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COMMONWEALTH

vs.

THE WORCESTER GAS LIGHT COMPANY.

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Indictment for Nuisance.

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REPORTED BY EDWARD W. LINCOLN, ESQ.

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WORCESTER :  
PRINTED BY C. B. WEBB,  
206 Main Street.  
1855.

TRIAL

COMMONWEALTH

THE HONORABLE THE JUSTICE OF THE PEACE

Indictment for

of the County of

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## PREFACE.

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In Appendix, marked A., will be found a certified copy, from the City Records, which was offered in evidence by Counsel for Defendants, during the trial, and ruled inadmissible by the Court. It is now published, to show the action of the Board of Health upon the only complaint, against the Gas Company, ever brought before that Board.

The Defendants had obtained the Depositions of several very eminent scientific gentlemen, physicians and chemists, of Philadelphia, which, in consideration of the length of the trial and the abundance of oral testimony, it was not thought necessary to use. The length of this Report prevents their publication, in full. As they contain much, however, that will wholly relieve the public from any lurking apprehension of injury to health, whether resulting from the inhalation of the Gas, or from the vapors and exhalations consequent upon its manufacture, large extracts from them bearing upon that subject have been incorporated in Appendix, marked B.

The Reporter acknowledges his deep sense of obligation to the District Attorney and the Counsel for Defendants, for their aid in revising the Report; and also to His Honor, for a copy of his Charge to the Jury.

It is claimed that the Report is as accurate as it could be made with due care and impartiality.

E. W. L.

# COURT OF COMMON PLEAS.

## CRIMINAL TERM.

HIS HONOR HORATIO BYINGTON, JUSTICE C. C. P.

WILLIAM A. SMITH, CLERK.

IN THE CASE OF  
THE COMMONWEALTH OF MASSACHUSETTS

vs.

THE WORCESTER GAS LIGHT COMPANY.

### INDICTMENT FOR NUISANCE.

P. EMORY ALDRICH, DISTRICT ATTORNEY, for the Commonwealth.

DWIGHT FOSTER, Esq., for Defendants.

THIS Indictment was found by the Grand Jury, at the May Term of the Court, A. D. 1854, and was continued, for trial, to the September Term, and thereafter, by adjournment, to the 14th day of November.

And now, upon the 14th day of November, the Court came in and proceeded to empanel a jury for the trial of said indictment.

John Hammond of Worcester, was excused, having formed an opinion in the case. The following jurors were then sworn :

Foreman, Peter Fay of Southborough, Augustus A. Allen of Shrewsbury, Holdridge Ammidown of Southbridge, Samuel Fowler of Northbridge, Gilbert Green of Clinton, Charles Hersey of Worcester, David N. Jacobs of Dudley, Artemas Merriam of Westminster, Alfred Morse of Grafton, Charles B. Temple of Princeton, Alexander Thayer of Worcester, Jacob Willis of Milford.

The Indictment was then read by the Clerk, as follows :

COMMONWEALTH OF MASSACHUSETTS.

WORCESTER, SS.

At a Court of Common Pleas, begun and holden at Worcester, within and for the County of Worcester, on the last Monday of May in the year of our Lord one thousand eight hundred and fifty-four :

The Jurors for the Commonwealth aforesaid on their oath present, that the Worcester Gas Light Company, a corporation established by the laws of the Commonwealth aforesaid for the purpose of manufacturing and selling Gas in the City of Worcester, in the County of Worcester aforesaid, on the first day of August in the year of our Lord one thousand eight hundred and fifty-three, at Worcester aforesaid, in the County aforesaid—near to a public street and common highway there—and also near to the dwelling houses of divers citizens there situate and being, did unlawfully and injuriously erect and maintain and cause to be erected, built and maintained a certain building and buildings for the purpose of manufacturing Gas therein, and did unlawfully and injuriously make, set up and place, and did cause and procure to be made, set up and placed in said buildings and around and near them divers furnaces, stoves, cauldrons, pipes and gasometers, retorts and reservoirs, to wit : nine furnaces, one gasometer, nine retorts and sundry pipes and cauldrons and one reservoir, for the purpose of heating coal and other materials used in the manufacture of Gas and for conducting the Gas so manufactured to different parts of the City aforesaid and for receiving the refuse or drainage water so called ; and the said Gas Company did on the day and year last aforesaid, and on divers days and times between that day and the day of making this Indictment, at Worcester aforesaid, in the County aforesaid, unlawfully and injuriously heat coal and manufacture Gas as aforesaid and did cause the coal to be so heated in the retorts and by the said furnace and the Gas so manufactured and conducted in the pipes so made, set up and placed in and round said building or buildings as aforesaid and did then and there make and manufacture, and did cause and procure to be made and manufactured divers large quantities of Gas from the said coal and other materials by reason of which said premises divers noisome and unwholsome smokes, vapors, smells and stenches on said days and times aforesaid were emitted and issued from said buildings, so that the air on the said several days and times aforesaid at Worcester aforesaid was greatly filled and impregnated with smokes, vapors, smells, and stenches, and was rendered and was corrupted and made offensive and unwholsome.

And also that the Gas escaping from the pipes, gasometer and retorts aforesaid and the drainage water aforesaid flowing from the said reservoir were diffused through the ground on the several days and times at Worcester aforesaid so as to impregnate the water in sundry wells and springs

and make the water in said wells and springs unwholesome, offensive and wholly unfit for use, to the great and common nuisance of all the citizens of said Commonwealth there residing and being.

A true bill. (Signed.) LEONARD BURRAGE, Foreman.  
P. EMORY ALDRICH, Dis. Att'y.

To this Indictment, the Defendants pleaded "Not Guilty." Upon this plea, issue is joined.

ALDRICH, Dis. Att'y, opened the case for the Commonwealth, by remarking to the jury that the importance of the case cannot be overestimated. It is not too much to say, that the future growth and prosperity of this City require that Gas should be manufactured and conducted over its limits. But then, the business should be properly conducted,—so as not to be a nuisance. Now, a nuisance may be either public or private. Cites authorities to show the distinction.

The learned Attorney further argues that that is a nuisance which renders the enjoyment of life and property uncomfortable, though it does not injure health.

Also, that the convenience of having Gas cannot compensate its offensiveness. Alleges the impossibility of manufacturing Gas without rendering the proximity almost insupportable. Contends that health has been impaired—people been annoyed in their houses, and in the streets. Wells have been made useless; one individual having had seven spoiled. Has evidence to prove these allegations.

The District Attorney next proceeded to explain the process of manufacture, illustrating his description by drawings in "Clegg on Coal Gas." Contends that impurities must continually escape—from the retorts—from the condensers—from the purifiers, and at almost every stage of the process. Especially, he alleges, must that be the case when the retorts are opened for discharge. Also, the chimney, being only sixty feet high, is too low to carry off, effectually, the smoke, noxious gases, &c., which are constantly emitted.

After adverting to a few additional points, of less importance, the learned Attorney concluded his brief and able address, and proceeded to call his list of witnesses.

#### EVIDENCE FOR THE COMMONWEALTH.

ELISHA BROAD, *sworn and examined*.—I reside at No. 76 Main Street. Lived at the Nashua Hotel during the time alleged in the indictment; occupied the house for three years; the house is ten to fifteen feet from the Gas Works, and is divided from them by a board fence ten feet high. At times there was a disagreeable odor from the

Works—sometimes once or twice a week, and then not oftener than once a month; it depended on the direction of the wind. Sometimes noticed it in the house, of which we kept the windows shut, to exclude the odor. The odor was like that from gas tar-water. Have had boarders leave because of the odors; don't know that it affected my health. The odor would last from an hour to a half day—usually a short time. In the autumn of 1853, I noticed such an offensive smell in my cellar; found that it came through the cellar-wall; it was not from the gas pipe in the cellar. Have noticed it, out of the house, when the tar water was carried off; could tell when that water was pumped out. Think the air in the neighborhood was different from what it was at a little distance. The yard was not covered over then as it now is. Have seen the tar water pumped into a close box wagon, in the yard. Have seen the retorts discharged; never noticed any particular effect from that. The coke was carried out into the yard—never saw water thrown on it.

*Cross examined.*—I had a verbal lease, the rent payable quarterly. Left April 1, 1854. Remember taking some ashes from the yard of the Works, to bank up my cellar walls; put it on the north side; cannot tell if this was before or after I noticed the smell; did not mention the smell to any one. The tank for tar water is underneath the ground and covered. Some boarders, on that side of the house, complained that they could not hoist the windows. One, I think, was named Green, a machinist—another, Elliott, or Ellis. Some left the house on this account.

GEORGE F. HOAR, *sworn and examined.*—Reside in Worcester, in the neighborhood of the Works. Have passed the Works almost every day during the time laid in the indictment. Have noticed a very strong and offensive odor. One Sunday evening, in May, 1854, Mr. Harrison Bliss called my attention to an odor which would have made any person sick; it would have sickened me in ten minutes. Know of no odor that will rank with it; it produced nausea. Never noticed it so bad at any other time. Have noticed it at noon and at night. Members of my family have made it a subject of discussion.

*Cross examined.*—Bought my land, in the vicinity, in May 1853. The Gas Works existed before I purchased and I was aware of it. Bought, to make my residence there. The evening that I was with Bliss was rainy and drizzly—the wind east. Don't doubt that the smell came from the Works. My estate is some distance from the Works and is unaffected by their proximity. Don't know from what part of the Works the smell came.

SAMUEL A. KNOX, *sworn and examined*.—Have resided at No. 4 Lincoln Street, Worcester, for four years. The house is on the opposite side to the Gas Works, ten or fifteen rods off. Passed the Works four or five times daily. In an east wind have sometimes noticed an odor from the Works. Have noticed an odor that would be offensive; oftenest, at morning, noon, and night. Have noticed it in the yard of my house; never experienced sickening effects from it, and never saw any one that had. I make plow patterns for Ruggles, Nourse & Mason.

*Cross examined*.—Have no written lease of my house; it belongs to Harrison Bliss. Noticed the odor, in an east wind, but not often. My place of business is at the Court Mills, south of the Works—never noticed any odor there, unless when there was some temporary cause.

FOSTER, for Def'ts, proposed to ask the witness, if, upon the whole, he regarded the Gas Works as a public nuisance.

ALDRICH, Dis. Att'y, objected,—that it was the province of the Jury to pass upon that question.

The question was not allowed by the Court.

SILAS J. BRIMHALL, *sworn and examined*.—Reside on Lincoln street in Worcester, about thirty rods from the Gas Works, which I pass as often as five times daily. Have noticed a very strong smell at various times when passing the Works, mostly when going to my work at the Court Mills in the morning. Have a family; have not noticed the smell at my house; have had no trouble with the water at my house. The smell is not very agreeable; I have noticed the odor at the Court Mills, coming from the water, under the shop, up through the floor, when the pond was drawn off; could notice it at other times; there used to be a drain from the Gas Works into the brook. About two hundred men work in and about the mills; some of them, working in the lower room, would be more liable to smell this odor than others. I noticed the odor, when passing, say once a week, or thrice a fortnight. It has affected me worse at the shop, than in passing, sickening me at the stomach; the odor at the shop is full as strong as at the side walk opposite the Works; until I get opposite, passing, I don't notice it much.

*Cross examined*.—Have lived, where I now am, four years. Board with my father-in-law, John Phelps. James White is agent for the owner of the house. I work for Ruggles, Nourse & Mason, about the water and over the dam; noticed the trouble from the low stage of the pond at least two years ago; never noticed it before the drain into the brook was made. We use the water for washing; it is forced up

into the fourth story, and drawn thence, down, through a faucet ; should say that this smell in the water was habitual.

HENRY PHELPS, *sworn and examined*.—Live in Mt. Vernon Place, in Mt. Vernon Street, Worcester, not a half mile from the Gas Works ; have to pass the Works five or six times daily ; have frequently noticed the smell of the ammoniacal tar water when they were pumping it out ; it was offensive to me ; noticed it as often as once a week ; as often as I passed, and I pass at all times ; am not troubled at my house.

*Cross examined*.—Own the place where I live. The natural approach is by the Works. Bought the place in August 1851, after the establishment of the Gas Works. Have passed when they were carting off the ammoniacal liquor ; did not notice the smell particularly at such times.

BETSEY WHITNEY, *sworn and examined*.—Live right opposite the Works, on the same side of the street, and in the nearest house ; have lived there over thirty years. My family consists of two ; I suffer great inconvenience from the Gas Works. Our well has not been fit to use for a whole year ; when boiled, the water gives out a disagreeable odor ; cannot make tea nor coffee, nor eat anything cooked in it. The well-water was once excellent ; it has been bad for three years ; it was spoiled by the Gas Works ; it has been pumped and cleaned out, but is as bad now as ever ; it is worse this summer than ever. The odors in the air are very bad ; they affect my lungs, and keep me coughing ; cannot shut them out by closing my doors and windows. Do not use gas in my house. The odors smell and affect me most when they are kindling up in the morning and evening.

*Cross examined*.—Half of this well belongs to the Artemas Ward estate ; it was spoilt in the first year of the Gas Works ; I think it was pumped out two years ago. The water has always been bad since the Works were established, except when the well was first cleaned. Mr. Lazell once paid me some money on account of this damage. Dr. Green is my physician. There is one house, occupied by Mr. Cook, between my house and the Works. Have been to the neighbors for water. The Gas Company supplied me with some. Mr. Bliss has supplied me with water also. Knew that the gas folks were forbidden the use of the water in the pasture belonging to Mr. Goodsir.

*Re-examined*.—The Gas Company supplied me with water in the spring, for not more than five weeks ; they have not supplied any for two months.

POLLY WHITNEY, *sworn and examined*.—Have heard the testimony

of my sister Betsey, and think it correct; my health has not been affected by the Works; the smell is disagreeable and produces occasional headache.

ISAAC DAVIS, *sworn and examined*.—Reside in Worcester; own no real estate on Lincoln street; own some near the Court Mills; within the period complained of, have frequently had occasion to pass the Works. Sometimes would notice a disagreeable smell and at other times would not smell anything. The gas has entirely ruined five or six wells of mine; I had another dug, and that was ruined. The six were ruined before August 1, 1853; the last was sunk ten feet deeper and stoned with new stones—still, it is not fit to use. These wells are twenty-five or thirty rods from the Gas Works, and lower. The new work on the wells was managed by Lewis Thayer.

