

**The Explosion of Natural Gas at Murrysville.**

One of the most serious and fatal explosions of natural gas that has yet been recorded occurred at Murrysville, Pa., on the 19th ult. In the attempt to make connection with a 1 1/2 inch main of the Chartiers Company, a large volume of gas poured into the streets and neighboring houses.

Coming in contact with burning jets of gas, a terrible explosion occurred, fatally injuring several persons and destroying a large amount of property. The fire was then communicated to the big McWilliams well, and a volume of flame at least seventy-five feet high shot up into the air. The flame pouring out of the main was finally extinguished, but it was not until the 22d that the fire at the McWilliams well was put out, and the danger of a general conflagration averted. During this time the entire village was kept in a state of constant anxiety, for there seemed every probability that the neighboring gas wells would take fire, and place the flames beyond hope of control.

For about three days the men employed by the gas companies fought the fire almost incessantly. The heat was so great that they could only work with their heads bound in wet cloths, and then only for three or four minutes at a time. The roar of the escaping gas made conversation impossible anywhere near the burning well. The noise was heard distinctly at a distance of five miles, while the glare of this more than giant's torch kept the night in abeyance over an area of several miles radius.

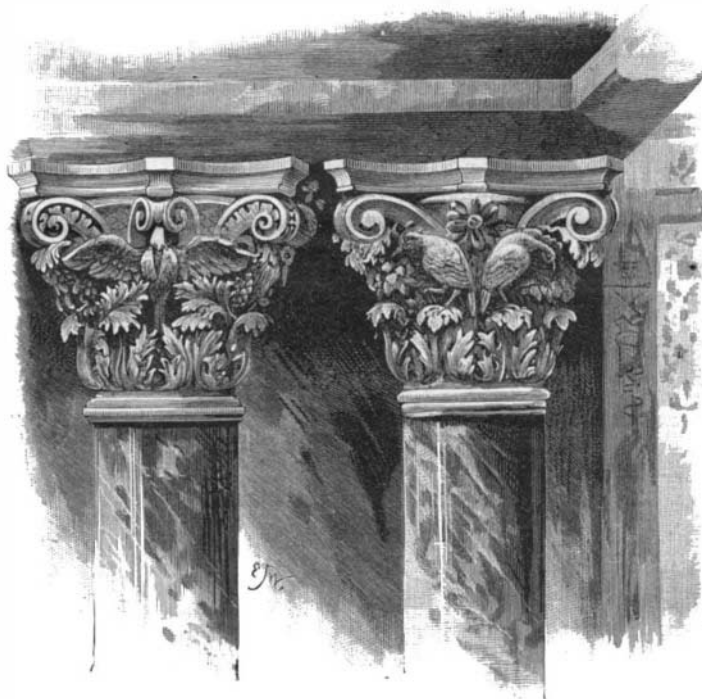
It was estimated that 3,000,000 cubic feet of gas were being consumed every hour, and that three times that amount escaped into the air unignited. The atmosphere within a radius of 1,500 feet was so saturated with gas that it was almost impossible for a human being to approach the flames and maintain strength and consciousness enough to do any work. As a desperate remedy, it was proposed to cannonade the well, in the hope of either quenching the flame or, by collapsing the pipes, so far reduce the outflow of gas as to bring the flame under control. For this purpose a detachment of Battery B, of Pittsburg, was taken to the scene of the disaster. The suggestion, however, was not carried out, as other means appeared more practicable. Yet it is a curious sight, that of a three inch cannon being dragged twenty miles through mud and rain, to storm this powerful but rebellious servant into submission to his newly found master.

Less revolutionary means were adopted. A trench was dug to within a few feet of the standpipe. Under cover of a fireproof shield, the men gradually accomplished their hard task. A short tunnel was then driven to the pipe itself. By careful chiseling, a ring was cut half way through the tubing. Then began an earnest tug of war. Chains were attached to the standpipe, and 150 men pulled with their might and main. The pipe bent over and broke, and volumes of flame poured out along the ground. The gas afterward became ignited where it issued from the well at the ground. This had one advantage, that it brought the fire all to one spot, the mains having been cut off by the removal of the surface piping. An attempt was then made to drop one end of a long pipe over the jet, so as to extinguish the flame by cutting off the supply of air, but it proved unsuccessful. The force of the outrushing gas threw the pipe to one side. A large funnel like the snuffer of an old-fashioned candlestick was also tried, and failed.

