REPORT ON THE WATER GAS.

[Prepared expressly for the Scientific American.]

MESSRS. MUNN & Co.—In accordance with your instructions to make a careful and impartial inquiry into the merits of Sanders' water gas, which was reported to be in successful operation at the Girard House, in Philadelphia, I went to that city suitably provided with letters of introduction to the proper parties from Dr. Sanders, the patentee of the water gas process.

I have collected whatever evidence seemed pertinent to the purpose of my commission. I present below, a brief account of what has transpired, together with the conclusions at which I have arrived, and the most important considerations upon which they are based.

THE VISIT TO PHILADELPHIA AND THE GAS WORKS.

I reached Philadelphia at 10 P. M., on Monday, Oct. 21st. On entering the Girard House, I had the good fortune to meet Abraham Hart, Esq., one of the directors of the Keystone Water Gas Company, to whom I explained the object of my visit. I stated that you were wholly disinterested, and desired only to obtain reliable information of the practical working of the process. Mr. Hart conversed with me quite courteously on the subject, and assured me that the friends of water gas would be pleased to afford me every facility for procuring information, and in the morning I should see the gas making, have an interview with the engineer, and at 11 o'clock I should call on the directors, &c.

On Tuesday morning I made an early call for the engineer, but failed to see him, and this search, with the apparently willing assistance of the employés of the hotel, I renewed at frequent intervals up to nearly 11 o'clock, but always without success. At 11 o'clock, I presented myself at the office of the Keystone Company, in Walnut-street, and found the directors in session with closed doors. The agent, Mr. Brown, however, appeared, and stated that the directors were unable to see me, and that he would call at the hotel at 3 P. M. At about 5 P. M., instead of 3, Mr. Brown called, and after a short and unsatisfactory conversation as to the *rationale* of the water gas process, he introduced me to the engineer, Mr. Place, when it was intimated that I might go into the gas house and ask any questions of the engineer, but there was little encouragement to believe that other privileges would be accorded. I then made a rapid survey of the gas house with the engineer, and was shown the various parts of the apparatus.

The gas house, situated at the rear of the hotel, is a one and a half story brick building, about 20 feet square; the entrance to the building is from an alley-way parallel to Chestnut-street. The retort room is about 20 by 12 feet; the south end of this room is occupied by a bench of three retorts, and two rather large steam boilers, running north and south, which are constantly in operation for the use of the hotel, for cooking, warming, steam engine, &c. The gas from the retorts passes into a small room on the east side, through a hydraulic main, to a set of condensing pipes and scrubber; thence it returns to the retort room, is measured by a meter, from which it ascends in the direction of the furnaces up to the gas holder, which is at the top of the building. The arrangement and location of the apparatus, it will thus be seen, favor the warming of the gas, to prevent the deposition of condensible products.

The retorts are in the shape of a boot, the horizontal part being of the usual ⊐ form, and the upright part cylindrical. The rosin tank, placed back and above the retorts, is a cast iron vessel of the capacity of about two barrels. The whole apparatus is well made and in appearance quite imposing to those who are familiar only with the ordinary rosin gas apparatus. It seems to have been modeled after the apparatus in use for coal gas.

After the inspection of the gas house, the engineer sat down with me, and, in answer to questions, gave the following statement of the operations for one day:—

Amount of gas, 20,000 feet, rosin used, 660 lbs; fuel for retorts (coke), 15 bushels, lime, about 3 bushels. The charge of charcoal for three retorts is 4 bushels, of which about one-third is recovered, sifted, and used again.

Steam at 30 lbs., through a ⅜ inch pipe nearly closed, cost, practically nothing. Labor done by two men, working alternately, which would, however, produce three times the amount of gas This estimate is for such gas as they were then making. The amount of tar from main, scrubber and condenser was practically nothing. Pressure on gas holder, 2 inches; specific gravity had not been determined. Six-feet burners were used; some smaller, of the double slit fishtail variety. Gas had not been analyzed. Candle value had not been lately determined; supposed to be 18 or 20; had made gas of 30 candles. The manufacture was regular and certain. Gasometer, 3,000 feet. A 3-inch main, 235 feet in length, carried the gas to the front of the hotel; average depth of the main in the ground, about 2 feet. The drip from this main, in six weeks, was half a bucket of water, with no tar or oil; water supposed to have come from water of the gasometer. No experiments had been lately made on condensible products; Professor Sanders had subjected the gas to a freezing mixture without deterioration. Dimensions of retorts: Vertical part, 63 inches high, 8 inches diameter; horizontal part, 34 inches long, 8 inches wide, 6 inches high.

