation I will visit any corporation, company, or public meeting to explain the new mode of gas manufacture and gas generally, the expenses merely being paid.

Editors and the press generally, who really wish this reform as well as themselves, will publish this; good politicians will make it a substantial plank, for light and heat should be of the best and cheapest kind, next equal to food.

Your obedient servant,

JAMES CRUTCHETT, C. E.

WASHINGTON, D. C., August, 1878.