Finally, a large stack was prepared, and one end cautiously pushed toward the mouth of the well. The other end was then raised, and the flame rushed through it with a deafening roar. It was proposed to raise it to some height, and then, by suddenly letting it fall, put out the flame by the draught created. When the stack had reached an angle of about 45°, there was a sudden puff, and the workmen sprang back in alarm. But no further flame appeared. It had been strangled. It is believed the heat was so great that an outward current of air was drawn into the stack in sufficient quantity to form a miniature whirlwind, and thus extinguished the flame.

**ARTISTIC ARCHITECTURAL DESIGNS.**

The studios and residences of artists always possess a peculiar charm for the traveler and sight-seer. With a natural love of the beautiful, and with a taste cultivated by study and elevating association, the artist becomes the exponent of refinement and culture. A glimpse into a painter's home is always a treat. The columns, with their beautiful capitals, in the accompanying cut are from



**ARTISTIC COLUMNS AND CAPITALS.**

the hallway in the residence of the eminent English artist, Sir Frederick Leighton. This house is situated in Holland Park Road, Kensington, London, and is the achievement of Mr. Atchison. The staircase shown in the lower cut is not Sir Frederick's, but is a design of M. Koekx Wouters, of Brussels, Belgium. The banisters are of wrought iron work and of exquisite finish, and executed entirely by hand. This style of work for stairs is comparatively unknown in this country, although it is often found in palaces and residences in Europe. However beautiful, light, and graceful it may appear, the effect produced is hardly commensurate with the great cost attending its construction.

PETRIFIED wood is susceptible of as fine a polish as marble or Mexican onyx, and is taking the place of the latter on the Pacific coast for mantelpieces, tablets, and



**WROUGHT IRON STAIRCASE AND BANISTER.**

other architectural parts for which marble, slate, and tiles are commonly used. The raw material employed comes mostly from the forests of petrified wood in the territories of Arizona, Wyoming, and the Rocky Mountains, along the line of the Atlantic and Pacific Railway. Geologists will regret the destruction of such interesting primeval remains, and some steps ought to be taken to preserve certain tracts in their original state.

**Earth Closets.**

To those persons who live in smaller cities, in villages, and in country districts where the advantages of a sewerage system are not accessible, and in large cities where sewers are not extended to outlying districts, there is no such easy and economical method of disposing of excreta as by using earth closets.

The primitive and barbaric privy pits are universally condemned and almost as universally used. Earth closets can take their place in a majority of instances without disturbing the habits of the family, and with great benefit to their health. The old privy can, by a little home carpentering, be fitted into a good earth closet. The pit should be cleaned as thoroughly as possible and refilled with clean earth. The lower portion of the back of the old structure may be fixed as a door to raise up, to permit the removal and placing of the soil containers, which should be either galvanized iron pails or strong wooden boxes. The earth may be kept in a box or barrel, in the structure itself.

The trouble with remodeling the outbuilding for an earth closet is that it makes no change in the publicity of access or the disagreeableness of reaching it in stormy weather. As an earth closet, properly constructed and managed, with a due regard to decency and cleanliness, need not be an offense to sight or smell, it can be so built as to place it in some side room or shed attached to the dwelling and under the same roof. In this case a portable, easily managed closet is necessary.

The value of dry earth as an absorbent, deodorizer and disinfectant is not properly recognized. It is said by some to be more powerful in these capacities than any other agent known. If two parts of dry earth are put with one of excrement, and kept in a dry place, the two assimilate, the excreta becoming undistinguishable from the soil after a time, and it may be used over and over again, though it is generally better to bury each pailful in a different place each time, over a portion of the land adjoining the residence. The earth must not be sand or gravel, but soil of a clayey nature, thoroughly dry and finely pulverized. Powdered charcoal, coal ashes, and street dust are equally effective.

Earth closets offer many advantages, chief of which is that, when they are properly cared for, the excreta of one family is rendered harmless and disposed of on the premises, not being liable to soak into a neighbor's well. There is no offensive odor or contamination of the soil. They may be placed under the same roof as the living rooms, and thus be easily accessible to women, children, and invalids.

There are many failures of earth closets to give satisfaction, but the failure is due to an inability on the part of the owner to understand their capacities. They must not be made the receptacle of house or chamber slops, as the ability of the dry earth to absorb moisture is necessarily limited, and any excess of its capacity creates a nuisance. A great improvement has been perfected in earth closets by Mr. William Heap, in an automatic urine separator, which prevents any undue soaking of the earth, and does away with the only source of annoyance in their legitimate use.

