

ANSWERS TO CORRESPONDENTS.

G. C. of N. Y.—*Daniell's pyrometer is the only instrument for measuring the intensity of fire which possesses any real value. It is constructed of a metallic bar, generally iron or platinum, placed within a tube of well baked black lead ware. The metallic bar is shorter than the tube, and a short plug of earthenware is placed in the mouth of the tube above the bar, and so secured by a drop of platinum foil and a small wedge, that it slides with difficulty in the tube. By the expansion of the metallic bar, the plug of earthenware is pushed outwards, and remains in its new position after the contraction of metallic bar on cooling. An index is adapted to the instrument, which traverses a circular scale, before and after the earthenware plug has been moved outwards by the expansion of the metallic bar. The degrees on the scale are convertible into those of Fahrenheit.*

Wedgwood's pyrometer was the first one invented, but its indications were extremely erroneous and it has been entirely supplanted by the instrument of Daniell.

J. R. S. of Ga.—*The opinion you hold in reference to the comparative production of noxious impurities by the consumption of gas and other illuminating substances, is entirely erroneous. The fact that many well informed men agree with you in this does not by any means prove you to be correct in your views. According to the experiments of Mr. Lewis Thompson, the author of the Chemistry of Gas Lighting, the product of the combustion of gas, contains much less carbonic acid than that of the best wax, which is universally conceded to be the purest candle material. In the experiment referred to it was ascertained that 5 cubic feet, or 1,064 grains of gas gave as much light as 1,885 grains of wax, when every attention was paid to the trimming of the wick. The 1,885 grains of wax, according to the analysis, contained 1,174 grains of carbon, and must therefore have generated during combustion 5,404 grains of carbonic acid; whereas the gas contained only 767 grains of carbon and consequently generated only 2,812 grains of carbonic acid. Thus during the production of equal quantities of light by the combustion of the wax and of the coal gas, the air was contaminated with nearly twice as much carbonic acid by the wax as by the gas.*

G. N. K. of Mo.—*You have acted just as we should have done under the circumstances, and your conduct will be upheld by every reasonable man. It is well sometimes to take a firm stand, and to evince such a disposition as you have exhibited.*

A. E. of Pa.—*We cannot answer your inquiries unless you state your questions more explicitly. As your letter now reads, we think you have taken a wrong view of the whole matter, and we advise you to be careful how you proceed.*

J. D. J. of N. J.—*Oxygen gas was discovered in 1774 by Priestly, a celebrated English chemist, and not by Lavoisier as you incorrectly suppose. Almost any elementary work on chemistry would have given you this information had you taken the trouble to look for it.*

A WALSH GAS-BURNER LIGHTING OF THE LEGISLATURE.

—The Assembly of this State was brilliantly illuminated on one occasion last month by a new five-foot eight inch gas-burner, evidently an infringement of the old patent burner of that name, manufactured and sold by George Cottingham, as illustrated on page 155, Vol. 1. of this JOURNAL. The subject matter of this display was a bill introduced by one Honorable Mr. Walsh, in the following words:—"No gas company in the city of New York shall, after the passage of this act, be allowed to charge or receive pay for the use of gas-meters. All acts inconsistent with this act are hereby repealed."

On reference to our mailing books we could not find the name of the Hon. gentleman therein, which accounts for this brilliant flash of the legislative originality, and we have consequently presented him with the Dec. 1 number of the JOURNAL wherein on page 170 he finds himself anticipated by the three New York gas companies, who then and there gave notice that on and after Feb. 1, no rent would be charged for the use of meters.

We recommend Mr. Cottingham to look sharp after this infringement of his valuable burner, and we would also affectionately advise Mr. Walsh to subscribe to the AMERICAN GAS-LIGHT JOURNAL from its commencement, (terms \$3 per annum, strictly in advance,) to save him from any more wasteful hits at legislation. We must do the gentleman the justice to add in view of there being no rent charged for meters, he promises not to press his bill.