Q. Can you conveniently vary the proportion of steam and rosin, or can you easily shut off either or both?

A. Certainly; it only requires the turning of the cocks.

Q. What is the effect when you shut off the rosin?

A. We should only get rosin gas.

Q. That is evident; but what would be the variation in quantity and quality?

A. (After a little hesitation.) The amount would be diminished to about one-fifth or one-sixth. The quality would of course be that of rosin gas, and but a trifle richer than what was before made.

Q. What is the effect if you shut off the steam?

A. I cannot positively state. We do not feel at liberty to make such experiments while the hotel depends on us for gas.

Q. What is the amount of steam you ordinarily use?

A. Very little; I cannot easily estimate how much. The cost is practically nothing when the boiler is not expressly fired for the purpose.

At the conclusion of this interview I said to the engineer that I would look over his statements and call on him again, when I would make other inquiries.

Shortly after, I went to the gas house and said to the engineer that I had found his statements very clear and comprehensive; that they were, however, of such an extraordinary character that I could not endorse them without some verification, they represented that a gas, nearly equal in quality to rosin gas, was produced for about one-fifth the cost. But, fortunately, the points in doubt were few and simple, and could be determined without expense or trouble: it was only necessary to turn the stopcocks and observe the meter and trial burner. The engineer replied that his statements were all true, but it was not consistent with his duties to make experiments. I suggested that I had brought some instruments, and would willingly be at the trouble and expense of making certain tests in my own room. For this he thought the company should be consulted. At this point the engineer was called out of the room, and I was left, with a workman in charge. While the engineer was absent, in order to see more plainly the connections about the retorts, I passed over to them by a plank, which was placed uncomfortably near the steam boilers. As I stood before the apparatus, it occurred to me that it was strange that I heard no steam issuing into two retorts, while from one the sound was quite distinct. I leaned towards the retorts in succession, and satisfied myself that I was not mistaken; and into the one from which the sound came there was little or no rosin flowing. This observation occupied only a moment, and, as you may readily suppose, was accompanied with a very painful suspicion, which was not at all lessened by the rapid approach of the workman in charge, who then manipulated the stopcocks in what appeared to me an excited manner, and as if something had gone quite wrong. I came away from the retorts, and not a word was spoken. I passed into the hotel, and made inquiry for any member of the gas company. I found Judge Sanders, a brother of the inventor, and represented to him how easily every doubt about the utility of water gas could be settled. He agreed with me that it was desirable that I should go before the directors and present my views.

On Wednesday, 11 A.M., on my way to the office of the company, I was intercepted by Mr. Brown, the agent, by whom I was told that the directors were engaged in urgent business, and that they were not accessible. I stated that I was very desirous of seeing one or more of the directors. The result of a little further parley was that Mr. Brown engaged to see that Mr. Hart should meet me at the hotel at 3 P.M. Mr. Hart, however, did not appear. At about 4 P.M., I met Mr. Brown in the public hallway of the hotel, and was told, in answer to inquiry, that he had not spoken with Mr. Hart respecting an interview with me. After this time I sought for Mr. Hart and others of the company, but without success. As I had now consumed more than two days, and there appeared only a poor prospect of any further information from the Keystone Company, I returned to New York on Thursday morning.

The above account will give you some idea of the drift of events; but it cannot make so deep an impression upon you or your readers, as did the actual presence of the circumstances upon myself. Besides seeking information from the Water Gas Company, especially as soon as I had doubts of their willingness to assist me, I used every reasonable opportunity to make inquiries elsewhere. I called at the City Gas Works, and at various other places where water gas was supposed to be understood. I found an interest in the subject everywhere, and people ready to talk about it. Every one had an opinion about the utility of water gas, but the opinion was almost invariably based on personal likes or dislikes, rather than on practical demonstrations or scientific reasoning. The effect of all the testimony of this kind is to strengthen the conclusions to which I have come. Moreover, by subsequent inquiries made in New York at the St. Nicholas Hotel, and other places where water gas was attempted, those conclusions are further confirmed.