*Cross examined*.—I mean French Row in the rear of Bangs Block. All these wells were affected in the course of six or eight months after the establishment of the Gas Works; the wells were all dug in the cellar originally—say fifty feet from the stream. The last well was two hundred feet off, and became as bad as the others; don't know the cause, but it was attributed to the discharge, by the Gas Company, of their refuse water into the brook. Had my last well dug some two years since; think the drains of the block empty into the brook, but am not sure; cannot say how many privies there are—but think there are three double ones; they are three rods from the wells. The City Marshal served a notice on me to clean out these privies. The contents of the privies have always been carried off, to my farm; am sure of this, because I have paid for doing it; am sure, from tasting, that the wells were injured by gas. The gas may escape from the pipes on Main street—say five rods off. Think the house drains now lead into the brook.

HARRISON BLISS, *sworn and examined*.—Reside on Lincoln street, opposite the Gas Works; have lived there twelve or thirteen years; there are eight persons in my family; there are fifty to seventy-five families above me, on Lincoln street, having occasion to pass the Works. The process of making gas is kept up night and day; there are two furnaces and six retorts. I should estimate the height of the chimney at less than sixty feet; never have been present when the retorts were opened; there was no roof over the yard before the finding of this indictment; the roof was built in July last; there was nothing, before the roof was built, to prevent the smoke, gas, &c., rising directly into the air. In a south east wind, or in sultry, dog-day weather, there is a very bad atmosphere; cannot keep the win-

dows of my house open; all my family complain of the effects; it chokes them and makes them cough. Could not say that it has caused sickness. On warm days, and with the wind from the south east, the windows must be closed. Have noticed the odor when passing, in the street; noticed it thus very commonly; the nature of the odor is similar to that from gas and from tar; recollect the time spoken of by Mr. Hoar. Have very frequently observed it as strong. It has spoiled the water of the well at my second house, north of where I live; it was spoilt long ago—before last August. The water is not fit for use. The well has been cleaned out. When my family were sick, last summer, and the gas came into the house, the family, my sick child and the nurse, were unpleasantly affected; have an Irish girl in my family, who is nervous; she complains of it. Think the prevalence of the odor is governed by the atmosphere.

*Question by District Attorney.*—Do you know the location of the tank for ammoniacal water?

*FOSTER, for Defendants.*—Objected to this question—because the allegations of the indictment are limited to offensive odors issuing from the “buildings” and do not include any nuisance which might, by possibility, arise from a reservoir in the yard and outside of the “buildings.” And counsel cited, Commonwealth vs. Brown, 13 Metcalf’s Reports, p. 365.

The Court sustained the objection, but the evidence was admitted, upon the suggestion of counsel for defendants, that they preferred an investigation of the whole case, though they wished to reserve the benefit of the exception.

*Examination of Bliss continued.*—Noticed a great stench every time that the ammoniacal water was removed. Could distinguish the stench of this water from that arising from the Gas house; don’t know how often it is removed.

*Cross examined.*—Own three houses in that neighborhood; I live in the first, and Mr Knox in the second. There are three families in the third. Mr. Stratton’s is one: he has lived there two or three years. Mr. Fletcher’s is another; he moved there in April. Mr. Whittemore preceded Mr. Fletcher. Mr. Fisk’s is the third, and has been there since April. There are two wells on the whole estate; my own is good and always has been; it is the nearest of the two to the Gas Works. The further well has been injured these three years; the Gas Company cleaned it out two or three times; think I have heard that a tom-cat was taken out, in a state of decomposition. Mr. Blake, Agent of the Company, supplied the two houses with aqueduct

water; think that the ammoniacal water was drained into the brook at the time the wells were spoilt; don't think that the wells were hurt in that way. Rent the house to Knox for \$150, per annum. Consider it a small rent. Have contemplated erecting a brick block there; have not advised Knox to refrain from introducing gas into the house because I contemplated building said block. The ammoniacal water was first carried off in a box-wagon. Have never seen any iron cart; think that the water is carted off in the night. Have distinguished a different odor from the process of wetting the coke. Have been instrumental in getting up this prosecution. For three or four years frequently consulted with Mr. Bickford about it; think not, however, since he was a member of the Grand Jury; certainly not since being aware that he was a member.

EDWARD EARLE, *affirmed and examined*.—Reside in Worcester, about forty to sixty rods from the Gas Works; have occasion to pass the Works very frequently, though my business does not lead me that way. Last spring I noticed a very offensive odor—also in June. It was very suffocating. Am not given to nausea, but don't doubt that it thus affected my wife. Her name is Ann B. Notice it more often at my own house than elsewhere; have frequently got up at night, and closed my windows, the odor was so perceptible. Especially was this the case in a north west wind; I then got a good dose. General Heard's house is in a line between me and the Works; the smell at my house is more like that from gas-water. Have used gas in my house for three years, and in my card-factory from the first; there are seven or eight in my family.

*Cross examined*.—Have sold off part of the land, east of my house, for building lots. Some that I sold on the Turnpike, may be nearer the Works than my house, but none of the rest. Half of the lots have been sold since 1849. Antiquarian Hall is in a direct line between my house and the Works. General Heard's house is also between the Works and my house, but think my house is a little the highest; never noticed the odor except when the wind was north west.

JOSEPH H. WALKER, *sworn and examined*.—Reside in Worcester, on Park street. My place of business is in the brick building, on Lincoln Square, opposite the Antiquarian Hall, and about twelve rods from the Gas Works. Am a manufacturer of boots and shoes, and, when business is good, employ sixty or seventy-five hands. Have very frequently smelt the odor from the Gas Works in the counting room, though not so much this summer. Have not observed it so much since they adopted the new mode of carrying off the ammoniacal

water; the gas has spoilt a spring in our cellar; it was spoilt before August, 1853. Have noticed a gas taste and smell in the water; the water runs into this spring, from the direction of the Gas Works; the spring is thirteen feet from the north east corner of the building; the old drain of the Gas Works run into the mill brook on the north side of Lincoln street; think that the spring is lower than the bed of the brook; the mouth of the drain, from the Gas Works into the brook, was about seven rods from the spring; the water leaches rapidly into the spring from the north east corner; the soil around the spring is coarse gravel; there can be no other cause of injury than the proximity of the Gas Works. Have noticed odors in passing by the Works; have been a member of the Board of Health. Examined Col. Davis's French Row, and, finding the privies in a bad condition, ordered them cleaned.

*Cross examined.*—The privies were in a filthy condition; they were merely holes dug in the soil. First occupied our store three or four years ago; think the spring was spoiled six months afterwards; have smelt the odors, lately, less than formerly; the stopping of drainage into the brook was the reason assigned; the spring is thirty feet from the gutters in Summer street; Mr. Salisbury owns the building; the Worcester and Nashua Railroad Company owned it first. Am not aware of any damage or trouble to the Gas Company on Summer street, from mismanagement of their former agent. We burn the refuse leather in our establishment. We notice at our shop the smoke from Ruggles, Nourse & Mason's works. The odors which come from Ruggles, Nourse & Mason's works are so many that I would not like to swear that I can distinguish them from the gas odors. I know of no complaint against the Gas Company, since I have been a member of the Board of Health; that Board does not limit its action to cases of complaint brought before it.

*Re-examined.*—I meant to be understood that some odors do come from the Gas Works; but that so many come from Ruggles, Nourse & Mason's, that I would not undertake to distinguish between them.

A. S. PUTNAM, *sworn and examined.*—Have resided on Lincoln street since April 1, 1854; my house is the second on the left, north east. Pass the Gas Works from four to six times daily. Have noticed odors before coming to, when opposite, and when beyond the Works. The smell was disagreeable, but did not nauseate. Sometimes smelt it two or three rods off. May have smelt it once or twice a week; don't think that I ever noticed it at my house; had no water from April to May. When the water in my well is pumped, I smell the odor of gas.

*Cross examined.*—Harrison Bliss owns the house. It is the second. Have used aqueduct water. Have used the pump of Knox's well, which connects with Bliss's well, when not using aqueduct water.—Never had my well pumped out. Knox's well is the same that is used by Harrison Bliss's family. My well is under a piazza and I think is not open. Have worked for Ruggles, Nourse & Mason for a year and a half. Never smelt anything of the Gas Works at their shops.

CHARLES W. ENGLE, *sworn and examined.*—Lived on Lincoln Street between August 1853 and May 1854; my house was twenty-five rods from the Gas Works. My place of business was on Pleasant Street; passed the Works four times, daily, and noticed occasionally a very strong, offensive smell; would notice it two or three times a week, if the wind was south; noticed it on no particular day or hour more than others; noticed it frequently at my house and it smelt the same as when I was passing. My family consists of four; it has not been a very frequent subject of complaint with them. Don't think it has affected the water in my well.

*Cross examined.*—Resided there some seven or eight years; sold the place because my business was at the other end of the street; sold to Eli Thayer. It was an occasional, not a constant, annoyance. The Widow Geer lived next to me—Artemas Ward was next to her, and Miss Whitney beyond him and nearest to the works. Don't think I made any sacrifice of my property when I sold, because the Gas Works were there; the property kept rising in value, perhaps in spite of them. Mr. Allen and Mr. Skinner now occupy the house.

OLIVER K. EARLE, *affirmed and examined.*—Live on Edward Street, one-eighth of a mile south-east of the Works. My business takes me opposite the Works about once a day; have suffered no great inconvenience from them; have smelt the odors at times; once or twice they were very offensive; never was affected by them at my house; my business was at the Nashua Rail Road Depot; used to stay from ten to twenty minutes; have noticed the odors, though not frequently, when riding, by the Works, up Lincoln street; have been at the Depot many times and not smelt the odors at all.

*Cross examined.*—Have been in the habit of going to the Depot for five years—was there once or twice when the odors were very offensive.

WILLIAM T. ALLEN, *sworn and examined.*—Have lived on Lincoln Street since last October; before that I lived on Hanover Street. I work at Joseph Walker's. Have noticed the odors, at times, in the

shop in a north east wind and in damp weather, and also when the waste water was carted off; have not observed any odors from the waste water since the new cart was procured; I have noticed them from the Works; the odors are not sickening to me, but disagreeable. Noticed them sometimes once a week, and sometimes once in ten days. Never noticed them when I was passing in dry weather—only in wet. Never knew any one made sick by the odors. Smelt them in the two north rooms; cannot say how long they would continue at any one time.

*Cross examined.*—I live at No. 16 Lincoln Street, in the second brick block; Mr. Burt is the owner and James White the agent; have been at Walker's since Oct. 1851. The present cart for waste water is a round iron vessel like a boiler. Think the smell of the old cart arose from leakage. It would be offensive, when spilled, for hours, and until evaporated. The water in the Spring at the shop was spoiled in the spring of 1852. At my house the water is good. Remember a leak in the main on Summer Street, say twenty rods south of the spring in the shop cellar.

APPLETON WALKER, *sworn and examined.*—I live on Lincoln Street, seventy-five rods from the Works; pass them six times a day; often smell offensive odors; should think they were owing to a damp state of the atmosphere; the odors do not produce nausea, headache, &c, but are simply disagreeable; have smelt them in the street before my house; have never smelt any odor at my house. The street is a highway, much traveled, leading to Boylston and Shrewsbury. Have lived there since February 1849. Think that from seventy-five to one hundred families must pass by the Works. There is no particular hour of noticing it; at times it is *very* offensive—generally it is not *very* offensive. In damp weather have seen the smoke from the chimney settle down; consider the chimney about seventy feet high.

*Cross examined.*—Own the house I live in—built it myself. During one season I noticed the smell in the street before my house several times; think likely there was a leak in the pipes. Live on the west side of the street, between Mr. Wheeler and Mr. Conant.

EDWIN CONANT, *sworn and examined.*—Reside on Lincoln Street, fifty rods from the Works; have occasionally noticed unpleasant smells in the early part of the day and early in the evening; this was perhaps once a week; noticed them as I was passing, and oftener when I was going south from my house, than when coming north. The main Gas building is situated just on the line of the street. I have noticed the odor most when the weather was damp; the morning smell

is like that in rooms that are lighted with gas—that noticed in the evening similar to a skunk.

*Question by the Court.*—Esteem the latter smell to be the worst.

Have not been made sick by the smells. Have usually five in my family. Was inside the Works once, some two or three years ago. Have not noticed the issue from the chimney.

*Cross examined.*—Smell it about as often in the morning as in the evening.

JOHN P. DRYDEN, *sworn and examined.*—Live on Lincoln Street, from fifteen to twenty rods above the Works, which I pass from four to six times daily. Have smelt them occasionally. Have not smelt them, in my house, within the period alleged in the indictment. Have smelt them in my yard. Sometimes they were very offensive.

*Cross examined.*—May have smelt them once or twice a week. Live on the same side of the street as the Works and north of Engley.

JOHN H. MARTIN, *sworn and examined.*—Have boarded, on Lincoln Street, at the Nashua House, since April 1, 1854. At different times, have noticed a smell. I live in the south-east part of the house. It has been offensive two or three times a week. It has not sickened me.

*Cross examined.*—I board by the month, and am under no contract to stay.

WILLIAM C. THOMPSON, *sworn and examined.*—Live on Lincoln Street, about seventy rods above the Works. At one time, last spring, the smell was very offensive at my house. Have noticed it, occasionally, when passing, but never observed it so bad as at that one time. It produces no disagreeable effect but smell.

*Cross examined.*—I moved into my house in September, 1852. Mr. Hooper built my house and, at the same time, the house next north of me. Presume that the Gas Works were then established. Mr. Hooper has sold his house since I went there.

ELI GOULDING, *sworn and examined.*—Live thirty or forty rods north-east of the Gas Works, on what is called Kendall Hill. Have been annoyed, in person, at my house, a few times, by disagreeable smells. My family have been annoyed frequently. My business is near the Gas Works, and it is not uncommon for me to experience disagreeable smells when passing. It does not sicken me, but my wife, Martha, has complained. I built French Block for Col. Davis. Two years ago, the wells there were good. They have been spoilt by gas.

*Cross examined.*—Should think it was ten years since I built French Block. There is an extensive Brick yard, in the rear of the Gas

Works, owned by me and worked by Gen. Hobbs. Don't *know* that gas spoils the wells at French Row. Greenleaf, who had the care of the buildings, told me so.

JAMES E. WOOD, *sworn and examined*.—I drive an Omnibus. Have occupied the Nashua House since April 1, 1854. Been troubled somewhat by vapors from the Works, in drying clothes, and by the scent coming into the house. Use gas in the house. Know that it does not escape from the pipes. Keep the house closed on the north side, to avoid the smell and dirt of the Works. My boarders have complained.