Seriously, to what unprofitable expedients do legislators who grave popularly with injured gas consumers, resort to secure the vox populi, that hurrahs for them to-day and votes against them to-morrow. Gas consumers who pay their bills do not need such advocates. In the words of a correspondent, we can only hope that "the day is not far distant when the institutions that are to society a compact and an honor, that place the State of New York and city of New York so far beyond all others, will be objects not of suspicion, defamation, and oppression, but of encouraging legislation." Amen.

THE WATER-WORKS OF AMERICA.

TROY, N. Y.

The last annual report of the Water Commissioners of Troy, N. Y., is before us, being for the fiscal year ending March 5, 1860.

The active management of the works has been continued, as for several years past, under Edwin H. Chapin, Superintendent, and Alexander McCall, Clerk; the former in charge of the mechanical and labor department, and the latter in charge of the books and accounts, water rents and finances.

INCOME OF THE WATER-WORKS FOR THE YEAR 1859.

The amount of water rents for the year commencing May 1, 1859, assessed on premises situated on lots on streets in which the distributing pipes are laid, in books required by law to be prepared by the Commissioners and thence transferred to the tax rolls in the Chamberlain's office as a part of the annual tax on such premises, was:

From the three districts.....	17,962 88
From special rates; sprinkling streets with small hoses; masons' use, erecting buildings; jobbing, and pipe sold, &c.....	6,807 07
	23,770 86

EXPENDITURES FOR THE YEAR 1859.

Interest on Water-Works' Debt.....	4,610 69
Iron pipe.....	2,207 80
Land for new Reservoir.....	2,568 77
Construction, lumber, slop-cocks, hardware, printing, advertising, &c., &c.....	3,289 32
	8,270 16
	20,924 74

Net earnings for the year 1859..... 2,846 11

The expenditures are divided, properly, thus:
For interest, salaries, labor, materials, &c., including all ordinary expenses of maintaining the works..... 12,141 31
For construction..... 8,783 43
\$20,924 74

COMPARATIVE STATEMENT.

The Water-Works have been under the charge of the present Commissioners five years, during which the receipts and expenditures have been as follows:

Year.	RECEIPTS.		Total Receipts.
	Assessed rents payable to the Chamberlain.	Paid to the Chamberlain by the Clerk.	
1855.....	18,324 68	5,520 94	23,845 64
1856.....	19,005 57	6,169 16	25,174 73
1857.....	16,898 47	5,043 19	21,941 66
1858.....	17,131 11	4,770 66	21,901 77
1859.....	17,962 88	5,807 97	23,770 85
			109,634 65

EXPENSES.

Year.	EXPENSES.		Total Expenditures.
	Interest and ordinary expenses.	Construction.	
1855.....	12,611 34	12,611 38
1856.....	14,124 69	8,868 69	23,993 38
1857.....	11,978 66	11,858 08	23,836 74
1858.....	10,857 36	11,484 69	22,342 05
1859.....	12,141 31	8,783 43	20,924 74
			100,605 60

Balance of 5 years' earnings in Chamberlain's office, unexpended..... \$9,023 69

Year.	RECEIPTS.					Total.
	Special rates on Schools Churches, &c.	Street Sprinkling.	Simon Uses.	Job Work.	Penalties.	
1855.....	352 76	308 00	104 46	4,355 74	5,020 94
1856.....	284 75	437 78	296 78	4,149 84	5,169 16
1857.....	222 81	926 96	202 17	3,854 26	60 00	5,043 19
1858.....	841 31	749 69	251 12	3,303 78	4,770 66
1859.....	334 50	695 50	327 63	4,382 84	10 00	5,807 97

The sums received in the office by the Clerk, from the different sources above named, vary, of course, every year—being some years more and some less. But the annual water rents placed on the tax rolls, and payable to the Chamberlain, have increased each year, and the sum of these for the year 1859 over the sum for 1855, is \$2,638 28.

This increase arises partly from new buildings and new uses, where the pipes were previously laid; but mostly from the extension of street mains in '56, '57, '58, and '59—in all amounting to nearly two miles. The sum expended for construction during these four years is \$40,991 89.

DAM FOR NEW RESERVOIR.