The death rate from zymotic diseases has been shown to have been much reduced by the introduction of proper systems of sewerage, as at Memphis. There is no doubt that the uniform adoption of the dry earth system of soil removal in villages would show a corresponding reduction in the death rate, from typhoid fever especially.—*Sanitary News.*

PROF. LESLIE says: "I take the opportunity to express my opinion in the strongest terms that the amazing exhibition of oil and gas which has characterized the last twenty years, and will probably characterize the next ten or twenty years, is, nevertheless, not only geologically but historically a temporary and vanishing phenomenon—one which young men will live to see come to its natural end. And this opinion I do not entertain in any loose or unreasonable form; it is the result of both an active and a thoughtful acquaintance with the subject."

### Street Cleaning and Garbage Removal in Boston, Mass.

Before describing the methods of the department under the control of the Superintendent of Health, a word of introduction is, perhaps, necessary to enable our readers to better understand the reason for the prevailing discipline and thoroughness of work performed by this official in Boston.

The secret of success here lies in the fact that the executive head is, first, a very efficient man, and secondly, that this qualification has been appreciated by the appointing powers to such an extent that, though nominally appointed each year, he has actually continued in office for about twenty years. The practical result of this wise though unusual policy in the selection of city officers is a well-trained and efficient corps of assistants and an able, experienced head to guide them. Permanency of employment has made positions in this department, even of the lowest grade, highly desirable; and having many to select from, and being free to choose, the best of the applicants only are selected, the choice of the superintendent being for young married men. This is city civil service of the best type, apparently brought about by an honest desire to benefit the city and the public rather than the political "worker."

**The Removal of Ashes, Offal, etc.**—In the removal of city refuse, the first requirement of the city ordinances is that no ashes or other material matter or house rubbish shall be mixed with the animal or vegetable waste, usually called "swill." This material must be placed by the householder in suitable separate receptacles; the ashes usually in metallic tubs, so that there may be no danger from fire, and the house waste, or swill, in a tight vessel. These receptacles must be located in an "easily accessible place" on the premises, usually inside the yard; the city scavengers are required to remove them from the yard and return the empty vessels to their proper places.

The "swill" is removed daily from all hotels, markets, restaurants, and other points of rapid accumulation; it is taken from dwelling houses three times a week during the summer months, and twice a week in winter. For this purpose the city is divided into forty-nine districts, to each of which is assigned one swill wagon, a driver, and a helper. With each wagon are two offal buckets, in which the swill is transferred from the house receptacle to the wagon; there is also an offal chisel used in chopping frozen matter out of the house receptacle. This swill wagon has a thoroughly water-tight body, containing about 64 cubic feet, and is closed by tight, hinged wooden covers; there is absolutely no dripping, nor any offensive odor. The collection is made during the whole day up to 5 P. M., and the daily average of each wagon is from two to three loads, depending on the length of haul to the depot.

When the wagon is filled, it is taken to one of three city depots, in Boston, Roxbury, or Charlestown, and the contents are there dumped out upon a tight, raised platform, and the wagon itself thoroughly cleaned inside and out before being sent after another load. This "swill" is readily sold to farmers for feeding hogs and cattle, customers hauling it as far as twenty miles from Boston in tight, covered wagons, which are required on the part of the farmers by the communities they pass through. The prices paid per cord (128 cubic feet) in 1885 were, in Boston, \$4; in Roxbury, \$5; and in Charlestown, \$6.

In the official year of 1884-85, the department employed in this service 108 men and 49 one-horse swill wagons. This force collected 28,520 loads, or, averaging the loads at 60 cubic feet, about 63,400 cubic yards of house offal or "swill." The cost of labor was \$87,691.93, and the amount realized from the sale of offal in the year was \$36,420.52.

In collecting ashes and house dirt, the city is again divided into seventy-six fixed routes, to each of which is assigned a one-horse cart, a driver, and a helper. This class of refuse is removed from hotels, tenement houses, and stores twice in each week, and from dwelling houses once a week.

The ash carts contain about 44 cubic feet, and must be covered with canvas when being hauled through the streets. The city employes enter the house, yard, or shed of the citizen, and remove the ashes to the cart, but they are not required to go up stairs. This plan practically does away with the nuisance of sidewalks blocked with unsightly or offensive vessels of refuse awaiting the city carts. While the driver is taking the loaded cart to the nearest city dumping ground, the helper remains on the route and transfers the ash barrels to the street ready for the next load. Each cart makes from six to eight trips per day, depending on the length of haul.