WATER GAS CONSIDERED FROM A SCIENTIFIC POINT OF VIEW.

The manufacture of rosin gas is a very simple operation, and is generally understood. At a hotel like the St. Nicholas, and possibly the Girard House, it is cheaper than the city coal gas. The maximum of illuminating gas that is producible from one pound of rosin is ten cubic feet. In practice, however, the product is only six to eight feet. Where rosin tar is valuable, the smaller yield of gas may be preferable. Now, by injecting with the rosin a small quantity of steam, the water gas folks say that the yield of gas will be increased fivefold without material depreciation of quality. In explanation, they say that the elements of water and rosin re-act on each other, and, by the peculiar action of some of the elements in the nascent state, new arrangements and combinations take place.

My view of the effect of steam is as follows: steam, when brought in contact with intensely heated charcoal, is decomposed, and carbonic oxyd and hydrogen are the products. The temperature at which this decomposition takes place is several hundred degrees higher than the temperature at which rosin is decomposed; and, consequently, if rosin and steam be introduced into a retort charged with charcoal, rosin gas will be first formed, and this gas, mingled with steam, will pass out unless the steam chance to come in contact with the charcoal at a temperature high enough to decompose it. But the temperature at which the steam is decomposed is probably high enough to decompose the rosin gas also, so that it will precipitate its carbon and its quality be thus greatly impaired. The gases finally thus resulting might be almost entirely hydrogen and carbonic oxyd, of no value for illuminating. It is plainly to be seen on this theory, that the practical result will be influenced especially by the proportion of steam and temperature of the charcoal; but, in no case, would the use of steam in the manner supposed increase the illuminating power, but, on the contrary, diminish it whenever the steam was decomposed. If the steam be decomposed in a separate retort, as in the process of White and others, the mixture of the water gases with the rosin gas would apparently be somewhat advantageous, for the reason that the hydrogen and carbonic oxyd would carry in solution or suspension a notable quantity of hydro-carbons which otherwise would condense with the tar. This result would also be, in some degree, attained by causing the rosin to enter at one end of a long retort and steam at the other. But the advantage in such ways obtained I understand to have

been proved in practice to be of little consequence. Although water for water gases costs nothing, yet the machinery and fuel are as expensive as for the manufacture of more useful products.

This theory, in my opinion, is consistent with all the facts with which I am acquainted. It affords a clear explanation of the irregularities and failures of Sanders' gas which have been reported, and also of the peculiar working of Dr. Cressou's retort, about which so much has been said in the Pbiladelphia papers.

THE CONCLUSIONS.

From a careful comparison of all the evidence to which I have had access, I have arrived at the following conclusions.

1st. That persons connected with the Water Gas Works of the Girard House were unwilling to permit me to make a scientific and practical examination of the process.

2d. That the Sanders water gas process does not produce the increased quantity of illuminating gas claimed for it.

If I have erred in these conclusions, fortunately the Keystone Gas Company have the power to confute me at once. For, let it be distinctly understood, that it is only necessary to turn a steam cock and watch a meter and burner for a few minutes to settle the leading question upon which the whole claim is founded. Such a test, made before reliable witnesses, is a ready way to settle the matter and crush all their supposed enemies. Here is the point at issue: without steam, the Girard House apparatus produces rosin gas; with steam, it produces Sanders' water gas, but five times as much and nearly as good, and at about one-fifth the cost. Surely, this is a clear, simple statement; and it is just so clear and simple that its truth or falsity may be determined by the turning of a stopcock.

Finally, it is proper to state that I concluded to go to Philadelphia only after the consent and almost request of gentlemen interested in the success of water gas, and with assurances that the company would be pleased to see me and afford me all the necessary facilities for examination.

CHAS. A. SEELY, Chemist.

New York, Oct. 29, 1860.

HOW MUCH PORK WILL A BUSHEL OF CORN MAKE?