The following, by WILLIAM BARTON, Esq., engineer of the work, is a description of the dam, and also an account of the water passing down the stream in October:

This new storing reservoir is situated about fifty rods east of Oakwood Avenue, on the Pisconaw creek, and lands purchased of Titus Eddy, Gary Brothers, and Robert P. Winne, embracing by the present parol about eleven acres of land.

The reservoir, when complete and filled to top water line, will contain about thirty-seven million gallons of water, and flow about six and a half acres of land.

The site for the embankment forming the dam, is at a place where nature seems to have supported a similar structure in by-gone days; the sides and bottom of the ravine being formed of slate rock, whose projections were at a closer proximity here than any other, and requiring but little effort of art to make a thorough and substantial dam.

At this point the rock sections, consisting of alternate strata of indurated clay-slate and compact limo-stone, exhibit some very remarkable and highly interesting examples of contortions and flexures—proving most conclusively that at some period, after the deposition and formation of the rock, it had been subjected to intense lateral pressure, whereby the strata have been bent and corrugated at sharp angles, and in some instances completely reversed, so that what were originally the surface beds are now the undermoat. The most curious portions of this disturbed strata are now concealed from inspection by the earth-work of the dam, but at a point on the north bank a little below the dam, a section still remains exposed, which will well repay a visit and examination.

The embankment formed at the dam will be about one hundred and sixty-five feet wide at the bottom, in the deepest part of the ravine, twenty feet wide at top, about thirty-five feet long on bottom and two hundred and seventy feet long on top. The slope of the embankment on the inside will be two horizontal to one vertical; the outside slope, one and one-half horizontal to one vertical, and the embankment carried up to a point about five feet above the top water line. The deepest part of the embankment will be forty-nine feet, and the greatest depth of water thirty-four feet, which will be at the entrance to the pipes.

There are three cast-iron pipes laid from the foot of the inner slope, and extending under said embankment about 140 feet, entering a pipe chamber which has been constructed under the outer slope to receive the water passing through the pipes. This chamber's bulk of stone masonry, arched with brick; being eight feet wide, sixteen feet feet long, and about nine feet high. The bottom of the chamber is about two feet below the outlet, leaving always two feet of water into which the water from the stop-cocks is discharged, thence passing out into the creek below the dam. The pipes are two twelve inch and one eight inch in diameter, and provided with suitable stop-cocks at the inner side of the pipe chamber, so as to control the discharge. These can at all times be approached by a door from near the foot of the western, or outer slope, and upon a flooring constructed over the water-way, to the back part of the chamber. The pipes have been laid with great care, upon a bench or shelf cut into the rock on the north side of the ravine, bedded on about one foot of puddled earth, and well covered with the same material. At a point about fifty-three feet westerly from the upper end of the pipes, a cast-iron flange of about three and a half feet wide, was placed on each pipe and well leaded on, so as to more effectually prevent the water from following the outer surface of the pipe under the embankment. The pipes are laid nearly on a straight line, their upper ends only inclining a little to the south. The foot of the western, or outer slope, is shortened and sustained by a wall of stone masonry resting upon rock; the wall is about eleven feet high, four and a half feet thick, and about thirty-six feet long at top. Through this wall is the entrance to the pipe chamber, well protected from the frost by a set of double doors, one near the outer side and one upon the inner side of the wall, leaving a space of about three feet between the doors.

The inner surface of the dam will be lined with two feet of good gravel, and floored with a slope or revetment wall, about one and one-half feet thick; the foot of the wall resting in a trench cut in the solid rock to receive the same. The dam or embankment is made of material obtained from within the flow line of the reservoir, and is composed of clay, gravel and loam, being the best material to retain water, and make a tight dam. At about the centre of the embankment, a puddle wall has been begun, and will be completed as follows: a trench has been excavated in the slate rock, forming the bottom and sides of the ravine, fifteen feet wide and six feet deep, which is filled with material selected for the purpose, being one part good gravel to two parts good clay, laid in courses of six inches, and wet properly with