At the present time, the main city dump is on the South Boston Flats, where this refuse is utilized in filling low land, chiefly belonging to the State of Massachusetts. This dump is the rendezvous of a motley crowd of general scavengers, who make a precarious living by rescuing from the rubbish the rags, bottles, old metal, and any other marketable material found therein. There are other dumping grounds on the

Back Bay and in the outlying districts; but as all these dumps will very soon cease to be available, the Board of Health, in 1884, proposed to carry this refuse to sea and there dispose of it. Experiments were made to this end with ordinary dump scows, such as are used in connection with dredges; but owing to the buoyancy and clogging nature of the material, it was found that it would not sink through the bottoms of the scows, and sometimes twenty prisoners from the Deer Island institutions would be engaged fourteen hours in clearing one scow. The Board then tried a Barney dumping boat as used in New York Harbor, and were so well pleased with its performances that in their last report (1885) they recommended the purchase of the boat at a cost of \$12,000, and \$1,500 annually as royalty. Previous to this recommendation, they had hired the boat for \$15 per day.

This Barney dumping boat is 110 feet long, 28 feet wide, and 12 feet deep; its carrying capacity is about 500 tons, and when loaded it draws about 9 feet. It is thoroughly seaworthy in construction, and two men will dump the load, wash out and close the boat, and be ready to return to port in from five to ten minutes. There are two strong hulls, or pontoons, secured together at both ends and in the middle by heavy bridges hinged to the pontoons. The storage room is V-shaped, and the fastenings, at all three bridges, are operated from a center wheel; the pontoons work automatically, and open and close as soon as released, the movement being about one-eighth of a circle. This Barney scow has been in use in Boston since June, 1884, and to April 1, 1885, it had dumped 14,823 loads, making the trip once or twice a week as required. The Board estimated that the saving in horses, teams, and labor exceeded \$25,000 in the period named. As an additional source of income, private parties were permitted to dump refuse material into the scow on the payment of ten cents per barrel.

During the year 1884-85, 162 men and seventy-two wagons were employed in the removal of ashes and house dirt. This force collected 182,642 loads of ashes and 62,222 of street dirt; or, with an average of only 40 cubic feet per load, a total of 362,761 cubic yards. The cost of labor for this work was \$125,902.21, and the amount received from the sale and removal of ashes was \$14,159.76. On this basis, the average cost of collection and removal was about 30<sup>1</sup>/<sub>10</sub> cents per cubic yard.

There is a "snow drag" used by this department in removing ash barrels from the yard to the street in winter. A club used in loosening up frozen ashes in the barrels of the householders is the source of unceasing tribulation and complaint on the part of the Boston housewife; and besides being a formidable and effective instrument, is perhaps too frequently handled with unnecessary vigor.

**Street Sweeping and Cleaning.**—This work is done by the city with its own men, horses, and machines. At the present time, about 185 miles of streets are cleaned weekly, the work upon the business streets being usually finished before 7 A. M. During the winter months the teams are employed in moving house dirt and some of the machines in cleaning crossings. In this latter service, experience has shown that a one-horse sweeper will do more and better work than seven or eight men. Only paved streets are swept; on the macadamized and gravel streets in the districts, the gutters are kept clean and paper and other rubbish is gathered up. Sweeping such streets would naturally carry off the top dressing and lessen their durability.

The sweeping machines now used are built by the department under the patent of Aaron Stackpole, Jr., of Oct. 23, 1883. The original machine is intended for one horse only, but the department in some of the latest made have fitted them for two horses by adding a pair of front wheels and a pole. This two-horse machine has decided advantages, and two horses can work in it all day, while in the smaller machine one horse can only work one-half day; the substitution of rattan for the usual "bass" in the broom, though more expensive, is found to be much more efficient, especially in handling slush in winter, and in sweeping gravel from the railway tracks.

The work of street sweeping as practiced in Boston is worthy of a detailed description, both as an evidence of the discipline of the laborers and as a contrast to the slovenly manner in which similar work is performed in some other cities. Taking a street of average width as an example, the first on the ground is a city watering cart, which differs only from that used in ordinary street sprinkling in having finer jets or openings in the sprinkler. After this cart come usually two one-horse sweeping machines, which travel in echelon, so that vehicles may pass between them; these machines, commencing in the middle of the street, sweep the dirt toward the two gutters, making several turns over the block if the street is wide. Then come two men with broad hoes, who gather the dirt into rough piles on each side of the street, the distance between piles being regulated by the quantity of matter swept up. Then we have generally four men armed with the ordinary birch brooms, two men to a gutter, who clean up the interval be-

tween the piles and go into the angles and corners that the machine cannot reach. And finally come the one-horse carts with two men to each; one man shovels in the dirt, and the other assists him in filling his shovel with the special carter's broom.