*Cross examined*.—Lived in town for a year and a half before taking the hotel. Have a lease for one or three years. The house has been fall this summer. Have made a proposition to the landlords to enlarge the house. There is only one permanent boarder on the north side: the other rooms are kept for transient custom. It has not been decided whether to enlarge the house or not. Warren Lazell, Dr. Sargent, Mr. Blake of Boston, and Messrs. L. & S. P. Harrington, own the house. I wanted more room in the rear of the house.

E. H. BROAD, *sworn and examined*.—I lived in the Nashua House a part of the time when my father kept it. Changed my own room twice, to avoid the gas. It was very offensive to me. It did not sicken me, but the smell was bad. The smell depended very much upon the weather. In damp, heavy weather, would notice it nearly all day. Horses were once taken away from the barn, on account of the gas. Have smelt it in the cellar.

*Cross examined*.—Lived there three winters and one summer—that of 1853. Mr. D. P. Cutting's horses were moved from the barn. He said that one died.

Court adjourned, at 6, P. M.

Wednesday, Nov. 15.—The Court came in at 9, A. M., when the District Attorney resumed, by calling—

GEORGE C. MERRILL, *sworn and examined*.—I live on Exchange Street. Lived at the time alleged, in the second house to the left of Lincoln Street, owned by Mr. Bliss. Boarded with my mother, and worked at Merrifield's buildings. Passed the Works six times a day. Noticed a very offensive smell nearly every time that I passed; this was about a year ago. Sometimes it was *very* offensive; not so *very* offensive, usually. Sometimes,—not very often,—have noticed it at my house; never observed it inside the house. Our well was unfit for use. When I would start the pump, the water would be very offensive; it was

not bad when I first went there—but, in a month, it was affected by the gas; we did not use it at all. There were three in my mother's family.

*Cross examined.*—The well was at our house. We got water from the aqueduct for a short time. Did not use the aqueduct water all the time. We used the well only one month. Think the well was not pumped out. The house is owned by Bliss and is the next to that in which he lives. Bliss told me when I went there, that I could use the well; but I could not. Went there in November, 1853, and left in April, 1854. Had the aqueduct water when I first went there.

ELIZA A. KNOX, *sworn and examined.*—Am wife of Samuel A. Knox. Have suffered annoyance from the smell of the Gas Works, both in passing, and at my house. Sometimes it was worse than at others. Generally, when the wind was south-east. Think it affected my lungs, making it difficult to breathe. Noticed this effect on my lungs more when I first went there than now. It caused some headache. My lungs were affected, whenever I was exposed to it.

*Cross examined.*—Live next Mr. Bliss and have been there for two years. For two years before, I lived in the house next beyond. Lived in the neighborhood before the Works were built, and have moved once, since they were built, nearer them. I was more affected by them in my first house, farthest from the Works, which is also owned by Mr. Bliss. Think there was more of it in the first house. Noticed it as often as once a week: though, only when the wind was south-east. Dont use gas in my house. My present house is a better one, and that was one reason for moving.

DANIEL WARD, *sworn and examined.*—I board on Main Street, at present. Used often to pass the Gas Works and smelt the odor from them. It is disagreeable to me. Am acquainted with the Ward estate. The water there was formerly good. The well is the same spoken of by Miss Whitney. Know nothing much more disagreeable than this smell. While my father was living, I would notice the smell at the house, about eight or ten rods from the Works.

*Cross examined.*—The well belonged to two estates. My father died in November, 1850. The well was spoiled in the spring of 1850. [Witness here identified the signature of his father to a receipt in full for damages to a date therein expressed. Foster, for Defendants, offered the receipt in evidence.] The last time that I tried the water was in February last, and it was then bad. The Gas Company cleaned out the well two or three times afterwards. It would be good, for a while; and then, after heavy rains, grow as bad as ever. The smell

in passing the Works, and at the house, was rather frequent, so that I cannot specify any particular occasion. Have taken no part in applying to the City Government for removal of the Gas Works. Have known of no such application.

HENRIETTA GOULDING, *sworn and examined*.—Am daughter of Eli Goulding and live with my father. I have experienced inconvenience at the house. This was not very often. It was very offensive. I noticed it frequently when passing. The odor was the same in both places. It does not affect my health, at all. Sometimes, but seldom, notice it at home, when the window towards the Works is open. Our family have complained of it.

*Cross examined*.—Have lived there about seven years. Father's brick yard is nearer to us than are the works. I usually pass down Lincoln Street by the Works.

ANN L. PUTNAM, *sworn and examined*.—Live on Lincoln Street, in the same house with Mrs. Knox, in the north part. Did not notice it at the house, during the month of April last. Noticed it in the water. Mrs. Knox lives in the south part. My windows open both north and south. I live in the ell. I can see the Works from my windows. Have noticed a smell, when passing—not much.

*Cross examined*.—Never used the well—the one under the piazza.

MARTHA GOULDING, *sworn and examined*.—Am wife of Eli Goulding. Can confirm statements of my daughter. Our visitors have complained of the smell. Have noticed it both at home and when passing. Seldom noticed it at home.

BETSEY ANN ENGLE, *sworn and examined*.—Wife of C. W. Engley. Lived on Lincoln Street during the time alleged. Would notice a bad smell at the house. Cannot tell how often; suppose I got accustomed to it. There was the same smell when passing. When the odor was strong, at home, it caused a sort of choking; no headache.

*Cross examined*.—Did not remove because of the Gas Works, but on account of husband's business. Think there was more smell long ago than lately.

ELISHA FULLER, *sworn and examined*.—Live on Main Street, in the north end of Salisbury Block. Occasionally, in a north-east wind, have perceived an unpleasant smell. It produced nausea, rendering it necessary to shut the windows. Have noticed an odor when passing. Have closed the windows at the request of my family. Was not very frequently annoyed, at home, last spring; and not at all in autumn. My house fronts east and west. Can see the railroad crossing, but not the Works.

*Cross examined.*—The shop of Ruggles, Nourse & Mason is directly in my rear. There are sometimes odors from their shop.

WILLIAM ELLIS, *sworn and examined.*—I boarded at the Nashua House during the time alleged. There was a considerable smell, which was sometimes disagreeable.

SAMUEL STRATTON, *sworn and examined.*—Have lived in the third house on Lincoln Street two years last September. Have noticed a disagreeable smell from the Works, when passing. It produced no sickness. Did not notice it at my house.

*Cross examined.*—Live in Bliss's second house. Would smell it when passing, perhaps once a week. Passed from two to six times daily.

ALONZO HILL, *sworn and examined.*—My house, in Lincoln Street, is one hundred rods above the Gas Works. Occasionally at my house, my family complained of being sick from the odors. When passing, have sometimes noticed it; occasionally not at all. I find it offensive. My wife has complained more than any one.

*Cross examined.*—Before the establishment of the Gas Works, there was a rum tavern and bowling alley in the same place. Think the stable was stopped, when the Works commenced. Have noticed, in Lincoln Square, smoke from the railroad—the smell of burning leather, and perhaps smells from Ruggles, Nourse & Mason's shop. Am of impression that there was a bad leak, on Lincoln Street, before the incorporation of the present company.

WILLIAM E. DRURY, *sworn and examined.*—Live on Grove street, one hundred and fifty rods from the Works. Have been employed close by the Gas Works, in Goulding's lumber yard, for a year past. Have never experienced any inconvenience or annoyance from the Works. [*Aside, by the Dist. Attorney: What then are you here for?*]

*Cross examined.*—I work for Eli Goulding. His business is all around everywhere. He owns back of the Gas Works.

JOHN HAMMOND, *sworn and examined.*—I live three-fourths of a mile west of the Works. Have noticed the smell within the time alleged. Last May, I smelt it very plain, on Mr. Davis's land, about sixty rods from the Works. Have noticed it in the Square, frequently. Noticed it on the hill, west, and it was offensive. Have not been made sick within the time alleged. Noticed the smell more in damp weather and when the water was carted up the hill, west. Have experienced an oppressive effect on my lungs.

*Cross examined.*—The ammoniacal water was carted upon Gov. Lincoln's farm, for manure. I referred to Samuel Davis. He told

me that he had been using some of that ammoniacal water, for manure. This was fifty to a hundred rods from the Works.

LEWIS THAYER, *sworn and examined*.—I acted as Agent for Col. Davis's French Row, in August or September, 1853. The water in the wells was not good when I took charge of them. Had them cleaned out and the water tasted gassy. There were twelve families and six privies. The privies are too far off to affect the wells. I complained to Mr. Blake, Agent of the Gas Company. Have frequently noticed a disagreeable smell, when passing the Works. This was the same as the odor from the wells,—only stronger. The wells are west of the brook.

*Cross examined*.—The nearest well is six or seven rods from the brook; can't say if water from the brook gets into the wells; think there are four necessaries, for twelve families. Had them cleaned out two or three times; once, I took charge of the cleaning, in person.—The contents were carried off, twice. Can't say if the contents were ever buried up in the ground. The privies are about thirty feet from the wells; they have been moved back. These privies are merely holes in the ground. There are three cess-pools close to the privies, which are also holes in the ground; perhaps planked on one side. The sub-soil is clayey. I suppose the nearest gas-pipe is on Main Street, five or six rods from the wells. The wells are nine or ten feet deep. Think the bottom of the brook is higher. One well was dug down, and planked up, so that no water could enter, except from the bottom. The privies are four feet deep. They were cleaned by Peter Rich, in August, or July, last. They have been complained of, by the workmen of Ruggles, Nourse & Mason. The tenants are French and work for Ruggles, Nourse & Mason.

MRS. ELIZA B. DAVIS, *sworn and examined*.—I live on Lincoln Street, some distance from the Works. Have experienced a slight inconvenience, once or twice, at my house. I am always annoyed, in passing the Works. I seldom go by, without feeling nausea. Some weeks, I pass the Works two or three times a day. On other weeks, only on Sundays. Mr. Davis was sometimes affected with a slight sickness and dizziness, by the odor in passing. We have not talked much about it, not being used to much talk of things that we could not remedy.

*Cross examined*.—We do not use gas in the house.

DANA L. GOODSIR, *sworn and examined*.—I live in Connecticut.—Own real estate in the neighborhood of the Gas Works. Bought before the Works were commenced. Was upon the land five or six

times during the time alleged. Made large calculations upon the sale of four lots back of the Works, but have had no offer for the lots on account of the Works. Have stood upon my line and smelt and smelt. Have taken persons there to whom I was trying to sell the property. In every instance, I smelt something. It was not always disagreeable. This disheartened me. The smell did not vomit me, but produced a sickening effect. On account of it, could not say all I wanted to, in order to effect a sale.

*Cross examined.*—Am a minister of the gospel. Bought my land of Mr. Howland—gave \$4000, for from three to five acres, and paid cash. Have sold all except a dwelling-house upon the Turnpike, and four lots back of the Works. Realized, \$2500, retaining a right of way. Don't recollect fixing a price for these four lots. I told Mr. Mason, this Summer, that I should ask \$7000, or \$8000. Mr. Blake may have spoken to me about the price. The lots are forty-five feet front, by one hundred and twenty-five or one hundred and fifty deep. Was taxed \$22 this year—last year's tax was \$19. Every individual objected to purchasing, on account of the Works. Have never set a price upon the lots, and am not ready to, now. My right of way will be in a street to be laid out from Belmont Street, opposite Antiquarian Hall. My whole front on the new Street, when laid out, will be one hundred and sixty to one hundred and seventy-five ft. There are nine families, tenants of my house. They are—American, six; Irish, two; and Canadian, one. The brick-yard is not visible from my lots.

WILLIAM M. BICKFORD, *sworn*.—[FOSTER for Defendants,—objects to examination of the witness, for that he was a member of the Grand Jury which found the present Bill of Indictment. The objection was overruled by the Court, and the examination proceeded.]

WILLIAM M. BICKFORD, *examined*.—I reside on Main Street.—Have some occasion to be near the Works. My wife owns some property near them, which belonged to her father, Mr. Ward. When passing, have generally smelt an odor from the Works. It was sometimes very offensive; smell it when going to my shop, at the Grove Mills; never, at my house. It smells similar to the leakage from a street main. When the ground is impregnated with it, Gas will destroy the life of trees. Have known trees killed by it. My wife's interest is in the Ward estate.

No cross examination.

JOHN FIELD, *sworn and examined*.—I live on Elm Street. Have passed the Works when riding, and found the smell offensive. My wife has complained.

*Cross examined.*—Have smelt leakages, when they occurred, in other parts of the city. Would generally notice the smell, when passing; not always.

With the examination of the last witness, Mr. Field, the evidence for the Commonwealth rested.

ALDRICH, *District Attorney*,—then proposed to prove, that the Gas Company was first established by a private association;—that an act of Incorporation was subsequently obtained; that the Company indicted was organized under said act; and to show the date of the Incorporation of the Company.

FOSTER, for Defendants,—consented that these facts be taken, as admitted.

The District Attorney also remarked that he might wish, at a future stage in the case, to call a scientific witness, as an expert, to prove that Illuminating Gas is impure, and in what manner.

The Court conceded this, with the assent of Counsel for Defendants.

Whereupon the District Attorney announced that he should here rest his case.

#### DEFENCE.

FOSTER, for Defendants opened his case by moving for a view, by the Jury, of the premises under indictment.

The District Attorney objected to the motion, on the ground that the recent alterations and improvements, in the Works, may present them in a more favorable aspect than they offered during the time alleged in the indictment.

The Court granted the view: His Honor remarking that the alterations might be pointed out to the Jury, by whom all proper allowance would be made.

FOSTER, for Defendants, then submitted, in manuscript, a summary of the legal positions, fifteen in number, upon which he should ask the ruling of the Court. [This summary the Reporter was unable to obtain; but it is of less consequence, as its import will be gathered from the ruling thereon in the charge to the Jury.]

Counsel for Defendants then proceeded to address the Jury, in a few pertinent remarks, indicating briefly the nature of the defence, after which he commenced calling his list of witnesses.

#### EVIDENCE FOR THE DEFENCE.

JAMES B. BLAKE, *sworn and examined.*—I am Agent and Superintendent for the Gas Company. Assumed that office in January,

1852. Had been in the business for four years before, as Gas engineer and constructor of works, in Lawrence, Lowell, Providence, and a little while in this city. These works were erected by Blake & Darracott, of Boston. They were the earliest constructed of any, in any inland town of this State. When I came, the refuse water was carried away in a wooden box, on wheels, with half of the cover made to open. It was used so late as this year. The iron one was first used in May or June last. The pipe of the old drain had one end in the brook and the other end in the tank. When I came, there was great trouble from leaks on Summer and Lincoln Streets. I commenced in the spring and relaid the Summer Street main, for nearly a mile. The joints were caulked with a thickness of two inches of tarred-rope gaskets, hammered down, and this was then cemented with six inches of hydraulic cement brought to a bevelled edge. I found that when first laid, some of the joints had not been caulked, and some not cemented.