water, and cut with shovels so as to thoroughly mix the material and form a water-tight wall, which will be contained through the whole length and height of the dam to a point three feet above the flow line; the base of said wall being fifteen feet wide for the first twelve feet in height; then thirteen feet wide for the next ten feet; then eleven feet wide for the next ten feet; then eight feet wide to a point about three feet above the flow line. A further precaution was taken to prevent the water from passing between the rock forming the bottom and sides of the ravine and the embankment: Three trenches were excavated in the rock, each four feet wide and three feet deep: one located ten feet east of main puddle wall, one eighteen feet west of main puddle wall, and another thirty-six feet west of main puddle wall. These trenches were filled with material same as main puddle wall, and extended up into the common embankments about five feet throughout the bottom and sides of the ravine.

A good and sufficient waste wler will be formed by an excavation in rock, about fifty feet south of the main dam, entirely disconnected therewith. The surplus water passing over this will enter the stream again about two hundred feet below the dam.

QUANTITY OF WATER.

During the first week in October a good opportunity was afforded by the passage of the water through a trough, to ascertain the quantity used at this time. A series of measurements were made by running the water into a box, constructed for the purpose, which would contain fifty-six cubic feet; the time required for filling the same being carefully noted, gave actual measure; the result being found to be 1,463,946 Winchester gallons passing in twenty-four hours down the stream into the distributing reservoir; thence into the pipes for the supply of the city.

COST OF THE WATER-WORKS.

The entire cost to March, 1859, was..... 207,203 48
Add for construction this year..... 8,783 43
Total cost of construction to March, 1860..... \$215,987 91

WATER-WORKS DEBT.

There was due on this debt, at the commencement of the fiscal year, in March, 1859..... 60,000 00
Paid on the debt, in 1859..... 9,000 00
Due March, 1860..... \$81,000 00
The Commissioners of the Sinking Fund hold, of bonds loaned for the water-works, \$1,000 due in 1872, and \$5,000 due in 1875, bought up some years since with moneys raised yearly for a sinking fund. These bonds, which have been reckoned in the annual account as part of the debt, with themselves as an offset to pay it, have been cancelled during the year, thus reducing the several debt, as above stated, to..... 91,000 00
There is due on this debt, May 1, 1861..... 10,000 00
Which, with funds already provided for the purpose, will be paid, leaving the debt then..... \$71,000 00

HYDRANTS.

There are two kinds of hydrants in use in the city—one, the old style friction draught-cock hydrant, introduced with the water-works in 1833-4, and very generally used in the city; the other, Bartholomew's patent hydrant, which works with a valve, instead of a friction draught-cock. A dozen of these, as an experiment, was taken by the office in 1855, since which time the number has been increased each year, and there are now in use about two hundred of them. They have several advantages over the old style: They cost less; allow no leakage or waste of water; with good usage require little or no repairs for years; but are as liable to freeze as the other kind, and perhaps not any more so, and, when understood, are just as easily thawed when frozen. The office keeps on hand for sale, both kinds, and those who need hydrants will take their choice.

WASTE OF WATER.

It is not easy to estimate the quantity of water wasted every year, arising from wantonly or carelessly allowing the hydrants to run when not necessary; from leakage under ground, of old and partially worn-out hydrants, neglected to be repaired, and kept in order, as the By-Laws require. The leakage and consequent waste are almost entirely, if not wholly, from the old style hydrants, and not likely to be known or checked till the water shows itself above ground in the yard, or makes its way into the cellar or basement of the owner, or of a neighbor. But the most inexcusable waste is that which comes from purposely or carelessly, by some takers, leaving the hydrants open, and allowing the water to run.

During the year, one full penalty of \$10 was enforced and collected from one person so offending; some others were let off by paying part of a full penalty, and some were punished by having their water for a time shut off. The employees of the office are directed to enforce rigidly the By-Laws and Ordinance against this abuse and mis-

use of the common property of the city. While it is expected and desired that the water be used freely for all needful and useful purposes, it is expected likewise that it be used with due economy, and a due regard to the rights of the prudent and careful taker.

WATER METERS.

The subject of adopting water-meters has been discussed in Troy, and the probability is that, in view of the waste of water, they will be adopted. They have Worthington's on trial at present.