In the year 1884-85, there were employed in this service 181 men (87 being sweepers), 34 carts, 10 sweeping machines, and 6 watering carts. The principal streets were cleaned daily, the others twice a week; as previously stated, 185 miles of streets are cleaned each week. The quantity of street dirt removed was about 92,180 cubic yards, and the cost for the year for labor was \$97,280.10. This street dirt is disposed of in the same manner as the ashes and house dirt.

So that the cost of street cleaning under the Boston system may be better understood, we have secured the following figures from Mr. M. B. Rowe, who has a general supervision over the work under the Superintendent of Health:

The department "day's labor" is ten hours. The wages paid in 1885 were as follows: Teamsters, \$2.10; teamsters' helpers, \$2.02; drivers of sweeping machine, \$2.10; sweepers, ash cart and offal cart drivers, and their helpers, \$2.00 each.

The daily cost, without driver, of a watering cart is figured at \$2.00; one-horse sweeping machine, \$4.40 (allowance made for two horses, one in the morning, and another in the afternoon); two-horse sweeping machine, \$4.75 (here the same two horses work all day); one ash cart and one offal wagon, \$2.10 per day each.

To get at some idea of the itemized cost of street cleaning, we have taken, in summer time, a street 66 feet between curbs, and a length of 8,385 feet. The total time occupied in cleaning this area of 553,410 square feet was 2<sup>3</sup>/<sub>4</sub> hours. The itemized cost we make as follows from data furnished by the Health Department:

No. employed.	Class of Labor.	Cost per hour.	Total hours.	Total cost.
1	Watering cart.....	\$0.20	2.75	\$0.55
1	Driver.....	.21	2.75	.57 <sup>1</sup> / <sub>2</sub>
3	Sweeping machine.....	.44	8.25	3.63
3	Drivers.....	.21	8.25	1.73 <sup>1</sup> / <sub>2</sub>
6	Men with hoes.....	.20	16.50	3.30
12	Men with brooms.....	.20	33.00	6.60
8	Carts.....	.21	2.200	4.62
8	Teamsters.....	.21	2.200	4.62
8	Teamsters' helpers.....	.20 <sup>1</sup> / <sub>2</sub>	2.200	4.44 <sup>1</sup> / <sub>2</sub>

Total cost of sweeping 553,410 sq. ft. = \$30.07<sup>1</sup>/<sub>2</sub>

At this rate the cost per 1,000 square feet would be \$0.054; or on one mile of the same street 66 feet wide it would be \$18.81<sup>1</sup>/<sub>2</sub>.

### Monster Sea Turtle in Kansas.

The discoverer of a gigantic extinct sea turtle found near Fort Wallace, in Western Kansas, first observed the large bony shields projecting from a bluff near Butte Creek. They were carefully taken out and brought to Philadelphia, where the restoration was made. The fore flippers alone were nearly five feet long, while its expanse from the tip of one extended flipper to another was about seventeen feet. The question may arise, How did the sea turtle become buried in a bluff in the State of Kansas? A natural supposition would be that Kansas is the bed of a former ocean, and so it is. Ages ago, in what is called by geologists the Cretaceous Period, that part of the world was the bed of a great sea, in which the great turtle swam, together with other monsters of curious shape and appearance. Gradually the crust of the earth was raised, the water fell back or became inclosed, and left the inhabitants of the Cretaceous Sea high and dry, to be covered by the earth and preserved for us to study ages afterward.

The shores of this ancient ocean are easily found and followed by geologists. Its extent has been traced on our Western plains by the bleaching and disintegrating remains that have been found, upon and beneath the surface.—Charles Frederick Holder, in *St. Nicholas*.

### A Substitute for Sugar from Coal Tar.

Mr. Ivan Levinstein, the President of the Manchester Section of the Society of Chemical Industry, calls attention to a new substance which is extracted from coal tar, and possesses sweetening properties far stronger than the best cane or beet root sugar. This substance, he said, seemed likely to enter into daily consumption. According to Mr. Levinstein, 1 part of it will give a very sweet taste to 10,000 parts of water, for it is 230 times sweeter than best sugar, and taken in the quantities added to food as sweetening material, has no injurious effects whatever on the human system. Patients suffering from diabetes have been treated for the last few months in one of the principal hospitals in Berlin with saccharin without feeling in the least inconvenienced by its use. The use of saccharin would, therefore, Mr. Levinstein said, be not merely a probable substitute for sugar, but it might even be applied to medicinal purposes where sugar was not permissible.