I first heard of injury to the well of Harrison Bliss, in the spring of 1852. Pumped out his well two or three times;—it did no good. I then sent a man down and he brought up a large cat, partially decomposed, when I stopped doing anything farther. The well of Bliss was covered. If it was injured by gas, it must have been caused by a leak in the Lincoln Street pipe. Those leaks were all stopped two years ago last spring. The earth might be impregnated by the gas, and so affect the wells a long time after the original cause ceased to operate.

The Artemas Ward well was injured before I came. It has been good, since, at different times; and I suppose the variations in its quality is attributable to heavy rains. Think that well was injured from the tank. Think that this well could not have been injured since I came here. The tank consists of two courses of brick, laid in hydraulic cement, and coated with similar cement upon the inside and bottom. It was built in the spring or summer of 1852. It is situated at the N. W. end of the old coal-shed—out of doors—in the the yard, and thirty-five feet from the buildings which contain the Works. It is about eight feet deep—is under ground, and is covered with planks and six inches of gravel. It is connected with the Purifiers, partly by an iron pipe and partly by a brick conduit, laid in cement. The old tank was within eight or nine feet of the building, and was built of brick. I changed it so that it could be worked with a chain pump.

One well lies nearer the Works than the Ward well. It belongs

to the Company and is in the yard. It was spoilt when I came; is perfectly good now. It is in a line with the Ward well. There is another well back of the Works, about thirty feet from the gasometer which is good. The workmen have used it. It belongs to Mr. Goodsir.

1 P. M.. Court adjourned.

2 1-4 P. M.—The Court came in, and, with the Jury, proceeded to take a view of the premises.

3 1-2 P. M.—JAMES B. BLAKE, *resumed*.—There are about four hundred and eighty consumers of gas. From \$48,000 to \$50,000 has been invested by them in fixtures, at a low estimate. The consumption will average thirty thousand feet per night. During the time alleged, the average nightly consumption was about fifteen thousand feet. Trees are killed by gas, by its depriving them of Oxygen. Do not think that trees could inspire gas through their leaves. The Jury have seen every thing connected with the manufacture, except the pipes under ground. For the last four years I have been constantly exposed to the effects of gas. It has not affected my health injuriously, nor the health of the men at the Works. It is better to locate Gas Works on low ground, if not too low. It might be so low as to render it impossible to sink a tank for the gasometer. Never heard of the spring at Walker's shop until one or two weeks since; know the location of French Row. Main Street is the nearest place to that Row in which there is a gas-pipe. A twelve inch main costs about \$14,000 per mile, laid down. The largest in Worcester is six inches, and costs about \$7,400, per mile. We have another gasometer on Green Street. Complaint about Col. Davis's wells was made to me about two years ago, and I sent a man to pump them out. Assured myself that it was not caused by gas, and that it was not our fault; was sure that it was not caused by gas, because the wells were surrounded by vaults and cess-pools—and because there was no gas-pipe nearer than that on Main Street. There is a brook between the wells and the Works. I do not think the brook could have injured the wells. The chimney is sixty feet high. It would be useless to raise it higher than it could be kept warm. You could not injure trees by gas, without inclosing them in it. Mr. Samuel Davis carried off, to his farm, several loads of ammoniacal water and also of ashes, to make manure. Mr. Waldo Lincoln had some. Don't know by what road it was conveyed. It did not go up Main Street. The bulk of it is carted to Quinsigamond, to William S. Lincoln's, to be employed in manuring

by irrigation. The gas, passing through the purifiers, leaves a deposit which flows into the tank, and is carried off for manure. To test gas, we dip paper into acetate of lead—pass the gas over it,—and, as the test is, deliver the gas, or withhold it. If it contains sulphur, the paper will turn black. We never deliver the gas, if it is impure. At its price, gas costs less than any other mode of illuminating to the same degree. The tank has never been under any part of the buildings until covered by the enlargement, of last Summer.

*Cross examined.*—The men are called stokers and clinkers. These men have worked here for three years. We have day and night sets of hands. The present year we have laid in about one thousand tons of coal. We burn coke for fuel, which produces no smoke. Should think the general currents of air would be up the chimney. The ammoniacal odor might possibly escape towards the Nashua House—to the south. Warm air is needed to give a chimney ascensive power. The chimney would be warm for almost its whole height. I don't mean that a chimney one hundred feet higher might not be less objectionable, but only that the higher it is, so much the more difficult it is to warm. Don't think that, though a great deal of this gas would kill a tree, a small quantity would hurt it. Have no doubt that the gas has destroyed trees. The components of this gas are, light carburetted hydrogen; hydrogen; nitrogen; the sulphurets; and vapors of tar and oil. Consider, practically, that *all* impurities may be removed in the process of manufacture. A connecting pipe runs from the building to the tank. The retorts are charged once in four hours. The meters are not so accurate as to indicate the street consumption by a simple deduction from the gross amount manufactured. The discrepancy is owing to condensation. Gas condenses 1-480th to each 0 of Fahrenheit. I own fifteen shares of the stock, which is worth about \$100, per share. I also receive a salary from the Company. The odor from the tank is a little offensive to me—not very. Can't say that water impregnated with gas is more obviously apparent, when warm.

*Re-examined.*—Subtract the amount indicated by the meters of consumers, from the aggregate registered at the Works, and the discrepancy is loss by condensation. Loss by condensation is against the Company.

FOSTER, for Defendants, here submits the deposition of Benjamin Silliman, Junior, of New Haven.

*Commonwealth of Massachusetts, vs. The Worcester Gas Light Company.*

DEPOSITION OF BENJAMIN SILLIMAN, JUNIOR.

In answer to the several Interrogatories put by the Defendants' At-

torney, the said Deponent, Benjamin Silliman, Junior, being duly cautioned and sworn, deposeth and saith as follows—viz.

*Interrogatory 1st.*—What is your name, age, residence and occupation ?

*Answer.*—My name is Benjamin Silliman, Junior, am thirty-seven years of age ; reside in New Haven, Connecticut, and am Professor of Chemistry in Yale College.

*Interrogatory 2d.*—Are you familiar with the subject of the manufacture of gas for the lighting of cities, how long have you been so, and at what Gas Works ?

*Answer.*—I am familiar with the manufacture of gas from bituminous coal and from other combustibles. I have been more or less familiar with the subject for the last twenty years. I have examined the manufacture of gas at the Manhattan Company Works at New York, the Northern Liberties at Philadelphia, the Philadelphia City Works, the Boston City Gas Light Company, and the St. John, New Brunswick, Gas Works.

*Interrogatory 3d.*—Has the gas made from coal, in the usual way, any qualities the smell of which is injurious to health ?

Have the goodness, in answer to this question, to state fully the grounds on which your judgment as to this point are formed, and what your opportunities for deciding this point have been, whether scientific or practical, or for how long a time your attention has been directed to this inquiry ?

*Answer.*—The gas made from coal, in the usual way, has no qualities the smell of which is injurious to health. I do not wish to be understood as affirming, that the inhalation of an atmosphere consisting to a considerable extent of illuminating gas is consistent with the preservation of life. Illuminating gas consists essentially of light and heavy carburetted hydrogen gas, with a portion of free, hydrogen gas ; neither of these gases is regarded by the toxicologist as a poison. The immersion of an animal in either of these gases would result in death, not because they are specifically poisons, which they are not, but simply because they exclude atmospheric air, and the animal immersed in them is drowned, as he would be in water.

The process of purification to which illuminating gas is subjected, removes from it carbonic acid gas, sulphuretted hydrogen, ammonia, and other products, the presence of which incompletely purified would bring it within the class of poisonous substances. A poison is a substance, the continued use of which, in small quantities, produces death ; this cannot be predicated of illuminating gas, even although

the purification should be at times somewhat imperfect. A broad distinction is to be made between those substances which from their heavy and offensive odors disgust the sense of smell, while they exert no material influence prejudicial to health, and those substances which in their very nature are poisonous. I should refer illuminating gas to the former class. I rest my opinion on this subject alike upon my scientific and practical experience.

I have no knowledge of any evils to the health resulting from the inhalation of odors in the manufacture and distribution of gas. Having been long familiar with the manufacture of gas, I have no knowledge of any workmen employed about the Works, or other persons whose occupation constantly exposed them to the inhalation of these odors, being injured thereby.

*Interrogatory 4th.*—How near are the Gas Works with which you are acquainted located to any public street or highway, and how near to any occupied tenements or dwelling houses?

*Answer.*—All the Works with which I am acquainted are upon public streets, and all are surrounded with dwellings, and several are in densely peopled districts of the cities where they are located.

*Interrogatory 5th.*—Suppose the case of Gas Works, built of brick, located on a public street; where the tank for the refuse water both from the condenser and the purifier is kept perfectly tight from the air, and its contents are carted away in a perfectly tight iron receiver being pumped into it from the tank without exposure to the air; where the purification is effected by a solution of lime—where the chimney is of suitable size and construction, and sixty feet high and the fuel burned is coke—where the gasometer, meters, pipes and other apparatus are kept in good condition—and the manufacture is prudently, skillfully and carefully conducted—and the quantity of gas made is from ten thousand to forty thousand cubic feet daily—would such an establishment be injurious to the health of the vicinity, or offensive or inconvenient to the public. If so, from what causes, and to what extent?

[So much of the fifth (direct) Interrogatory, as is embraced in these words, "or offensive or inconvenient to the public," is objected to by the District Attorney.]

*Answer.*—I should say it would not be injurious to the health of the neighborhood, nor offensive to the public, if conducted in the manner specified.

In reply to the *Cross Interrogatories* put by Attorney to the Commonwealth said Deponent deposeth and saith:

*Cross Interrogatory 1st.*—Are you engaged as employee or otherwise in the manufacture of gas for the use named in the second Direct Interrogatory? Do you own any stock in any Gas Works, or are you pecuniarily interested in such Works?

*Answer.*—I am not engaged as an employee, or otherwise, in the manufacture of Gas. I am a stockholder in the New Haven City Gas Light Company, to the amount of \$375,00.

*Cross Interrogatory 2d.*—Does not the quality of gas depend very much upon the kind and quality of coal from which it is manufactured? The quality of gas referred to in this question is its noxious or innocuous quality, as affecting the health of persons exposed to it or inhaling it?

*Answer.*—The coal employed for the manufacture of gas is rich in bituminous matter, yielding from thirty-five to forty per cent of its entire weight in illuminating gas. That coal is preferred which is most free from sulphur or compounds yielding sulphur, but no coal in market is entirely unobjectionable in this respect; hence the manufacture of illuminating gas involves necessarily the employment of adequate means for its purification. If these means are sufficient for the purpose intended, as they are in all well-conducted Works, the gas is entirely deprived of all poisonous noxious qualities before it is delivered to the consumer.

While therefore it is expedient for the interest of the company to employ the very best coal which they can procure, the use of an inferior quality of coal does not necessarily imply that the gas, when it is distributed by the company employing such coal, contains poisonous or noxious qualities. In the use of these terms "poisonous or noxious" qualities, the Deponent refers for their more definite explanation to his answer to Direct Interrogatory Third.

*Cross Interrogatory 3d.*—Are you aware of any cause that renders the gas and Gas Works of London and Paris injurious to the health of those cities which does not exist in connection with the gas and Gas Works in this country with which you are acquainted? If so, please state what.

*Answer.*—According to my own personal observation in those cities, I have been led to believe that the gas there employed is not as carefully purified as that delivered to consumers by the companies in the United States with which I am acquainted. In proof of which I could adduce the fact that gas in those cities is not so universally employed for illumination in private houses, as it is in the cities of the United States, owing, as is alleged, to the unpleasant odor and

corrosive vapors exhaled in its combustion; facts which are explicable only from the imperfect purification of the gas. The sole products from the combustion of well-purified illuminating gas, are carbonic-acid and water; the same products which result from the combustion of a candle. If any other products whatever are found in the combustion of gas from bituminous coal, they are chargeable solely to the imperfect purification of the gas. The use in private dwellings, of gas which is imperfectly purified, may involve injurious effects to the health and especially to the eyes. Another cause which has rendered Gas Works obnoxious to the citizens of London and Paris, is, that up to a recent period sufficient care had not been taken in those cities to insure the tightness of the distribution pipes both in the streets and houses. In this country, so far as my observation extends, each pipe, before it is laid, is subjected to a severe test for its soundness, and after they are laid and before the gas is admitted to them the joints are proved to be tight by hydrostatic pressure. The neglect of these precautions in the cases referred to, as well as in the case of some of the earlier companies in the United States, resulting in the escape to the soil of a large proportion of all the gas manufactured; thus opening numerous sources of objection. These objections I believe, so far as my observation extends, are now very completely avoided in the United States.

*Cross Interrogatory 4th.*—If the Gas Works within your knowledge are any of them located near a public highway, please state how many, and whether the highway is much or little used—if there are tenements, or dwelling houses near them, please give the number and general character of their occupants.

*Answer.*—All are located in public highways which are places of great resort. The Works in New Haven are situated upon St. John Street, the wall of the Retort House resting upon the line of the street. Numerous and eligible dwellings, inhabited by respectable people, surround them on every side, and one of the largest churches in New Haven has been built immediately in the rear of, and since the erection of the New Haven Gas Works. In Boston the Gas Works are situated in one of the oldest and most densely populated districts of that densely-built city.

*Cross Interrogatory 5th.*—May not the gas ordinarily used in lighting cities when diffused in considerable quantities through the atmosphere, become injurious to the health of those who are constantly exposed to it?

*Answer.*—This Interrogatory has been fully answered in the reply to Direct Interrogatory, number Three.

*Cross Interrogatory 6th.*—Are not the odors arising from the refuse water, and the other residuary products of gas manufactures, injurious to health? Or may they not be injurious to health?

*Answer.*—The residual products from the manufacture of gas are chiefly as follows, *to wit*: First—Coal Tar, a substance entirely free from all objections on the score of health. Second—Ammoniacal Water, from the washers; this product is eminently valuable for agricultural purposes, and, although having an offensive odor, is innocuous. Third—Condensation Water from the Condensing Pipes; this, with the products accompanying it, is too small in quantity to be deserving of notice. Fourth—Waste Lime from the Purifiers; this product retains, in a state of chemical combination, those substances evolved in the distillation of which are most prejudicial to health, *to wit*: Compounds of Sulphur, &c. This waste lime is eagerly sought for for agricultural purposes, and therefore is so disposed of that no evil can result to the public health, supposing it to possess poisonous qualities, which is not the fact, and further Deponent saith not.