It has been suggested, and very sensibly, that instead of expending large sums in building a new reservoir for the storage of water, it would be more judicious and beneficial to invest a tithe of the amount in purchasing meters to save it. The actual daily consumption of Troy is estimated at one and a-half million of gallons, while the daily waste is computed to be three million gallons, or twice the quantity used for legitimate purposes! What a commentary upon the annual increase of construction account in municipal water-works!

VALUE OF THE HYDRANT WATER.

The dependence of the citizens, in the parts of the city where the pipes are laid, upon hydrant water for household and culinary purposes, is almost universal, and its value in these respects is incalculable. This use, of itself alone, is more than ample compensation for the cost of the works. But when, in addition, is taken into the account its use in furnaces, machine shops and printing offices, for driving the large number of steam engines in the city; its use for other manufacturing purposes and in breweries and laundries; its use by masons in erecting buildings; its use for sprinkling the streets, and especially its use by the fire department for extinguishing fires and saving property, to say nothing of its use in promoting the general health and cleanliness of the city—we cannot adequately estimate the value of the water-works; while, from the fact that the cost of the works is comparatively low, the price of water for all these uses is remarkably cheap.

THE CASH SYSTEM.

By reference to the By-Laws, it will be seen that all labor and materials furnished by the office must be paid for at the time, and in default, the water is to be withheld from the person neglecting thus to do, until he pays his bill, together with the expense of shutting off and letting on the water. The good effects of this By-Law are seen in the facts, that no bad debts are made; that nothing is lost; that the payments are made with commendable promptness, and that no suits are, or need be commenced in order to collect the bills due the office.

The Water Commissioners are T. Symonds, Liberty Gilbert, Harvey Smith, J. M. Warren, Wm. F. Sage.

LIGHTING SHIPS WITH GAS.—The London Times says that one of Major Fitzmaurice's gas apparatus has been erected in the steam-factory at Woolwich Dockyard, by order of the Board of Admiralty, and has been put into operation experimentally for the purpose of testing its availability for supplying the ships of Her Majesty's fleet and the service generally with gas, in which case one of the apparatus will be fitted in the engine-room of each vessel, to supply the burners fixed in the various compartments of the ship in a similar manner to that on shore. The gas is termed "olefin" gas, being made from any kind of oil, grease, bones, cocconut, fat of every description, or even shavings, peat, wood, &c., and the apparatus may be managed with perfect safety by a mere lad, so extremely simple are its arrangements. The lights were pronounced of a greater brilliancy than the common gas-lights, being at the same time free from smoke, and the flame was observed to be of a thicker and stronger quality, although the heat produced was considerably less. The gas will continue in use for a short time in the factory, experimentally, in order to obtain a correct testimony of its superiority, for their Lordships' approval. The Birkenhead Commissioners are also trying the experiment of lighting the cabins of their river steamers with gas, a quantity of which will be carried on board each steamer daily.

FISHKILL, N. Y.—Rosin-gas works, built by Providence Steam and Gas Pipe Company, under the superintendence of James E. Van Steenberg, Esq., cashier of the Fishkill Bank, actuated solely by a public spirited desire to benefit the town by this improvement. Meters from Code, Hopper & Gratz. About 3 miles of mains laid, gradually increasing and extending to the residences of the citizens.

GAS EXPLOSION AT ST. MARY'S CHURCH, OXFORD.—We learn from the London Builder that an explosion recently occurred at St. Mary's church, which resulted in the building being damaged to a very serious extent. The vice-chancellor's and proctor's seats were blown to some distance, almost to splinters, while some of the seats of the heads of the houses were nearly demolished, and those of the ladies were much injured. So great was the explosion that thirteen windows were greatly damaged, some having been entirely destroyed and others partially so. The large window over the Western entrance had even the lead surrounding the stone-work forced from it. It was at first supposed this accident was caused by the explosion of the hot water heating apparatus, but a report by Mr. Siemens, of London, attributes it to the gas escaping from a broken main, and which was ignited by a workman throwing down a lighted match.