The followng valuable facts are from the *Valley Farmer*:—Upon the question of "how much pork will a bushel of corn make,?" Mr. Richard Thatcher, of Pennsylvania, gives, in the New York *Tribune*, the result of his feeding scalded or cooked corn meal, in several instances, to fattening hogs. The result of one trial gave sixteen and one-half pounds of pork for each bushel of fifty six pounds of meal fed out. In another instance, seventeen and nearly one-half pounds were the gain from a bushel. The breed of hogs experimented upon was the "Chester" (county, Pa.) white, which we regard as among the best breeds now in the country. We have recently seen accounts of several other experiments of feeding hogs in the same way, with similar results, while the same breed of hogs fed in the ordinary way, upon dry corn, in the ear, gave a return of but about one-third of the weight compared with those fed on the cooked meal.

The experiments of Mr. Clay, of Kentucky, as detailed in the December number of the *Valley Farmer*, for 1856, afford conclusive evidence of the advantages of feeding cooked over raw food. In the experiments on the same animals, it was proved that dry corn would afford a gain of about five and three-quarters to six and three-quarters pounds of pork to each bushel consumed, but when changed to food prepared by grinding and cooking, gave a return of from fifteen to nearly eighteen pounds of flesh for each bushel of corn fed out. These various experiments demonstrate facts worthy the consideration of farmers, and especially when the price of corn and pork is constantly advancing.

With care in breeding from a good stock of hogs, and with their proper management throughout, keeping the hogs constantly thriving, at least an average of fifteen pounds of flesh may be received from every bushel of corn consumed. A few well conducted experiments in feeding, with appropriate apparatus for preparing the food, compared with facts determining the amount of gain from the ordinary method of feeding, would forever settle the question and lead to valuable improvements in this most important interest to Western farmers.

USEFUL MEDICAL HINTS.

We find the following remarks (by the editor) in the *Cincinnatus*, a scientific and agricultural journal, published at Cincinnati, Ohio:—

If a person swallows any poison whatever, or has fallen into convulsions from having overloaded the stomach, an instantaneous remedy is a tea-spoonful of common salt and as much ground mustard, stirred rapidly in a tea-cup of water, warm or cold, and swallowed instantly. It is scarcely down before it begins to come up, bringing with it the contents of the stomach; and lest there be any remnant of poison, however small, let the white of an egg or a tea-cupful of strong coffee be swallowed as soon as the stomach is quiet; because these nullify many virulent poisons. In case of scalding or burning the body, immersing the part in cold water gives entir relief, as instantaneously as the lightning. Meanwhile, get some common dry flour, and apply it an inch or two thick on the injured part the moment it emerges from the water, and keep sprinkling on the flour through anything like a pepper-box cover, so as to put it on evenly. Do nothing else; drink nothing but water; eat nothing until improvement commences, except some dry bread softened in very weak tea of some kind. Cures of frightful burnings have been performed in this way, as wonderful as they are painless. We once saved the life of an infant which had been inadvertently drugged with laudanum, and which was fast sinking into the sleep which has no waking, by giving it strong coffee, cleared with the white of an age—a tea-spoonful every five minutes—until it ceased to seem drowsy.

THE HIGHEST BUILDINGS IN THE WORLD.

The following list of lofty buildings is taken from the French scientific almanac (*Annuaire par le Bureau des Longitudes*) for 1860. The measurements are above the earth in each case (not above the sea):—

	Meters.	Feet.
Highest Egyptian pyramid	146	479
Tower of the Strasburg cathedral	142	465.90
Tower of St. Etienne (Vienna)	138	452.75
Ball of St. Peter's (Rome), over the dome	132	433
Tower of Michael's (Hamburg)	130	426.50
"The Arrow" of Antwerp church	120	393.70
St. Paul's at London	110	360.90
The Milan cathedral tower	109	357.60
Pantheon at Paris	79	259.18

This may answer the question asked by one of your correspondents not long ago, to name the five highest buildings in the world. Who will give us an authentic statement of the hight of American buildings?

* * *

[To tho above we add that the chimney of Messrs. Tennant's chemical works in Glasgow, Scotland, is 450 feet in hight, and there is another now building in that city which is to be 460 feet.—EDS.

APPLICATIONS FOR THE EXTENSION OF PATENTS.

Machine for Manufacturing Cordage.—William Joslin, of Cleveland, Ohio, has applied for the extension of a patent granted to him on the 19th of Jannary, 1847, for an improvement in the above-named class of inventions. The testimony will close on the 24th of December next; and the petition will be heard at the Patent Office on the 7th of January, 1861.