(Signed)

B. SILLIMAN, Jr.

STATE OF CONNECTICUT, }  
County of New Haven, }

NEW HAVEN, October 11th, A. D. 1854.

By virtue of the commission hereto annexed, issued from the Court of Common Pleas now holden at Worcester, within and for the County of Worcester, directed to me the undersigned, Commissioner, I hereby certify that Benjamin Silliman, Jr., the aforesaid Deponent, then and there personally appeared before me, and being duly cautioned, and sworn, and examined by me, made the above Answers to the several interrogatories and cross-interrogatories put by Defendants' Attorney, and by Attorney for the Commonwealth, and annexed to said Commission, and said Answers were by me reduced to writing, and by said Deponent subscribed and sworn to, this eleventh day of October, A. D. 1854. No person being present at said examination except said Deponent and myself, and no person communicating with said Deponent during said examination by interrogatories or otherwise except myself, and said Deposition was taken in all respects in conformity with the rules of Court annexed to said Commission.

(Signed)

HENRY D. WHITE, COMMISSIONER.

SAMUEL A. KNOX, *recalled for Defendants.*—My place of business is in the counting-room of Ruggles, Nourse & Mason. The walls of my building are not four feet from the privies of Colonel Davis. Three years from next Spring I discovered an offensive smell in my room. Upon inquiring into the cause, I found that there were six privies upon the land of Colonel Davis. I complained to Lewis Thayer, the

agent. He came with some Irishmen, dug new holes, moved the buildings over the privies, and covered the old holes. The stuff oozes into our basement. In reply to my complaint about that way of doing it, Thayer said it was the best way—it was his way, and it was the sweetest way. He had charge of forty in the city, and always did so. There were three cess-pools equally near our line; ten feet wide and three to four feet deep. The stuff in the cess-pools is there now. I never saw the stuff from the privies removed. Think it is still there. There are five privies—two double and three single. Should call the sub-soil, where the last well was dug, coarse gravel. Should think the wells would be affected by the privies and cess-pools.

FREDERICK W. PAINE *sworn and examined*.—I live on Lincoln Street, about one-third of a mile from the Gas Works. I pass within thirty or forty feet of the Works. Have never perceived any odors, except when there has been a leak in the pipes; it was very offensive, then. Have noticed one leak near the house of Mr. Knox, and one near Dr. Blood's. Messrs. Hill, Morrison and Thompson, live east of Dr. Blood, on the opposite side of the street. I generally pass the Works twice a day. Know of nothing caused by the Gas Works, except these leaks, that has affected my enjoyment of life, property, or health.

*Question, by FOSTER for Defendants*.—What occupied that location before the Gas Works?

*Answer*.—A bowling-alley.

This answer was objected to by the District Attorney, on the ground that the proof of a prior nuisance would not justify the creation and maintenance of another, subsequent.

The Court sustained the objection and ruled out the evidence.

FREDERICK W. PAINE, *continued*.—I was and am now a member of the American Antiquarian Society. I never heard of any complaint of the Gas Works by the Society. Believe that the property of the Society has been bought by the Baptists, for an Academy. Colonel Davis had some agency in buying the estate.

*Cross-examined*.—I think that the worst leaks were sixteen months ago. Think there have been none within a year. Have never noticed any odors from the Works, when passing.

NATHANIEL T. BENT, *sworn and examined*.—I reside on Lincoln Square, at the Salisbury Mansion. I moved there in January, 1853. I have a school for young ladies—both boarders and day scholars. My family, exclusive of the day scholars, will average from twenty-five to thirty. I have experienced no inconvenience from the Gas

Works. Once, and once only, was any odor noticed; that was during the past season. I have a lease of the building, which I have enlarged. I built upon the east side, nearest the Gas Works. The works have not injured my life or property. I lived in Worcester, and was Rector of the Episcopal Church some three or four years before I went to Lincoln Square. Was familiar with the Square before going there. I have had occasion to visit families employed at the Works. They were my parishioners. I found no annoyance. I was surprised to find none, because of the complaints. I took occasion, before renting, to inquire of the former occupants of the Salisbury Mansion, if the Works were an objection.

*Cross examined.*—My house is on the west side of the brook, about twenty-five rods from the Works and in a line with them. The house is surrounded by trees, and pretty well shaded. I have smelt gas, when passing the Works; it did not offend me.

MOORE M. CHAFFIN, *sworn and examined.*—I reside up Lincoln Street about a mile and one third from the Works. Am obliged to pass the Works, when coming into Main Street. Sometimes I pass several times, daily; and at other times not oftener than once in three or four days. During the time alleged, I passed oftener than once a day. I have not been annoyed. When the wind was south-east, I have smelt the gas, or smoke from the coal. The same coal smell comes from other sources. Have noticed no more smell than at other places where they use coal. Don't regard my property as any the less valuable because of the Works. Have bought into a farm of one hundred acres within two years.

SAMUEL P. HARRINGTON, *sworn and examined.*—I live in Worcester and have owned part of the Nashua Hotel for five years. Sold their estate to the Gas Company. The estate was bought partly with a view of selling to the Gas Company. We bought of old Capt. Barnard. The House has not been unoccupied since the erection of the Gas Works. No tenants have left on account of the Gas Works. There have been proposals to purchase the remainder of the land, with the view of building a Catholic Church. This negotiation is still pending. Mr. Broad was one tenant. He left because we wanted him to leave. I think he would have been glad to stay. I have occasion to go to the Nashua Depot, on account of my lumber business. Have not been annoyed by odors from the Gas Works, nor perceived them much. I go to the Depot two or three times a week, or oftener. I should call Lincoln Square a *business square*.

*Cross examined.*—I am not a stockholder in the Gas Company.

STEPHEN SALISBURY, *sworn and examined*.—I own the house in which Mr. Bent lives, and Mr. Walker's shop. I pass through Lincoln Square, constantly, though not on the east side. Have noticed nothing *objectionable* from the Gas Works. The drain into the brook injured my pond. I had it cut off, but the injurious effect remained. That injury was done more than three years since. Col. Davis effected the purchase of Antiquarian Hall.

*Cross examined*.—I am not a stockholder. I do not often pass the Works.

WARREN LAZELL, *cross examined*.—I was Superintendent of the Gas Works until the business required the whole time of one man. I am not a stockholder. We first tried to get rid of the refuse water by a dry well, sunk from ten to fifteen feet deep, and stoned up like a common well. It became full in a few months, and saturated the ground, so that we had to take it up. It lasted three or four months. This was in the winter of '49-'50. Next—we laid a drain and pipe into the brook. Think that lasted through the summer, and part of the winter, into the summer of 1851. The wells on the premises of the Gas Company, the Misses Whitney and Esquire Ward, were affected in this way. I paid money to these parties.

[FOSTER, for Defendants, here exhibited to witness, a receipt in full of all damages to April, 1851, which he, witness, identified.]

The pipe on Summer Street turned out to have been badly laid. I recollect one leak near the south end of the School House lot. The first brick tank was built in the winter of '50-'51. Recollect no leak near Walker's spring. Was one of the original investors in the Gas Company. Am one of the proprietors of the Nashua House. We ask more for that property than we did. The taxes upon it have been stationary for two or three years.

*Cross examined*.—The value of real estate has risen, of late years, throughout the city.

Six P. M. The Court here adjourned.

Thursday, Nov. 16.—The Court came in at 9 A. M.

FOSTER, for Defendants, offered, in evidence, an attested copy of the City Records, showing an agreement between the original investors and the City, of date May 3, 1849:

Also, an application from individuals, dated March, 1851, to the City Government, for removal of the Works, together with the adverse report thereon, by the Board of Health, and the acceptance of said report by the City Government:

Connecting the action of the City Government, and of the investors, as indicating an original assignment, and subsequent confirmation, of a location of the Works, by the proper authority, in accordance with the requisitions of Revised Statutes, Sec. 21, Chap. 45.

ALDRICH, *District Attorney*, objects to the admission of these papers in evidence, on the ground that they relate to action taken before the incorporation of the existing Gas Company.

THE COURT.—The evidence is not admissible.

JAMES B. BLAKE, *recalled by District Attorney*.—I am agent of the Gas Company. There is a President and Board of Directors, who employ me as agent. They all live in this city, except Mr. Blake, of Boston. There was no cover to the tank before I took charge of the Works. There is now. It was originally left open to the air. A chain pump removed the water. [Witness here corrects his testimony.] I think there was a cover when I took charge. There was, within the mouth of the pump, a sliding-board, as a cut-off to the odor.

JOSHUA SMITH, *sworn and examined for Defendants*.—I work at the shop of Ruggles, Nourse & Mason. Am all over their premises. Have worked for them six years. I know French Row. The privies have been offensive to the neighborhood. Some of them have been moved nearer to our shop. There are three cess pools in sight. The privies have not been cleansed for a long time. A year ago, last spring, was the last time. The refuse of the cess pools was carried away.—Don't know about that from the privies. Some, from the privies, remained in sight last year. Their condition has been a subject of complaint, every year, in the warm weather.

J. HENRY HILL, *sworn and examined*. I live in Worcester, at the south end of the city. Own property on Kendall Street. Have owned it since 1847. The access to it is by Lincoln street. Within the time alleged, I have passed the Works about a half dozen times. I frequently enter Lincoln Square. I noticed no injurious or offensive smell within the time alleged. Two years ago my land was valued, for taxation, at \$1000. Last year and the present the valuation has been \$1750. I have not thought of its value as being affected by the Works. My land is fifty or sixty rods from the Works, by way of the street. I paid \$700 for the lot. Bought of Judge Thomas and Joseph G. Kendall. Think that the estate of Edward Lamb owns the land between mine and Lincoln Street.

ALDRICH, *District Attorney*, objects that this whole inquiry into the value of land is not pertinent to the issue.

THE COURT sustained the objection and ruled out the evidence.

OLIVER H. BLOOD, *sworn and examined*.—I have lived on the west side of Lincoln Street for six years. Mr. Morrison is east of me and Mr. Banister next south. I pass the Works from five to six times a day. Have noticed nothing from the Works that was particularly annoying to me. Am not apt to go in search of annoyances. There was formerly a smell when the coke was drawn out. Have scarcely observed the smell within the time alleged. My life and comfort are not much affected by the Works. Don't know that they have impaired my property. I have used the ammoniacal water as a fertilizer on the garden at my house. There might be an odor from that, if left uncovered. I used it, composted. It was brought to me, by my workman, in a barrel. There was a leak next Mr. Walker's house, from the street pipe. There is a house between Mr. Walker's and mine. The leak would have been apt to affect the residence of Gov. Davis, if any.

*Cross examined*.—Think the leak was the year before last. I have not noticed smells from the Works. The smell of gas is not disagreeable to me, but I should notice it. The ammoniacal water would be offensive, if left uncovered. It is offensive only when very strong. I have had two or three barrels. I am a Dentist, by profession. In my business, I use charcoal and anthracite. No more odors from my occupation than are indispensable from the use of a coal stove.

MRS. E. W. BLOOD, *sworn and examined*.—Am wife of Dr. Blood. Have observed the smell from the Works very little indeed. I pass them five or six times a week. Have never heard the Works spoken of, in my family, as a subject of complaint.

MISS CHARLOTTE BLOOD, *sworn and examined*.—Am daughter of Dr. Blood. Have lived at home for the six years last past, and have been in the habit of passing the Works once or twice, daily. Have not been troubled at all by odors from the Works. They have not been a source of annoyance, nor a subject of complaint, in our family, during the time alleged.

*Cross examined*.—Perhaps I may have been slightly annoyed, at times.

MISS DORA C. CHAMBERLAIN, *sworn and examined*.—Am daughter of Gen. Chamberlain. I reside at Mr. Bent's school. I am one of the instructors. Have been there since March 1853, excepting three months in the autumn of that year. I live on the east side of the house, next the brook and the Works. I seldom pass the Works. I formerly perceived unpleasant odors, when I crossed the Square. They were not perceptible, at any time, in my room, at the house.

*Cross examined.*—Think it was before August 1853, that I noticed the odors in the Square.

MISS GERTRUDE BOTTOMLY, *sworn and examined.*—My home is in Leicester. Have resided in Mr. Bent's school, since March 1853. Last year, I lived on the east side—partly in the main house, and partly in the new addition. There are no buildings between my room and the Works. No odors were noticed by me. I pass the Works twice a week. The scholars have prescribed walks. Have noticed no offensive odors, when passing. The Works are no objection to that walk, among the scholars.

*Cross examined.*—We walk between four and five p. m. We don't walk if it storms; we do, if the weather is merely damp. Have never noticed the odor of gas, when passing. Have sometimes noticed it in the streets, when passing a place where the pipe leaked. It was, then, offensive.

MISS MARY L. PUTNAM, *sworn and examined.*—Am daughter of Charles L. Putnam. Reside in Mr Bent's school. Have been there since March 1853. Occupy a room on the east side of the house.—Have never noticed anything from the Gas Works that was offensive. There are two windows in the east side of my room. I keep them open, when the weather is warm enough. Only once or twice, during my whole residence, have I noticed any offensive odors.

MISS ELIZA NEWCOMB, *sworn and examined.*—I have been a member of Mr. Bent's school, since May 1853. Have been in the habit of passing the Works throughout that period. Never noticed any offensive odors from the Gas Works during all the time that I have been there.

GEORGE R. M. WITHINGTON, *sworn and examined.*—Reside in Lancaster and am Counsellor at Law. I come into Worcester over the Nashua Railroad. Have a season ticket and come frequently.—Until recently, I often got out at Lincoln Square. Have never, at any time, perceived any offensive odors in the Square. A year ago, I often went to the station in Lincoln Square, to take the outward train. Often waited a half-hour, for the cars, on the platform towards the Works. Have been summoned since I came into the Court House.

*Cross examined.*—I come to Worcester, say twice a week. I don't often stop long at the station. I usually try to get to the cars before they start—am in the habit of being in season.

SILAS THURSTON, *sworn and examined.*—I live in Lancaster and come to Worcester as often as two or three times a month. Never noticed anything offensive, from the Gas Works, in Lincoln Square.

*Cross examined.*—I usually leave the cars in Lincoln Square. My business does not detain me in the Square.