GAS EXPLOSION IN NEW HAVEN, CONN.—While some workmen were digging around a gas pipe for the purpose of finding a leak, in New Haven, Conn., a few days ago, one of the men struck a stone with his pick, which produced a spark, igniting the gas, and causing a tremendous explosion, which scattered the earth in all directions, but, very fortunately, no one was injured.

GAS A PACIFICATOR.—A correspondent suggests that Major Anderson be advised to throw a red hot shot into the gas-holders at Charleston, S. C., in order to put a stop to the present turbulent condition of that town. There is no doubt that such a prescription would act as a quietus upon all within reach of its influence; but we are not yet prepared to consent to its being administered to our countrymen in South Carolina, however harshly they are treating us—really their good friends.

PATENTS.

Inventors are informed that Patents are procured at the Rooms of the AMERICAN GAS-LIGHT JOURNAL, through F. C. TREADWELL, JR., Esq., an experienced Patent Agent and Expert, in the United States, and in all other countries where Patent Laws are in force.

UNITED STATES.

- 4.—J. M. Connel, of Newark, Ohio, for an Improvement in Water Elevators.
I claim the arrangement of means for actuating the spout, M, which is hinged to the curb, as set forth, for operating the valve, P, and controlling the quantity and the flow of water in connection with the aperture board, J, as and for the purposes described.
- 8.—C. H. Dolbear, of Boston, Mass., for an Improvement in Lamps:
I claim, in a burner of the kind as specified, the application or arrangement of a filling tube, D, so as to pass down through the cap, A, substantially in manner, and for the purpose as set forth.
- 20.—Henry Leibert, of Norristown, Pa., for an Improvement in Lamps:
I claim forming an adjustable cap for lamps of a single flat piece of metal having projections, a, f, and b, and recesses of the shape and arrangement described, the said piece of metal being bent as specified, so as to form the body of the cap and so that the two projections, c, e, shall form a spring clip for grasping the tube of the lamp in the manner set forth.
- 41.—Stephen R. Weeden, of Providence, R. I., for an Improvement in Lamp and Caudle Wicks:
I claim the wick composed of a single strand encased in a series of single loops as described.
- 45.—C. A. Wortendyke, of Godwiville, N. J., for an Improvement in Candle Wicks:
I claim the wick produced by the system of spinning and twisting specified.
- 51.—F. G. Johnson, of Brooklyn, N. Y., assigns to himself, W. T. Milliken, of Morrisania, N. Y., and E. Jones, of New York City, for an Improvement in Water Meters:
I claim the alternate combination of the several (two or more) sections, 1, 2, 3, of the water passages with the several (two or more) intervening blade wheels, 10, 20, 30, substantially in the manner and for the purpose set forth.
- 96.—James Adams, of New York City, for an Improvement in Hydrometers:
I claim the construction of a hydrometer or other instrument for ascertaining the specific gravity of liquids, substantially as described, by combining with its bulb and lower part, made of hard vulcanized india-rubber or gutta-percha, a graduated upper stem made of metal.
- 99.—Amброse E. Barnard, of Paterson, N. J., for an Improved Hose Coupling:
I claim, first, The india-rubber ring, C, made in the manner described, which constitutes an automatic or self-acting washer.
Second, in combination with the same, the bush, A, cap, B, spring catches, D, and clamp ring, E, arranged and operated as set forth and for the purpose described.
- 107.—T. B. De Forest, of Birmingham, Ct., for an Improved Instrument for Cleaning Lamp Chimneys:
I claim a wiping instrument for lamp chimneys, formed by the combination with a lower part, of the peculiar form of a removable fibrous envelope, operating substantially as set forth.
- 135.—William Braidwood, of Mount Vernon, N. Y., and James Whiting, of Brooklyn, N. Y., assigns to Thos. Holmes, of said Brooklyn, for an improvement in Operating Slide Valves of Engines and Pumps:
We claim the combination of the sliding seating surfaces, f, f', with the valve, h, or h', the packing being constructed as specified, so that the valve covers the openings through which the steam, gas, and renders separate packings or stuffing boxes unnecessary, as set forth.