Diaper Pins.—James Rabbeth, of East Hartford, Conn., has applied for the extension of a patent granted to him on the 21st of January, 1847, for an improvement in the above-named class of inventions. The testimony will close on the 1st of January next; and the petition will be heard at the Patent Office on the 14th of same month.

FIGS IN MARYLAND.—We were not aware that figs were grown in Frederick county (says the Frederick *Union*) until we saw and tasted them at the agricultural exhibition in this city last week, and learned, upon inquiry, that between four and five bushels are raised each year at Mt. St. Mary's College, in this county. Those we saw were the second crop, in size about as large as a hen's egg. The first crop, we learned, are about twice the size of the second crop.

LADIES' SKIRTS IN COURT.—On the 1st inst., in the United States District Court, this city, before Chief-Justice Nelson, a verdict of $2,000 damages was given by a jury against Moran, Kelly & Co., for infringing the patent of Dougherty and Draper, for what is known as the "woven skeleton skirt." The defense set up was that the invention was not new and not patentable, but the evidence failed to prove this; hence the jury sustained the patent.

WEALTH OF THE CANADAS.—The English journals contain glowing accounts of the beauty and fertility of the scenery and soil of Upper Canada, furnished by the representatives of the London papers who accompanied the Prince of Wales to America. The London *Times'* correspondent, in speaking of the advantages offered to British emigrants from Upper Canada, says that in this agricultural El Dorado there are millions upon millions of acres of virgin ground, waiting only for the hand of the cultivator to disgorge their boundless wealth, and urges that all vexatious restrictions with respect to the purchase of land should at once be abandoned, as he anticipates a "mighty future for Upper Canada if emigration is only fairly encouraged and developed by the government at home." This sounds very much like the discovery of a new country. If we mistake not, Upper Canada has long been down on the maps, and its resources pretty well understood on this side of the Atlantic.

OLD BATTLE SHIPS.—The commission appointed under Senator Mallory's resolution for an examination of the sailing vessels of war belonging to the United States navy have completed their survey of the ships at the navy yards, and are now deliberating on the subject. The commission consists of Captains Stringhorn and Stover, and constructors Lenthol, Delano and others. They will be ready to report in a few days. Our old line-of-battle ships are all found, it seems, to be sound, and capable of conversion into war steamers; that is, they have sufficient breadth of beam for the purpose. The cost of conversion and of machinery, &c., will, of course, be reported. The twenty new steamers which have been built under this administration have been found eminently useful, and more of the same class are much wanted for the protection of our commerce. The Secretary of the Navy will, as heretofore, recommend to Congress a provision for an additional number of war steamers. The twenty war steamers last built cost but $5,000,000 in the aggregate.

A NOVELTY IN RAILROAD TRAVELING.—According to a correspondence which we find in a French provincial paper, the railroad companies in France are about to put in operation a plan which cannot fail of being received with favor by the public. It is proposed to run, each week, a train of cars between distant points, for which tickets can be obtained in advance, and to which the companies will guarantee to admit only a limited number of passengers, four hundred, for example. All the places being occupied, the engine not carrying any "dead weight," to use a technical expression, the traveler can be transported at the price of merchandise; and the companies, not only without any loss, but even with a certain and calculable profit, will apply to these special trains a tariff, the great cheapness of which cannot fail of producing an immense business. By this arrangement the fare is about one-fifth the usual price. Cannot some such plan be perfected by our railroad companies?

HOW TO OBTAIN A PATENT.—We have just issued a circular in the German language, giving full directions how to obtain Letters Patent for new inventions. Any one who may desire this circular will receive it free of charge by addressing MUNN & Co., 37 Park-row.

AIR ENGINES.—The report of the discussion of the Polytechnic Association, published in this week's paper, will be found of more than usual interest, as the subject of air engines was the leading topic and was handled in a very intelligent manner.

AN intelligent writer in the *Atlantic Monthly*, who spent some time in the Portuguese island, Fayal, one of the Azores, in speaking of the extreme indigence of the mass of the people, says that he knew one old woman who boarded with a poor family for five cents a week.

THE American Institute at their meeting, Nov. 1, voted to sell their property on Broadway, and put up a building in the upper part of the city, for their exhibitions, &c. Their property in Broadway is, we believe, in the neighborhood of Leonard-street, and is said to be worth about $150,000.