JOHN S. C. KNOWLTON, *sworn and examined.*—Am now Mayor of Worcester, and have been since January, 1853. I reside on Salisbury Street, which enters Main Street at Lincoln Square. Am and have been Chairman of the Board of Health, *ex-officio*. It would be my duty to inquire into matters affecting the public health. I pass through the Square five or six times daily; sometimes pass the Works. The subject of the Works has been mentioned to me, but never with a view to a complaint. I have noticed nothing in this part of the city more offensive than elsewhere. I occasionally smell gas in various parts of the city. There was nothing connected with the Gas Works in 1853, or before July, 1854, to call for special notice from the Board of Health.

*Cross examined.*—A year ago, for a month, I was in the vicinity of the Works every day. I was all over the Square. Perhaps it was a little earlier than this. My ordinary route is along either side of Main Street, indiscriminately. These Works have been spoken of in my family as offensive, at the house. My house is, say fifty rods from the Works. It is further off than Mr. Bent's. It is north-west from the Works. There are seven in my family.

*Direct examination resumed.*—Cannot specify the occasion when my family complained. Know of ammoniacal water being carted upon Mr. Salisbury's land, about a year ago. The complaints were not connected with the ammoniacal water. There are no gas pipes in our street.

DENNIS CARPENTER, *sworn and examined.*—I have lived in French Row for five or six years. Have lived in five tenements. Have used the water from three wells. The water was not good when I first began to use it. It never was good. I never smelt gas in the water.

*Cross examined.*—The water looks and smells greasy. It is good for nothing at all.

SAMUEL BANISTER, *Government witness, recalled for Defendants.*—Since April 1, 1854, I have lived at No. 20 Lincoln Street. It is on the west side, the next house to the second brick block. From April 1st to May 31st, 1854, I never discovered the gas but once. That was in the last of May. I remarked, at the time, to Mr. Harrison Bliss, that I never discovered the gas before. It was quite perceptible at that time. The wind was very strong from the south-east.

*Cross examined.*—I was not summoned by the Defendants. I never had discovered the smell before that time.

JOHN H. BLAKE, *sworn*.—ALDRICH, *District Attorney*, objects to the examination of the witness, because he is a Director, and may, therefore, be amenable criminally—that he is, in fact, a party to the suit.

FOSTER, for Defendants, cites Statutes, 1852, Chap. 312, Sec. 60, in support of his competency. Admitted by the Court.

*Examined*.—I reside in Roxbury. Am a Director and Stockholder. Was one of the original constructors of the Works in this city. Have been engaged in the construction of Gas Works about fourteen years, and was familiar with the subject, as a chemist, for more than thirty years. Been frequently at the Works here—cannot say how often. Consider Gas Works as little prejudicial to health as any manufacturing establishment I know. Have known the same workmen to make gas over twenty-five years. Never knew the health of a workman in gas to be injured by the work.

Illuminating gas is noxious, from its containing no oxygen. It is noxious, like the gases generated by the combustion of coal, or of oil lamps. By noxious, I mean unfit for respiration. About four-fifths of the atmosphere is noxious to the same degree. Illuminating gas is not specifically noxious—it is rendered so by the displacement of oxygen. To affect the open air noxiously would require so large quantities as to be impossible,—the proportion of atmosphere is so large.

The weight of this gas is about half that of common air. It would rise faster than a balloon, for the inflation of which it is sometimes used.

Its effect upon a tree is similar to that upon individuals—depriving it of oxygen. Have never known a tree injured by this gas, except there was a leak in the pipe. Never knew one injured by the escape of gas into the open air. Its mode of killing a tree would be by exclusion of oxygen from the roots, thus smothering or drowning it.

It has been part of my professional duty to select sites for Gas Works. I selected the site of the Works in this city. The main point to be regarded, in the selection of a site, is to have it central. We thus acquire greater facilities for distribution. Our proximity to the consumer enables us to afford it cheaper. The size of the mains may be less, on account of the diminished friction. The size of the main increases as the distance, in proportion. [Witness here referred to tables.] The main must be ten inches in diameter, if the Works were removed a mile further, supposing the consumption to be 40,000 feet nightly. Such a main would cost \$3 50 per foot, laid down, and the expenses of a mile would exceed \$15,000.

ALDRICH, *District Attorney*, here objected to any inquiry into the cost of removal. If the Works are a nuisance, they must be removed at any cost.

FOSTER, *for Defendants*, cites *Barn & Ald*, Eng. Com. Law Rep., Vol. 24, *Rex vs. Pease*, to the point that the jurisdiction conferred by the charter, that jurisdiction being unimpaired by non-user, is conclusive of the question of location. The Mayor and Aldermen are empowered to locate trades of certain descriptions. In default of adverse action by them, in the premises, and offering, on the part of the Defendants, to show acquiescence in the present location by the Mayor and Aldermen, it is not for this Court to assume jurisdiction.

ALDRICH, *District Attorney*, replies that this Court has concurrent jurisdiction with the Mayor and Aldermen. That their power to restrain trades to specific locations cannot be taken, in case of the non-user of that power, to oust the jurisdiction of the Court of Common Pleas upon an indictment for nuisance.

THE COURT ruled: that the Legislature, by the act of incorporation, could not intend to authorize a nuisance, by conferring upon the City authorities power to remove it.

Also, that if the expense of a removal were so great, in case of the removal being declared necessary, as to practically result in the discontinuance of the manufacture, it would be for the Jury to pass upon the balance between the benefits and the evils of gas manufacture, in deciding the general issue of nuisance.

*Examination of JOHN H. BLAKE, resumed.*—There are certain products of the manufacture, resulting from the decomposition of coal, that would injure wells, though only temporarily. They are ammonia, sulphuric acid, carbon and hydrogen. Never knew an instance of pure gas affecting a well. Pure gas would be absorbed by water, if escaping from a pipe. If wells were damaged for three or four years, I should attribute it to something else. I don't see how a leak can injure wells, because I don't see how gas can descend a well, being itself so light.

It would take a long time to remove the effect of the saturation of a large quantity of ammoniacal water in the earth; eventually it would disappear.

I have examined the Works recently, and remember their condition at the time alleged in the indictment.

*Question, by FOSTER, for Defendants.*—Were the Works in a proper condition as regards the public health, safety, and convenience? Were they properly managed?

*Objected to by District Attorney, and not allowed.*

I have examined the chimney. [Foster, for Defendants, proposed to ask the witness if the chimney was of suitable height. Objected to by District Attorney, and not allowed.] Am one of the owners of the Nashua House. Bought with a view to sell to the Gas Company, and thought that a sale to them would enhance the value of the remainder. Mr. Harrington alone, of the owners, was not interested in the Gas Company.

*Cross examined.*—Gas, as it leaves the Retorts, is composed of carbon and hydrogen, in various proportions—part gaseous and part liquid. It contains ammonia, nitrogen, (free), and a small portion of oxygen. Carbonic acid is formed there. This is injurious to animal life. Sulphureous acid is found in a free state, and combined with carbon. The ultimate results of gas, as it leaves the Retorts, are exactly known. Its impurities are combinations of sulphur, carbon, ammonia and hydrogen. The bi-sulphate of carbon is liquid; it is very volatile, and is slightly offensive. It may *possibly* escape in going to the purifiers. Sulphuretted hydrogen *may* pass out, even, into the distributing mains, in which case, being very offensive, its smell gives warning, and thus acts as a safeguard to the community. It is not desirable, therefore, to remove the odor entirely. Gas may sometimes remain in small quantities in the retorts, and escape when they are opened.

Cyanogen has been detected by some analyses—in many, not at all. It would be removed in the purifiers. It is very offensive.

Gas-Holders, or Gasometers, are easily made absolutely tight. No conceivable amount of pressure could force the gas down through the water and beneath the lower edge of the Gasometer. The gas might be compressed, but not expelled. When the Gasometer is full, its lower rim may be two inches under water. The greater the pressure that is then put upon the Gasometer, the more that vessel sinks, condensing the gas.

I own stock in this Gas Company. My partner and myself own \$12,000. My share is \$6,000.

*Direct examination resumed.*—Cyanogen is detected in such extremely minute quantities that harm is impossible. The escape of impure gas from the retorts would take place when they were discharged. It is set on fire, as it is trying to escape.

THE COURT adjourned at one o'clock P. M.

THE COURT came in at two o'clock P. M., and His Honor reconsidered his decision and allowed inquiry as to the effect of a higher chimney.

JOHN H. BLAKE, *continued*.—Think no benefit would result from a more elevated chimney. Many of the new Gas Works have no chimneys—for example, the new City Works of Philadelphia. Have had the management of the Boston Works. They produce 600,000 feet daily. Lived near those Works for three years and experienced no annoyance. The use of a chimney is to carry off the gases from the combustion of ccke, and the smoke and gases from coal. Coke produces no smoke, and is used in this city.

By HERSEY, *Juror*.—Do not think an opening in the Main Street pipe, and the evolution of 40,000 feet of gas therefrom, would produce a deleterious effect. It is not conceivable that gas should be made in quantities sufficient to affect injuriously the atmosphere.

By *District Attorney*.—Think the chimney would be just as useful, if twenty feet high, for making gas. It would not diffuse its escape so widely. A low chimney would be more likely to offend the scent of the neighbors. At a height of 20 ft., the smoke and gases would not incommode nor injure anybody. Should think they possibly would at a height of ten feet. I should govern myself by the requisition of the municipal authorities. The gases evolved from coke are colorless.

DR. CHARLES T. JACKSON, *sworn and examined*.—I reside in Boston. Am Dr. of Medicine, Chemist and Geologist by profession. Am Geologist to the State and to the United States, and State Assayer. I have been familiar with the manufacture of Gas ever since it was introduced into this country. I have seen the Works in Boston, New York, and Philadelphia, and in this city. Illuminating gas has no effect injurious to health. Am not aware that a little, escaping into the air, would be injurious. The smell mixed with air is not injurious. It is irrespirable. All gases are fatal to life, but air; by the exclusion of oxygen. Before purification, illuminating gas contains sulphuretted hydrogen, tar, &c., which are injurious. The mode of purification in this country is adequate to its purpose. Its success has surprised me. I should think the chimney of suitable height and construction to carry off the gases. Nothing escapes from the chimney which would not escape from any chimney, in this or other cities, where coal or coke is used for fuel. There is no more smoke from coke than from anthracite coal. The gases are invisible.

*Cross-examined*.—I have seen the Gas Works in London. Have not seen those in Edinburgh, but know that they have very high chimneys. The use of which is, to make a strong draught and to carry off the smoke, gases, &c. I think that the effect of a higher chim-

ney would be, to diffuse the gases evolved by combustion over a wider area. The current of heated air rises much higher than the chimney. Think that the operation of the flue, outside of the chimney, at the Works in this City, would be similar. The flue being warm, the smoke, vapors, &c., would be taken up to its outlet, and afterwards ascend in a column of rarefied air. There will always be some smoke, gases, &c., in drawing the retorts.

GEORGE W. BENTLEY, *cross examined*.—I am superintendent of the Worcester & Nashua Railroad. Have been for now nearly a year. Before that, was clerk in the office of the superintendent. My business leads me to Lincoln Square two or three times daily. I have to go to the Depot, and to the Freight House, in the rear, and opposite the Gas Works. Have experienced no annoyance, nor perceived any offensive odors from the Works.

JAMES GREEN, *sworn and examined*.—I pass the Gas Works three or four times daily. Own property on Lincoln street. Cannot remember that I ever smelt gas, or odors from the Works, when passing.

*Cross-examined*.—Am an apothecary, and have sometimes to mix my own compounds. Am a stockholder to the amount of \$1,000; and own real estate on Lincoln Street to the amount of \$6,000.

CHARLES WHITE, *sworn and examined*.—I was a member of the City Government, and of the Board of Health in 1851. My attention was called to the Works, in that year. During part of the time alleged, say in the fall of 1853, I had to pass the Works, say three times a week. I experienced no annoyance from the Works.

*Cross-Examined*.—Think it would be impossible to *stop* by the Works, without smelling them. I did not notice them, myself. I should not mind the smell so much as others would. I was in the habit of riding past. Used a fair kind of horse, as to speed. I rode by with my family. They did not speak of it.

ALVAN ALLEN, *sworn and examined*.—I reside in Worcester. Was City Marshal from January 1853, to May 1854. It was my duty to attend to complaints of nuisances. I attended to that duty, and had also to see that none existed in the streets. Some weeks I would pass the Gas Works three or four times. Some weeks did not pass at all. My attention was never called to the Works as a source of annoyance. Smelt no odors from them, in the time alleged. During that period, no complaints of the works were made to me.

*Cross-examined*.—I live in Trumbull Street, east of the common. I never smelt the Gas, in the time alleged. Never smelt the ammoniacal water in that time. I did smell the ammoniacal water, in

1849. Think I am likely to notice odors: that of gas is very offensive to me.

JAMES WHITE, *sworn and examined*.—I live in Trumbull Street, and have charge of two brick blocks on Lincoln Row. Have had the entire charge of them since 1847-8. The blocks are on the west side of the street. Mr. Dryden and Widow Geer live opposite on the east. I pass up Lincoln Street at least once a quarter and at times every day. I never was annoyed by the Works. Had no complaints from the tenants about the Works. Had no difficulty in renting the tenements. I am acquainted with French Row. Have measured the distance between the wells and cess-pools. They are from 25 to 30 feet apart.

*Cross-Examined*.—I live about ten minutes walk from the Gas-Works—say a long mile. The blocks belong to Mr. Burt, and the heirs of Edward Lamb.

ORAMEL MARTIN, *sworn and examined*.—Have been a practising physician in Worcester for five years. Have occasion to pass the Works, on professional business; say, three times a week, during the time alleged. I experienced no annoyance; and perceived no offensive odors except on the top of the hill by Samuel Davis's, from ammoniacal water used for manure. Have known no case of sickness attributable to inhalation of this gas or its impurities. Can find no statistics which would lead me to form an opinion as to the influence of this gas upon the public health.

JULIUS C. BACON, *sworn and examined*.—My place of business is at the Depot of the Worcester & Nashua Railroad, in Lincoln Square. I have been there since April, one year ago. My business keeps me in and around the Depot. Have experienced no annoyance, except when the cart passed, drawing away the refuse water. Have perceived no bad smell from the Works.

*Cross-examined*.—Am Clerk and Transportation Agent, in the north room of the Passenger Depot. The air is a good deal affected by the oil and smoke from our engines. We keep an engine, in the yard, all the time, fired up.

THOMAS COOK, *sworn and examined*.—Am employed in the Gas-Works, in this city. Have been here five years. Was in the employ of the Boston Company, previously. I live at the Works in a house belonging to the company, north of the Works. I was four years in the Boston Works. I have a family. The business never hurt my health nor that of my family.

*Cross-examined*.—My family consists of a wife and four children. I

don't smell the gas. I work at the fires and tend the purifiers. The odor of the ammoniacal well does not offend me.

DAVID S. MESSENGER, *sworn and examined*.—I live in Worcester. Own property in the north part of the city. I own Bangs Block. Have passed the Gas Works, during the time alleged, very frequently, both riding and walking. Have not experienced the least annoyance from the Works. Can not remember perceiving any disagreeable odors. Have noticed the smell, when there were leaks in the pipes. It is offensive to me, when strong.

*Cross-examined*.—I live on the S. W. corner of Walnut and Chestnut Streets. I pass the Works, at all hours of the day. I go by Grove and Lincoln Streets. Generally go by one road and return by the other. I go as often as once a week; and, in pleasant weather, two or three times a day. I do not remember noticing the odor of gas, when I passed.

CHARLES W. WHITCOMB, *sworn and examined*.—I have practised medicine in this city, for five years. My business leads me to all parts of the city. I am employed by the County at the Jail. I go up Lincoln Street frequently. Had occasion to pass, very often, in the time alleged. I had patients on Lincoln street. Have never been annoyed by the Gas Works. Have known no case of sickness occasioned by the gas: nor any aggravated by it. Have no particular scientific knowledge of gas—only, as laid down in the books. My opinion would be, that this gas is not injurious to health; nor fit for respiration.

*Cross-Examined*.—Think that, inhaled, it would not affect delicate lungs. It would not produce nausea. Nor would it produce headache, unless the exposure was to a very large quantity of it. If a person should be subjected to it, steadily for a day, it might produce asphyxia, or suffocation. I give this opinion of the gas, when it is pure.

L. B. NICHOLS, *sworn and examined*.—I have been a physician in this city, for four years. I frequently have occasion to go through the Square and up Lincoln Street. Had such occasion in the time alleged. Don't recollect being annoyed by the Gas Works. I visit in eight or nine families on Lincoln Street, and never heard it mentioned among them. The smell of gas, mixed with atmospheric air, is unpleasant. I never saw any ill effects from it. Inhaled it would produce asphyxia.

*Cross-examined*.—I give this opinion of gas when pure.

CAROLINE BANISTER, *sworn and examined*.—I am wife of Samuel Banister. I reside on Lincoln St. opposite Mr. Dryden. Pass the

Gas Works several times a week. Have experienced no annoyance from them. Have heard no complaint in my family. Since this indictment, my family have remarked that they had never heard complaint.

*Cross-examined.*—I was never annoyed at home, and have not observed it when passing.

RUFUS WOODWARD *sworn and examined.*—I have practised medicine in this city, over four years. In the time alleged, I had occasion to pass the works every day. Have not experienced annoyance in passing the Works. Have never seen any cases of sickness, attributable to, nor aggravated by gas. Have practised in the family of Mr. Harrison Bliss. Don't know that purified gas is injurious to health.

*Cross-examined.*—I never saw sickness produced by gas. If confined, it would cause headache, lassitude &c. Ammoniacal water would have the same effect. I should think it impossible so to charge the atmosphere as to produce injurious effects. The gas would rise, being lighter than air. Not all gases are lighter, however. Carbonic-acid gas is heavier than air: So is sulphuretted hydrogen. Don't know that cyanogen is found in gas.

GEORGE A. BATES, *sworn and examined.*—I have practised medicine in Worcester, for ten years. I had occasion to pass the Gas Works, in the time alleged, say five times a week. I had patients on Lincoln street. I experienced no annoyance, in the time alleged. I have seen no case of illness occasioned by the gas. Should not think this gas, mingled with atmospheric air, would produce any ill effect.

*Cross-examined.*—I have devoted no especial attention to the subject. If the gas were inclosed in a room, and no oxygen admitted, should think it would produce death. It would produce ill effects, probably, discharged into a close, confined room.

BENJAMIN HEYWOOD, *sworn and examined.*—I have practised medicine, in this city, for ten or twelve years. Have occasion, frequently to pass up Lincoln street. During the time alleged, I passed the Works from four to six times a week. Have experienced no offensive odors in the last two or three years. Have not been annoyed by them. The odors are offensive to me, when perceptible. Have seen no case of illness occasioned or aggravated by inhaling this gas. In an open atmosphere, the gas could do no harm, for it would be impossible to infuse a sufficient quantity into the atmosphere.

*Cross-examined.*—I mean that pure gas would not injure the atmo-

sphere. Have devoted no particular attention to the subject. Have not been troubled by the smell of the ammoniacal water, : not in the time alleged. Have smelt the cart slightly, when I have met it upon the road to Quinsigamond.

EDWIN DRAPER, *sworn and examined*.—I have occasion to go to both Depots in Lincoln Square. During the time alleged, used to pass the Works from two to three times a week. Never experienced inconvenience from the Works. I can smell gas when it leaks from the pipes. It is offensive to me. I have not noticed that smell near the works.

HENRY CLARKE, *sworn and examined*.—I have practised medicine, in this city, for three years. I had to go up Lincoln Street in the time alleged. I experienced no inconvenience from the Works. Once when my attention was called to it, since this Indictment, I noticed a smell. Never saw a case of sickness, which had been produced or aggravated by it. Think there can be no injury, save to a very slight extent, from mixing a large quantity of gas with the open air. Think no harm could be caused in the vicinity of the Works, for the gas would rise and the air would rush in, to fill up the vacuum.

*Cross-examined*.—I have no especial experience in this subject. I judge from my former chemical education. The odor that I noticed was not gaseous, but ammoniacal.

ORAMEL MARTIN, *Recalled by District Attorney*.—The theory is held, by some, that this illuminating gas is noxious, *per se*: and by others, that it is noxious only when oxygen is excluded. Would alter my former testimony, by stating that gas, discharged into a room, has produced headache in my family.

FOSTER, *for Defendants*, here stated that he had hoped to secure the testimony of Rev. A. M. Morrison, owning property and residing on Lincoln Street, but that the Rev. gentleman had been unexpectedly called away before a summons could be served upon him. He had also thought of calling Drs. Joseph and Henry Sargent: but, as they were both stockholders, and as so much medical testimony was already put into the case, he would relinquish the intention and here rest the evidence for the Defence.

And, at the further suggestion of counsel for Defendants, that it was near the usual time of adjournment—that the testimony was voluminous, and, in a case of so much importance, required careful analysis: The Court, expressing its concurrence with the learned counsel in the propriety of allowing him a brief interval for the preparation of his argument; at 5 30 p. m. adjourned.

Friday, Nov. 17th.—The Court came in at 9 A. M.

After ruling, by His Honor, upon several points of law, a statement of which is not material to this Report,

FOSTER, for *Defendants*, commenced his closing argument to the Jury.

ARGUMENT FOR DEFENCE.

He reminded them of the unusual importance of the trial. If the Works of the Defendants are a nuisance they must be a source of great public injury; the general welfare of the community requires their removal. If they are not so, the whole city is interested to have their business proceed unmolested.

The article which this company was incorporated to manufacture has been truly spoken of by the District Attorney as a necessity of modern civilization. It furnishes the cheapest and most brilliant of all artificial lights. Within a few years the products of the whale fisheries have diminished, while the demand for oil has been greatly increased by its extensive use in machinery. The various burning fluids are more or less dangerous and explosive, and a fruitful source of personal injuries and accidental fires. Not only the users of gas are benefited by this beautiful invention, but its indirect advantages are equally important to all dependent on other modes of illumination.

The prices of other materials for light have constantly advanced notwithstanding a large annual increase of the consumers of gas—and were it not for this supply of their fluid—the cost would be incalculably greater.

If a portion of the discoveries of modern science were to be given up and added to the list of lost arts—there was hardly one which society would more reluctantly abandon than this.

To the Defendants the case was one of great pecuniary magnitude.

The prosecution had not been instituted to inflict a fine for accidental mismanagement, but to compel a removal of the Gas Works, which would destroy property to the amount of many thousand dollars.

Besides the Defendants believed that they could not change to any location less objectionable than the present. A verdict against them would excite a prejudice which would follow them wherever they might go. The further their distance from the centre of consumption the greater the cost of supplying the public. And if gas was to be furnished in towns and cities of moderate size, the works must be located within a short distance from the streets.

The Defendants placed implicit confidence in both the court and the

jury, yet they believed they had not been summoned before the most appropriate tribunal. The terms of their charter placed all their operations completely under the control of the municipal authorities, whose judgment need not depend upon testimony alone: but who might ascertain all the facts by a daily and personal inspection of their works.

From such an investigation the company would never shrink.

The Defendants were sensible that their position before the jury was seriously injured in consequence of accidents and mistakes which were admitted to have occurred in the early history of the company; which had been long ago remedied, but which occasioned prejudices that lingered after the causes had ceased and affected the opinions expressed by a portion of the witnesses. It was a fact highly creditable to the enterprise and public spirit of the citizens of Worcester, that these were the first Gas Works in this country, located away from the sea board or some great river—where the refuse water could be discharged into the harbor or stream, and carried away by the tide or current. Here there was no such resource and various ineffectual expedients were at first adopted for disposing of this offensive liquid. The annoyances occasioned in this way were not the subject of the present indictment, and they should be carefully distinguished by the jury from the real questions at issue.

The Defendants had been indicted for a common nuisance—that is for doing acts to the common annoyance of all the citizens. This is a public evil for which the public have the remedy of Indictment.—For private injuries, individuals may have their actions for damages. It is only when the cause of complaint rises to the dignity and magnitude of an injury to the community, that it becomes the subject of Indictment.

This injury must be serious, substantial and permanent, not trifling, rare or imaginary.

It must be general and not limited to a few in number.

And in proving the charge the Government were confined in point of time as well as every other particular, to the allegations of the indictment.

The specific charges in the present case were injuries to wells and springs and offensive and unhealthful odors.

The Counsel then entered upon a minute review of the evidence as applicable to these two charges.

He contended that the wells owned by Col. Davis had been clearly proved to have been spoiled by other causes.

This left only three instances of injury to water for which the Gas Works were responsible. And such an evil was quite too limited in extent to constitute a public nuisance.

Besides in each case the injury occurred long before the time embraced in the indictment; and in every instance but one before the incorporation of the present company; and the damage was attributable, either to the mode of disposing of the refuse water, which had been wholly remedied, or to leaks in the gas pipes which did not depend at all on the location of the Works.

He said that the charge of offensive smells did not include such as were caused by leaks in the pipes—nor by the carting away of the refuse water—nor by the water when spread on the ground as a manure.

Yet it was apparent that the greater part of the odors, referred to in the testimony of the Government, arose from those sources, though the witnesses had not been able to distinguish their origin.

In this connection he described the entire process of manufacturing gas from the introduction of coal into the retorts, until the gas after its purification was stored in the gasometer and distributed through the pipes to the consumers. He also called the attention of the jury to the situation and condition of the Works which they had themselves seen on their view of the premises.

And after commenting in detail on the evidence on both sides he claimed as the general result of the testimony :—

That many of the witnesses had passed by the Works repeatedly and never noticed any offensive odors. That hardly any one had perceived them habitually.

That the majority of those who were daily in the vicinity noticed odors from once a month to near twice a week, and only rarely to an offensive degree; and this while the Works were constantly in operation, and the fires in the furnaces were never extinguished.

The houses in the immediate vicinity were chiefly inhabited by tenants from quarter to quarter; the rents were constantly rising. Estates in the neighborhood were bought and sold at an advance. New houses were erected.

Under these circumstances how could it be pretended that property was depreciated; health destroyed, or life rendered uncomfortable.—

The Mayor and City Marshal, whose official duty made them watchful observers of every source of public annoyance, had never noticed or been called to notice any evil here.

The medical testimony was uniform in favor of the good health of that locality.

And the physicians unanimously agreed with the highest scientific authority in the country, that the smells arising from gas works were not, and in their nature never could be prejudicial to health.

It had been said that the Gas Company embarked in their enterprise as a pecuniary speculation. To some extent this was true.— Yet all who knew the late Col. Lincoln, their former President, or Mr. Rice, now President of the Company, could readily believe that the works were established from disinterested and public spirited motives, and that the expectation of obtaining eventually a fair remuneration for their investment was only a secondary consideration.

He concluded by again urging upon the jury the importance of the cause and expressing the willingness of the company to adopt any improvements which could be suggested in the management or construction of their Works.

The learned Counsel closed his very able argument at ten minutes before 12 o'clock, M., having occupied just two hours and one half in its delivery.

#### ARGUMENT FOR THE COMMONWEALTH.

ALDRICH, DISTRICT ATTORNEY: commenced his argument, in conclusion of the prosecution, by remarking to the jury that they must act without reference to the magnitude of the interests at stake. The importance of a case has no necessary, inevitable proportion to its merits. The duty of the Jurors will be to consult the comfort of the citizens rather than the interests of the Gas Company.

He contended that it would not be necessary to establish that the Works were a nuisance to all persons who had occasion to pass the location: but, if a considerable portion only, of the very large number, who were obliged to travel Lincoln Street, and who resided upon the line of said Street, were inconvenienced or annoyed either in passing, or at their houses, by the process of manufacture or its unavoidable results, why then the Commonwealth must be deemed to have maintained its case.

The Jury is a better tribunal to adjudicate this case, than the City Government. The latter is swayed by so many diverse interests and is bound by such and so numerous local ties, from all which the Jury is free, that there cannot be a more impartial trial than the present.

The exemption from liability, of the present incorporated company, on account of acts done by the unincorporated associates was conceded.

The learned Attorney claimed that there are qualities in gas, as well as in the ammoniacal water, which are destructive to the vitality of trees. It is immaterial in what manner these operate. The fact cannot be denied. If the gas and ammoniacal water possess destructive qualities inherent and ineradicable;—and if their presence was manifested under the unincorporated association, of course the same effect must be produced by a similar manufacture, continued under similar conditions by their legal successors. This argument was directed, in its application, to the wells and springs, claimed to have been injured. Such are those of Col. Davis, Mr. H. Bliss and the Ward estate. Why should the Ward well vary in quality? For no other reason than that the escape of gas from the Works is still continuous. The infiltration of rain-water, in combination with the soil, will not account for it. And this same thing holds equally good of the Walker spring.

Again: conceding the description of the Works by Counsel for Defendants to be correct, and even that they are as perfect as such Works can be made, it is evident that the men, to whom they must be entrusted, may be careless. For instance, the retorts may be over-charged; and, if too soon opened, the gas would escape.

The attention of the Jury was next called to the fact that the Works have been altered since the finding of the Indictment. The yard has been roofed over and the ammoniacal tank covered. Before that, there was nothing to prevent the escape of gases into the atmosphere. Odors might find vent, such as the jury doubtless noticed at the time of opening the ammoniacal water tank for their inspection.

The inference drawn from the continuance of owners upon their estates, and of tenants in their leasehold, although the lease was but parol, was repelled. Who has a right to require us to remove, to avoid a nuisance which may itself be removed and which, if a nuisance, most certainly ought to be removed?

Neither can the Defence deduce a plea in their own behalf, from the rise of rents in the vicinity of the Works: since the fact is notorious that the rise has been universal.

The learned Attorney next proceeded to a minute analysis of the medical testimony. Now, these doctors may have studied chemistry: but so have we, likewise. A knowledge of that science is not monopolized by the medical profession. The doctors testify that they never knew a case of sickness, arising from, nor aggravated by the inhalation of illuminating gas. But the venerable Mrs. Davis; Mr. Hoar; and Mr. John Hammond, of this very panel, swear that they have

been made sick by it. The medical testimony, therefore is overruled by the actual and precise facts.

12.55 p. m. At this stage of the Argument the Court adjourned.

2 1-4 p. m. The Court came in, and ALDRICH, DISTRICT ATTORNEY, resumed his address to the Jury. The learned Attorney resumed the thread of his argument, by adverting to the deposition of Professor Silliman. That skillful and accomplished chemist testifies that he knows of nothing existing in *pure* gas, which is deleterious to health. Admitting this to be correct; and even then the testimony does not affect the question of a possible escape of unpurified gas from the mouth of the retorts, whenever they are opened.

Again: gases, being specifically lighter than air, ascend. So the scientific witnesses all say. But, suppose the lateral currents of air strike the ascending column of gas! And at least forty witnesses testify that they have perceived the presence of gases, which must have been deflected and brought down, in some such way, from the mouth of the chimney.

CHIMNEYS: should suffice to carry off the gases and augment the draught. But it is a matter of entire indifference to the Commonwealth whether the draught is good or bad. What it does claim is that the gases should be carried off at all events. And the superiority of a high chimney, over a low one, is urged, on the ground that the gases carried by the former would be diffused over a wider expanse of atmosphere, and at an elevation more remote from habitation.

The indictment is sustained, if it is shown that the odors were generally disagreeable. And, in this connection, the evidence was reviewed at length, to demonstrate such its tenor.

The very clear and cogent address of the District Attorney was concluded at 3 20 p. m., having consumed two hours and ten minutes in its delivery.

HIS HONOR then proceeded to deliver his

#### CHARGE TO THE JURY.

He commenced his charge by saying that the trial has been conducted by the counsel with ability, fairness and urbanity. The witnesses (eighty in number,) have testified with unusual fairness and candor, and without any undue bias. The trial has been an instructive one: as, from the testimony of intelligent witnesses and an examination of the Gas Works of the Company, much information has been obtained in relation to that important and beautiful art—the manufacture and distribution of gas to the inhabitants of the City, who enjoyed its pure light.

The Court then proceeded to state to the Jury the principles of law by which they were to be governed in deciding the case.

A Public Nuisance is the doing that, which endangers the public personal safety, or health; or doing that which is noisome and offensive, annoying and plainly hurtful to the public. To carry on a trade or business, in a place so situated that those who reside in the vicinity or neighborhood, or those who pass the highway, are thereby substantially and seriously annoyed and injured by noisome, offensive smells, stenches, vapors, and smoke; or to carry it on in such a way, and place as to corrupt and destroy, or seriously injure, the springs and wells of such neighborhood, is a nuisance. It must be annoying and injurious to the public generally, who live in the neighborhood, or pass the highway: for, if it thus affects only a few of many exposed to it, on account of their temperament; or, is so limited in its action as to injuriously affect only a small part of a large number who live in the neighborhood of the alleged nuisance, or pass the highway, it is not an offence.

But it is not necessary to show that all such persons are in fact annoyed or injured; if a large proportion, compared with the whole, and the others are liable to be thus annoyed and injured, the injury would then be so public as to become a nuisance. Nor is it necessary to prove it to be annoying, at all times: if the business is so carried on, that by means thereof, such smoke, vapors, smells &c., are so made and diffused, from time to time, and to such extent and so frequently, as to be plainly hurtful to the public, it will be an offence.

It is not necessary, under this Indictment, to prove that the acts charged were injurious to health, producing sickness; but if substantially and seriously hurtful, prejudicial to the public in the enjoyment of life and property, the indictment is maintained. But slight and occasional inconveniences produced by carrying on a trade do not constitute a nuisance. Many trades and occupations produce inconvenience and are to some extent annoying. And the inhabitants of a populous city must bear many inconveniences arising from the business and employment of its citizens. They enjoy the benefits, comforts and luxuries derived from thus living; and must bear some inconveniences arising from their living in close proximity.

The Defendants make it a point of defence that they are a corporation, and are not liable to Indictment: but say that their officers and agents who did the acts are the persons liable. Indictments against corporations are usually for neglect of duty and not for positive acts; but the Court instructs you that the Defendants may be liable for

acts done,—for the acts of their directors, agents and servants. If the company committed to them the business of carrying on their Works, in the manner they were carried on, and there was an offence, the Indictment is maintained.

It is also claimed that, the Defendants having been incorporated for the express purpose of making gas, and you are of opinion that the nuisance charged upon them is necessarily incident to the business authorized by their charter and not aggravated by any fault, or mismanagement in the mode of carrying it on, nor by an improper location of their Works, they will not be liable. But the Court is of opinion that their act of incorporation does not affect their liability; and they are equally liable as they would be had they done the acts charged having no charter.

It is further claimed that, if the injury occasioned to the public, by the acts of the Defendants, is necessarily incident to their business; and, on the whole, the public benefits resulting therefrom are greater than the injuries occasioned thereby, they are not liable. But proof of such facts would constitute no defence. If the acts done are injurious, resulting benefits, as supplying pure and cheap light, will not excuse them.

Nor is it a defence, as is contended, to show that the evils, resulting from the Works of the Defendants, are as small as they would be in any other location where their business could be carried on in a reasonable and remunerative and productive manner. The question to determine is, whether the business is injurious to the public, as has been before stated.

Nor does the control over this corporation, given by law to the Mayor and Aldermen of the City of Worcester, exclude the jurisdiction of this Court over the matter.

The principles of law applicable to this case are the same as in other cases of like kind. And you are to determine, applying the law given to you by the Court to the facts in the case, whether the Defendants are guilty.

His Honor then called the attention of the Jury to the evidence in detail, and committed the case to them, having occupied in the delivery of his charge about thirty minutes.

The Jury retired at 4 15 p. m. And His Honor, after awaiting their return for a brief period, ordered an adjournment, permitting the Jury to return a sealed verdict, in case of agreement. And such a verdict was returned, about fifteen minutes after the Court adjourned.

SATURDAY, NOV. 18. The Court came in at 9 a. m.

And the Jury being all present, and being asked, through their Foreman replied that they had agreed upon a verdict. And upon interrogation whether the Defendants were, or were not guilty, in manner and form as charged in the Indictment, the Jury returned that the Defendants were *Not Guilty*.

And thereupon the Court was adjourned, sine die.

## APPENDIX

## APPENDIX. [A]

*To the Mayor and Aldermen of the City of Worcester :*

Respectfully represent, your Petitioners, that the manufacture of gas in the immediate neighborhood of Lincoln Square is a great public nuisance : that it corrupts the air by the *insufferable stench* for a great distance around the place of manufacture : and that it corrupts the *water* so that it is unfit and unwholesome for domestic use—

Therefore your petitioners pray that the Gas Company be required forthwith to remove the place of manufacturing gas to some part of the city remote from dwelling houses and from places of business.

Signed by William Barker, and 173 others.

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### CITY OF WORCESTER.

IN BOARD OF ALDERMEN,

MARCH 22, 1851.

The Board of Health to whom was referred the petition of William Barker and others, representing that the manufacture of gas in the neighborhood of Lincoln Square is a public nuisance &c., &c., and praying that the place of manufacturing should be removed, have attended to the duty assigned them, and submit the following report :

Members of the Board of Health have frequently been in the part of the city where the alleged nuisance is said to exist, and have not found sufficient reasons for granting the prayer of the petitioners.

The Chairman of the Board of Health spoke specially to two of the prominent petitioners, whose places of business are in the immediate vicinity of Lincoln Square, and asked them to inform him of the state of things at any particular time which would seem to require the interference of the Board, pledging himself to call a meeting of the Board whenever such notice should be given. No notice has been given to him, and no petitioner has ever appeared before any member of the committee to demonstrate the correctness of the statements contained in the petition. Under these cir-

circumstances the Board of Health ask to be discharged from the consideration of the petition ; but inasmuch as the matter of said Gas Works may hereafter have to be attended to, the Board of Health recommend that the whole subject be referred to the next City Council. All of which is respectfully submitted.

HENRY CHAPIN, CHARLES WHITE, J. M. MILES, HENRY PRENTICE, ALBERT TOLMAN,	}	Board of Health,
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Copy of the petition (with the exception of the signers' names) and copy of the Report, thereon. Report accepted by both branches of the City Council, March, 24th, 1851, and no further action has been had thereon.

Attest, C. A. HAMILTON City Clerk.

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## APPENDIX. [B]

EXTRACTS FROM THE DEPOSITIONS OF JOSEPH CARSON, ROBLEY DUNGLISON, JOHN K. MITCHELL AND B. HOWARD RAND, OF THE CITY OF PHILADELPHIA, AND STATE OF PENNSYLVANIA.

### *Direct Interrogatory Third.*

Has the gas made from coal in the usual way, any qualities the smell of which is injurious to health? Have the goodness in answering this question, to state fully the grounds on which your judgment as to this point, is formed, and what your opportunities for deciding this question have been, whether scientific or practical, and for how long a time your attention has been directed to this subject of inquiry?

ANSWER OF JOSEPH CARSON, DOCTOR OF MEDICINE.

I am not aware that it possesses qualities the smell of which is injurious to health, from not having heard, or there having fallen under my observation no cases which bore upon this point. My answer is founded upon a want of knowledge, rather than from any positive convictions. I have had no opportunities for deciding this question. I have paid no attention to the subject.

ANSWER OF ROBLEY DUNGLISON, M. D. AND PROFESSOR IN THE  
JEFFERSON MEDICAL COLLEGE.

I never have had any reason for believing that gas made from coal in the usual way has any qualities the smell of which is injurious to health, except in the case of persons of highly impressible nervous systems, who usually soon become accustomed to it ; in this respect acting like any other unusual or unpleasant odor. I form this opinion as the result of my observation, and of my general reading. My opportunities for deciding this question have been such as medical men have in cities where Gas Works exist. I have had no unusual opportunities. My opportunities have been rather scientific than practical. I have never been called to any case

where there were any effects which I could ascribe to gas. My attention has been directed to this subject as a part of general professional inquiry. I have been a teacher of medicine for thirty years, and have given the subject attention during all that time. In 1837 I wrote and published a work on Hygiene, and necessarily considered the effects of gas upon health in reference to this work; and as Professor of Hygiene I taught upon the subject in the University of Maryland from 1833 to 1836.

ANSWER OF JOHN K. MITCHELL M. D. AND TEACHER OF CHEMISTRY.

I am familiar with the subject of the manufacture of gas for the lighting of cities. I was a teacher of Chemistry for thirteen years, and one of the first Board of Directors of the Gas Works of the City of Philadelphia, I have been familiar with the subject for twenty years at least.

The gas made from coal in the usual way, has not any qualities the smell of which is injurious to health. The gas itself might be injurious to health, if concentrated in sufficient quantities, just as anything else might be which did not contain oxygen. The grounds upon which my judgment as to this point is formed, are, that carburetted hydrogen is not a noxious or poisonous gas, and the people who are engaged in its production, are not less healthy than others, and have no peculiar diseases.— This I know from personal observation. As a chemist and physician, I have had an opportunity theoretically and practically of ascertaining these points; having been a teacher of chemistry for thirteen years, both of chemistry as applied to the arts, and of chemistry as applied to medicine, in separate courses of lectures. I have been a chemist at least twenty years. My attention has been directed to this subject of inquiry ever since I commenced the practice of medicine, about thirty years ago.

ANSWER OF B. HOWARD RAND, M. D. PROFESSOR OF CHEMISTRY IN THE PHILADELPHIA COLLEGE OF MEDICINE, AND LECTURER UPON CHEMISTRY AT THE FRANKLIN INSTITUTE.

The mere odor of ordinary coal gas is not injurious to health—that is, of gas made from coal in the usual way. The gas made from coal is prepared in air-tight vessels, passed through air-tight pipes, and only allowed to escape when burned; consequently few opportunities are afforded of judging of the effects of its odor upon human health. When breathed pure, or mixed with a moderate quantity of atmospheric air, it produces suffocation, or prostration and faintness. These effects, however, if not followed immediately by fatal results, are temporary. I have never seen or heard of, or read of a case of disease resulting from the action of coal gas upon the human system. The grounds on which this opinion is founded are, first, actual observation occurring in practice of medicine seven years; frequent visits to the Philadelphia Gas Works during that period, and the cases reported in all systematic works on Chemistry and Toxicology of the effects of coal gas when breathed pure or in a state of moderate dilution. My opportunities for deciding this question have been of a

mixed scientific and practical character. My attention has been directed to this subject of inquiry for upwards of seven years.

I do not believe that the gas ordinarily used in lighting cities when diffused in considerable quantities through the atmosphere can become injurious to the health of those who are constantly exposed to it. On the contrary, it is the general opinion of the profession, and my own opinion also, that epidemic diseases are less prevalent in the vicinity of Gas Works. The men employed at the Philadelphia Gas Works appear to be in as robust health and as little liable to attacks of disease as those employed in any equally laborious and exposing employment.

I do not believe that the odors arising from the refuse water and the other residuary products of gas manufacture, are, or may be injurious to health. When dry lime is used in the purifiers and is then exposed to the air and light, sulphuretted hydrogen, or hydro-sulphuric acid gas is disengaged. When the well containing ammoniacal liquor is allowed to remain uncovered, ammonia, and hydro-sulphate of ammonia are given off. That these gases however, although offensive to most persons, cannot be considered as causes of disease, or injurious to health when freely diluted, is shown by the fact that the men engaged in removing night soil, as a nightly occupation, do not suffer in health, although exposed to these very gases in a far more concentrated condition than they can exist from the causes already named, and mixed with organic emanations of an equally offensive nature, which would certainly aid the injurious effect of these gases did any such exist.